FILE COPY

RESULTS OF THE JULY 23 - 25, 1996 AIR EMISSION COMPLIANCE TESTS AT THE LOUISIANA PACIFIC OSB PLANT SAGOLA, MICHIGAN

interpoll

LP Louisiana-Pacific Corporation

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November 5, 1996

Director, Air Enforcement Division
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Mr. Laxmi Kesari
Multi-Media Enforcement & Strategic Planning Division
U.S. EPA
401 M. Street SW
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Washington, D.C. 20460

re: United States v. Louisiana-Pacific Corporation
No. CV93-0869(W.D. La)

subject: Sagola, MI Acceptance Testing

Dear Sir/Madam:

Upon review of the compliance test results for Louisiana-Pacific's Oriented Strand [...] facility located near Sagola, MI, it was determined that the test report was in error [...] emissions reported from the dryer regenerative thermal oxidizer (RTO) outlet we[...] from propane to a single carbon; therefore, the emission rate of 4.2 lb/hr from t[...] been revised to 14.6 lb/hr.

This revision did not effect the compliance status, as the destruction remov[...] (1-(14.6/476)) is 97%. This demonstrates compliance with the 95% limit a[...] Amendment to the Consent Decree.

[...] find the enclosed copy of the revision to the test report.

[...] comments, please feel free to contact m[...]

O.

Carbo

Opacity

DRYER R

Particulate

DRY 4

Louisiana-Pacific Corporation

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November 5, 1996

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subject: Sagola, MI Acceptance Testing

Dear Sir/Madam:

Upon review of the compliance test results for Louisiana-Pacific's Oriented Strand Board (OSB) facility located near Sagola, MI, it was determined that the test report was in error. The VOC emissions reported from the dryer regenerative thermal oxidizer (RTO) outlet were not converted from propane to a single carbon; therefore, the emission rate of 4.2 lb/hr from the dryer RTO has been revised to 14.6 lb/hr.

This revision did not effect the compliance status, as the destruction removal efficiency (DRE) (1-(14.6/476)) is 97%. This demonstrates compliance with the 95% limit as stated in the First Amendment to the Consent Decree.

Please find the enclosed copy of the revision to the test report.

If you have any questions or comments, please feel free to contact me.

Sincerely,

Keith Seelig
Environmental Manager
North Central Division

cc w/enc: Julie Domike - U.S. EPA, Air Toxics, New Source Review and Permit
Kim Armbruster - MI DEQ, Air Quality Division

PARAMETER		MEASURED
DRYER PRIMARY CYCLONE EXHAUST 3		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.303
	(LB/HR)	70
DRY CATCH ONLY	(GR/DSCF)	0.198
	(LB/HR)	46
Oxides of Nitrogen		
	(ppm,d)	47
	(LB/HR)	9.0
Carbon Monoxide		
	(ppm,d)	1744
	(LB/HR)	204
Total Hydrocarbons		
	(ppmC,w)	3189
	(LBC/HR)	209
Formaldehyde		
	(ppm,d)	12
	(LB/HR)	1.5
E-TUBE OUTLET		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.0417
	(LB/HR)	37
DRY CATCH ONLY	(GR/DSCF)	0.00829
	(LB/HR)	7.3
Oxides of Nitrogen		
	(ppm,d)	2.4
	(LB/HR)	1.8
Carbon Monoxide		
	(ppm,d)	1836
	(LB/HR)	826
Opacity	(%)	*
DRYER RTO OUTLET		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.00635
	(LB/HR)	5.5
DRY CATCH ONLY	(GR/DSCF)	0.00228
	(LB/HR)	2.0
Oxides of Nitrogen		
	(ppm,d)	2.8
	(LB/HR)	2.0
Carbon Monoxide		
	(ppm,d)	229
	(LB/HR)	100
Total Hydrocarbons		
	(ppmC,w)	59.9
	(LBC/HR)	14.6
Formaldehyde		
	(ppm,d)	2.5
	(LB/HR)	1.2

* *Visible emission determinations were unable to be performed due to inclement weather conditions.*

Table 9. Summary of the Results of the July 23 - 25, 1996 **Total Hydrocarbons** Emission Compliance Tests at the Louisiana Pacific Plant in Sagola, Michigan.

Date	Time (HRS)	Concentration (ppmC,w)	Emission Rate (LBC/HR)
Primary Cyclone Exhaust 1			
7-23-96	1435-1535	1937	129
7-23-96	1645-1745	1796	120
7-23-96	1925-2025	1677	112
Avg		1803	121
Primary Cyclone Exhaust 2			
7-23-96	1435-1535	2165	153
7-23-96	1645-1745	2125	153
7-23-96	1925-2025	1840	133
Avg		2043	146
Primary Cyclone Exhaust 3			
7-23-96	1435-1535	3498	237
7-23-96	1645-1745	2595	167
7-23-96	1925-2025	3474	223
Avg		3189	209
Dryer RTO Stack*			
7-23-96	1435-1535	82.1	19.9
7-23-96	1645-1745	32.5	8.0
7-23-96	1925-2025	65.1	16.0
Avg		59.9	14.6
Press Inlet			
7-25-96	1620-1720	705	88
7-25-96	1800-1900	764	101
7-25-96	1934-2034	744	104
Avg		738	98
Press Stack*			
7-25-96	1620-1720	11.9	1.8
7-25-96	1800-1900	19.4	2.9
7-25-96	1934-2034	6.8	1.0
Avg		12.7	1.9

* TGNMOs = corrected for methane

Test No. 2
Dryer RTO Stack

Results of Total Hydrocarbons Determinations——————Method 25A

	Run 1	Run 2	Run 3
Date of run	7-23-96	7-23-96	7-23-96
Time run start/end (HRS)	1435-1535	1645-1745	1925-2025
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	22.9	23.5	23.5
Oxygen content (%V/V)	17.3	17.3	17.3
Volumetric flow rate (DSCFM)	99560	100405	100405
THC concentration			
ppmC,wet (as carbon)	82.1	32.5	65.1
THC emission rate (LB/HR)	19.9	8.0	16.0

Test No. 8
Press RTO Stack

Results of Total Hydrocarbons Determinations——————Method 25A

	Run 1	Run 2	Run 3
Date of run	7-25-96	7-25-96	7-25-96
Time run start/end (HRS)	1620-1720	1800-1900	1934-2034
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	2.9	3.3	3.4
Oxygen content (%V/V)	20.9	20.9	20.9
Volumetric flow rate (DSCFM)	77990	76250	77090
THC concentration			
ppmC,wet (as carbon)	11.9	19.4	6.8
THC emission rate (LB/HR)	1.8	2.9	1.0

Report No. 6-8024

Total HydroCarbons Calculations

Dryer RTO Stack

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
2	1	22.9	82.1	99560	19.81				0.0232137
	2	23.5	32.5	100405	7.97				0.0092614
	3	23.5	65.1	100405	15.97				0.0185514
						59.9	14.58197		

Press RTO Inlet

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
8	1	3.9	705	64300	88.14				0.1599272
	2	2.9	764.0	68979	101.41				0.1715263
	3	3	744	72300	103.62				0.1672082
						737.66667	97.72591		

Press RTO Stack

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
8	1	2.9	11.9	77990	1.79				0.0026717
	2	3.3	19.4	76250	2.86				0.0043735
	3	3.4	6.8	77090	1.01				0.0015346
						12.7	1.886125		

	LOUISIANA PACIFIC - SAGOLA					Report No. 6-8024			
	Sagola, Michigan								
	Gas Concentration Correction Calculations								
PCE#1		THC Calculations							
	Cbar				*Cma*				
	OUR CONC	ZERO	ZERO		CONC	Upscale	Upscale		
RUN #	(ppm,w)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	665.39	8.6	1	4.80	287	310	287	299	645.52
3	580.81	2.4	0	1.20	287	270	288	279	598.81
4	547.44	7.65	2.4	5.03	287	280	287	284	559.02
PCE #2									
	Cbar				*Cma*				
	OUR CONC	ZERO	ZERO		CONC	Upscale	Upscale		
RUN #	(ppm,w)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	705.39	5.5	1	3.25	287	282	283	283	721.63
3	694.91	4	1	2.50	287	282	284	283	708.46
4	586.96	4	1	2.50	287	270	282	276	613.31
PCE #3									
	Cbar				*Cma*				
	OUR CONC	ZERO	ZERO		CONC	Upscale	Upscale		
RUN #	(ppm,w)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	1124.87	1	2	1.50	287	269	287	278	1166.03
3	844.41	10	0	5.00	287	280	287	284	865.03
4	1143.93	0	0	0.00	287	284	283	284	1158.05
Dryer RTO Stack									
	Cbar				*Cma*				
	OUR CONC	ZERO	ZERO		CONC	Upscale	Upscale		
RUN #	(ppm,w)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	27.37	0	0	0.00	30	27	30	29	28.81
3	12.36	1	0	0.50	30	29	30	30	12.27
4	22.21	2	0	1.00	30	27	30	29	23.14
Press RTO Inlet									
	Cbar				*Cma*				
-	OUR CONC	ZERO	ZERO		CONC	Upscale	Upscale		
RUN #	(ppm,w)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
1	233.39	0	0	0.00	285	281	285	283	235.04
2	255.7	1	0	0.50	285	287	285	286	254.75
3	252.27	0	0	0.00	285	292	287	290	248.35
Press RTO Stack									
	Cbar				*Cma*				
	OUR CONC	ZERO	ZERO		CONC	Upscale	Upscale		
RUN #	(ppm,w)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
1	6.30	0	0.4	0.20	30.4	28.6	30.7	30	6.30
2	8.45	0	0	0.00	30.4	28.8	29.5	29	8.81
3	5.11	1.5	0	0.75	30.4	29.2	30.0	30	4.59

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RESULTS OF THE JULY 23 - 25, 1996 AIR EMISSION COMPLIANCE TESTS AT THE LOUISIANA PACIFIC OSB PLANT SAGOLA, MICHIGAN

Submitted to:

LOUISIANA PACIFIC CORPORATION
Route 8, Box 8263
Hayward, Wisconsin 54843

Attention:

Keith Seelig

Approved by:

Kathleen Eikstadt for
Daniel J. Despen
Manager
Stationary Source Testing Department

Report Number 6-8024
August 29, 1996
SL/sll

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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.

g:\stack\wp\misc\abbrev.frm

1 INTRODUCTION

During the period of July 23 - 25, 1996 Interpoll Laboratories personnel conducted Air Emission Compliance tests at the Louisiana Pacific Corporation (LP) OSB Plant Located in Sagola, Michigan on the following sources:

Source	Parameters
Dryer Primary Cyclone Exhaust 1	PM,NO_x,CO,THC's,CH_2O
Dryer Primary Cyclone Exhaust 2	PM,NO_x,CO,THC's,CH_2O
Dryer Primary Cyclone Exhaust 3	PM,NO_x,CO,THC's,CH_2O
E-Tube Outlet	PM,NO_x(7E),VE,CO,THC's
Dryer RTO Outlet	PM,NO_x(7E),CO,THC's,CH_2O
Press RTO Inlet	PM,NO_x(7E),CO,THC's,CH_2O,Phenol
Press RTO Stack	PM,NO_x(7E),VE,CO,THC's,CH_2O,Phenol,MDI

On-site testing was performed by Mark Kaehler, Duane Van Hoever, Ed Juers, Scott Fjelsta, Jamie Bainville, Mark Petersen, Scott Bainville, Jim Lorenz, Lee Hansen, and Dan Hulleman. Coordination between testing activities and plant operation was provided by Keith Seelig of LP. The tests were not witnessed by a member of the Michigan Department of Natural Resources.

The Sagola plant operates three 12 x 60 Heil wafer dryers fired by Coen burners, a press and one GEKA thermal oil heater. Press emissions are ducted to an RTO prior to exhaust to the atmosphere.

Particulate evaluations were performed in accordance with EPA Methods 2-5, CFR Title 40, Part 60, Appendix A (revised July 1, 1995). 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 EPA Method 202.

An integrated flue gas sample was extracted 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 in-leakage are discarded. Integrated flue gas samples collected during each particulate sampling were also analyzed for carbon monoxide as per EPA Method 10 (NDIR).

The oxides of nitrogen samples at each Dryer Primary Exhaust site were collected using an all-glass Method 7 sampling train. A heated stainless steel probe was used to extract the samples from the exhaust stream. A plug of glass-wool was used in the end of the probe to remove particulate material.

The NO_x samples were collected in volume-calibrated two-liter all-glass flasks. An aliquot of 25 cc of absorbing solution was added to each flask on-site; the flask was closed; inserted into the sampling train; and evacuated. The probe was then purged and the sample collected over a 15 second interval. The flask was then closed; the flask removed from the sampling train; shook for two minutes and then secured for transport to the laboratory.

Upon arrival at the laboratory, the NO_x samples are logged in, placed in a designated area and maintained at 72 °F for 24 hours to allow completion of the conversion of NO to NO_2 and absorption in the acidified peroxide reagent. The flasks are then shook to complete absorption; attached to a mercury manometer and the static pressure and temperature recorded. The samples are then recovered and analyzed by ion chromatography.

Oxides of nitrogen, carbon monoxide, oxygen, and carbon dioxide concentrations were determined in accordance with Methods 7E, 10, and 3A (Ibid). 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 each analyzer was recorded with a computer datalogger and backed up with a strip chart recorder. The NO_x, CO, O_2 and CO_2 analyzers were calibrated with National Specialty Gases and Air Products and Chemicals standard gases. The instrument was calibrated before and after each run as per EPA Method 7E, 10, and 3A. 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 each source using a Method 5 sampling train with 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 analyzed by GC/MS for phenol, phenol-d_5, and 2-fluorophenol.

MDI concentrations were determined in accordance with the 1,2-PP Method as developed by Radian Corporation under contract to USEPA. This method employs collection of MDI with 1,2-PP in toluene reagent, with analysis by HPLC.

Testing on the Primary Cyclone Outlet Exhaust 1 was conducted from two test ports oriented at 90 degrees. These test ports are located 6.7 diameters downstream and 2.4 diameters upstream of the nearest flow disturbances. A 16-point traverse was used to collect representative particulate and formaldehyde samples. Each traverse point was sampled 4 minutes to give a total sampling time of 64 minutes per run.

Testing on the Primary Cyclone Outlet Exhaust 2 was conducted from two test ports oriented at 90 degrees. These test ports are located > 2 diameters downstream and > 0.5 diameters upstream of the nearest flow disturbances. A 12-point traverse was used to collect representative particulate and formaldehyde samples. Each traverse point was sampled 5 minutes to give a total sampling time of 60 minutes per run.

Testing on the Primary Cyclone Outlet Exhaust 3 was conducted from two test ports oriented at 90 degrees. These test ports are located > 2 diameters downstream and > 0.5 diameters upstream of the nearest flow disturbances. A 12-point traverse was used to collect representative particulate and formaldehyde samples. Each traverse point was sampled 5 minutes to give a total sampling time of 60 minutes per run.

Testing on the E-Tube Outlet was conducted from two test ports oriented at 90 degrees. These test ports are located approximately 10 diameters downstream and 1 diameter upstream of the nearest flow disturbances. A 24-point traverse was used to collect representative particulate samples. Each traverse point was sampled for 2.5 minutes to give a total sampling time of 60 minutes per run.

Testing on the Dryer RTO Outlet was conducted from two test ports oriented at 90 degrees. These test ports are located approximately 5 diameters downstream and 2 diameters upstream of the nearest flow disturbances. A 16-point traverse was used to collect representative particulate and formaldehyde samples. Each traverse point was sampled for 4 minutes to give a total sampling time of 60 minutes per run.

Testing on the Press RTO Inlet was conducted from two test ports oriented at 90 degrees. These test ports are located 2.1 stack diameters downstream and 4.5 stack diameters upstream of the nearest flow disturbances. A 24-point traverse was used to collect the particulate and formaldehyde samples. Each traverse point was sampled 2.5 minutes to give a total sampling time of 60 minutes per run. A 3-point traverse was used to collect representative phenol samples. Each traverse point was sampled for 20 minutes to give a total sampling time of 60 minutes per run.

Testing on the Press RTO Stack was conducted from two test ports oriented at 90 degrees on the stack. These test ports are located 5.5 stack diameters downstream and 4.3 stack diameters upstream of the nearest flow disturbances. A 20-point traverse was used to collect the particulate, formaldehyde, MDI samples. Each traverse point was sampled 3 minutes to give a total sampling time of 60 minutes per run. A 3-point traverse was used to collect representative phenol samples. Each traverse point was sampled for 20 minutes to give a total sampling time of 60 minutes per run.

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

2 SUMMARY AND DISCUSSION

The important results of the particulate emission compliance tests are summarized in Tables 1 - 12. The particulate results have been calculated using the dry plus method 202 condensible wet catch ("a" Tables) and again with the dry catch only ("b" Tables). An overview of all results is presented in the tables on the following pages:

PARAMETER		MEASURED
DRYER PRIMARY CYCLONE EXHAUST 1		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.324
	(LB/HR)	75
DRY CATCH ONLY	(GR/DSCF)	0.211
	(LB/HR)	49
Oxides of Nitrogen		
	(ppm,d)	37
	(LB/HR)	7.1
Carbon Monoxide		
	(ppm,d)	1798
	(LB/HR)	211
Total Hydrocarbons		
	(ppmC,w)	1803
	(LBC/HR)	121
Formaldehyde		
	(ppm,d)	13
	(LB/HR)	1.6
DRYER PRIMARY CYCLONE EXHAUST 2		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.242
	(LB/HR)	60
DRY CATCH ONLY	(GR/DSCF)	0.179
	(LB/HR)	44
Oxides of Nitrogen		
	(ppm,d)	35
	(LB/HR)	7.1
Carbon Monoxide		
	(ppm,d)	1902
	(LB/HR)	239
Total Hydrocarbons		
	(ppmC,w)	2043
	(LBC/HR)	146
Formaldehyde		
	(ppm,d)	13
	(LB/HR)	1.7

PARAMETER		MEASURED
DRYER PRIMARY CYCLONE EXHAUST 3		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.303
	(LB/HR)	70
DRY CATCH ONLY	(GR/DSCF)	0.198
	(LB/HR)	46
Oxides of Nitrogen		
	(ppm,d)	47
	(LB/HR)	9.0
Carbon Monoxide		
	(ppm,d)	1744
	(LB/HR)	204
Total Hydrocarbons		
	(ppmC,w)	3189
	(LBC/HR)	209
Formaldehyde		
	(ppm,d)	12
	(LB/HR)	1.5
E-TUBE OUTLET		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.0417
	(LB/HR)	37
DRY CATCH ONLY	(GR/DSCF)	0.00829
	(LB/HR)	7.3
Oxides of Nitrogen		
	(ppm,d)	2.4
	(LB/HR)	1.8
Carbon Monoxide		
	(ppm,d)	1836
	(LB/HR)	826
Opacity	(%)	*
DRYER RTO OUTLET		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.00635
	(LB/HR)	5.5
DRY CATCH ONLY	(GR/DSCF)	0.00228
	(LB/HR)	2.0
Oxides of Nitrogen		
	(ppm,d)	2.8
	(LB/HR)	2.0
Carbon Monoxide		
	(ppm,d)	229
	(LB/HR)	100
Total Hydrocarbons		
	(ppmC,w)	17.1
	(LBC/HR)	4.2
Formaldehyde		
	(ppm,d)	2.5
	(LB/HR)	1.2

* *Visible emission determinations were unable to be performed due to inclement weather conditions.*

PARAMETER		MEASURED
PRESS RTO INLET		
Oxides of Nitrogen		
	(ppm,d)	7.3
	(LB/HR)	3.6
Carbon Monoxide		
	(ppm,d)	4.9
	(LB/HR)	1.5
Total Hydrocarbons		
	(ppmC,w)	738
	(LBC/HR)	98
Formaldehyde		
	(ppm,d)	6.3
	(LB/HR)	2.0
Phenol		
	(ppm,d)	< 0.17
	(LB/HR)	< 0.17
PRESS RTO STACK		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.0148
	(LB/HR)	9.3
DRY CATCH ONLY	(GR/DSCF)	0.00233
	(LB/HR)	1.5
Oxides of Nitrogen		
	(ppm,d)	35.2
	(LB/HR)	19.4
Opacity	(%)	0
Carbon Monoxide		
	(ppm,d)	21.4
	(LB/HR)	7.2
Total Hydrocarbons		
	(ppmC,w)	12.7
	(LBC/HR)	1.9
Formaldehyde		
	(ppm,d)	0.16
	(LB/HR)	0.056
Phenol		
	(ppm,d)	< 0.17
	(LB/HR)	< 0.20
MDI		
	(ppm,d)	< 0.0008
	(LB/HR)	< 0.0024

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 23, 1996 Particulate Emission Compliance Test of the Dryer Primary Cyclone Exhaust 1 at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-23-96	07-23-96	07-23-96
Time runs were done	(HRS)	1130/1330	1436/1543	1645/1751
Process rate				
Volumetric flow				
actual	(ACFM)	48712	50015	50083
standard	(DSCFM)	26981	26838	27141
Gas temperature	(DEG-F)	223	224	223
Moisture content	(%V/V)	22.53	24.86	24.25
Gas composition	(%V/V,dry)			
carbon dioxide		3.00	3.40	3.70
oxygen		17.60	17.10	16.80
nitrogen		79.40	79.50	79.50
Isokinetic variation	(%)	96.8	100.4	98.8
Particulate concentration				
actual	(GR/ACF)	0.155	0.178	0.196
standard	(GR/DSCF)	0.280	0.331	0.362
Part. emission rate	(LB/HR)	64.79	76.13	84.22

Note: Dry + Method 202 Condensible Particulate Material

Table 1b Summary of the Results of the July 23, 1996 Particulate Emission Compliance Test of the Dryer Primary Cyclone Exhaust 1 at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-23-96	07-23-96	07-23-96
Time runs were done	(HRS)	1130/1330	1436/1543	1645/1751
Process rate				
Volumetric flow				
actual	(ACFM)	48712	50015	50083
standard	(DSCFM)	26981	26838	27141
Gas temperature	(DEG-F)	223	224	223
Moisture content	(%V/V)	22.53	24.86	24.25
Gas composition	(%V/V,dry)			
carbon dioxide		3.00	3.40	3.70
oxygen		17.60	17.10	16.80
nitrogen		79.40	79.50	79.50
Isokinetic variation	(%)	96.8	100.4	98.8
Particulate concentration				
actual	(GR/ACF)	.0967	0.111	0.137
standard	(GR/DSCF)	0.175	0.206	0.253
Part. emission rate	(LB/HR)	40.41	47.39	58.92

Note: Dry Catch Only

Table 2a Summary of the Results of the July 23, 1996 Particulate Emission Compliance Test of the Dryer Primary Cyclone Exhaust 2 at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-23-96	07-23-96	07-23-96
Time runs were done	(HRS)	1134/1330	1435/1542	1645/1750
Process rate				
Volumetric flow				
actual	(ACFM)	50773	51371	52976
standard	(DSCFM)	27990	28278	29969
Gas temperature	(DEG-F)	205	205	211
Moisture content	(%V/V)	25.03	25.14	22.40
Gas composition	(%V/V,dry)			
carbon dioxide		3.20	3.80	3.20
oxygen		17.20	16.90	17.20
nitrogen		79.60	79.30	79.60
Isokinetic variation	(%)	99.9	100.2	98.7
Particulate concentration				
actual	(GR/ACF)	0.137	0.125	0.141
standard	(GR/DSCF)	0.248	0.228	0.250
Part. emission rate	(LB/HR)	59.45	55.19	64.13

Note: Dry + Method 202 Condensible Particulate Material

Table 2b Summary of the Results of the July 23, 1996 Particulate Emission Compliance Test of the Dryer Primary Cyclone Exhaust 2 at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-23-96	07-23-96	07-23-96
Time runs were done	(HRS)	1134/1330	1435/1542	1645/1750
Process rate				
Volumetric flow				
actual	(ACFM)	50773	51371	52976
standard	(DSCFM)	27990	28278	29969
Gas temperature	(DEG-F)	205	205	211
Moisture content	(%V/V)	25.03	25.14	22.40
Gas composition	(%V/V,dry)			
carbon dioxide		3.20	3.80	3.20
oxygen		17.20	16.90	17.20
nitrogen		79.60	79.30	79.60
Isokinetic variation	(%)	99.9	100.2	98.7
Particulate concentration				
actual	(GR/ACF)	.0986	.0930	0.107
standard	(GR/DSCF)	0.179	0.169	0.190
Part. emission rate	(LB/HR)	42.94	40.97	48.73

Note: Dry Catch Only

Table 3a Summary of the Results of the July 23, 1996 Particulate Emission Compliance Test of the Dryer Primary Cyclone Exhaust 3 at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-23-96	07-23-96	07-23-96
Time runs were done	(HRS)	1133/1328	1435/1529	1645/1736
Process rate				
Volumetric flow				
actual	(ACFM)	47773	49892	47420
standard	(DSCFM)	25358	27973	27234
Gas temperature	(DEG-F)	214	214	213
Moisture content	(%V/V)	26.69	22.66	20.79
Gas composition	(%V/V,dry)			
carbon dioxide		3.10	3.70	3.10
oxygen		17.50	16.80	17.40
nitrogen		79.40	79.50	79.50
Isokinetic variation	(%)	101.1	95.5	96.6
Particulate concentration				
actual	(GR/ACF)	0.140	0.186	0.179
standard	(GR/DSCF)	0.265	0.331	0.312
Part. emission rate	(LB/HR)	57.51	79.46	72.83

Note: Dry + Method 202 Condensible Particulate Material

Table 3b Summary of the Results of the July 23, 1996 Particulate Emission Compliance Test of the Dryer Primary Cyclone Exhaust 3 at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-23-96	07-23-96	07-23-96
Time runs were done	(HRS)	1133/1328	1435/1529	1645/1736
Process rate				
Volumetric flow				
actual	(ACFM)	47773	49892	47420
standard	(DSCFM)	25358	27973	27234
Gas temperature	(DEG-F)	214	214	213
Moisture content	(%V/V)	26.69	22.66	20.79
Gas composition	(%V/V,dry)			
carbon dioxide		3.10	3.70	3.10
oxygen		17.50	16.80	17.40
nitrogen		79.40	79.50	79.50
Isokinetic variation	(%)	101.1	95.5	96.6
Particulate concentration				
actual	(GR/ACF)	.0953	0.117	0.118
standard	(GR/DSCF)	0.180	0.209	0.206
Part. emission rate	(LB/HR)	39.05	50.20	48.18

Note: Dry Catch Only

Table 4a Summary of the Results of the July 23, 1996 Particulate Emission Compliance Test of the E-Tube Outlet at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-23-96	07-23-96	07-23-96
Time runs were done	(HRS)	1133/1326	1435/1539	1645/1748
Process rate				
Volumetric flow				
actual	(ACFM)	165860	166648	167899
standard	(DSCFM)	103433	103228	103158
Gas temperature	(DEG-F)	157	162	161
Moisture content	(%V/V)	22.68	22.60	23.41
Gas composition	(%V/V,dry)			
carbon dioxide		2.80	2.90	2.90
oxygen		17.80	17.70	17.60
nitrogen		79.40	79.40	79.50
Isokinetic variation	(%)	97.9	101.5	102.6
Particulate concentration				
actual	(GR/ACF)	.0260	.0236	.0279
standard	(GR/DSCF)	.0416	.0382	.0454
Part. emission rate	(LB/HR)	36.91	33.79	40.15

Note: Dry + Method 202 Condensible Particulate Material

Table 4b Summary of the Results of the July 23, 1996 Particulate Emission Compliance Test of the E-Tube Outlet at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-23-96	07-23-96	07-23-96
Time runs were done	(HRS)	1133/1326	1435/1539	1645/1748
Process rate				
Volumetric flow				
actual	(ACFM)	165860	166648	167899
standard	(DSCFM)	103433	103228	103158
Gas temperature	(DEG-F)	157	162	161
Moisture content	(%V/V)	22.68	22.60	23.41
Gas composition	(%V/V,dry)			
carbon dioxide		2.80	2.90	2.90
oxygen		17.80	17.70	17.60
nitrogen		79.40	79.40	79.50
Isokinetic variation	(%)	97.9	101.5	102.6
Particulate concentration				
actual	(GR/ACF)	.006906	.003974	.004517
standard	(GR/DSCF)	.0111	.006418	.007355
Part. emission rate	(LB/HR)	9.82	5.68	6.50

Note: Dry Catch Only

Table 5a Summary of the Results of the July 23, 1996 Particulate Emission Compliance Test of the Dryer RTO Outlet at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-23-96	07-23-96	07-23-96
Time runs were done	(HRS)	1132/1331	1435/1540	1645/1751
Process rate				
Volumetric flow				
actual	(ACFM)	192090	186922	189616
standard	(DSCFM)	103148	99560	100405
Gas temperature	(DEG-F)	261	263	262
Moisture content	(%V/V)	22.55	22.94	23.53
Gas composition	(%V/V,dry)			
carbon dioxide		3.00	3.00	3.00
oxygen		17.30	17.30	17.30
nitrogen		79.70	79.70	79.70
Isokinetic variation	(%)	97.9	94.2	100.3
Particulate concentration				
actual	(GR/ACF)	.003123	.004124	.002911
standard	(GR/DSCF)	.005819	.007745	.005499
Part. emission rate	(LB/HR)	5.14	6.61	4.73

Note: Dry + Method 202 Condensible Particulate Material

Table 5b Summary of the Results of the July 23, 1996 Particulate Emission Compliance Test of the Dryer RTO Outlet at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-23-96	07-23-96	07-23-96
Time runs were done	(HRS)	1132/1331	1435/1540	1645/1751
Process rate				
Volumetric flow				
actual	(ACFM)	192090	186922	189616
standard	(DSCFM)	103148	99560	100405
Gas temperature	(DEG-F)	261	263	262
Moisture content	(%V/V)	22.55	22.94	23.53
Gas composition	(%V/V,dry)			
carbon dioxide		3.00	3.00	3.00
oxygen		17.30	17.30	17.30
nitrogen		79.70	79.70	79.70
Isokinetic variation	(%)	97.9	94.2	100.3
Particulate concentration				
actual	(GR/ACF)	.001214	.001679	.000747
standard	(GR/DSCF)	.002261	.003154	.001412
Part. emission rate	(LB/HR)	2.00	2.69	1.22

Note: Dry Catch Only

Table 6a Summary of the Results of the July 24, 1996 Particulate Emission Compliance Test of the Press RTO Stack at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-24-96	07-24-96	07-24-96
Time runs were done	(HRS)	1835/1936	2005/2108	2137/2237
Process rate				
Volumetric flow				
actual	(ACFM)	109804	110107	111185
standard	(DSCFM)	73214	73818	74439
Gas temperature	(DEG-F)	259	257	255
Moisture content	(%V/V)	3.92	3.67	4.07
Gas composition	(%V/V,dry)			
carbon dioxide		0.03	0.03	0.03
oxygen		20.90	20.90	20.90
nitrogen		79.07	79.07	79.07
Isokinetic variation	(%)	96.6	100.0	100.5
Particulate concentration				
actual	(GR/ACF)	.008852	.0182	.002554
standard	(GR/DSCF)	.0133	.0272	.003816
Part. emission rate	(LB/HR)	8.33	17.23	2.43

Note: Dry + Method 202 Condensible Particulate Material

Table 6b Summary of the Results of the July 24, 1996 Particulate Emission Compliance Test of the Press RTO Stack at the Louisiana Pacific Plant in Sagola, Michigan.

ITEM		Run 1	Run 2	Run 3
Date of test		07-24-96	07-24-96	07-24-96
Time runs were done	(HRS)	1835/1936	2005/2108	2137/2237
Process rate				
Volumetric flow				
actual	(ACFM)	109804	110107	111185
standard	(DSCFM)	73214	73818	74439
Gas temperature	(DEG-F)	259	257	255
Moisture content	(%V/V)	3.92	3.67	4.07
Gas composition	(%V/V,dry)			
carbon dioxide		0.03	0.03	0.03
oxygen		20.90	20.90	20.90
nitrogen		79.07	79.07	79.07
Isokinetic variation	(%)	96.6	100.0	100.5
Particulate concentration				
actual	(GR/ACF)	.002736	.000857	.001076
standard	(GR/DSCF)	.004105	.001278	.001608
Part. emission rate	(LB/HR)	2.58	0.809	1.03

Note: Dry Catch Only

Table 7. Summary of the Results of the July 23 - 25, 1996 **Oxides of Nitrogen** Emission Compliance Tests at the Louisiana Pacific Plant in Sagola, Michigan.

Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
Primary Cyclone Exhaust 1			
7-23-96	1130-1330	40	7.8
7-23-96	1436-1543	36	6.9
7-23-96	1645-1751	34	6.7
Avg		37	7.1
Primary Cyclone Exhaust 2			
7-23-96	1134-1330	36	7.1
7-23-96	1435-1542	34	6.9
7-23-96	1645-1750	35	7.4
Avg		35	7.1
Primary Cyclone Exhaust 3			
7-23-96	1133-1328	65	11.7
7-23-96	1435-1529	45	9.0
7-23-96	1645-1736	32	6.2
Avg		47	9.0
E-Tube Outlet			
7-23-96	1435-1535	3.2	2.4
7-23-96	1645-1745	2.4	1.8
7-23-96	1925-2025	1.7	1.3
Avg		2.4	1.8
Dryer RTO Stack			
7-23-96	1435-1535	2.5	1.8
7-23-96	1645-1745	2.8	2.0
7-23-96	1925-2025	3.2	2.3
Avg		2.8	2.0
Press Inlet			
7-25-96	1620-1720	8.2	3.8
7-25-96	1800-1900	7.6	3.8
7-25-96	1934-2034	6.2	3.2
Avg		7.3	3.6
Press Stack			
7-25-96	1620-1720	36.3	20.3
7-25-96	1800-1900	34.3	18.7
7-25-96	1934-2034	34.9	19.3
Avg		35.2	19.4

Table 8. Summary of the Results of the July 23 - 25, 1996 **Carbon Monoxide** Emission Compliance Tests at the Louisiana Pacific Plant in Sagola, Michigan.

Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
Primary Cyclone Exhaust 1			
7-23-96	1130-1330	1822	214
7-23-96	1436-1543	1794	210
7-23-96	1645-1751	1778	210
Avg		1798	211
Primary Cyclone Exhaust 2			
7-23-96	1134-1330	1590	194
7-23-96	1435-1542	1902	235
7-23-96	1645-1750	2214	289
Avg		1902	239
Primary Cyclone Exhaust 3			
7-23-96	1133-1328	1756	194
7-23-96	1435-1529	1770	216
7-23-96	1645-1736	1706	203
Avg		1744	204
E-Tube Outlet			
7-23-96	1435-1535	1817	818
7-23-96	1645-1745	1841	828
7-23-96	1925-2025	1851	833
Avg		1836	826
Dryer RTO Stack			
7-23-96	1435-1535	212	92
7-23-96	1645-1745	234	102
7-23-96	1925-2025	241	106
Avg		229	100
Press Inlet			
7-25-96	1620-1720	5.0	1.4
7-25-96	1800-1900	5.3	1.6
7-25-96	1934-2034	4.4	1.6
Avg		4.9	1.5
Press Stack			
7-25-96	1620-1720	19.2	6.5
7-25-96	1800-1900	24.2	8.0
7-25-96	1934-2034	20.8	7.0
Avg		21.4	7.2

Table 9. Summary of the Results of the July 23 - 25, 1996 **Total Hydrocarbons** Emission Compliance Tests at the Louisiana Pacific Plant in Sagola, Michigan.

Date	Time (HRS)	Concentration (ppmC,w)	Emission Rate (LBC/HR)
Primary Cyclone Exhaust 1			
7-23-96	1435-1535	1937	129
7-23-96	1645-1745	1796	120
7-23-96	1925-2025	1677	112
Avg		1803	121
Primary Cyclone Exhaust 2			
7-23-96	1435-1535	2165	153
7-23-96	1645-1745	2125	153
7-23-96	1925-2025	1840	133
Avg		2043	146
Primary Cyclone Exhaust 3			
7-23-96	1435-1535	3498	237
7-23-96	1645-1745	2595	167
7-23-96	1925-2025	3474	223
Avg		3189	209
Dryer RTO Stack			
7-23-96	1435-1535	24.5	5.9
7-23-96	1645-1745	8.0	2.0
7-23-96	1925-2025	18.8	4.6
Avg		17.1 [59.9]	4.2 [14.6]
Press Inlet			
7-25-96	1620-1720	705	88
7-25-96	1800-1900	764	101
7-25-96	1934-2034	744	104
Avg		738	98
Press Stack			
7-25-96	1620-1720	11.9	1.8
7-25-96	1800-1900	19.4	2.9
7-25-96	1934-2034	6.8	1.0
Avg		12.7	1.9

Table 10. Summary of the Results of the July 24 & 25, 1996 **Formaldehyde** Emission Compliance Tests at the Louisiana Pacific Plant in Sagola, Michigan.

Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
Primary Cyclone Exhaust 1			
7-24-96	1710-1828	12	1.5
7-24-96	1915-2020	13	1.7
7-24-96	2040-2144	15	1.7
Avg		13	1.6
Primary Cyclone Exhaust 2			
7-24-96	1710-1830	12	1.6
7-24-96	1915-2017	14	1.8
7-24-96	2040-2142	13	1.8
Avg		13	1.7
Primary Cyclone Exhaust 3			
7-24-96	1710-1828	14	1.8
7-24-96	1915-2015	14	1.7
7-24-96	2040-2140	8	1.0
Avg		12	1.5
Dryer RTO Outlet			
7-24-96	1710-1830	1.8	0.9
7-24-96	1915-2025	2.7	1.3
7-24-96	2040-2142	2.9	1.3
Avg		2.5	1.2
Press Inlet			
7-25-96	0937-1039	6.0	2.0
7-25-96	1235-1335	6.1	1.9
7-25-96	1410-1512	6.8	2.2
Avg		6.3	2.0
Press Stack			
7-25-96	0937-1039	0.16	0.057
7-25-96	1235-1335	0.16	0.055
7-25-96	1410-1512	0.15	0.055
Avg		0.16	0.056

Table 11. Summary of the Results of the July 25, 1996 **Phenol** Emission Compliance Tests at the Louisiana Pacific Plant in Sagola, Michigan.

Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
Press RTO Inlet			
7-25-96	1620-1720	< 0.18	< 0.17
7-25-96	1800-1900	< 0.17	< 0.17
7-25-96	1935-2035	< 0.17	< 0.18
Avg		< 0.17	< 0.17
Press RTO Stack			
7-25-95	1620-1720	< 0.17	< 0.20
7-25-95	1800-1900	< 0.17	< 0.19
7-25-95	1935-2035	< 0.17	< 0.20
Avg		< 0.17	< 0.20

Table 12. Summary of the Results of the July 25, 1996 **MDI** Emission Compliance Tests at the Louisiana Pacific Plant in Sagola, Michigan.

Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
Press RTO Stack			
7-25-96	1620-1720	< 0.0008	< 0.0024
7-25-96	1800-1900	< 0.0008	< 0.0024
7-25-96	1935-2035	< 0.0008	< 0.0024
Avg		< 0.0008	< 0.0024

3 RESULTS

The results of all field and laboratory evaluations are presented in this section. Orsat (gas composition) and moisture is presented first followed by the computer printout of the particulate, oxides of nitrogen, opacity, carbon monoxide, total hydrocarbons, formaldehyde, phenol, and MDI results. 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
Dryer Primary Cyclone Exhaust 1 PM

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Dry basis (orsat)			
carbon dioxide............	3.00	3.40	3.70
oxygen...................	17.60	17.10	16.80
nitrogen.................	79.40	79.50	79.50
Wet basis (orsat)			
carbon dioxide............	2.32	2.55	2.80
oxygen...................	13.63	12.85	12.73
nitrogen.................	61.51	59.74	60.22
water vapor..............	22.53	24.86	24.25
Dry molecular weight........	29.18	29.23	29.26
Wet molecular weight........	26.66	26.44	26.53
Specific gravity...........	0.921	0.913	0.916
Water mass flow......(LB/HR)	22015	24900	24372
FO	1.100	1.118	1.108

Test No. 1
Dryer Primary Cyclone Exhaust 2 PM

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Dry basis (orsat)			
carbon dioxide............	3.20	3.80	3.20
oxygen....................	17.20	16.90	17.20
nitrogen..................	79.60	79.30	79.60
Wet basis (orsat)			
carbon dioxide............	2.40	2.84	2.48
oxygen....................	12.89	12.65	13.35
nitrogen..................	59.67	59.37	61.77
water vapor...............	25.03	25.14	22.40
Dry molecular weight........	29.20	29.28	29.20
Wet molecular weight........	26.40	26.45	26.69
Specific gravity............	0.912	0.914	0.922
Water mass flow......(LB/HR)	26218	26632	24264
FO	1.156	1.053	1.156

Test No. 1
Dryer Primary Cylcone Exhaust 3

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Dry basis (orsat)			
carbon dioxide............	3.10	3.70	3.10
oxygen....................	17.50	16.80	17.40
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	79.40	79.50	79.50
Wet basis (orsat)			
carbon dioxide............	2.27	2.86	2.46
oxygen....................	12.83	12.99	13.78
carbon monoxide...........	0.00	0.00	0.00
nitrogen..................	58.21	61.48	62.97
water vapor...............	26.69	22.66	20.79
Dry molecular weight........	29.20	29.26	29.19
Wet molecular weight........	26.21	26.71	26.87
Specific gravity............	0.905	0.923	0.928
Water mass flow......(LB/HR)	25899	22991	20046
FO	1.097	1.108	1.129

Test No. 1 PM
E Tube Outlet

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Dry basis (orsat)			
carbon dioxide............	2.80	2.90	2.90
oxygen....................	17.80	17.70	17.60
nitrogen..................	79.40	79.40	79.50
Wet basis (orsat)			
carbon dioxide............	2.17	2.24	2.22
oxygen....................	13.76	13.70	13.48
nitrogen..................	61.39	61.45	60.89
water vapor...............	22.68	22.60	23.41
Dry molecular weight........	29.16	29.17	29.17
Wet molecular weight........	26.63	26.65	26.55
Specific gravity............	0.920	0.920	0.917
Water mass flow......(LB/HR)	85089	84570	88459
FO	1.107	1.103	1.138

Test No. 1
Dryer RTO Stack PM

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Dry basis (orsat)			
carbon dioxide............	3.00	3.00	3.00
oxygen....................	17.30	17.30	17.30
nitrogen..................	79.70	79.70	79.70
Wet basis (orsat)			
carbon dioxide............	2.32	2.31	2.29
oxygen....................	13.40	13.33	13.23
nitrogen..................	61.73	61.42	60.95
water vapor...............	22.55	22.94	23.53
Dry molecular weight........	29.17	29.17	29.17
Wet molecular weight........	26.65	26.61	26.54
Specific gravity............	0.921	0.919	0.917
Water mass flow......(LB/HR)	84217	83132	86652
FO	1.200	1.200	1.200

Test No. 7
Press RTO Stack PM

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

	Run 1	Run 2	Run 3
Date of run	07-24-96	07-24-96	07-24-96
Dry basis (orsat)			
carbon dioxide............	0.03	0.03	0.03
oxygen...................	20.90	20.90	20.90
nitrogen.................	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide............	0.03	0.03	0.03
oxygen...................	20.08	20.13	20.05
nitrogen.................	75.97	76.17	75.85
water vapor..............	3.92	3.67	4.07
Dry molecular weight........	28.84	28.84	28.84
Wet molecular weight........	28.42	28.44	28.40
Specific gravity...........	0.982	0.982	0.981
Water mass flow......(LB/HR)	8377	7885	8853

Test No. 4
Dryer Primary Cyclone Exhaust 1 Form

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

	Run 1	Run 2	Run 3
Date of run	07-24-96	07-24-96	07-24-96
Dry basis (orsat)			
carbon dioxide............	3.20	3.20	3.30
oxygen..................	17.20	17.20	17.00
nitrogen................	79.60	79.60	79.70
Wet basis (orsat)			
carbon dioxide............	2.52	2.48	2.55
oxygen..................	13.55	13.36	13.13
nitrogen................	62.69	61.81	61.54
water vapor..............	21.24	22.34	22.78
Dry molecular weight........	29.20	29.20	29.21
Wet molecular weight........	26.82	26.70	26.65
Specific gravity............	0.926	0.922	0.921
Water mass flow......(LB/HR)	0.00	0.00	0.00
FO	1.156	1.156	1.182

Test No. 4
Dryer Primary Cyclone Exhaust 2 FORM

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

	Run 1	Run 2	Run 3
Date of run	07-24-96	07-24-96	07-24-96
Dry basis (orsat)			
carbon dioxide............	3.40	3.80	3.10
oxygen....................	17.10	16.80	16.80
nitrogen..................	79.50	79.40	80.10
Wet basis (orsat)			
carbon dioxide............	2.73	2.87	2.44
oxygen....................	13.73	12.68	13.24
nitrogen..................	63.85	59.92	63.15
water vapor..............	19.69	24.53	21.17
Dry molecular weight........	29.23	29.28	29.17
Wet molecular weight........	27.02	26.51	26.80
Specific gravity............	0.933	0.916	0.926
Water mass flow......(LB/HR)	0.00	0.00	0.00
FO	1.118	1.079	1.323

Test No. 4
Dryer Primary Cyclone Exhaust 3 FORM

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

	Run 1	Run 2	Run 3
Date of run	07-24-96	07-24-96	07-24-96
Dry basis (orsat)			
carbon dioxide............	3.50	3.20	3.80
oxygen....................	17.00	17.00	16.50
nitrogen..................	79.50	79.80	79.70
Wet basis (orsat)			
carbon dioxide............	2.72	2.42	2.88
oxygen....................	13.20	12.87	12.49
nitrogen..................	61.72	60.39	60.32
water vapor...............	22.36	24.32	24.32
Dry molecular weight........	29.24	29.19	29.27
Wet molecular weight........	26.73	26.47	26.53
Specific gravity............	0.923	0.914	0.916
Water mass flow......(LB/HR)	0.00	0.00	0.00
FO	1.114	1.219	1.158

Test No. 4
Dryer RTO Stack

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

	Run 1	Run 2	Run 3
Date of run	07-24-96	07-24-96	07-24-96
Dry basis (orsat)			
carbon dioxide............	2.50	3.20	2.90
oxygen....................	18.20	17.30	17.60
nitrogen..................	79.30	79.50	79.50
Wet basis (orsat)			
carbon dioxide............	2.01	2.47	2.20
oxygen....................	14.65	13.33	13.38
nitrogen..................	63.83	61.27	60.43
water vapor...............	19.51	22.94	23.99
Dry molecular weight........	29.13	29.20	29.17
Wet molecular weight........	26.96	26.63	26.49
Specific gravity............	0.931	0.920	0.915
Water mass flow......(LB/HR)	0.00	0.00	0.00
FO	1.080	1.125	1.138

Test No. 9 FORM
Press Inlet

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

	Run 1	Run 2	Run 3
Date of run	07-25-96	07-25-96	07-25-96
Dry basis (orsat)			
carbon dioxide............	0.03	0.03	0.03
oxygen....................	20.90	20.90	20.90
nitrogen..................	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide............	0.03	0.03	0.03
oxygen....................	20.28	20.42	20.31
nitrogen..................	76.74	77.27	76.86
water vapor...............	2.95	2.27	2.80
Dry molecular weight........	28.84	28.84	28.84
Wet molecular weight........	28.52	28.59	28.54
Specific gravity............	0.985	0.988	0.986
Water mass flow......(LB/HR)	0.00	0.00	0.00

Test No. 9 Form.
Press Stack

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

	Run 1	Run 2	Run 3
Date of run	07-25-96	07-25-96	07-25-96
Dry basis (orsat)			
carbon dioxide............	0.03	0.03	0.03
oxygen..................	20.90	20.90	20.90
nitrogen................	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide............	0.03	0.03	0.03
oxygen..................	20.31	20.41	20.29
nitrogen................	76.82	77.22	76.76
water vapor..............	2.84	2.34	2.92
Dry molecular weight........	28.84	28.84	28.84
Wet molecular weight........	28.53	28.59	28.52
Specific gravity............	0.986	0.987	0.985
Water mass flow......(LB/HR)	0.00	0.00	0.00

3.2 Results of Particulate Determinations

Test No. 1
Dryer Primary Cyclone Exhaust 1

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Time run start/end.....(HRS)	1130/1330	1436/1543	1645/1751
Static pressure......(IN.WC)	-9.00	-9.00	-9.00
Cross sectional area (SQ.FT)	8.73	8.73	8.73
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	207.0	233.0	242.0
desiccant..........(GRAMS)	23.0	37.0	18.0
total..............(GRAMS)	230.0	270.0	260.0
Total particulate material.. ....collected(grams)	0.6769	0.8255	0.8985
Gas meter coefficient.......	1.0024	1.0024	1.0024
Barometric pressure..(IN.HG)	28.33	28.33	28.33
Avg. orif.pres.drop..(IN.WC)	1.21	1.30	1.28
Avg. gas meter temp..(DEF-F)	85.5	89.8	88.5
Volume through gas meter....			
at meter conditions...(CF)	40.47	42.10	41.79
standard conditions.(DSCF)	37.28	38.49	38.29
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter.........(IN)	.189	.189	.189
Avg.stack gas temp ..(DEG-F)	223	224	223
Volumetric flow rate........			
actual..............(ACFM)	48712	50015	50083
dry standard.......(DSCFM)	26981	26838	27141
Isokinetic variation.....(%)	96.8	100.4	98.8
Particulate concentration...			
actual............(GR/ACF)	0.15512	0.17752	0.19612
dry standard.....(GR/DSCF)	0.28016	0.33095	0.36204
Particle mass rate...(LB/HR)	64.791	76.131	84.224

Test No. 1
Dryer Primary Cyclone Exhaust 2

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Time run start/end.....(HRS)	1134/1330	1435/1542	1645/1750
Static pressure......(IN.WC)	-8.60	-8.60	-8.60
Cross sectional area (SQ.FT)	9.39	9.39	9.39
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	211.0	211.0	189.0
desiccant..........(GRAMS)	10.0	14.0	13.0
total..............(GRAMS)	221.0	225.0	202.0
Total particulate material.. ....collected(grams)	0.5011	0.4663	0.5339
Gas meter coefficient.......	1.0056	1.0056	1.0056
Barometric pressure..(IN.HG)	28.33	28.33	28.33
Avg. orif.pres.drop..(IN.WC)	0.94	0.99	1.04
Avg. gas meter temp..(DEF-F)	94.7	97.7	86.7
Volume through gas meter....			
at meter conditions...(CF)	34.36	34.97	35.80
standard conditions.(DSCF)	31.20	31.60	33.00
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.179	.179	.179
Avg.stack gas temp ..(DEG-F)	205	205	211
Volumetric flow rate........			
actual..............(ACFM)	50773	51371	52976
dry standard.......(DSCFM)	27990	28278	29969
Isokinetic variation.....(%)	99.9	100.2	98.7
Particulate concentration...			
actual............(GR/ACF)	0.13654	0.12530	0.14118
dry standard.....(GR/DSCF)	0.24778	0.22771	0.24966
Particle mass rate...(LB/HR)	59.447	55.194	64.131

Test No. 1
Dryer Primary Cylcone Exhaust 3

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Time run start/end.....(HRS)	1133/1328	1435/1529	1645/1736
Static pressure......(IN.WC)	-9.00	-9.00	-9.00
Cross sectional area (SQ.FT)	8.73	8.73	8.73
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	238.0	152.0	135.0
desiccant..........(GRAMS)	27.0	24.0	12.0
total..............(GRAMS)	265.0	176.0	147.0
Total particulate material.. ....collected(grams)	0.5884	0.6083	0.5341
Gas meter coefficient.......	1.0032	1.0032	1.0032
Barometric pressure..(IN.HG)	28.33	28.33	28.33
Avg. orif.pres.drop..(IN.WC)	1.12	1.22	1.16
Avg. gas meter temp..(DEF-F)	92.1	93.7	90.0
Volume through gas meter....			
at meter conditions...(CF)	37.68	31.18	28.89
standard conditions.(DSCF)	34.32	28.32	26.41
Total sampling time....(MIN)	60.00	47.50	45.00
Nozzle diameter.........(IN)	.189	.189	.189
Avg.stack gas temp ..(DEG-F)	214	214	213
Volumetric flow rate........			
actual..............(ACFM)	47773	49892	47420
dry standard.......(DSCFM)	25358	27973	27234
Isokinetic variation.....(%)	101.1	95.5	96.6
Particulate concentration...			
actual............(GR/ACF)	0.14038	0.18574	0.17912
dry standard.....(GR/DSCF)	0.26458	0.33142	0.31201
Particle mass rate...(LB/HR)	57.51	79.46	72.83

Test No. 1
E Tube Outlet

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Time run start/end.....(HRS)	1133/1326	1435/1539	1645/1748
Static pressure......(IN.WC)	-1.83	-1.83	-1.83
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)	190.0	194.0	210.0
desiccant..........(GRAMS)	11.0	13.0	9.0
total..............(GRAMS)	201.0	207.0	219.0
Total particulate material.. ....collected(grams)	0.0872	0.0827	0.0994
Gas meter coefficient.......	0.9973	0.9973	0.9973
Barometric pressure..(IN.HG)	28.35	28.35	28.35
Avg. orif.pres.drop..(IN.WC)	1.09	1.17	1.19
Avg. gas meter temp..(DEF-F)	82.8	90.0	89.2
Volume through gas meter....			
at meter conditions...(CF)	35.07	36.74	37.08
standard conditions.(DSCF)	32.31	33.42	33.78
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.188	.188	.188
Avg.stack gas temp ..(DEG-F)	157	162	161
Volumetric flow rate........			
actual..............(ACFM)	165860	166648	167899
dry standard.......(DSCFM)	103433	103228	103158
Isokinetic variation.....(%)	97.9	101.5	102.6
Particulate concentration...			
actual............(GR/ACF)	0.02596	0.02364	0.02789
dry standard.....(GR/DSCF)	0.04164	0.03819	0.04541
Particle mass rate...(LB/HR)	36.914	33.787	40.150

Test No. 1
Dryer RTO Stack

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Time run start/end.....(HRS)	1132/1331	1435/1540	1645/1751
Static pressure......(IN.WC)	-0.54	-0.54	-0.54
Cross sectional area (SQ.FT)	50.79	50.79	50.79
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	242.0	239.0	262.0
desiccant..........(GRAMS)	15.0	5.0	9.0
total..............(GRAMS)	257.0	244.0	271.0
Total particulate material.. ....collected(grams)	0.0157	0.0194	0.0148
Gas meter coefficient.......	0.9964	0.9964	0.9964
Barometric pressure..(IN.HG)	28.35	28.35	28.35
Avg. orif.pres.drop..(IN.WC)	1.48	1.27	1.47
Avg. gas meter temp..(DEF-F)	84.3	88.6	90.9
Volume through gas meter....			
at meter conditions...(CF)	45.30	42.41	45.74
standard conditions.(DSCF)	41.63	38.65	41.53
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter.........(IN)	.245	.245	.245
Avg.stack gas temp ..(DEG-F)	261	263	262
Volumetric flow rate........			
actual..............(ACFM)	192090	186922	189616
dry standard.......(DSCFM)	103148	99560	100405
Isokinetic variation.....(%)	97.9	94.2	100.3
Particulate concentration...			
actual............(GR/ACF)	0.00312	0.00412	0.00291
dry standard.....(GR/DSCF)	0.00582	0.00775	0.00550
Particle mass rate...(LB/HR)	5.145	6.610	4.732

Test No. 7
Press RTO Stack

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

	Run 1	Run 2	Run 3
Date of run	07-24-96	07-24-96	07-24-96
Time run start/end.....(HRS)	1835/1936	2005/2108	2137/2237
Static pressure......(IN.WC)	-0.27	-0.27	-0.27
Cross sectional area (SQ.FT)	31.50	31.50	31.50
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	25.0	27.0	31.0
desiccant..........(GRAMS)	15.0	12.0	13.0
total..............(GRAMS)	40.0	39.0	44.0
Total particulate material.. ....collected(grams)	0.0398	0.0852	0.0121
Gas meter coefficient.......	0.9973	0.9973	0.9973
Barometric pressure..(IN.HG)	28.31	28.31	28.31
Avg. orif.pres.drop..(IN.WC)	2.23	2.46	2.53
Avg. gas meter temp..(DEF-F)	88.3	95.1	96.0
Volume through gas meter....			
at meter conditions...(CF)	50.61	53.48	54.27
standard conditions.(DSCF)	46.24	48.29	48.93
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.251	.251	.251
Avg.stack gas temp ..(DEG-F)	259	257	255
Volumetric flow rate........			
actual.............(ACFM)	109804	110107	111185
dry standard.......(DSCFM)	73214	73818	74439
Isokinetic variation.....(%)	96.6	100.0	100.5
Particulate concentration...			
actual...........(GR/ACF)	0.00885	0.01824	0.00255
dry standard.....(GR/DSCF)	0.01328	0.02722	0.00382
Particle mass rate...(LB/HR)	8.335	17.225	2.435

3.3 Results of Oxides of Nitrogen Determinations

Test No. 1
Dryer Primary Cyclone Exhaust 1

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

	Run 1A	Run 1B	Run 1C	Run 1D
Date of run................	07-23-96	07-23-96	07-23-96	07-23-96
Time of run............(HRS)	1130	1145	1215	1325
Flask number................	1	2	3	4
Volume of flask.........(ML)	2086	2063	2055	2116
Data: time of sampling				
flask temperature..(DEG-F)	102.00	106.00	108.00	110.00
bar. press.........(IN.HG)	28.33	28.33	28.33	28.33
flask vacuum.......(IN.HG)	26.38	26.38	26.38	26.35
flask abs. press...(IN.HG)	1.95	1.95	1.95	1.98
Data: Time of Flask Opening				
flask temperature..(DEG-F)	72.00	72.00	72.00	72.00
lab. bar. press....(IN.HG)	29.10	29.10	29.10	29.10
flask static press.(IN.HG)	-0.70	-0.50	-0.50	-0.90
flask abs. press...(IN.HG)	28.40	28.60	28.60	28.20
Volume gas sampled....(DSML)	1815	1809	1802	1827
Moisture content......(%V/V)	22.53	22.53	22.53	22.53
Nitrate in gas sample...(JG)	190.0	190.0	190.0	180.0
NO2 in gas sample.......(JG)	141.0	141.0	141.0	133.6
NOx Concentration				
(GR/DSCF).................	0.0339	0.0341	0.0342	0.0319
(MG/DSCM).................	78	78	78	73
(PPM-DRY).................	41	41	41	38
(PPM-WET).................	31	32	32	30
NOX Emission rate....(LB/HR)	7.85	7.88	7.91	7.39

Test No. 1
Dryer Primary Cyclone Exhaust 1

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

	Run 2A	Run 2B	Run 2C	Run 2D
Date of run................	07-23-96	07-23-96	07-23-96	07-23-96
Time of run............(HRS)	1436	1445	1515	1540
Flask number.................	5	6	19	20
Volume of flask.........(ML)	2057	2100	2069	2060
Data: time of sampling				
flask temperature..(DEG-F)	110.00	108.00	110.00	110.00
bar. press.........(IN.HG)	28.33	28.33	28.33	28.33
flask vacuum.......(IN.HG)	26.15	26.10	26.80	26.40
flask abs. press...(IN.HG)	2.18	2.23	1.53	1.93
Data: Time of Flask Opening				
flask temperature..(DEG-F)	72.00	72.00	72.00	72.00
lab. bar. press....(IN.HG)	29.10	29.10	29.10	29.10
flask static press.(IN.HG)	-0.10	-0.60	-0.90	-0.40
flask abs. press...(IN.HG)	29.00	28.50	28.20	28.70
Volume gas sampled....(DSML)	1817	1817	1814	1815
Moisture content......(%V/V)	24.86	24.86	24.86	24.86
Nitrate in gas sample...(JG)	190.0	180.0	150.0	150.0
NO2 in gas sample.......(JG)	141.0	133.6	111.3	111.3
NOx Concentration				
(GR/DSCF).................	0.0339	0.0321	0.0268	0.0268
(MG/DSCM).................	78	73	61	61
(PPM-DRY).................	41	38	32	32
(PPM-WET).................	30	29	24	24
NOX Emission rate....(LB/HR)	7.80	7.39	6.17	6.16

Test No. 1
Dryer Primary Cyclone Exhaust 1

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

	Run 3A	Run 3B	Run 3C	Run 3D
Date of run................	07-23-96	07-23-96	07-23-96	07-23-96
Time of run............(HRS)	1650	1710	1730	1745
Flask number................	21	22	23	24
Volume of flask.........(ML)	2068	2031	2056	2031
Data: time of sampling				
flask temperature..(DEG-F)	110.00	109.00	109.00	108.00
bar. press.........(IN.HG)	28.33	28.33	28.33	28.33
flask vacuum.......(IN.HG)	26.40	26.30	26.40	26.40
flask abs. press...(IN.HG)	1.93	2.03	1.93	1.93
Data: Time of Flask Opening				
flask temperature..(DEG-F)	72.00	72.00	72.00	72.00
lab. bar. press....(IN.HG)	29.10	29.10	29.10	29.10
flask static press.(IN.HG)	-1.60	0.10	-0.85	-0.05
flask abs. press...(IN.HG)	27.50	29.20	28.25	29.05
Volume gas sampled....(DSML)	1741	1816	1781	1812
Moisture content......(%V/V)	24.25	24.25	24.25	24.25
Nitrate in gas sample...(JG)	160.0	150.0	160.0	160.0
NO2 in gas sample.......(JG)	118.7	111.3	118.7	118.7
<u>NOx Concentration</u>				
(GR/DSCF).................	0.0298	0.0268	0.0291	0.0286
(MG/DSCM).................	68	61	67	66
(PPM-DRY).................	36	32	35	34
(PPM-WET).................	27	24	26	26
NOX Emission rate....(LB/HR)	6.93	6.23	6.78	6.66

Test No. 1
Dryer Primary Cyclone Exhaust 2

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

	Run 1A	Run 1B	Run 1C	Run 1D
Date of run................	07-23-96	07-23-96	07-23-96	07-23-96
Time of run............(HRS)	1234	1245	1305	1319
Flask number................	55	56	57	58
Volume of flask.........(ML)	2086	2069	2062	2085
Data: time of sampling				
flask temperature..(DEG-F)	91.00	92.00	94.00	95.00
bar. press.........(IN.HG)	28.33	28.33	28.33	28.33
flask vacuum.......(IN.HG)	26.02	25.95	26.03	25.92
flask abs. press...(IN.HG)	2.31	2.38	2.30	2.41
Data: Time of Flask Opening				
flask temperature..(DEG-F)	72.00	72.00	72.00	72.00
lab. bar. press....(IN.HG)	29.10	29.10	29.10	29.10
flask static press.(IN.HG)	-4.20	-0.20	0.10	-0.80
flask abs. press...(IN.HG)	24.90	28.90	29.20	28.30
Volume gas sampled....(DSML)	1549	1803	1823	1775
Moisture content......(%V/V)	25.03	25.03	25.03	25.03
Nitrate in gas sample...(JG)	170.0	180.0	160.0	120.0
NO2 in gas sample.......(JG)	126.1	133.6	118.7	89.0
NOx Concentration				
(GR/DSCF).................	0.0356	0.0324	0.0285	0.0219
(MG/DSCM).................	81	74	65	50
(PPM-DRY).................	43	39	34	26
(PPM-WET).................	32	29	26	20
NOX Emission rate....(LB/HR)	8.54	7.77	6.83	5.26

Test No. 1
Dryer Primary Cyclone Exhaust 2

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

	Run 2A	Run 2B	Run 2C	Run 2D
Date of run................	07-23-96	07-23-96	07-23-96	07-23-96
Time of run............(HRS)	1438	1454	1509	1530
Flask number................	59	60	43	44
Volume of flask.........(ML)	2077	2066	2088	2090
Data: time of sampling				
flask temperature..(DEG-F)	97.00	97.00	97.00	98.00
bar. press.........(IN.HG)	28.33	28.33	28.33	28.33
flask vacuum.......(IN.HG)	25.92	26.12	25.95	25.99
flask abs. press...(IN.HG)	2.41	2.21	2.38	2.34
Data: Time of Flask Opening				
flask temperature..(DEG-F)	72.00	72.00	72.00	72.00
lab. bar. press....(IN.HG)	29.10	29.10	29.10	29.10
flask static press.(IN.HG)	-0.05	-1.00	-4.20	-4.10
flask abs. press...(IN.HG)	29.05	28.10	24.90	25.00
Volume gas sampled....(DSML)	1820	1759	1548	1559
Moisture content......(%V/V)	25.14	25.14	25.14	25.14
Nitrate in gas sample...(JG)	120.0	140.0	140.0	180.0
NO2 in gas sample.......(JG)	89.0	103.9	103.9	133.6
<u>NOx Concentration</u>				
(GR/DSCF).................	0.0214	0.0258	0.0293	0.0374
(MG/DSCM).................	49	59	67	86
(PPM-DRY).................	26	31	35	45
(PPM-WET).................	19	23	26	34
NOX Emission rate....(LB/HR)	5.18	6.26	7.11	9.07

Test No. 1
Dryer Primary Cyclone Exhaust 2

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

	Run 3A	Run 3B	Run 3C	Run 3D
Date of run................	07-23-96	07-23-96	07-23-96	07-23-96
Time of run............(HRS)	1650	1704	1729	1750
Flask number................	45	46	47	48
Volume of flask.........(ML)	2086	2090	2074	2102
Data: time of sampling				
flask temperature..(DEG-F)	96.00	96.00	97.00	97.00
bar. press.........(IN.HG)	28.33	28.33	28.33	28.33
flask vacuum.......(IN.HG)	26.12	26.11	25.88	26.11
flask abs. press...(IN.HG)	2.21	2.22	2.45	2.22
Data: Time of Flask Opening				
flask temperature..(DEG-F)	72.00	72.00	72.00	72.00
lab. bar. press....(IN.HG)	29.10	29.10	29.10	29.10
flask static press.(IN.HG)	-4.30	-4.00	-0.50	-3.20
flask abs. press...(IN.HG)	24.80	25.10	28.60	25.90
Volume gas sampled....(DSML)	1550	1573	1784	1638
Moisture content......(%V/V)	22.40	22.40	22.40	22.40
Nitrate in gas sample...(JG)	130.0	140.0	160.0	150.0
NO2 in gas sample.......(JG)	96.5	103.9	118.7	111.3
NOx Concentration				
(GR/DSCF).................	0.0272	0.0289	0.0291	0.0297
(MG/DSCM).................	62	66	67	68
(PPM-DRY).................	33	35	35	36
(PPM-WET).................	25	27	27	28
NOX Emission rate....(LB/HR)	6.98	7.41	7.47	7.63

Test No. 1
Dryer Primary Cyclone Exhaust 3

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

	Run 1A	Run 1B	Run 1C	Run 1D
Date of run................	07-23-96	07-23-96	07-23-96	07-23-96
Time of run............(HRS)	1133	1250	1305	1325
Flask number.................	25	26	27	28
Volume of flask.........(ML)	2100	2035	2054	2031
Data: time of sampling				
flask temperature..(DEG-F)	102.00	102.00	103.00	103.00
bar. press.........(IN.HG)	28.33	28.33	28.33	28.33
flask vacuum.......(IN.HG)	26.06	26.03	25.59	25.82
flask abs. press...(IN.HG)	2.27	2.30	2.74	2.51
Data: Time of Flask Opening				
flask temperature..(DEG-F)	72.00	72.00	72.00	72.00
lab. bar. press....(IN.HG)	29.10	29.10	29.10	29.10
flask static press.(IN.HG)	-2.40	-2.00	-2.30	-2.20
flask abs. press...(IN.HG)	26.70	27.10	26.80	26.90
Volume gas sampled....(DSML)	1689	1661	1629	1631
Moisture content......(%V/V)	26.69	26.69	26.69	26.69
Nitrate in gas sample...(JG)	300.0	270.0	260.0	270.0
NO2 in gas sample.......(JG)	222.6	200.3	192.9	200.3
<u>NOx Concentration</u>				
(GR/DSCF).................	0.0576	0.0527	0.0518	0.0537
(MG/DSCM).................	132	121	118	123
(PPM-DRY).................	69	63	62	64
(PPM-WET).................	51	46	45	47
NOX Emission rate....(LB/HR)	12.52	11.46	11.25	11.66

Test No. 1
Dryer Primary Cyclone Exhaust 3

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

	Run 2A	Run 2B	Run 2C	Run 2D
Date of run................	07-23-96	07-23-96	07-23-96	07-23-96
Time of run............(HRS)	1435	1450	1505	1528
Flask number................	29	30	37	38
Volume of flask.........(ML)	2068	2071	2054	2056
Data: time of sampling				
flask temperature..(DEG-F)	103.00	103.00	90.00	90.00
bar. press.........(IN.HG)	28.33	28.33	28.33	28.33
flask vacuum.......(IN.HG)	25.91	25.60	25.39	26.20
flask abs. press...(IN.HG)	2.42	2.73	2.94	2.13
Data: Time of Flask Opening				
flask temperature..(DEG-F)	72.00	72.00	72.00	72.00
lab. bar. press....(IN.HG)	29.10	29.10	29.10	29.10
flask static press.(IN.HG)	-2.00	-2.40	-1.20	-2.85
flask abs. press...(IN.HG)	27.10	26.70	27.90	26.25
Volume gas sampled....(DSML)	1681	1636	1686	1629
Moisture content......(%V/V)	22.66	22.66	22.66	22.66
Nitrate in gas sample...(JG)	250.0	230.0	150.0	140.0
NO2 in gas sample.......(JG)	185.5	170.7	111.3	103.9
NOx Concentration				
(GR/DSCF)................	0.0482	0.0456	0.0289	0.0279
(MG/DSCM)................	110	104	66	64
(PPM-DRY)................	58	55	35	33
(PPM-WET)................	45	42	27	26
NOX Emission rate....(LB/HR)	11.56	10.93	6.92	6.68

Test No. 1
Dryer Primary Cyclone Exhaust 3

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

	Run 3A	Run 3B	Run 3C	Run 3D
Date of run................	07-23-96	07-23-96	07-23-96	07-23-96
Time of run............(HRS)	1645	1700	1715	1730
Flask number................	39	40	41	42
Volume of flask.........(ML)	2062	2093	2076	2094
Data: time of sampling				
flask temperature..(DEG-F)	95.00	95.00	95.00	95.00
bar. press.........(IN.HG)	28.33	28.33	28.33	28.33
flask vacuum.......(IN.HG)	26.00	25.82	25.87	25.54
flask abs. press...(IN.HG)	2.33	2.51	2.46	2.79
Data: Time of Flask Opening				
flask temperature..(DEG-F)	72.00	72.00	72.00	72.00
lab. bar. press....(IN.HG)	29.10	29.10	29.10	29.10
flask static press.(IN.HG)	-0.70	-0.10	-0.50	-0.30
flask abs. press...(IN.HG)	28.40	29.00	28.60	28.80
Volume gas sampled....(DSML)	1767	1824	1785	1792
Moisture content......(%V/V)	18.75	18.75	18.75	18.75
Nitrate in gas sample...(JG)	130.0	160.0	140.0	160.0
NO2 in gas sample.......(JG)	96.5	118.7	103.9	118.7
NOx Concentration				
(GR/DSCF).................	0.0239	0.0284	0.0254	0.0289
(MG/DSCM).................	55	65	58	66
(PPM-DRY).................	29	34	30	35
(PPM-WET).................	23	28	25	28
NOX Emission rate....(LB/HR)	5.57	6.64	5.94	6.76

Test No. 2
E-Tube Outlet

Results of Oxides of Nitrogen Determinations——————————Method7E

	Run 1	Run 2	Run 3
Date of run	7-23-96	7-23-96	7-23-96
Time run start/end (HRS)	1435-1535	1645-1745	1925-2025
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	22.6	23.4	23.4
Oxygen content (%V/V)	17.7	17.6	17.6
Volumetric flow rate (DSCFM)	103228	103158	103160
NO_x concentration ppm,dry	3.2	2.4	1.7
NO_x emission rate (LB/HR)	2.4	1.8	1.3

Test No. 2
Dryer RTO Stack

Results of Oxides of Nitrogen Determinations——————————Method7E

	Run 1	Run 2	Run 3
Date of run	7-23-96	7-23-96	7-23-96
Time run start/end (HRS)	1435-1535	1645-1745	1925-2025
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	22.9	23.5	23.5
Oxygen content (%V/V)	17.3	17.3	17.3
Volumetric flow rate (DSCFM)	99560	100405	100405
NO_x concentration ppm,dry	2.5	2.8	3.2
NO_x emission rate (LB/HR)	1.8	2.0	2.3

Test No. 8
Press RTO Inlet

Results of Oxides of Nitrogen Determinations——————————Method7E

	Run 1	Run 2	Run 3
Date of run	7-25-96	7-25-96	7-25-96
Time run start/end (HRS)	1620-1720	1800-1900	1934-2034
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	3.9	2.9	3.0
Oxygen content (%V/V)	20.9	20.9	20.9
Volumetric flow rate (DSCFM)	64300	68979	72300
NO_x concentration ppm,dry	8.2	7.6	6.2
NO_x emission rate (LB/HR)	3.8	3.8	3.2

Test No. 8
Press RTO Stack

Results of Oxides of Nitrogen Determinations————————————Method7E

	Run 1	Run 2	Run 3
Date of run	7-25-96	7-25-96	7-25-96
Time run start/end (HRS)	1620-1720	1800-1900	1934-2034
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	2.9	3.3	3.4
Oxygen content (%V/V)	20.9	20.9	20.9
Volumetric flow rate (DSCFM)	77990	76250	77090
NO_x concentration ppm,dry	36.3	34.3	34.9
NO_x emission rate (LB/HR)	20.3	18.7	19.3

3.4 Results of Opacity Observations

Test No. 1
E-Tube Outlet

Results of the Opacity Observations——————————EPA Method 9

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

* Note: Opacity observations were unable to be performed due to inclement weather conditions.

Observer: Mark Petersen
Cert. Date: 04-03-96
Date of Observation: 7-23-96
Time of Observation: –

Test No. 9
Press RTO Stack

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: Mark Petersen
Cert. Date: 04-03-96
Date of Observation: 07-25-96
Time of Observation: 0937-1037

3.5 Results of Carbon Monoxide Determinations

Test No. 1
Dryer Primary Cyclone Exhaust 1

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Time run start/end.....(HRS)	1130-1330	1436-1543	1645-1751
Total sampling time....(MIN)	64.0	64.0	64.0
Moisture content......(%V/V)	22.53	24.86	24.25
O2 Concentration......(%V/V)	17.60	17.10	16.80
Volumetric flow rate (DSCFM)	26981	26838	27141
CO concentration............			
(GR/DSCF)................	0.9271	0.9129	0.9047
(MG/DSCM)................	2122.	2090.	2071.
(PPM-WET)................	1411.	1348.	1346.
(PPM-DRY)................	1822.	1794.	1778.
(PPM-DRY @ 7% O2)........	7502.	6440.	5926.
CO emission rate.....(LB/HR)	214.401	209.988	210.465

CO = Carbon monoxide

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

Test No. 1
Dryer Primary Cyclone Exhaust 2

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Time run start/end.....(HRS)	1134-1330	1435-1542	1645-1750
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content......(%V/V)	25.03	25.14	22.40
O2 Concentration......(%V/V)	17.20	16.90	17.20
Volumetric flow rate (DSCFM)	27990	28278	29969
CO concentration............			
(GR/DSCF)................	0.8091	0.9678	1.1266
(MG/DSCM)................	1852.	2215.	2579.
(PPM-WET)................	1192.	1423.	1718.
(PPM-DRY)................	1590.	1902.	2214.
(PPM-DRY @ 7% O2).........	5857.	6494.	8156.
CO emission rate.....(LB/HR)	194.098	234.574	289.382

CO = Carbon monoxide

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

Test No. 1
Dryer Primary Cyclone Exhaust 3

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

	Run 1	Run 2	Run 3
Date of run	07-23-96	07-23-96	07-23-96
Time run start/end.....(HRS)	1133-1328	1435-1529	1645-1736
Total sampling time....(MIN)	60.0	47.5	45.0
Moisture content......(%V/V)	26.69	22.66	20.79
O2 Concentration......(%V/V)	17.50	16.80	17.40
Volumetric flow rate (DSCFM)	25358	27973	27234
CO concentration............			
(GR/DSCF).................	0.8935	0.9007	0.8681
(MG/DSCM).................	2045.	2062.	1987.
(PPM-WET).................	1287.	1368.	1351.
(PPM-DRY).................	1756.	1770.	1706.
(PPM-DRY @ 7% O2).........	7024.	5900.	6634.
CO emission rate.....(LB/HR)	194.205	215.940	202.634

CO = Carbon monoxide

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

Test No. 2
E-Tube Outlet

Results of Carbon Monoxide Determinations——————————Method10

	Run 1	Run 2	Run 3
Date of run	7-23-96	7-23-96	7-23-96
Time run start/end (HRS)	1435-1535	1645-1745	1925-2025
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	22.6	23.4	23.4
Oxygen content (%V/V)	17.7	17.6	17.6
Volumetric flow rate (DSCFM)	103228	103158	103160
CO concentration ppm,dry	1817	1841	1851
CO emission rate (LB/HR)	818	828	833

Test No. 2
Dryer RTO Stack

Results of Carbon Monoxide Determinations——————————Method10

	Run 1	Run 2	Run 3
Date of run	7-23-96	7-23-96	7-23-96
Time run start/end (HRS)	1435-1535	1645-1745	1925-2025
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	22.9	23.5	23.5
Oxygen content (%V/V)	17.3	17.3	17.3
Volumetric flow rate (DSCFM)	99560	100405	100405
CO concentration ppm,dry	212	234	241
CO emission rate (LB/HR)	92	102	106

Test No. 8
Press RTO Inlet

Results of Carbon Monoxide Determinations——————————————Method10

	Run 1	Run 2	Run 3
Date of run	7-25-96	7-25-96	7-25-96
Time run start/end (HRS)	1620-1720	1800-1900	1934-2034
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	3.9	2.9	3.0
Oxygen content (%V/V)	20.9	20.9	20.9
Volumetric flow rate (DSCFM)	64300	68979	72300
CO concentration ppm,dry	5.0	5.3	4.4
CO emission rate (LB/HR)	1.4	1.6	1.4

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Sagola, Michigan

Test No. 8
Press RTO Stack

Results of Carbon Monoxide Determinations——————————Method10

	Run 1	Run 2	Run 3
Date of run	7-25-96	7-25-96	7-25-96
Time run start/end (HRS)	1620-1720	1800-1900	1934-2034
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	2.9	3.3	3.4
Oxygen content (%V/V)	20.9	20.9	20.9
Volumetric flow rate (DSCFM)	77990	76250	77090
CO concentration ppm,dry	19.2	24.2	20.8
CO emission rate (LB/HR)	6.5	8.0	7.0

3.6 Results of Total Hydrocarbons Determinations

Test No. 2
Primary Cyclone Exhaust 1

Results of Total Hydrocarbons Determinations——————————Method25A

	Run 1	Run 2	Run 3
Date of run	7-23-96	7-23-96	7-23-96
Time run start/end (HRS)	1435-1535	1645-1745	1925-2025
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	24.9	24.3	24.3
Oxygen content (%V/V)	17.1	16.8	16.8
Volumetric flow rate (DSCFM)	26838	27141	27140
THC concentration ppmC,wet (as carbon)	1937	1796	1677
THC emission rate (LB/HR)	129	120	112

Test No. 2
Primary Cyclone Exhaust 2

Results of Total Hydrocarbons Determinations——————————Method25A

	Run 1	Run 2	Run 3
Date of run	7-23-96	7-23-96	7-23-96
Time run start/end (HRS)	1435-1535	1645-1745	1925-2025
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	25.1	22.4	22.4
Oxygen content (%V/V)	16.9	17.2	17.2
Volumetric flow rate (DSCFM)	28278	29969	29970
THC concentration ppmC,wet (as carbon)	2165	2125	1840
THC emission rate (LB/HR)	153	153	133

Test No. 2
Primary Cyclone Exhaust 3

Results of Total Hydrocarbons Determinations——————————Method25A

	Run 1	Run 2	Run 3
Date of run	7-23-96	7-23-96	7-23-96
Time run start/end (HRS)	1435-1535	1645-1745	1925-2025
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	22.7	20.8	20.8
Oxygen content (%V/V)	16.8	17.4	17.4
Volumetric flow rate (DSCFM)	27973	27234	27230
THC concentration ppmC,wet (as carbon)	3498	2595	3474
THC emission rate (LB/HR)	237	167	223

Test No. 2
Dryer RTO Stack

Results of Total Hydrocarbons Determinations————————————Method25A

	Run 1	Run 2	Run 3
Date of run	7-23-96	7-23-96	7-23-96
Time run start/end (HRS)	1435-1535	1645-1745	1925-2025
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	22.9	23.5	23.5
Oxygen content (%V/V)	17.3	17.3	17.3
Volumetric flow rate (DSCFM)	99560	100405	100405
THC concentration ppmC,wet (as carbon)	24.5	8.0	18.8
THC emission rate (LB/HR)	5.9	2.0	4.6

Test No. 8
Press RTO Inlet

Results of Total Hydrocarbons Determinations------------------------------Method 25A

	Run 1	Run 2	Run 3
Date of run	7-25-96	7-25-96	7-25-96
Time run start/end (HRS)	1620-1720	1800-1900	1934-2034
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	3.9	2.9	3.0
Oxygen content (%V/V)	20.9	20.9	20.9
Volumetric flow rate (DSCFM)	64300	68979	72300
THC concentration ppmC,wet (as carbon)	705	764	744
THC emission rate (LB/HR)	88	101	104

Test No. 8
Press RTO Stack

Results of Total Hydrocarbons Determinations——————Method 25A

	Run 1	Run 2	Run 3
Date of run	7-25-96	7-25-96	7-25-96
Time run start/end (HRS)	1620-1720	1800-1900	1934-2034
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	2.9	3.3	3.4
Oxygen content (%V/V)	20.9	20.9	20.9
Volumetric flow rate (DSCFM)	77990	76250	77090
THC concentration ppmC,wet (as carbon)	18.9	26.4	13.8
THC emission rate (LB/HR)	2.8	3.9	2.1

3.7 Results of Formaldehyde Determinations

Test No. 4
Dryer Primary Cyclone Exhaust 1

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

	Run 1	Run 2	Run 3
Date of run	07-24-96	07-24-96	07-24-96
Time run start/end.....(HRS)	1710/1828	1915/2020	2040/2144
Static pressure......(IN.WC)	-9.00	-9.00	-9.00
Cross sectional area (SQ.FT)	8.73	8.73	8.73
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	199.0	208.0	208.0
desiccant..........(GRAMS)	20.0	28.0	23.0
total..............(GRAMS)	219.0	236.0	231.0
Formaldehyde in sample..(uG)	16000	18000	19000
Gas meter coefficient.......	1.0024	1.0024	1.0024
Barometric pressure..(IN.HG)	28.53	28.33	28.33
Avg. orif.pres.drop..(IN.WC)	1.27	1.32	1.19
Avg. gas meter temp..(DEF-F)	90.6	91.1	90.5
Volume through gas meter....			
at meter conditions...(CF)	41.65	42.40	40.44
standard conditions.(DSCF)	38.29	38.67	36.91
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter.........(IN)	.189	.189	.189
Avg.stack gas temp ..(DEG-F)	229	232	227
Volumetric flow rate........			
actual..............(ACFM)	48023	49388	46236
dry standard.......(DSCFM)	27006	27081	25390
Isokinetic variation.....(%)	99.3	100.0	101.8
CH2O concentration..........			
(GR/DSCF).................	0.0065	0.0072	0.0080
(MG/DSCM).................	14.92	16.50	18.24
(PPM-DRY).................	11.95	13.21	14.61
(PPM-WET).................	9.41	10.27	11.28
CH2O emission rate...(LB/HR)	1.50752	1.67210	1.73310

CH2O = Formaldehyde

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

Test No. 4
Dryer Primary Cyclone Exhaust 2

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

	Run 1	Run 2	Run 3
Date of run	07-24-96	07-24-96	07-24-96
Time run start/end.....(HRS)	1710/1830	1915/2017	2040/2142
Static pressure......(IN.WC)	-8.60	-8.60	-8.60
Cross sectional area (SQ.FT)	9.39	9.39	9.39
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	146.0	220.0	174.0
desiccant..........(GRAMS)	18.0	6.0	9.0
total..............(GRAMS)	164.0	226.0	183.0
Formaldehyde in sample..(uG)	13000	16000	15000
Gas meter coefficient.......	1.0056	1.0056	1.0056
Barometric pressure..(IN.HG)	28.33	28.33	28.33
Avg. orif.pres.drop..(IN.WC)	0.98	1.06	1.02
Avg. gas meter temp..(DEF-F)	94.8	94.2	92.7
Volume through gas meter....			
at meter conditions...(CF)	34.73	36.05	35.25
standard conditions.(DSCF)	31.54	32.78	32.14
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.179	.179	.179
Avg.stack gas temp ..(DEG-F)	211	207	209
Volumetric flow rate........			
actual..............(ACFM)	51190	51616	51144
dry standard.......(DSCFM)	29935	28552	29442
Isokinetic variation.....(%)	94.4	102.9	97.8
CH2O concentration..........			
(GR/DSCF)................	0.0064	0.0075	0.0072
(MG/DSCM)................	14.60	17.29	16.53
(PPM-DRY)................	11.69	13.85	13.24
(PPM-WET)................	9.39	10.46	10.43
CH2O emission rate...(LB/HR)	1.63543	1.84754	1.82165

CH2O = Formaldehyde

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

Test No. 4
Dryer Primary Cyclone Exhaust 3

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

	Run 1	Run 2	Run 3
Date of run	07-24-96	07-24-96	07-24-96
Time run start/end.....(HRS)	1710/1828	1915/2015	2040/2140
Static pressure......(IN.WC)	-9.00	-9.00	-9.00
Cross sectional area (SQ.FT)	8.73	8.73	8.73
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	210.0	240.0	234.0
desiccant..........(GRAMS)	14.0	12.0	11.0
total..............(GRAMS)	224.0	252.0	245.0
Formaldehyde in sample..(uG)	18000	18000	10000
Gas meter coefficient.......	1.0032	1.0032	1.0032
Barometric pressure..(IN.HG)	28.33	28.33	28.33
Avg. orif.pres.drop..(IN.WC)	1.24	1.27	1.21
Avg. gas meter temp..(DEF-F)	88.7	89.5	88.0
Volume through gas meter....			
at meter conditions...(CF)	40.00	40.39	39.18
standard conditions.(DSCF)	36.67	36.97	35.96
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.189	.189	.189
Avg.stack gas temp ..(DEG-F)	223	223	224
Volumetric flow rate........			
actual..............(ACFM)	49906	49649	48961
dry standard.......(DSCFM)	27711	26880	26462
Isokinetic variation.....(%)	98.8	102.7	101.5
CH2O concentration..........			
(GR/DSCF).................	0.0076	0.0075	0.0043
(MG/DSCM).................	17.40	17.26	9.86
(PPM-DRY).................	13.94	13.82	7.89
(PPM-WET).................	10.81	10.46	5.98
CH2O emission rate...(LB/HR)	1.80432	1.73584	0.97601

CH2O = Formaldehyde

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

Test No. 4
Dryer RTO Stack

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

	Run 1	Run 2	Run 3
Date of run	07-24-96	07-24-96	07-24-96
Time run start/end.....(HRS)	1710/1830	1915/2025	2040/2142
Static pressure......(IN.WC)	-0.54	-0.54	-0.54
Cross sectional area (SQ.FT)	50.79	50.79	50.79
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	223.0	311.0	320.0
desiccant..........(GRAMS)	42.0	19.0	21.0
total..............(GRAMS)	265.0	330.0	341.0
Formaldehyde in sample..(uG)	3300	5000	5100
Gas meter coefficient.......	0.9957	0.9957	0.9957
Barometric pressure..(IN.HG)	28.31	28.31	28.31
Avg. orif.pres.drop..(IN.WC)	2.18	2.26	2.16
Avg. gas meter temp..(DEF-F)	72.7	77.1	80.0
Volume through gas meter....			
at meter conditions...(CF)	54.91	56.14	55.02
standard conditions.(DSCF)	51.55	52.28	50.95
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter.........(IN)	.270	.270	.270
Avg.stack gas temp ..(DEG-F)	261	265	261
Volumetric flow rate........			
actual...............(ACFM)	192533	195385	191748
dry standard.......(DSCFM)	107172	103593	100886
Isokinetic variation.....(%)	96.1	100.8	100.9
CH2O concentration..........			
(GR/DSCF)................	0.0010	0.0015	0.0016
(MG/DSCM)................	2.27	3.40	3.56
(PPM-DRY)................	1.82	2.72	2.85
(PPM-WET)................	1.47	2.10	2.16
CH2O emission rate...(LB/HR)	0.91223	1.31754	1.34262

CH2O = Formaldehyde

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

Test No. 9
Press Inlet

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

	Run 1	Run 2	Run 3
Date of run	07-25-96	07-25-96	07-25-96
Time run start/end.....(HRS)	937/1039	1235/1335	1410/1512
Static pressure......(IN.WC)	-4.75	-4.75	-4.75
Cross sectional area (SQ.FT)	17.72	17.72	17.72
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	12.0	10.0	18.0
desiccant..........(GRAMS)	18.0	12.0	10.0
total..............(GRAMS)	30.0	22.0	28.0
Formaldehyde in sample..(uG)	9800	9500	11000
Gas meter coefficient.......	0.9957	0.9957	0.9957
Barometric pressure..(IN.HG)	28.45	28.45	28.45
Avg. orif.pres.drop..(IN.WC)	2.06	1.90	2.00
Avg. gas meter temp..(DEF-F)	79.8	79.9	81.7
Volume through gas meter....			
at meter conditions...(CF)	49.99	47.93	49.44
standard conditions.(DSCF)	46.52	44.58	45.84
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.189	.189	.189
Avg.stack gas temp ..(DEG-F)	128	126	127
Volumetric flow rate........			
actual..............(ACFM)	85586	82319	84579
dry standard.......(DSCFM)	70110	68048	69412
Isokinetic variation.....(%)	100.7	99.4	100.2
CH2O concentration..........			
(GR/DSCF).................	0.0033	0.0033	0.0037
(MG/DSCM).................	7.48	7.57	8.52
(PPM-DRY).................	5.99	6.06	6.82
(PPM-WET).................	5.81	5.92	6.63
CH2O emission rate...(LB/HR)	1.96288	1.92656	2.21332

CH2O = Formaldehyde

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

Test No. 9
Press Stack

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

	Run 1	Run 2	Run 3
Date of run	07-25-96	07-25-96	07-25-96
Time run start/end.....(HRS)	937/1039	1235/1336	1410/1512
Static pressure......(IN.WC)	-0.27	-0.27	-0.27
Cross sectional area (SQ.FT)	31.50	31.50	31.50
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	18.0	16.0	18.0
desiccant..........(GRAMS)	12.0	9.0	14.0
total..............(GRAMS)	30.0	25.0	32.0
Formaldehyde in sample..(uG)	280	270	270
Gas meter coefficient.......	0.9973	0.9973	0.9973
Barometric pressure..(IN.HG)	28.45	28.45	28.45
Avg. orif.pres.drop..(IN.WC)	2.46	2.52	2.64
Avg. gas meter temp..(DEF-F)	92.1	92.6	96.3
Volume through gas meter....			
at meter conditions...(CF)	52.97	53.97	55.40
standard conditions.(DSCF)	48.32	49.20	50.18
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.251	.251	.251
Avg.stack gas temp ..(DEG-F)	253	255	258
Volumetric flow rate........			
actual..............(ACFM)	108245	110070	112242
dry standard.......(DSCFM)	73954	75412	76183
Isokinetic variation.....(%)	99.9	99.7	100.7
CH2O concentration..........			
(GR/DSCF)................	0.0001	0.0001	0.0001
(MG/DSCM)................	0.21	0.20	0.19
(PPM-DRY)................	0.16	0.16	0.15
(PPM-WET)................	0.16	0.15	0.15
CH2O emission rate...(LB/HR)	0.05701	0.05507	0.05456

CH2O = Formaldehyde

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

3.8 Results of Phenol Determinations

Test No. 6
Press Inlet

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

	Run 1	Run 2	Run 3
Date of run	07-25-96	07-25-96	07-25-96
Time run start/end.....(HRS)	1620-1720	1800-1900	1935-2035
Barometric pressure..(IN.HG)	28.45	28.45	28.45
Meter temperature....(DEG-F)	80.75	80.75	78.75
Meter correction coefficient	0.9968	0.9968	0.9968
Volume through gas meter....			
at meter conditions...(CF)	44.630	49.020	47.440
standard conditions (DSCF)	41.494	45.575	44.270
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content......(%V/V)	3.93	2.91	3.00
Volumetric flow rate (DSCFM)	64300	68979	72300
Phenol in sample........(uG)	840.00<	840.00<	840.00<
Phenol concentration........			
(GR/10^3DSCF)..............	0.3124<	0.2844<	0.2928<
(uG/DSCM)................	715.42<	651.35<	670.55<
(PPB-DRY)................	182.82<	166.45<	171.35<
(PPB-WET)................	175.63<	161.60<	166.21<
Phenol emis. rate(10^{-3}LB/HR)	172.148<	168.137<	181.427<

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. 6
Press Stack

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

	Run 1	Run 2	Run 3
Date of run	07-25-96	07-25-96	07-25-96
Time run start/end.....(HRS)	1620-1720	1800-1900	1935-2035
Barometric pressure..(IN.HG)	28.45	28.45	28.45
Meter temperature....(DEG-F)	84.38	86.63	88.29
Meter correction coefficient	0.9929	0.9929	0.9929
Volume through gas meter....			
at meter conditions...(CF)	47.810	48.370	47.930
standard conditions (DSCF)	43.986	44.318	43.782
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content......(%V/V)	2.91	3.29	3.43
Volumetric flow rate (DSCFM)	77990	76250	77090
Phenol in sample........(uG)	840.00<	840.00<	840.00<
Phenol concentration........			
(GR/10³DSCF)..............	0.2947<	0.2925<	0.2960<
(uG/DSCM)................	674.89<	669.83<	678.03<
(PPB-DRY)................	172.46<	171.17<	173.27<
(PPB-WET)................	167.44<	165.54<	167.32<
Phenol emis. rate(10^{-3}LB/HR)	196.971<	191.134<	195.605<

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

Analysis performed according to NIOSH Method 3502

3.9 Results of MDI Determinations

Test No. 5
Press RTO Stack

Results of MDI Determinations

	Run 1	Run 2	Run 3
Date of run	07-25-96	07-25-96	07-25-96
Time run start/end.....(HRS)	1620/1720	1800/1900	1935/2035
Static pressure......(IN.WC)	-0.27	-0.27	-0.27
Cross sectional area (SQ.FT)	31.50	31.50	31.50
Pitot tube coefficient......	.840	.840	.840
Water in sample gas			
condenser.............(ML)	0.0	0.0	0.0
impingers..........(GRAMS)	0.0	0.0	0.0
desiccant..........(GRAMS)	19.0	16.0	17.0
total..............(GRAMS)	19.0	16.0	17.0
MDI in sample ....(ug)	< 6.2	< 6.2	< 6.2
Gas meter coefficient.......	0.9973	0.9973	0.9973
Barometric pressure..(IN.HG)	28.45	28.45	28.45
Avg. orif.pres.drop..(IN.WC)	0.74	0.70	0.72
Avg. gas meter temp..(DEF-F)	93.2	94.6	94.8
Volume through gas meter....			
at meter conditions...(CF)	29.01	28.67	29.10
standard conditions.(DSCF)	26.30	25.92	26.30
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.........(IN)	.181	.181	.181
Avg.stack gas temp ..(DEG-F)	255	255	255
Volumetric flow rate........			
actual..............(ACFM)	114901	111880	113173
dry standard.......(DSCFM)	77991	76253	77090
Isokinetic variation.....(%)	99.1	99.9	100.3
MDI Concentration...........(ppm)	< 0.0008	< 0.0008	< 0.0008
MDI Emission Rate.........(LB/HR)	< 0.0024	< 0.0024	< 0.0024

4 RESULTS OF FUEL ANALYSES

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

Date:	8/12/96
Client:	LOUISIANA PACIFIC/SAGOLA
Laboratory Log Number:	8024-69-0359
Sample Collected:	7/24/96
Sample Received:	7/26/96
Source:	DRYER
Sample Identification:	ASPEN DRY WOOD

Ultimate Analysis WT %

Parameter	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total			2.10
Ash		1.07	1.04
Carbon	49.34	48.81	47.79
Hydrogen	6.07	6.00	5.88
Nitrogen	0.34	0.34	0.33
Oxygen (calculated)	44.26	43.78	42.87
Sulfur	< 0.05	< 0.05	< 0.05
Heating Value, BTU/LB	8443	8353	8178

Respectfully submitted,

David J. Schneider

David J. Schneider, Manager
Chemistry Department

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

Date:	8/12/96
Client:	LOUISIANA PACIFIC/SAGOLA
Laboratory Log Number:	8024-70-0360
Sample Collected:	7/24/96
Sample Received:	7/26/96
Source:	DRYER
Sample Identification:	SOFTWOOD

Ultimate Analysis WT %

Parameter	Moisture & Ash Free	Moisture Free	As Received
Moisture, Total			2.40
Ash		0.94	0.92
Carbon	50.01	49.54	48.35
Hydrogen	5.95	5.89	5.75
Nitrogen	0.32	0.32	0.31
Oxygen (calculated)	43.73	43.31	42.28
Sulfur	< 0.05	< 0.05	< 0.05
Heating Value, BTU/LB	8790	8707	8498

Respectfully submitted,

David J. Schneider, Manager
Chemistry Department

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APPENDIX A

RESULTS OF VOLUMETRIC FLOW RATE DETERMINATIONS

Test No. 1
Dryer Primary Cyclone Exhaust 1

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

Date of Determination............	07-23-96
Time of Determination.......(HRS)	720
Barometric pressure.......(IN.HG)	28.33
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter..............(IN)	40
Duct area.................(SQ.FT)	8.73
Direction of flow................	UP
Static pressure...........(IN.WC)	-9
Avg. gas temp............(DEG-F)	265
Moisture content..........(% V/V)	22.53
Avg. linear velocity.....(FT/SEC)	95.4
Gas density.............(LB/ACF)	.04663
Molecular weight......(LB/LBMOLE)	29.18
Mass flow of gas..........(LB/HR)	139766
Volumetric flow rate.............	
actual..................(ACFM)	49953
dry standard...........(DSCFM)	26061

Test No. 1
Dryer Primary Cylcone Exhaust 3

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

Date of Determination............	07-23-96
Time of Determination.......(HRS)	740
Barometric pressure.......(IN.HG)	28.33
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	12
Shape of duct....................	Round
Stack diameter...............(IN)	40
Duct area.................(SQ.FT)	8.73
Direction of flow................	UP
Static pressure...........(IN.WC)	-9
Avg. gas temp.............(DEG-F)	216
Moisture content..........(% V/V)	26.69
Avg. linear velocity.....(FT/SEC)	88.5
Gas density..............(LB/ACF)	.04916
Molecular weight......(LB/LBMOLE)	29.20
Mass flow of gas..........(LB/HR)	136655
Volumetric flow rate............	
actual...................(ACFM)	46333
dry standard............(DSCFM)	24533

Test No. 1
E Tube Outlet

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

Date of Determination............	07-23-96
Time of Determination.......(HRS)	907
Barometric pressure.......(IN.HG)	28.35
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	24
Shape of duct....................	Round
Stack diameter...............(IN)	81.5
Duct area.................(SQ.FT)	36.23
Direction of flow................	UP
Static pressure...........(IN.WC)	-1.83
Avg. gas temp.............(DEG-F)	155
Moisture content..........(% V/V)	22.68
Avg. linear velocity.....(FT/SEC)	71.0
Gas density..............(LB/ACF)	.05599
Molecular weight......(LB/LBMOLE)	29.16
Mass flow of gas..........(LB/HR)	518549
Volumetric flow rate.............	
actual...................(ACFM)	154363
dry standard............(DSCFM)	96635

Test No. 1
Dryer RTO Stack

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

Date of Determination............	07-23-96
Time of Determination.......(HRS)	1000
Barometric pressure.......(IN.HG)	28.35
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter...............(IN)	96.5
Duct area.................(SQ.FT)	50.79
Direction of flow................	UP
Static pressure...........(IN.WC)	-.54
Avg. gas temp.............(DEG-F)	260
Moisture content..........(% V/V)	22.55
Avg. linear velocity.....(FT/SEC)	61.1
Gas density..............(LB/ACF)	.04803
Molecular weight......(LB/LBMOLE)	29.17
Mass flow of gas..........(LB/HR)	536895
Volumetric flow rate.............	
actual...................(ACFM)	186316
dry standard............(DSCFM)	100134

Test No. 4
Dryer RTO Stack

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

Date of Determination............	07-24-96
Time of Determination.......(HRS)	1600
Barometric pressure.......(IN.HG)	28.35
Pitot tube coefficient..........	.84
Number of sampling ports.........	2
Total number of points...........	16
Shape of duct....................	Round
Stack diameter...............(IN)	96.5
Duct area.................(SQ.FT)	50.79
Direction of flow................	UP
Static pressure...........(IN.WC)	-.54
Avg. gas temp.............(DEG-F)	260
Moisture content..........(% V/V)	19.51
Avg. linear velocity.....(FT/SEC)	60.7
Gas density.............(LB/ACF)	.04857
Molecular weight......(LB/LBMOLE)	29.13
Mass flow of gas..........(LB/HR)	539208
Volumetric flow rate.............	
actual...................(ACFM)	185012
dry standard............(DSCFM)	103329

Test No. 7
Press RTO Stack

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

Date of Determination............	07-24-96
Time of Determination.......(HRS)	1810
Barometric pressure.......(IN.HG)	28.31
Pitot tube coefficient..........	.84
Number of sampling ports.........	2
Total number of points...........	20
Shape of duct....................	Round
Stack diameter...............(IN)	76
Duct area.................(SQ.FT)	31.50
Direction of flow................	UP
Static pressure...........(IN.WC)	-.27
Avg. gas temp.............(DEG-F)	255
Moisture content..........(% V/V)	3.92
Avg. linear velocity.....(FT/SEC)	57.1
Gas density..............(LB/ACF)	.05152
Molecular weight......(LB/LBMOLE)	28.84
Mass flow of gas..........(LB/HR)	333754
Volumetric flow rate.............	
actual...................(ACFM)	107959
dry standard............(DSCFM)	72427

Test No. 8
Press Inlet

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

Date of Determination............	07-25-96
Time of Determination.......(HRS)	1620
Barometric pressure.......(IN.HG)	28.45
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	24
Shape of duct....................	Round
Stack diameter..............(IN)	57.25
Duct area.................(SQ.FT)	17.88
Direction of flow................	UP
Static pressure...........(IN.WC)	-4.75
Avg. gas temp.............(DEG-F)	123
Moisture content..........(% V/V)	3.00
Avg. linear velocity.....(FT/SEC)	72.7
Gas density..............(LB/ACF)	.06299
Molecular weight......(LB/LBMOLE)	28.84
Mass flow of gas..........(LB/HR)	294528
Volumetric flow rate.............	
actual...................(ACFM)	77933
dry standard............(DSCFM)	64300

Test No. 8
Press Inlet

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

Date of Determination............	07-25-96
Time of Determination.......(HRS)	1800
Barometric pressure.......(IN.HG)	28.45
Pitot tube coefficient...........	.84
Number of sampling ports.........	2
Total number of points...........	24
Shape of duct....................	Round
Stack diameter...............(IN)	57.25
Duct area.................(SQ.FT)	17.88
Direction of flow................	UP
Static pressure...........(IN.WC)	-4.75
Avg. gas temp.............(DEG-F)	123
Moisture content..........(% V/V)	2.90
Avg. linear velocity.....(FT/SEC)	77.9
Gas density.............(LB/ACF)	.06301
Molecular weight......(LB/LBMOLE)	28.84
Mass flow of gas..........(LB/HR)	315752
Volumetric flow rate.............	
actual...................(ACFM)	83517
dry standard............(DSCFM)	68979

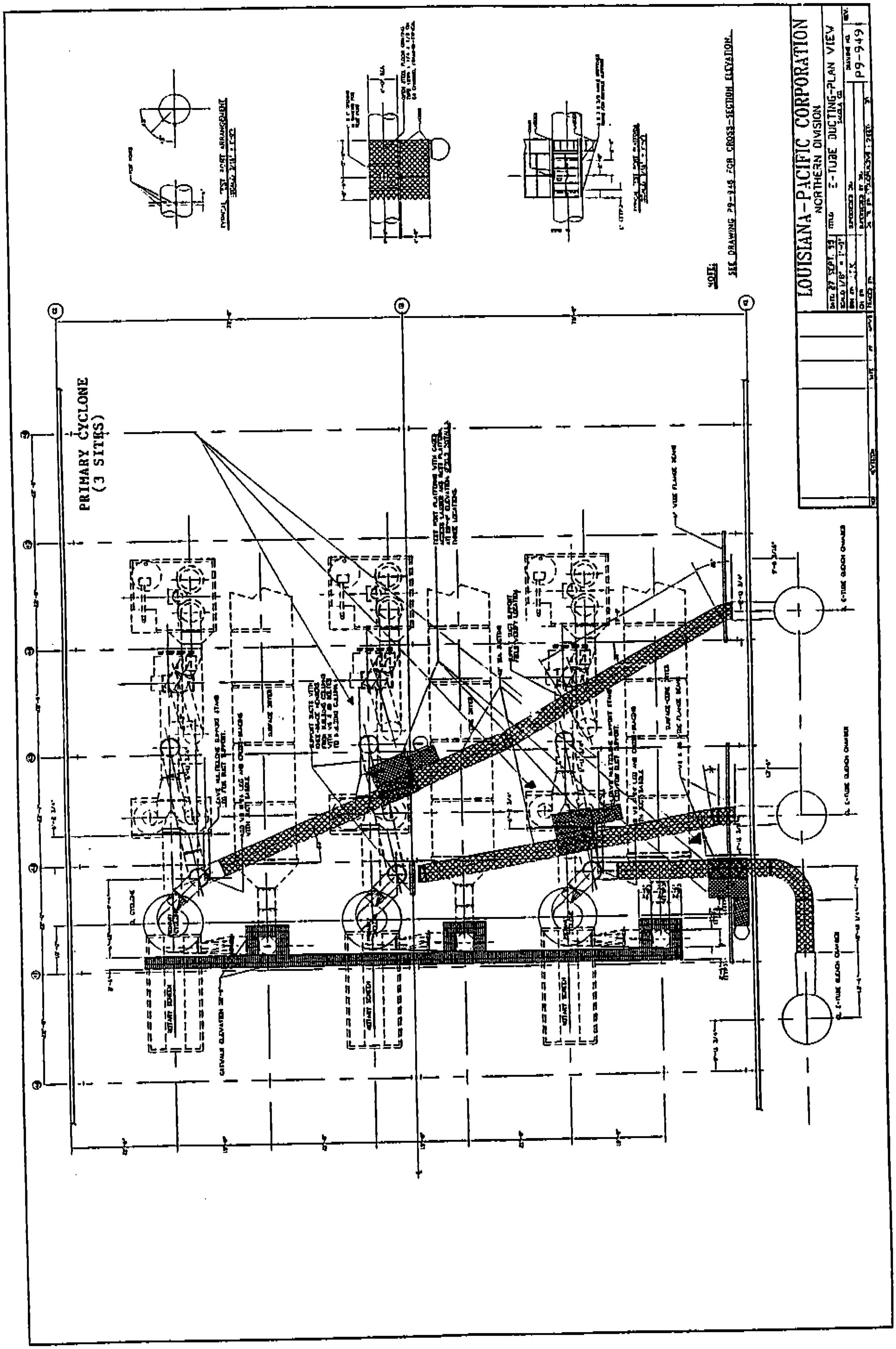
Test No. 8
Press Inlet

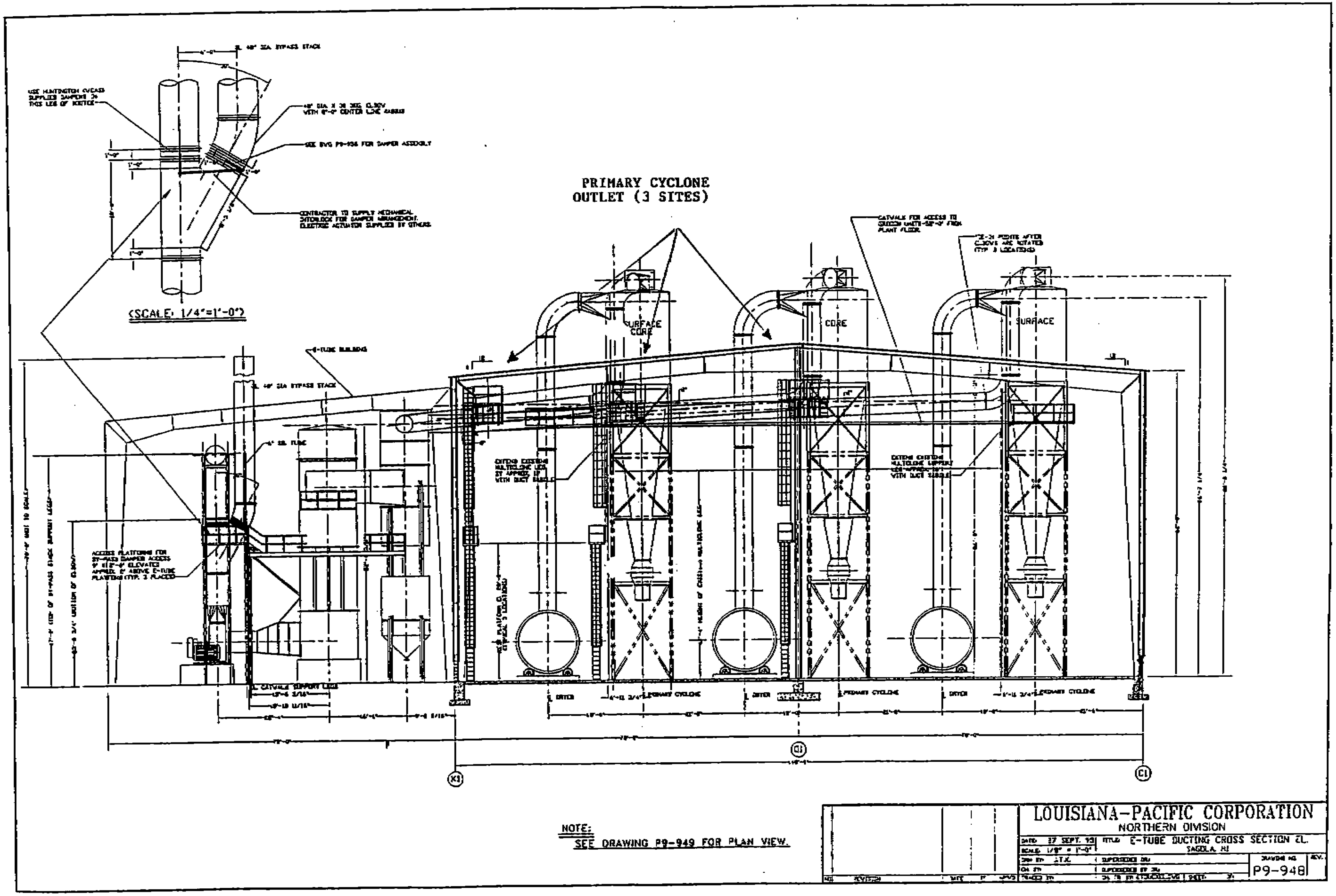
Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination............	07-25-96
Time of Determination.......(HRS)	1935
Barometric pressure.......(IN.HG)	28.45
Pitot tube coefficient..........	.84
Number of sampling ports.........	2
Total number of points..........	24
Shape of duct....................	Round
Stack diameter..............(IN)	57.25
Duct area...............(SQ.FT)	17.88
Direction of flow...............	UP
Static pressure..........(IN.WC)	-4.75
Avg. gas temp............(DEG-F)	123
Moisture content..........(% V/V)	3.00
Avg. linear velocity.....(FT/SEC)	81.7
Gas density.............(LB/ACF)	.06299
Molecular weight......(LB/LBMOLE)	28.84
Mass flow of gas..........(LB/HR)	331173
Volumetric flow rate............	
actual..................(ACFM)	87629
dry standard...........(DSCFM)	72300

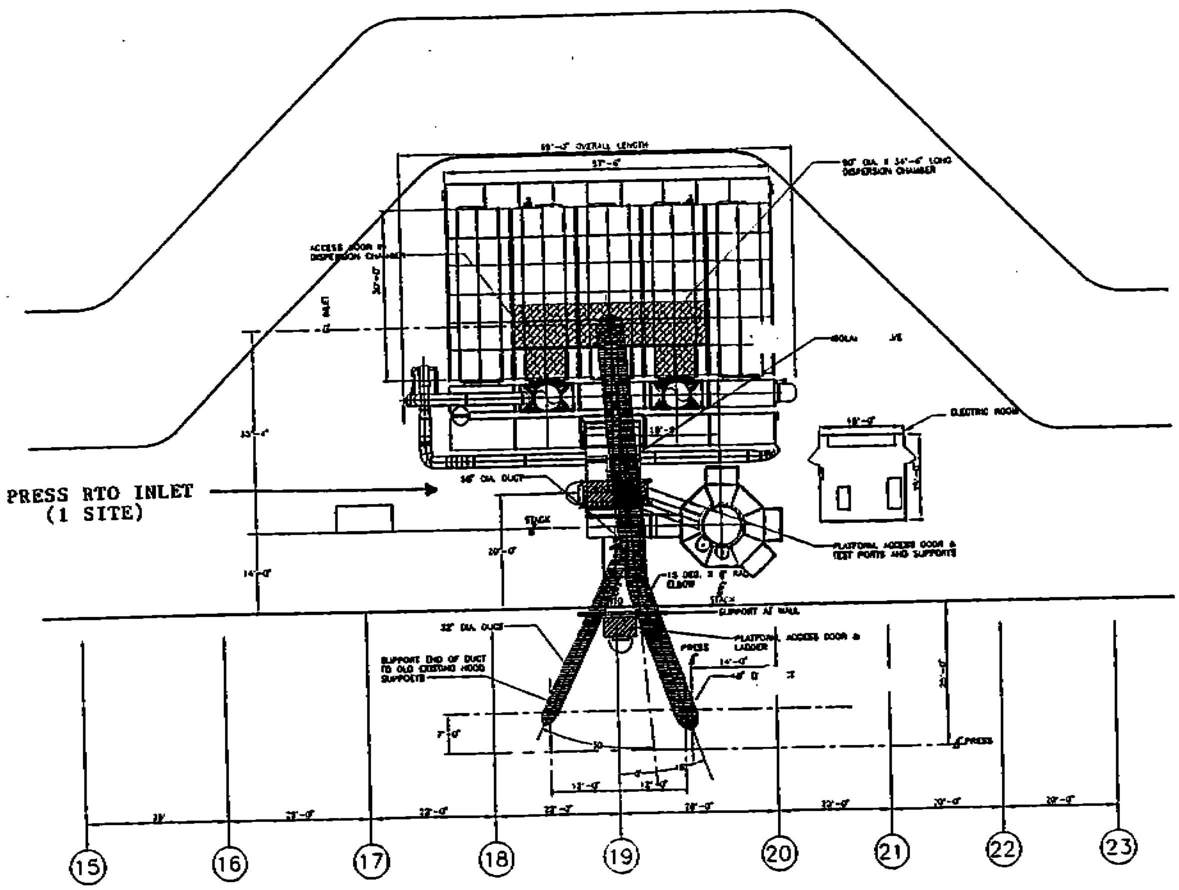
APPENDIX B

LOCATION OF TEST PORTS


LOUISIANA-PACIFIC CORPORATION
NORTHERN DIVISION
E-TUBE DUCTING-PLAN VIEW
P9-949
PRIMARY CYCLONE (3 SITES)
NOTE:



PRIMARY CYCLONE
OUTLET (3 SITES)
(SCALE: 1/4"=1'-0")
SURFACE
CORE
SURFACE
CORE
NOTE:
SEE DRAWING P9-949 FOR PLAN VIEW.
LOUISIANA-PACIFIC CORPORATION
NORTHERN DIVISION
E-TUBE DUCTING CROSS SECTION EL.
P9-948



NOTES:

1. DUCT SPECS: #304 10 GAUGE STAINLESS STEEL 3" X 3" 1/4" ANGLE FLANGES AT JOINTS.

2. DUCT INSULATION: 3" 1,000 DEG. F., 6# DENSITY FIBERGLAS INSULATION AND .032 EMBOSSED ALUM. LAGGING. ALL EXTERIOR DUCT TO BE INSULATED.

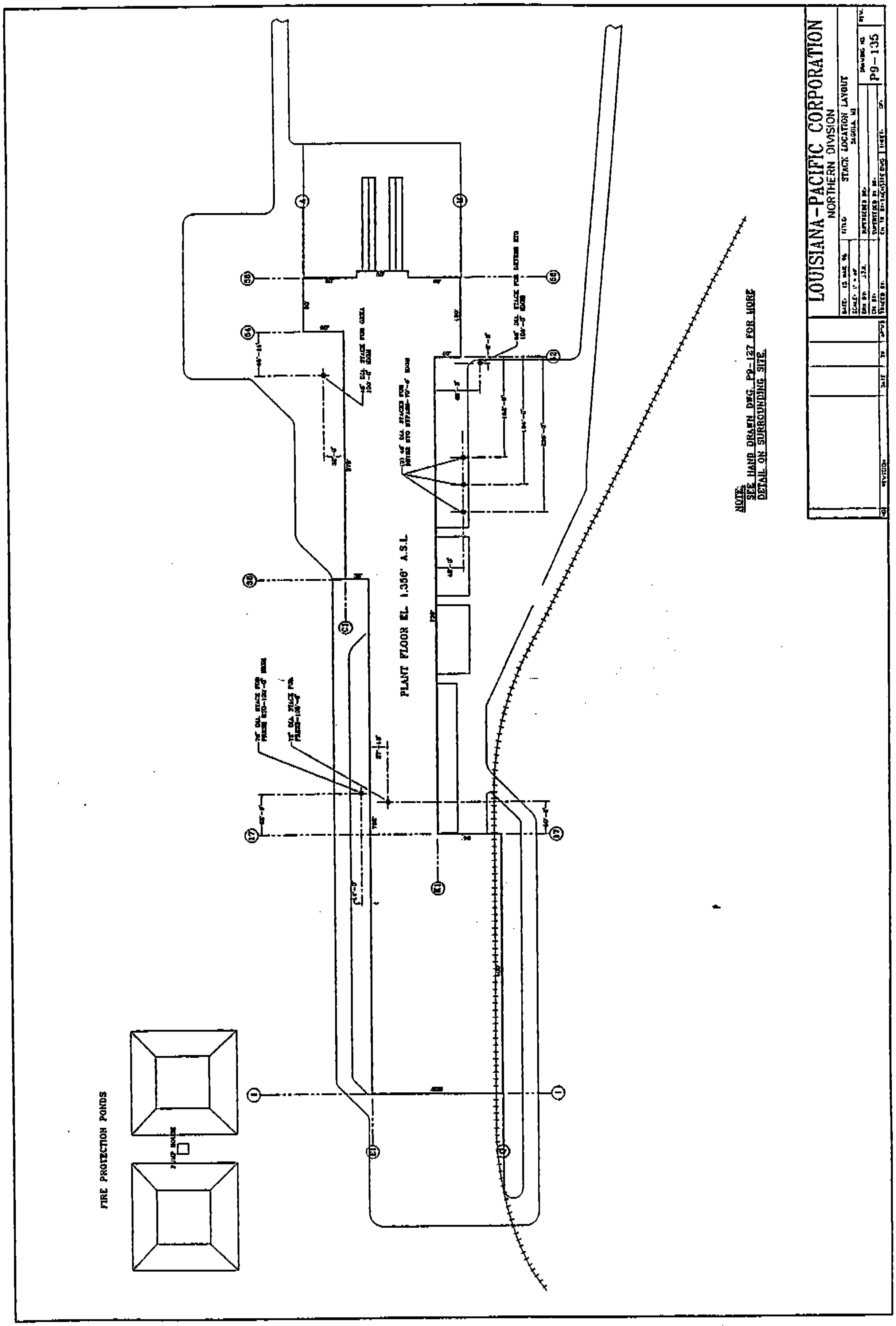
3. DUCT SPRINKLER: DUCTWORK PROTECTION SHOULD BE PROVIDED BY AUTOMATIC SPRINKLERS RATED AT LEAST 50 DEG.F. ABOVE THE MAXIMUM EXPECTED AMBIENT DUCT TEMPERATURE. HEADS SHOULD BE SPACED NO MORE THAN 12 FT. APART, EITHER HORIZONTALLY OR VERTICALLY, AND SHOULD BE DESIGNED TO PROVIDE 0.2 GPM/SQ. FT. OVER THE PROJECTED AREA OF THE DUCTWORK INCLUDING UP TO 100 LINEAL FT. OF DUCT. A 250 GPM HOSE STREAM ALLOWANCE SHOULD BE INCLUDED. SEPERATE CONTROL VALVES AND FLOW ALARMS SHOULD BE PROVIDED FOR THE DUCTWORK PROTECTION. FACTORY MUTUAL APPROVAL REQUIRED. SYSTEM TO BE DRY VALVE

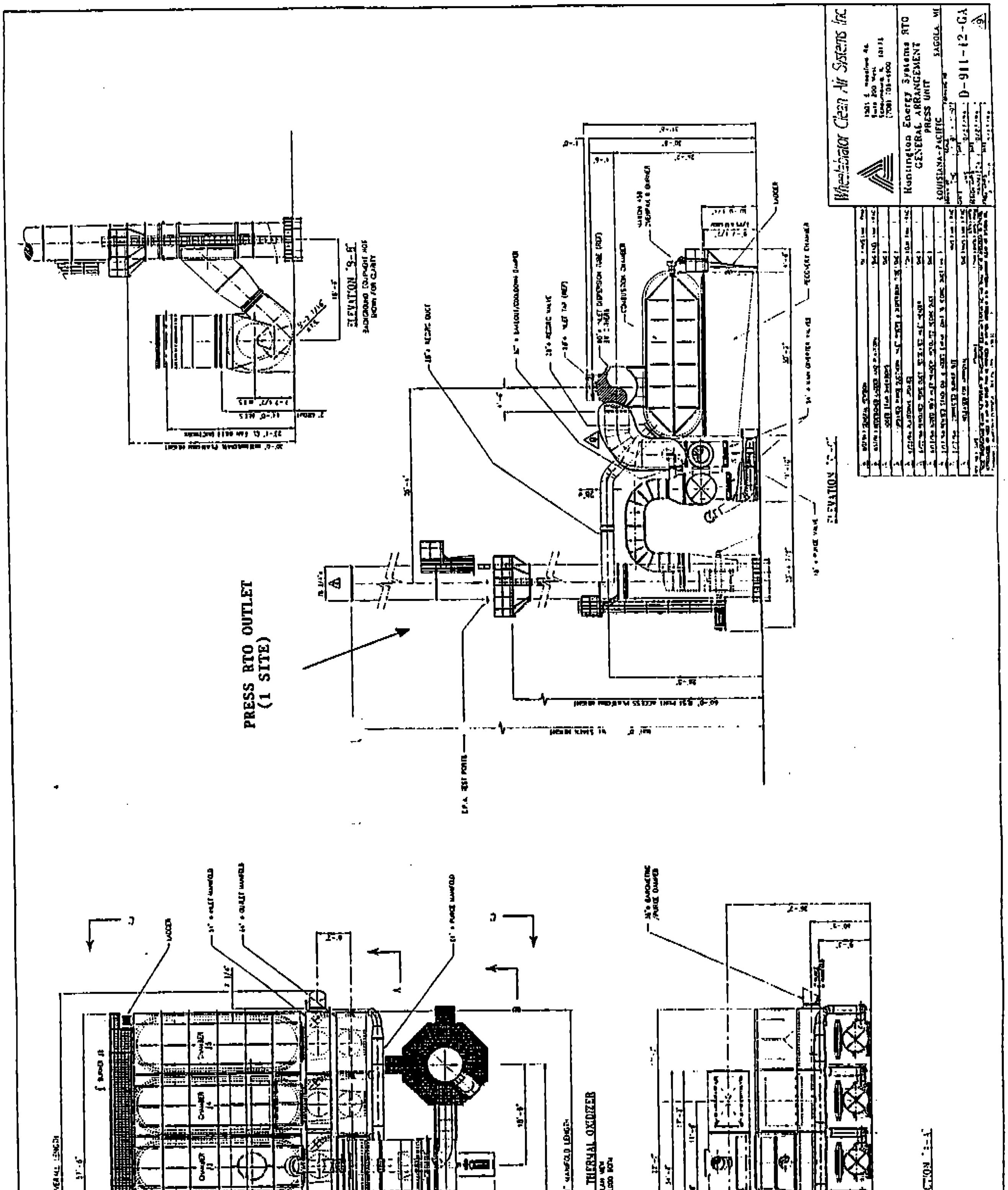
4. TEST PORTS: 4" DIA. X 6" LONG STAINLESS STEEL WITH THREADED CAP.

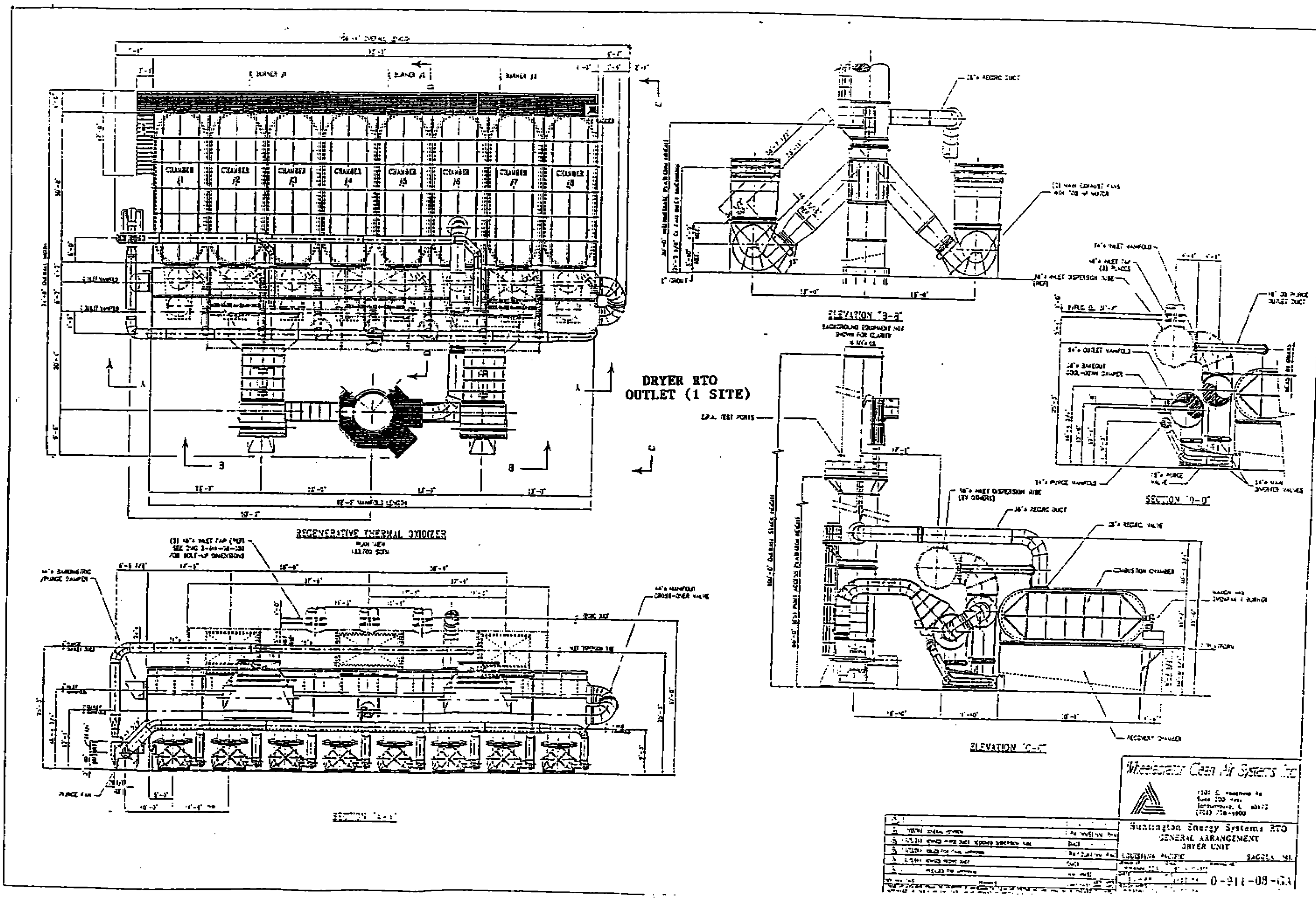
5. ACCESS DOORS: 2' X 2' I.D. RAISED FLANGE, BOLTED AND INSULATED.

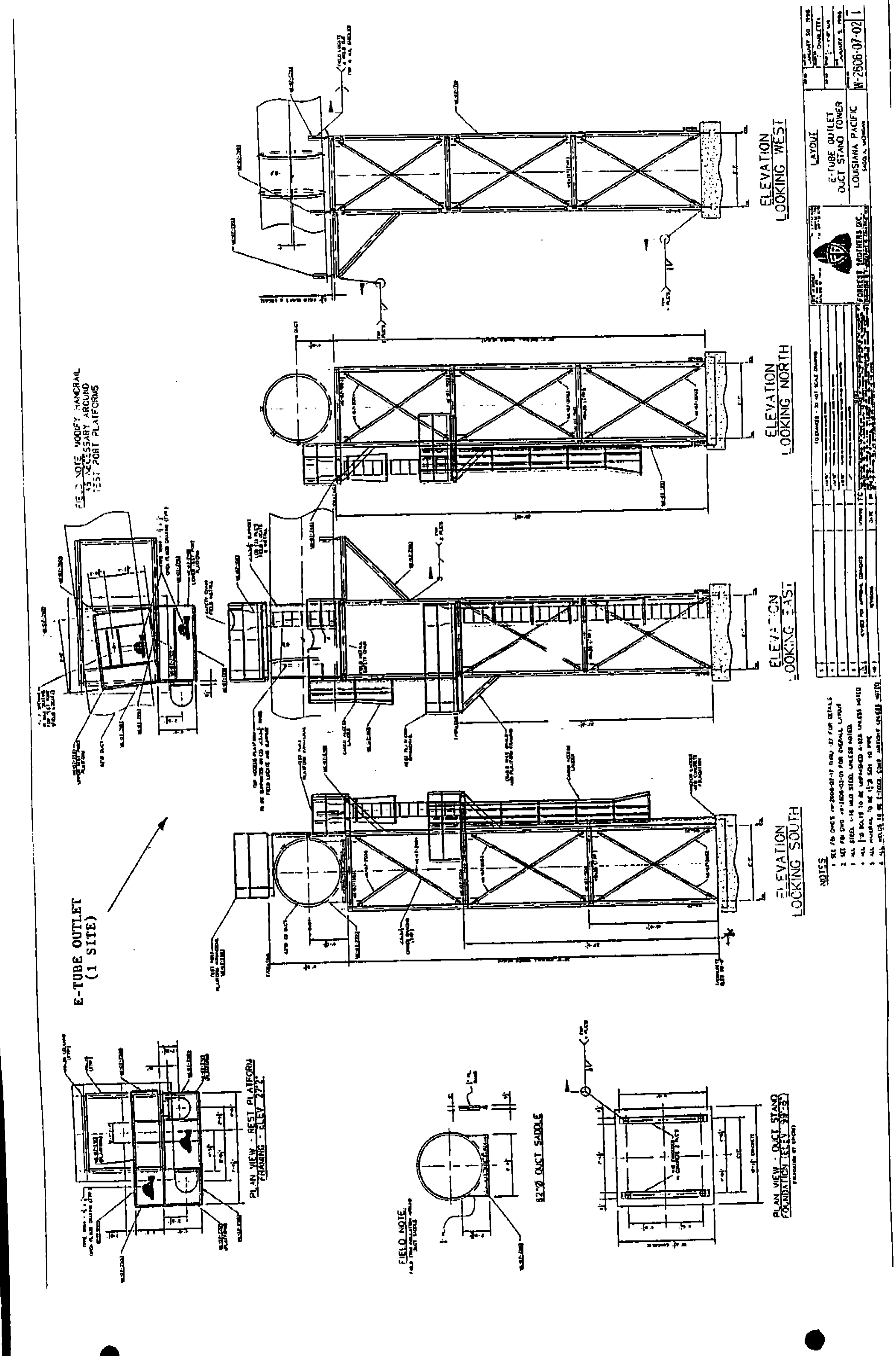
6. ALL ELBOW RADII TO BE 2 X DUCT DIA. EXCEPT WHERE OTHERWISE SPECIFIED.

LOUISIANA-PACIFIC CORPORATI(
NORTHERN DIVISION
TITLE: G.A. PRESS RTO DUCTING LAY
SAGOLA, MI
DATE: 8 OCT 91
SCALE: 1"=10'
DRAWING NO. P9-482

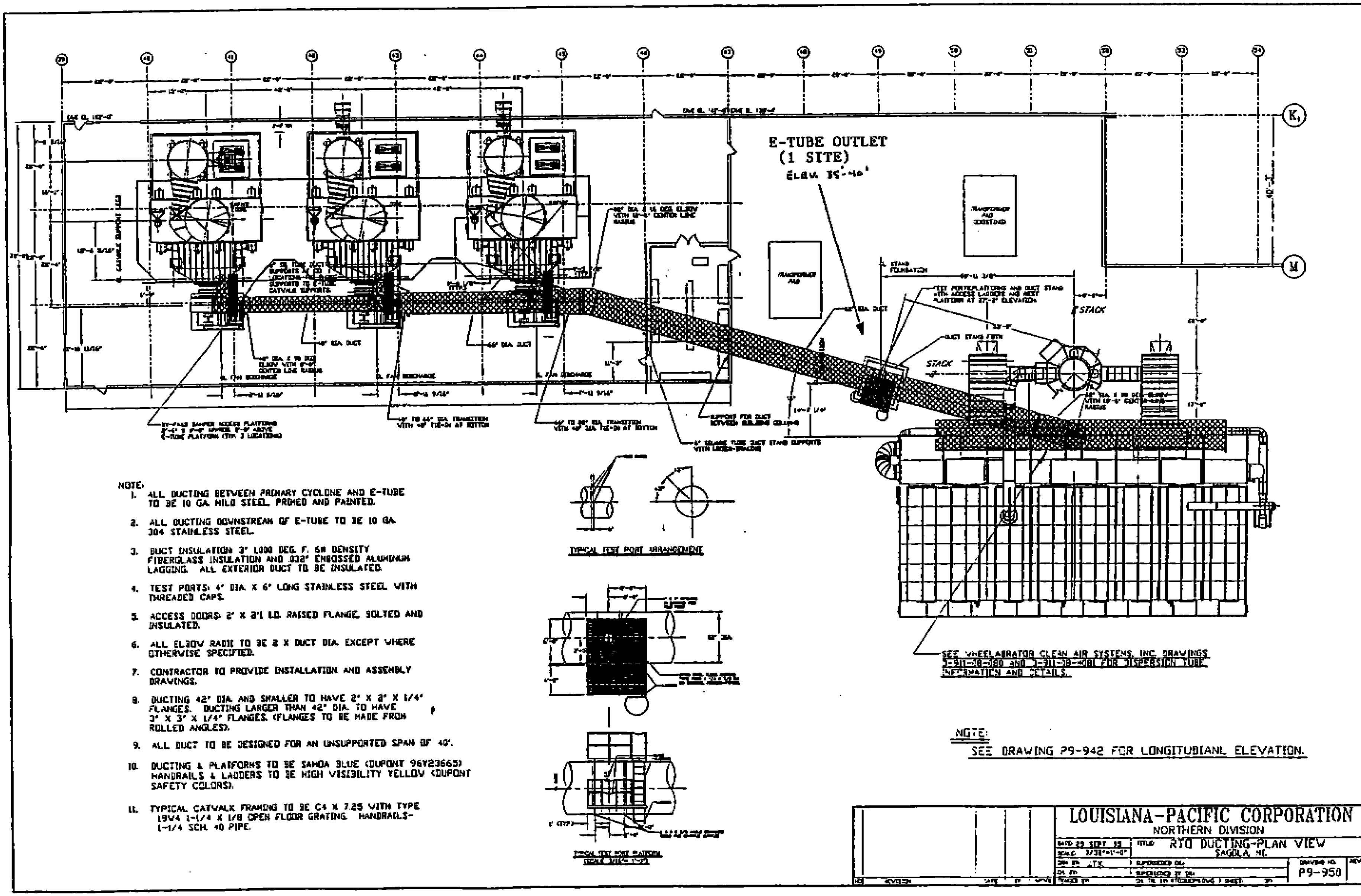

LOUISIANA-PACIFIC CORPORATION
NORTHERN DIVISION
STACK LOCATION LAYOUT
P9-135
PLANT FLOOR EL 1,356' A.S.L
FIRE PROTECTION PONDS
PUMP HOUSE
NOTE:
SEE HAND DRAWN DWG. P9-127 FOR MORE DETAIL ON SURROUNDING SITE.


PRESS RTO OUTLET
(1 SITE)
REGENERATIVE THERMAL OXIDIZER
Wheelabrator Clean Air Systems Inc
Huntington Energy Systems RTO
GENERAL ARRANGEMENT
PRESS UNIT
LOUISIANA-PACIFIC
SAGOLA, MI
D-911-12-GA


DRYER RTO
OUTLET (1 SITE)
REGENERATIVE THERMAL OXIDIZER
ELEVATION "B-B"
BACKGROUND EQUIPMENT NOT SHOWN FOR CLARITY
ELEVATION "C-C"
SECTION "D-D"
SECTION "A-A"
CHAMBER #1
CHAMBER #2
CHAMBER #3
CHAMBER #4
CHAMBER #5
CHAMBER #6
CHAMBER #7
CHAMBER #8
COMBUSTION CHAMBER
RECOVERY CHAMBER
E.P.A. TEST PORTS
Wheelabrator Clean Air Systems Inc.
Huntington Energy Systems RTO
GENERAL ARRANGEMENT
DRYER UNIT
LOUISIANA PACIFIC
SAGOLA, MI.
0-911-08-GA



E-TUBE OUTLET (1 SITE)
FIELD NOTE: MODIFY HANDRAIL AS NECESSARY AROUND TEST PORT PLATFORMS
ELEVATION LOOKING SOUTH
ELEVATION LOOKING EAST
ELEVATION LOOKING NORTH
ELEVATION LOOKING WEST
PLAN VIEW - REST PLATFORM FRAMING - ELEV 27'-2"
82"Ø DUCT SADDLE
FIELD NOTE
NOTES
LAYOUT
E-TUBE OUTLET DUCT STAND TOWER
LOUISIANA PACIFIC
FORREST BROTHERS INC.
W-2606-07-02


E-TUBE OUTLET
(1 SITE)
ELEV. 35'-40'
STACK
NOTE:
1. ALL DUCTING BETWEEN PRIMARY CYCLONE AND E-TUBE TO BE 10 GA. MILD STEEL, PRIMED AND PAINTED.
2. ALL DUCTING DOWNSTREAM OF E-TUBE TO BE 10 GA. 304 STAINLESS STEEL.
3. DUCT INSULATION: 3" 1000 DEG. F. 6# DENSITY FIBERGLASS INSULATION AND .032" EMBOSSED ALUMINUM LAGGING. ALL EXTERIOR DUCT TO BE INSULATED.
4. TEST PORTS: 4" DIA. X 6" LONG STAINLESS STEEL WITH THREADED CAPS.
5. ACCESS DOORS: 2' X 2'1 I.D. RAISED FLANGE, BOLTED AND INSULATED.
6. ALL ELBOW RADII TO BE 2 X DUCT DIA. EXCEPT WHERE OTHERWISE SPECIFIED.
7. CONTRACTOR TO PROVIDE INSTALLATION AND ASSEMBLY DRAWINGS.
8. DUCTING 42" DIA. AND SMALLER TO HAVE 2" X 2" X 1/4" FLANGES. DUCTING LARGER THAN 42" DIA. TO HAVE 3" X 3" X 1/4" FLANGES. (FLANGES TO BE MADE FROM ROLLED ANGLES).
9. ALL DUCT TO BE DESIGNED FOR AN UNSUPPORTED SPAN OF 40'.
10. DUCTING & PLATFORMS TO BE SAMOA BLUE (DUPONT 96Y23665) HANDRAILS & LADDERS TO BE HIGH VISIBILITY YELLOW (DUPONT SAFETY COLORS).
11. TYPICAL CATWALK FRAMING TO BE C4 X 7.25 WITH TYPE 19W4 1-1/4 X 1/8 OPEN FLOOR GRATING. HANDRAILS-1-1/4 SCH. 40 PIPE.
TYPICAL TEST PORT ARRANGEMENT
TYPICAL TEST PORT PLATFORM
SEE WHEELABRATOR CLEAN AIR SYSTEMS, INC. DRAWINGS
INFORMATION AND DETAILS.
NOTE:
SEE DRAWING P9-942 FOR LONGITUDIANL ELEVATION.
LOUISIANA-PACIFIC CORPORATION
NORTHERN DIVISION
RTO DUCTING-PLAN VIEW
SAGOLA, MI.
P9-950

APPENDIX C

FIELD DATA SHEETS

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: LP/Sagola
Source: Primary Cyclone Exhaust #1
Test: 1 Run: 0 Date: 7-23-96
Stack Dimen.: 40 IN.
Dry Bulb ____ °F Wet bulb ____ °F
Manometer: ☒ Reg. ☐Exp ☐Elec.
Barometric Pressure: 28.33 IN.HG
Static Pressure: -9.0 IN.WC
Operators: SF/SB
Pitot No.: V22-4 C_p 0.84

Drawing of Test Site

Cross-section View	Elevation View

* Particulate *

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas
		Port Length: 6 IN.		Time Start: 720 HRS	
A - 1	~~.026~~ .032	1.28	7.28	1.7	
2	~~.082~~ .105	4.20	10.20	2.0	
3	~~.146~~ .194	7.76	13.76	2.1	265
4	~~.226~~ .323	12.92	18.92	2.0	
5	~~.342~~ .677	27.08	33.08	1.7	
6	~~.658~~ .806	32.24	38.24	1.6	
7	.895	35.80	41.80	1.6	
8	.968	38.72	44.72	1.6	
B. 1				1.5	
2				1.9	265
3				1.9	
4				1.8	
5				1.7	
6				1.9	
7				1.9	
8				1.9	
Temp. Meas. Device & S/N: PDT-# 40				Time End: 732 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/Sogola Date 7-23-96 Test 1 Run 1

Source Primary Cyclone outlet #1 No. of traverse points 16

Method 5 Filter holder: S.S Glass Filter type: S.S. Thimble 4" 6F

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: Recovery solvent(s)

32 ☒ acetone

8539 ☒ other(s) MeCl2

No. of probe wash bottles: 1

Sample recovered by: SF

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	705	498	207
Impinger No. 3			
Condenser			
Desiccant	1459	1436	23
Total			230

Integrated Gas Sampling Data:

Bag Pump No. 22A Box No. 2 Bag No. 1

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

Pretest leak check: 0.00 cc/min at 16 IN.HG

Time start: 1130 (HRS) Time end: 1330 (HRS)

Sampling rate: 400 cc/min Operator: SF

S/N of O_2 Analyzer used to monitor train outlet: 8

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[redacted] TEL. [redacted] L [redacted] RA [redacted] ES, [redacted]
(612) 786-6020

EPA Method 5 Field Data Sheet

Job LP/Sagoia
Source Primary Cyclone Outlet #1
Date 7-23-96 Test 1 Run 1

Operators SF/SB
Meter Box No. 13 ΔH@ 1.84 in.WC
Gasmeter Coeff. 1.0024

Nozzle No. 4-3
Nozzle Dia. .189 in.
Bar. Press. 28.33 in.Hg

Pitot No. V22-5
C_p 0.84
H_2O 25 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1230)	710.48											
A-8	4	712.88	1.6	1.07	2.86	7	217	243	N/A	47	76	76	17.5
7	8	715.19	1.6	1.01	5.16	7	245	247		49	81	78	17.8
6	12	717.29	1.3	.86	7.26	8	221	252		50	82	82	18.2
5	16	719.85	1.8	1.19	9.77	12	223	255		50	84	84	18.2
4	20	722.43	1.9	1.26	2.35	8	223	255	241	50	84	84	18.4
3	24	725.63	2.1	1.39	5.07	8	225	253	247	52	84	84	18.0
2	28	727.60	1.9	1.28	7.67	9	218	250	251	54	84	84	17.7
1	32	730.30	2.1	1.39	0.38	10	225	248	252	54	84	84	18.1
B-8	36	732.84	1.8	1.19	2.89	8	225	247	255	51	85	84	18.0
7	40	735.35	1.9	1.26	5.47	9	225	249	253	51	96	84	18.0
6	44	738.03	1.9	1.28	8.09	10	221	246	259	53	96	85	18.4
5	48	740.60	1.8	1.21	0.64	10	221	248	258	55	94	85	18.3
4	52	743.21	1.8	1.21	3.18	10	221	248	260	56	93	85	18.1
3	56	745.83	1.9	1.28	5.80	10	217	250	260	54	94	85	17.7
2	60	748.46	2.0	1.35	8.49	10	218	253	261	52	93	86	17.8
1	64	750.95	1.7	1.14	0.96	9	221	254	257	53	92	86	17.9
	(1330)												
	0 - 64	V_m - 40.47		ΔH 1.21							Avg. - 85.5		

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/Saginaw Date 7-23-96 Test 1 Run 2

Source Primary Cyclone Exhaust No. of traverse points 16

Method 5 Filter holder: Glass Filter type: 4" GF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒

Post test: 0.00 cfm at 14 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: 8351

Recovery solvent(s)

☒ acetone

☒ other(s) $MeCl_2$ (Impinger Rinse)

No. of probe wash bottles: 1

Sample recovered by: SF

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	745	512	233
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1326	1289	37
Total			270

Integrated Gas Sampling Data:

Bag Pump No. 22A Box No. 2 Bag No. 2

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

Pretest leak check: 0.00 cc/min at 16 IN.HG

Time start: 1436 (HRS) Time end: 1543 (HRS)

Sampling rate: 400 cc/min Operator: SF

S/N of O_2 Analyzer used to monitor train outlet: 8

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[redacted]
(612) 786-6020

EPA Method 5 Field Data Sheet

Job	LP/Sagola	Operators	SF/SB	Nozzle No.	4-3
Source	Primary Cyclone Exhaust #1	Meter Box No.	23 ΔH@ 1.84 in.WC	Nozzle Dia.	.189 in.
Date	7-23-96 Test 1 Run 2	Gasmeter Coeff.	1.0024	Bar. Press.	28.33 in.Hg
Pitot No.	V22-5	C_p	0.84	H_2O	24 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1436)	751.73											
B - 8	4	754.19	1.80	1.22	4.27	6.5	225	253	249	47	86	86	18.0
7	8	756.83	1.85	1.26	6.86	8	225	253	252	48	88	85	18.0
6	12	759.37	1.90	1.30	9.48	8	221	250	255	48	90	86	18.0
5	16	762.02	1.90	1.30	2.11	9	224	251	257	52	91	86	18.1
4	20	764.60	1.80	1.23	4.67	8	225	253	257	52	91	86	18.3
3	24	767.23	1.90	1.30	7.31	9	223	257	256	53	91	86	18.0
2	28	769.89	1.90	1.31	9.96	9	222	258	259	55	91	87	17.9
1	32	772.54	1.80	1.23	2.52	9	223	262	260	56	93	87	18.1
A - 8	36	775.02	1.80	1.24	5.10	9	222	259	257	52	93	87	17.6
7	40	777.70	2.00	1.37	7.80	11	224	254	257	52	94	87	17.9
6	44	780.43	2.00	1.37	0.51	11	225	257	255	51	96	87	18.1
5	48	783.25	2.10	1.44	3.29	12	225	257	256	53	96	87	18.0
4	52	785.97	1.90	1.30	5.93	11	225	252	254	53	95	87	17.8
3	56	788.63	1.90	1.30	8.58	11	224	253	251	54	95	88	17.9
2	60	791.25	1.95	1.34	1.26	11	223	253	252	54	96	88	17.8
1	64	793.83	1.80	1.24	3.84	12	224	254	250	55	96	89	17.8
	(1543)												
	0-64	V_m - 42.10		ΔH - 1.30							Avg. - 89.8		

C-5

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INTERPOLL LABORATORIES, INC
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job 27/Saguia
Date 2-23-96 Test 1 Run 3

Source Primary Cyclone Exhaust #1
No. of traverse points 16

Method 5 Filter holder: Glass
Filter type: 4" GF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒

Post test: 0.00 cfm at 15 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used:
8575

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

No. of probe wash bottles: 1

Sample recovered by: SF

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	749	507	242
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1477	1459	18
			-
Total			260

Integrated Gas Sampling Data:

Bag Pump No. 22A
Box No. 2 Bag No. 3

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

Pretest leak check: 0.00 cc/min at 16 IN.HG

Time start: 1645 (HRS) Time end: 1751 (HRS)

Sampling rate: 400 cc/min Operator: SF

S/N of O_2 Analyzer used to monitor train outlet: 8

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(612) 786-6020

EPA Method 5 Field Data Sheet

Job 22/Sagula
Source Primary Cyclone Exhaust #1
Date 2-23-96 Test 1 Run 3

Operators SF/SB
Meter Box No. 13 ΔH@ 1.84 in.WC
Gasmeter Coeff. 1.0024

Nozzle No. 4-3
Nozzle Dia. .189 in.
Bar. Press. 28.33 in.Hg

Pitot No. UC2-5
C_p 0.84
H_2O 25 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1645)	794.70											
A - 8	4	797.24	2.0	1.34	7.38	8	222	247	255	48	85	86	18.0
7	8	799.92	1.90	1.27	9.97	8	223	249	254	48	88	84	18.4
6	12	802.50	1.90	1.27	2.56	8	223	252	255	49	90	85	18.2
5	16	805.09	1.90	1.27	5.16	8	222	253	257	50	91	84	18.0
4	20	807.87	2.10	1.41	7.90	11	221	254	259	50	92	84	18.2
3	24	810.66	2.10	1.40	0.63	11	223	255	258	50	90	84	18.0
2	28	813.30	1.90	1.27	3.24	10	221	257	262	51	89	83	18.0
1	32	815.90	1.90	1.27	5.83	10	222	260	261	52	91	84	18.2
B - 8	36	818.37	1.75	1.17	8.33	9	224	258	260	51	93	84	17.8
7	40	820.98	1.90	1.27	0.93	9	223	257	259	52	95	84	17.9
6	44	823.49	1.90	1.28	3.54	9	222	257	256	53	96	84	17.6
5	48	826.05	1.90	1.28	6.16	10	222	253	257	54	97	85	17.9
4	52	828.70	1.80	1.21	8.71	10	221	250	255	55	97	85	17.6
3	56	831.28	1.90	1.28	1.32	10	224	248	254	56	97	85	17.7
2	60	833.87	1.90	1.28	3.94	10	224	250	245	56	96	85	17.8
1	64	836.49	1.80	1.21	6.48	11	223	254	250	57	96	86	17.7
	(1751)												
	0 - 64	V_m - 41.79		ΔH - 1.28							Avg. - 88.5		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 7 Sampling Collection Field Data Sheet

Job	L.P. / SAGOLA	Date	7-23-96	Bar Pressure	28.33 IN.HG
Test Location	PRIMARY CYCLONE OUTLET #1	Fuel Type	~~NAT. GAS~~ WOOD WASTE	Sample Train No	3 Green
Technician	SLD	Pump No	1		

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	1130	26.38	102	☒ YES	☐ NO
2	2-1-2	2	1145	26.38	106	☒ YES	☐ NO
3	2-1-3	3	1215	26.38	108	☒ YES	☐ NO
4	2-1-4	4	1325	26.35	110	☒ YES	☐ NO
5	2-2-1	5	1434	26.15	110	☒ YES	☐ NO
6	2-2-2	6	1445	26.10	108	☒ YES	☐ NO
7	2-2-3	19	1515	26.80	110	☒ YES	☐ NO
8	2-2-4	20	1540	26.40	110	☒ YES	☐ NO
9	2-3-1	21	1650	26.40	110	☒ YES	☐ NO
10	2-3-2	22	1710	26.30	109	☒ YES	☐ NO
11	2-3-3	23	1730	26.40	109	☒ YES	☐ NO
12	2-3-4	24	1745	26.40	108	☒ 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

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INTERPOLL LABORATORIES, INC.
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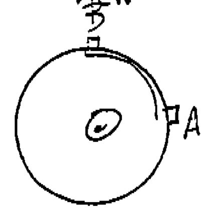
EPA Method 2 Field Data Sheet

Job: L. P. Sagola
Source: No 2 Cyclone Outlet
Test: 1 Run ___ Date: 7/23/96
Stack Dimen.: 41.5 IN.
Dry Bulb: ___ °F Wet bulb: ___ °F
Manometer: ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.33 IN.HG
Static Pressure: -8.6 IN.WC
Operators: J. Van Hoever & J. Lorenz
Pitot No.: V23-5 C_p .84

Particulate

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
		Port Length: 9 IN.		Time Start:	HRS
A 1	.044	1.82	10.82		
2	.146	6.06	15.06		
3	.296	12.28	21.28		
4	.704	29.22	38.22		
5	.854	35.44	44.44		
6	.956	39.67	48.67		
B 1					
2					
3					
4					
5					
6					
Temp. Meas. Device & S/N: PDT #35				Time End:	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. Sagola Date 7/23/96 Test 1 Run 1
Source No 2 Cyclone Outlet No. of traverse points 12
Method 5 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:
Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: 0 cfm at 10 IN. HG (vac) ☒

Particulate Catch Data:
No. of filters used: Recovery solvent(s)

8585

☐ acetone
☒ other(s) MeCl₂ & DI H₂O

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			211
Impinger No. 2	411	200	
Impinger No. 3			
Condenser			
Desiccant	1360	1350	10
Total			221

Integrated Gas Sampling Data:

Bag Pump No. 29 A Box No. 19 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 IN.HG
Time start: 1140 (HRS) Time end: 1330 (HRS)
Sampling rate: 400 cc/min Operator: DVH

S/N of O_2 Analyzer used to monitor train outlet: 4

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(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.P. Saqola
Source: No. 2 Cyclone Outlet
Date: 7/23/96 Test 1 Run 1

Operators: JWH & J.L
Meter Box No. 5 ΔH@ 1.80 in.WC
Gasmeter Coeff. 1.0056

Nozzle No. 6-3
Nozzle Dia. .179 in.
Bar. Press. 28.33 in.Hg

Pitot No. V23-5
C_p .84
H_2O 26 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1134	956.26											
A 6	5	959.29	2.10	1.08	9.24	7	207	253	261	52	90	101	17.7
5	10	962.47	2.2	1.19	2.45	8	207				106	89	17.4
4	15	965.39	1.80	.97	5.34	8	207	257	260	54	87	87	17.1
3	20	968.17	1.60	.86	8.04	8	199				91	88	16.9
2	25	970.80	1.50	.81	0.66	7	199	267	263	54	95	89	16.8
1	30	972.89	1.2	.54	2.81	6	199				97	89	17.0
B 6	35	975.89	1.95	1.05	5.81	[illegible]	202	268	261	56	97	90	16.9
5	40	978.96	1.90	1.03	8.78	8	202				101	91	16.7
4	45	981.81	1.80	.96	1.65	[illegible]	212	268	271	58	102	92	16.6
3	50	984.51	1.80	.96	4.54	8	212				103	90	17.0
2	55	987.37	1.80	.98	7.44	8	205	271	270	60	103	92	16.9
1	60	990.52	1.50	.81	6.09	7	205				104	92	17.5
	(1330)												
	θ - 60	V_m = 33.76		ΔH = .94							Avg. = 94.7		

Stop Test 8 minutes into restart at 1150

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. Sagola
Date 7/23/96 Test 1 Run 2

Source No 2 Cyclone Outlet
No. of traverse points 12

Method 5 Filter holder: glass
Filter type: glass fiber

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:

8560

Recovery solvent(s)

☒ acetone

☐ other(s)

No. of probe wash bottles: 1

Sample recovered by: Dirk

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	411	200	211
Impinger No. 3			
Condenser			
Desiccant	1489	1475	14
Total			225

Integrated Gas Sampling Data:

Bag Pump No. 29A
Box No. 19 Bag No. 2

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

Pretest leak check: 0 cc/min at 14 IN.HG

Time start: 1435 (HRS) Time end: 1542 (HRS)

Sampling rate: ~400 cc/min Operator: Dirk

S/N of O_2 Analyzer used to monitor train outlet: 4

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EPA Method 5 Field Data Sheet

Job: L.P. Sagola
Source: No 2 Cyclone Outlet
Date: 1/23/96 Test: 1 Run: 2

Operators: DUH & J.C
Meter Box No.: 5 ΔH@ 1.80 in.WC
Gasmeter Coeff.: 1.0056

Nozzle No.: 6-3
Nozzle Dia.: .179 in.
Bar. Press.: 28.33 in.Hg

Pitot No.: V23-5
C_p: .84
H_2O: 25 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1435	991.725											
B 6	5	994.77	1.90	1.04	4.71	7	208	253	260	51	90	90	15.5
5	10	997.86	2.10	1.15	7.84	7.5	203				99	92	16.5
4	15	1000.91	2.0	1.11	0.92	7.5	203	261	263	54	101	93	16.9
3	20	1003.99	1.85	1.02	3.89	7	206				103	93	16.2
2	25	1006.62	1.30	.72	6.39	6	206	264	266	53	104	94	17.1
1	30	1008.78	1.1	.61	8.69	5	204				104	94	17.1
A 6	35	1011.79	2.15	1.20	1.90	7	204	260	258	56	100	93	16.8
5	40	1015.02	2.0	1.11	4.99	7	204				105	94	16.9
4	45	1018.16	2.0	1.11	8.10	7	204	261	260	56	105	94	16.5
3	50	1021.11	1.8	1.0	1.04	7	205				105	95	16.1
2	55	1024.11	1.9	1.06	4.06		205	262	257	54	105	94	16.3
1	60	1026.170	1.4	.78	6.66		205				106	94	16.3
	(1542)												
	0 - 60	V_m - 34.445		ΔH - .99							Avg. - 97.7		

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INTERPOLL LABORATORIES, INC
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P Sagola
Date 7/23/96 Test 1 Run 3

Source No 2 Cyclone Outlet
No. of traverse points 12

Method 5 Filter holder: glass
Filter type: glass fiber

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒

Post test: 0 cfm at 10 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

☒ acetone

☐ other(s)

No. of probe wash bottles: 1

Sample recovered by: Duff

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	389	200	189
Impinger No. 3			
Condenser			
Desiccant	1414	1401	13
			-
Total			202

Integrated Gas Sampling Data:

Bag Pump No. 29A
Box No. 19 Bag No. 3

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

Pretest leak check: 0 cc/min at 15 IN.HG

Time start: 1556 (HRS) Time end: 1750 (HRS)

Sampling rate: 400 cc/min Operator: DH

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

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(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.P. Sagola	Operators: Dvd + J.L	Nozzle No.: 6-3	Pitot No.: U23-5
Source: No 2 Cyclone Outlet	Meter Box No.: 5 ΔH@ 1.80 in.WC	Nozzle Dia.: .179 in.	C_p: .84
Date: 07/23/96 Test 1 Run 3	Gasmeter Coeff.: 1.0056	Bar. Press.: 28.33 in.Hg	H_2O: 25 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
▒	(1645)	29.30	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒	▒
A 6	5	32.40	2.4	1.32	2.67	8	211	262	261	52	90	90	17.0
5	10	35.96	2.4	1.30	5.99	8	211				91	90	16.7
4	15	38.97	1.90	1.03	8.95	8	211				91	96	17.8
3	20	41.99	1.90	1.04	1.93	8	211	263	261	53	96	92	17.1
2	25	44.93	1.40	.98	4.83	7	211				98	92	16.8
1	30	47.40	1.4	.76	7.39	6	211	270	264	54	99	92	17.4
B 6	35	50.44	1.95	1.07	0.42	8	210				95	92	17.0
5	40	53.41	2.0	1.09	3.48	8	210	272	261	53	100	92	17.1
4	45	56.47	1.95	1.07	6.51	8	210				102	93	16.6
3	50	59.55	1.85	1.02	9.48	8	210	274	263	54	102	93	17.1
2	55	62.43	1.80	.99	2.40	7	210				102	93	17.3
1	60	65.10	1.45	.80	5.02		210				102	94	17.8
	(1750)												
▒	0 - 60	V_m = 35.80	▒	ΔH = 1.04	▒	▒	▒	▒	▒	▒	Avg. = 96.7		▒

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INTERPOLL LABORATORIES, INC.
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EPA Method 7 Sampling Collection Field Data Sheet

Job: LP Sagole Date: 7-23-96 Bar Pressure: 28.33 IN.HG
Test Location: No 2 Cyclone Outlet Fuel Type: wood waste Sample Train No:
Technician: J. Lorenz Pump No: 36

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	55	12:34	26.02	91	☒ YES	☐ NO
2	2/1/2	56	12:45	25.95	92	☒ YES	☐ NO
3	2/1/3	57	1:05 PM	26.03	94	☒ YES	☐ NO
4	2/1/1	58	1:19 PM	25.92	95	☒ YES	☐ NO
5	2/2/2	59	14:38	25.92	97	☒ YES	☐ NO
6	2/2/3	60	14:54	26.12	97	☒ YES	☐ NO
7	2/2/1	43	15:09	25.95	97	☒ YES	☐ NO
8	2/2/2	44	15:30	25.99	98	☒ YES	☐ NO
9	2/3/3	45	16:50	26.12	96	☒ YES	☐ NO
10	2/3/1	46	17:04	26.11	96	☒ YES	☐ NO
11	2/3/2	47	17:29	25.88	97	☒ YES	☐ NO
12	2/3/3	48	17:50	26.11	97	☒ 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

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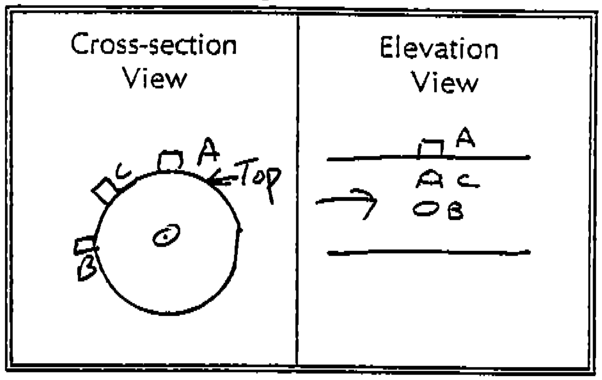
INTERPOLL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Job: C.P. Sogola
Source: Dryer Primary Cyclone Exhaust 3
Test: 1 Run: 0 Date: 7-23-96
Stack Dimen.: 40 IN.
Dry Bulb: 153 °F Wet bulb: 216 °F
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.
Barometric Pressure: 28.33 IN.HG
Static Pressure: -9.0 IN.WC
Operators: E. Jurgs Lee Hansen
Pitot No.: Teflon-4 C_p .840

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
		Port Length: 9.5 IN.		Time Start: 0740 HRS	
A-1	.044	1.76	11.26	.70	
2	.146	5.84	15.34	.83	
3	.296	~~28~~ 11.84	21.34	1.2	
4	.704	28.16	37.66	2.0	
5	.854	34.16	43.66	2.12	
6	.956	38.24	47.74	2.0	
B 1				1.6	216
2				1.7	
3				1.8	
4				1.9	
5				2.1	
6				2.1	

Temp. Meas. Device & S/N: PDT 47 & 42 Time End: 0755 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. Sagola Date 2-23-96 Test 1 Run 1
Source Dryer Primary Cyclone Exhaust 3 No. of traverse points 12
Method 5 Filter holder: Glass Filter type: 4"GF

Sample Train Leak Check:
Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: ≤.02 cfm at 9 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: 8586

Recovery solvent(s)
☒ acetone
☒ other(s) MeCl2 Imp Rinse

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	240	502	238
Impinger No. 3			
Condenser			
Desiccant	1481	1454	27
Total			265

Integrated Gas Sampling Data:

Bag Pump No. 29B Box No. 4 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 IN.HG
Time start: 1133 (HRS) Time end: 1328 (HRS)
Sampling rate: 400 cc/min Operator: EJ

S/N of O_2 Analyzer used to monitor train outlet: 29B

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(612) 786-6020

EPA Method 5 Field Data Sheet

Job	L.P. Sagola	Operators	ES	Nozzle No.	8-3
Source	Dryer Primary Cyclone Exhaust 3	Meter Box No.	17 ΔH@ 1.73 in.WC	Nozzle Dia.	.189 in.
Date	2-23-96 Test 1 Run 1	Gasmeter Coeff.	1.0037	Bar. Press.	28.33 in.Hg

Pitot No. TEF-4
C_p .840
H_2O 2.5 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Stack (°F)	Probe (°F)	Oven (°F)	Imp. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (% v/v)
	(1138)	(373.70)											
B 6	5	377.15	2.0	1.27	7.03	6	217	242	248	44	84	84	17.6
5	10	380.45	2.0	1.27	0.37	6	213	250	240	47	87	84	17.5
4	15	383.90	2.15	1.36	3.84	6.5	216	244	251	46	89	85	17.7
3	20	387.25	2.1	1.34	7.28	6.5	213	246	253	49	93	85	17.2
2	25	390.52	1.8	1.15	0.48	7	214	242	251	51	95	86	17.6
1	30	393.15	1.1	.71	2.99	5.5	214	245	250	53	95	88	17.4
A 6	35	396.43	2.0	1.29	6.37	7	213	242	253	50	91	87	17.6
5	40	399.73	2.0	1.28	9.74	8	215	251	250	52	95	89	17.6
4	45	402.68	1.4	.90	2.58	7	215	252	250	52	96	90	17.3
3	50	405.81	1.6	1.03	5.66	7	215	254	251	53	96	90	17.0
2	55	408.65	1.7	1.10	8.74	8	214	251	252	54	97	90	16.9
1	60	411.38	1.20	.78	1.38	7	213	256	252	56	96	91	16.7
	(1328)												
	θ = 60	V_m = 37.68		ΔH = 1.12							Avg. = 92.1		

stop 1140 start 12

081194-GASTACK\WP\FORMS\S-518

INTERPOLL LABORATORIES, INC
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job C. P. Seagale Date 7-23-96 Test 1 Run 2

Source Dryer Primary Cyclone Exhaust 3 No. of traverse points 12

Method 5 Filter holder: SS Filter type: SS thimble

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☑

Post test: ≤.02 cfm at 18 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: 8639

Recovery solvent(s)

☑ acetone

☑ other(s) MeCl2 Imp Rinse

No. of probe wash bottles: 1

Sample recovered by: EJ

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	649	497	152
Impinger No. 3			
Condenser			
Desiccant	1497	1473	24
Total			176

Integrated Gas Sampling Data:

Bag Pump No. 29B Box No. 4 Bag No. 2

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

Pretest leak check: 0 cc/min at 15 IN.HG

Time start: 1435 (HRS) Time end: 1529 (HRS)

Sampling rate: 400 cc/min Operator: EJ

S/N of O_2 Analyzer used to monitor train outlet: 29B

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INTERPOLL LABORATORIES, INC
(612) 786-6020

EPA Method 5 Field Data Sheet

Job: LP Sagola
Source: Dryer Primary Cyclone
Date: 2-23-96 Test 1 Run 2

Operators: EJ LH
Meter Box No. 17 ΔH@ 1.73 in.WC
Gasmeter Coeff. 1.0032

Nozzle No. 8-3
Nozzle Dia. .189 in.
Bar. Press. 28.33 in.Hg

Pitot No. TEF-4
C_p .840
H_2O 26 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1435)	(413.60)											
A 6	5	416.86	2.0	1.29	6.93	5.5	215	248	230	46	91	90	16.8
5	10	420.05	1.80	1.19	0.19	5.5	213	252	241	49	94	90	16.5
4	15	423.38	1.75	1.70	3.33	6	214	250	246	49	95	91	16.5
3	20	426.42	2.0	1.26	6.69	6.5	213	246	253	51	97	91	16.5
2	25	429.71	.19	1.20	9.96	6.5	214	240	250	53	99	92	16.4
1	30	432.90	1.60	1.01	2.98	7	215	242	250	56	99	92	16.8
B 6	35	436.44	2.10	1.33	6.43	8	214	241	250	58	96	92	17.4
5	40	439.88	2.0	1.27	9.80	8.5	212	238	247	50	97	92	17.0
4	45	443.20	2.0	1.27	3.17	10	212	234	246	52	97	92	17.3
3	50	~~446~~ 444.78	2.1	1.33	6.62	15	213	236	242	55	96	92	17.0
2	55												
1	60												
	(1529)												
	0 - 47.5	V_m - 31.18		ΔH - 1.22							Avg. - 93.7		

Stopped 47.5 minutes

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INTERPOLL LABORATORIES, INC
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. Sagola Date 7-23-96 Test 1 Run 3

Source Dryer Primary Cyclone Exhaust 3 No. of traverse points 12

Method 5 Filter holder: SS Filter type: SS Thimble

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒

Post test: <.02 cfm at 20 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: 6640

Recovery solvent(s)

☒ acetone

☒ other(s) MeCl2 Imp. Rinse

No. of probe wash bottles: 1

Sample recovered by: EJ

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	637	502	135
Impinger No. 3			
Condenser			
Desiccant	1510	1498	12
Total			147

Integrated Gas Sampling Data:

Bag Pump No. 29B Box No. 4 Bag No. 3

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

Pretest leak check: 0 cc/min at 15 IN.HG

Time start: 1645 (HRS) Time end: 1736 (HRS)

Sampling rate: 400 cc/min Operator: EJ

S/N of O_2 Analyzer used to monitor train outlet: 29B

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(612) 786-6020

EPA Method 5 Field Data Sheet

Job: C.P. Sogola
Source: Dryer Primary Cyclone Exhaust 3
Date: 7-23-96 Test 1 Run 3

Operators: EJ
Meter Box No.: 17 ΔH@ 1.73 in.WC
Gasmeter Coeff.: 1.0032

Nozzle No.: 8-3
Nozzle Dia.: .189 in.
Bar. Press.: 28.33 in.Hg

Pitot No.: TeFlon-6
C_p: .840
H_2O: 2.4 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (In.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1645)	(447.00)											
A 6	5	450.20	2.0	1.30	0.37	6	215	236	239	45	87	87	17.0
5	10	453.55	2.1	1.37	3.45	6	213	241	240	52	92	87	17.1
4	15	457.01	2.0	1.31	7.26	6.5	214	242	250	53	93	87	16.7
3	20	460.32	1.75	1.15	0.46	6	215	244	253	51	94	88	17.0
2	25	463.20	1.3	.85	3.22	5	214	246	252	53	94	88	17.2
1	30	465.79	1.1	.72	5.75	5	214	247	250	51	94	88	17.2
B 6	35	469.20	1.9	1.25	9.08	7	214	251	250	53	91	88	16.7
5	40	472.50	1.9	1.25	2.42	7	210	250	239	50	93	88	16.9
4	45	475.85	1.9	1.25	5.76	7.5	212	256	244	54	94	88	16.8
3	50												
2	55												
1	60												
	(1736)												
	0 - 45	V_m = 28.85		ΔH = 1.16							Avg. = 90.0		

C-23

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 7 Sampling Collection Field Data Sheet

Job: L.P. Sagola — Date: 7-23-96 — Bar Pressure: 28.33 IN.HG

Test Location: Dryer Primary Cyclone Exhaust 3 — Fuel Type: Natural Gas — Sample Train No: Blue

Technician: EJ - LH — Pump No: 29

	No.	Test Run Point	Flask No.	Time (HRS)	Vacuum (IN.HG)	Flask Temp. (°F)	Leak Rate <0.4 IN.HG/MIN.	
Box 5	1	2-1-A	25	1133	26.06	102	☒ YES	☐ NO
	2	B	26	1240	26.03	102	☒ YES	☐ NO
	3	C	27	1305	25.59	103	☒ YES	☐ NO
	4	A	28	1325	25.82	103	☒ YES	☐ NO
	5	2-2-B	29	1435	25.91	103	☒ YES	☐ NO
	6	C	30	1450	25.60	103	☒ YES	☐ NO
Box 7	7	A	37	1605	25.39	90	☒ YES	☐ NO
	8	B	38	1528	26.20	90	☒ YES	☐ NO
	9	2-3-C	39	1645	26.00	95	☒ YES	☐ NO
	10	A	40	1700	25.82	95	☒ YES	☐ NO
	11	B	41	1715	25.87	95	☒ YES	☐ NO
	12	C	42	1730	25.54	95	☒ 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

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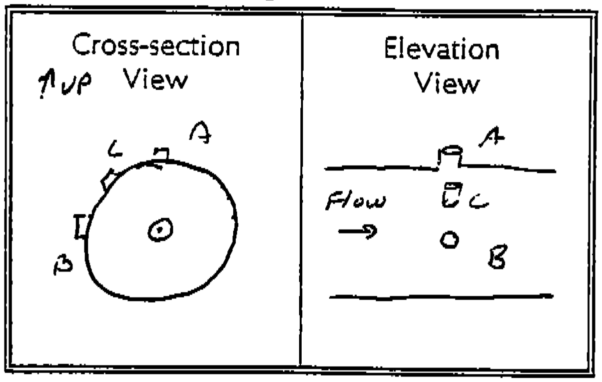
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: I.P. / Sagola, MI
Source: 'E' Tube / Outlet
Test: 1 Run: 0 Date: 7-23-96
Stack Dimen.: 81.5 IN.
Dry Bulb: 155 °F Wet bulb: 143 °F
Manometer: ☒ Reg. ☐Exp ☐Elec.
Barometric Pressure: 28.35 IN.HG
Static Pressure: -1.93 IN.WC
Operators: M. Kuehler + D. Hulleman
Pitot No.: 4MS-8 C_p: .84

Particulate

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
		Port Length: 6.0 IN.		Time Start: 0907 HRS	
A-1	.021	1.71	7.71 ML	1.17	
2	.067	5.46	11.46	1.20	
3	.118	9.62	15.62	1.18	
4	.177	14.43	20.43	1.15	
5	.250	20.39	26.39	1.09	
6	.356	29.01	35.01	1.17	
7	.644	52.49	58.49	1.29	
8	.750	61.13	67.13	1.47	
9	.823	67.07	73.07	1.43	
10	.882	71.88	77.88	1.25	↑
11	.933	76.04	82.04	1.15	
12	.979	79.79	85.79	1.14	155
B-1				.98	↓
2				1.00	
3				1.05	
4				1.10	
5				1.12	
6				1.13	
7				1.17	
8				1.35	
9				1.40	
10				1.31	
11				1.25	
12				1.20	

Temp. Meas. Device & S/N: PDT-45 / TC — Time End: 0915 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 ~~Dortcountry / Muscatine, IA~~ L.P. / Sagola, MI Date 2-23-96 Test 1 Run 1

Source 'E' Tube / Outlet No. of traverse points 24

Method 5 Filter holder: Glass Filter type: 4" G/F

Sample Train Leak Check:

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: 9431

Recovery solvent(s)

☒acetone

☒other(s) MeCl₂

No. of probe wash bottles: 1

Sample recovered by: M. Kuehler + D. Hilleman

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	670	500	170
Impinger No. 2	20	0	20
Impinger No. 3			
Condenser			
Desiccant	1371	1360	11
Total	░░░░░░		201 ~~201~~ MK

Integrated Gas Sampling Data:

Bag Pump No. 3/B Box No. 1 Bag No. 1

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

Pretest leak check: 0 cc/min at 15 IN.HG

Time start: ~~0930~~ 1133 (HRS) Time end: 1326 (HRS)

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

S/N of O_2 Analyzer used to monitor train outlet: 31A

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[redacted]TE.[redacted]L L.[redacted]RA.[redacted]ES, [redacted]
(612) 786-6020

EPA Method 5 Field Data Sheet

Job AP / Sagola, MI
Source 'E' Tube / Outlet
Date 7-23-96 Test 1 Run 1

Operators M. Koehler + D. Hulleman
Meter Box No. 10 ΔH@ 1.93 in.WC
Gasmeter Coeff. .9973

Nozzle No. 2-3
Nozzle Dia. .188 in.
Bar. Press. 28.35 in.Hg

Pitot No. 4115-8
C_p .84
H_2O 24 %

Down 0937 Restart 1015 Down 1019

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	0930	537.20											
B-12	2.5	539.91	1.07	.83	0.96	5	156	240	243	44	20	20	12.3
11	5	540.41	1.27	.98	0.34	4	158				23	20	12.3
10	7.5	541.84	1.38	1.07	1.28	4	156	251	239	43	22	21	12.5
9	10	543	1.29	1.00	3.18	4	156				23	21	12.5
8	12.5						157						
7	15												
6	17.5												
5	20												
4	22.5												
3	25												
2	27.5												
1	30												
A-12													
11													
10													
9													
8													
7													
6													
5													
4													
3													
2													
1													
	θ =	V_m =		ΔT =							Avg. =		

ABORT

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Field Data Sheet

Job L.P. / Sagola, MI
Source 'E' Tube / Outlet
Date 2-23-96 Test 1 Run 1

Operators M. Koehler + D. Holleman
Meter Box No. 10 ΔH@ 1.93 in.WC
Gasmeter Coeff. .9973

Nozzle No. 2-3
Nozzle Dia. .188 in.
Bar. Press. 28.35 in.Hg

Pitot No. 4115-8
C_p .84
H_2O 24 %

Down 1144 Restart 1230

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Stack (°F)	Probe (°F)	Oven (°F)	Imp. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (% v/v)
	1133	545.00											
B-12	2.5	546.43	1.23	.96	6.36	3	155	243	257	45	71	73	17.3
11	5	547.84	1.30	1.01	7.77	3	155				76	72	17.5
10	7.5	549.23	1.21	.94	9.12	3	156	239	251	43	77	73	17.9
9	10	550.74	1.38	1.08	0.58	3.5	155				80	73	18.0
8	12.5	552.20	1.40	1.10	2.04	3.5	155	243	258	47	76	75	17.8
7	15	553.51	1.37	1.07	3.49	3.5	155				79	75	17.8
6	17.5	554.99	1.43	1.12	4.98	4	156	245	253	44	81	75	17.7
5	20	556.52	1.50	1.17	6.50	5	157				84	75	17.8
4	22.5	557.99	1.42	1.11	7.98	5	157	240	255	44	86	76	17.5
3	25	559.57	1.36	1.07	9.44	4.5	158				88	76	17.5
2	27.5	560.78	1.03	.81	0.71	4	159	246	249	45	89	77	17.4
1	30	561.99	.92	.92	1.92	4	159				90	77	17.5
A-12	32.5	563.55	1.50	1.18	3.44	5	159	243	254	45	88	78	17.5
11	35	564.99	1.41	1.12	4.93	4	156				92	78	17.6
10	37.5	566.61	1.45	1.15	6.44	5	158	239	250	50	93	78	17.7
9	40	568.20	1.48	1.17	7.97	4.5	158				94	79	17.4
8	42.5	569.75	1.41	1.12	9.47	4	159	244	255	48	95	79	17.3
7	45	571.13	1.47	1.17	1.00	4.5	159				95	79	17.3
6	47.5	572.50	1.42	1.14	2.51	4	153	241	253	48	96	80	17.4
5	50	574.04	1.43	1.14	4.02	4	159				97	81	17.5
4	52.5	575.65	1.52	1.21	5.58	4.5	159	240	256	47	98	81	17.5
3	55	577.20	1.49	1.19	7.12	4	160				98	81	17.5
2	57.5	578.21	1.45	1.15	8.64	4	160	237	254	47	98	82	17.6
1	60	580.07	1.50	1.19	0.19	4	160				99	82	17.6
	(1326)												
	0 - 60	V_m = 35.07		ΔH = 1.09							Avg. = 82.8		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Sagola, MI
Source 'E' Tube / Outlet
Method 5 Filter holder: Glass

Date 7-23-96 Test 1 Run 2
No. of traverse points 24
Filter type: 4" G/F

Sample Train Leak Check:
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:

8432

Recovery solvent(s)

☒ acetone
☒ other(s) MeCl2

No. of probe wash bottles: 1
Sample recovered by: M. Kaehler + D. Halleman

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	669	495	174
Impinger No. 2	20	0	20
Impinger No. 3			
Condenser			
Desiccant	1513	1500	13
Total	░░░░░░		207 ~~187~~ MK

Integrated Gas Sampling Data:

Bag Pump No. 31B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0 cc/min at 15 IN.HG
Time start: 1435 (HRS)
Sampling rate: 400 cc/min

Box No. 1 Bag No. 2
Size: 44 L
Time end: 1539 (HRS)
Operator: M. Kaehler

S/N of O_2 Analyzer used to monitor train outlet: 31A

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 5 Field Data Sheet

Job L.P. / Sagola, MI
Source 'E' Tube / Outlet
Date 2-23-96 Test 1 Run 2

Operators M. Kaehler + D. Hulleman
Meter Box No. 10 ΔH@ 1.93 in.WC
Gasmeter Coeff. .9973

Nozzle No. 2-3
Nozzle Dia. .189 in.
Bar. Press. 29.35 in.Hg

Pitot No. 4-115-5
C_p .84
H_2O 20.9 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Stack (°F)	Probe (°F)	Oven (°F)	Imp. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (% v/v)
	1435	582.30											
A-12	2.5	583.88	1.42	1.20	3.84	4	159	232	248	43	82	83	17.4
11	5	585.47	1.45	1.21	5.39	4	164				85	82	17.1
10	7.5	586.96	1.38	1.16	6.90	4	163	241	253	42	87	92	17.2
9	10	588.51	1.50	1.26	8.48	4	164				90	92	17.2
8	12.5	590.10	1.42	1.19	0.03	4	164	239	257	42	91	92	17.4
7	15	591.77	1.63	1.37	1.68	4.5	163				93	82	17.3
6	17.5	593.26	1.60	1.35	3.33	4.5	164	245	251	43	94	82	17.3
5	20	594.96	1.62	1.37	4.98	4.5	163				95	82	17.4
4	22.5	596.55	1.35	1.14	6.50	4	162	249	245	45	96	83	17.4
3	25	598.15	1.38	1.17	8.03	4	162				96	83	17.5
2	27.5	599.43	.97	.82	9.32	3	161	243	249	45	97	83	17.5
1	30	600.62	.82	.69	0.50	3	162				97	83	17.3
B-12	32.5	602.15	1.48	1.25	2.09	4.5	163	240	255	46	94	85	17.4
11	35	603.63	1.25	1.06	3.55	4	163				99	84	17.2
10	37.5	604.99	1.20	1.01	4.99	5	163	243	258	47	98	85	17.2
9	40	606.63	1.27	1.08	6.46	4.5	163				99	85	17.2
8	42.5	608.21	1.42	1.21	8.03	5	161	249	255	47	100	85	17.1
7	45	609.77	1.41	1.20	9.59	5	161				100	86	17.4
6	47.5	611.30	1.39	1.19	1.14	5	161	245	257	47	101	86	17.3
5	50	612.80	1.37	1.17	2.68	4.5	161				101	86	17.2
4	52.5	614.38	1.49	1.28	4.29	5	161	247	253	48	102	87	17.2
3	55	615.95	1.42	1.22	5.86	5	159				102	87	17.2
2	57.5	617.46	1.50	1.28	7.47	5	162	243	256	48	102	88	17.3
1	60	619.04	1.48	1.27	9.08	5	162				102	88	17.2
	(1539)												
	0 - 60	V_m = 36.74		ΔH = 1.17							Avg. = 90.0		

INTERPOLL LABORATORIES, INC
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Sagola, MI Date 7-23-96 Test 1 Run 3

Source 'E' Tube / Outlet No. of traverse points 24

Method 5 Filter holder: Glass Filter type: 4" G.F.

Sample Train Leak Check:

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: 8432

Recovery solvent(s)

☑ acetone

☑ other(s) MeCl₂

No. of probe wash bottles: 1

Sample recovered by: M. Koehler + D. Helleman

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	664	494	170
Impinger No. 2	40	0	40
Impinger No. 3			
Condenser			
Desiccant	1380	1371	9
Total			219 ~~179~~ MK

Integrated Gas Sampling Data:

Bag Pump No. 31 B Box No. 1 Bag No. 3

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

Pretest leak check: 0 cc/min at 15 IN.HG

Time start: 1645 ~~30~~ (HRS) Time end: 1748 (HRS)

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

S/N of O_2 Analyzer used to monitor train outlet: 31A

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.P. / Sagola, MI
Source: 'E' Tube / outlet
Date: 2-23-96 Test 1 Run 3

Operators: M. Koehler + O. Hulleman
Meter Box No. 10 ΔH@ 1.93 in.WC
Gasmeter Coeff. .9973

Nozzle No. 2-3
Nozzle Dia. .188 in.
Bar. Press. 28.35 in.Hg

Pitot No. 4-M5-8
C_p .84
H_2O 20.9 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temp. (°F) Stack	Temp. (°F) Probe	Temp. (°F) Oven	Temp. (°F) Imp.	Temp. (°F) Gas/In	Temp. (°F) Gas/Out	Oxygen (% v/v)
	1645	619.90											
B-12	2.5	621.25	1.15	.98	1.30	3	159	243	256	43	84	84	12.5
11	5	622.83	1.27	1.07	2.76	3.5	159				84	83	12.3
10	7.5	624.05	1.30	1.10	4.24	4	159	247	251	44	86	83	12.4
9	10	625.55	1.27	1.07	5.70	4	160				88	82	12.4
8	12.5	627.12	1.35	1.14	7.21	4	159	239	246	44	89	82	12.9
7	15	628.71	1.44	1.22	8.77	4	159				91	82	12.4
6	17.5	630.33	1.41	1.20	0.31	4	158	243	255	45	92	82	12.6
5	20	631.97	1.49	1.27	1.91	4	158				93	82	12.5
4	22.5	633.61	1.51	1.28	3.51	4.5	158	244	257	45	94	82	12.4
3	25	635.22	1.45	1.23	5.08	4	159				95	82	12.5
2	27.5	636.79	1.53	1.31	6.70	4.5	157	249	251	47	96	82	12.4
1	30	638.37	1.48	1.26	8.29	4.5	159				96	82	12.4
A-12	32.5	639.98	1.57	1.33	9.93	4.5	160	245	256	48	92	84	12.0
11	35	641.63	1.39	1.18	1.46	4	161				96	84	12.3
10	37.5	643.20	1.42	1.21	3.02	4	161	241	257	48	97	84	12.2
9	40	644.84	1.47	1.25	4.61	4	163				98	84	12.2
8	42.5	646.27	1.56	1.32	6.24	4.5	163	245	253	49	99	84	12.3
7	45	647.99	1.68	1.43	7.94	5	163				99	85	12.3
6	47.5	649.69	1.50	1.28	9.54	4	163	241	250	51	100	85	12.4
5	50	651.27	1.54	1.31	1.17	4.5	163				100	85	12.4
4	52.5	652.93	1.51	1.28	2.78	4	164	237	254	51	101	86	12.5
3	55	654.49	1.46	1.24	4.37	4	164				101	86	12.5
2	57.5	655.85	1.15	.98	5.78	3.5	163	240	255	50	101	87	12.4
1	60	656.98	.78	.66	6.94	3	164				101	87	12.4
	(1748)												
	0 - 60	V_m = 37.08		ΔH = 1.19							Avg. = 99.2		

INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 2 Field Data Sheet

Job: LP SAGOLA
Source: DRYER RTO STACK
Test: 1 Run: 0 Date: 7-23-96
Stack Dimen.: 96.5 IN.
Dry Bulb: 252 °F Wet bulb: 130 °F
Manometer: ☒Reg. ☐Exp ☐Elec.
Barometric Pressure: 28.35 IN.HG
Static Pressure: -.54 IN.WC
Operators: J.B. / M.P.
Pitot No.: 427-5 C_p .84

* Particulate *

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
		Port Length: IN.		Time Start: HRS	
A 1				.63	
2				.73	
3				.77	
4				.78	
5				.80	
6				.75	
7				.79	
8				.82	
B 1				.65	
2				.73	
3				.74	
4				.78	
5				.79	
6				.78	
7				.81	
8				.82	
				fps = 60.76	
				ACFM = 185,162	
				DSCFM = 98,741	
				NO_x 7	
				CO 192	
Temp. Meas. Device & S/N: PDT #2				Time End: HRS	

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

LEAK CHECK PITOT

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/SAGULA   Date 7-23-96 Test 1 Run 1

Source DRYER RTO STACK   No. of traverse points 16

Method 5/202 Filter holder: GLASS   Filter type: GLASS

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) METH

No. of probe wash bottles: 1

Sample recovered by: SB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	744	502	242
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1500	1485	15
Total			257

Integrated Gas Sampling Data:

Bag Pump No. B6   Box No. 21 Bag No. 1

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

Pretest leak check: 0 cc/min at 15 IN.HG

Time start: 1132 (HRS) Time end: 12.31 (HRS)

Sampling rate: 400 cc/min Operator: SB

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

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(612) 786-6020

EPA Method 5 Field Data Sheet

Job LP S96 OLA
Source DRYER RTO STACK
Date 2-23-96 Test 1 Run 1

Operators SB / MP
Meter Box No. 15 ΔH@ 1.79 in.WC
Gasmeter Coeff. .9964

Nozzle No. 5-2
Nozzle Dia. .245 in.
Bar. Press. 28.35 in.Hg

Pitot No. U27-5
C_p .84
H_2O 24 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1132)	(393.33)											
A 1	4	396.37	1.00	1.78	6.38	7	271	247	231	48	80	80	17.5
2	8	399.63	1.10	2.00	9.68	10	254	245	231	49	81	79	17.5
3	12	403.10	1.20	2.18	3.13	10	256	251	230	42	80	80	17.3
4	16	405.60	.65	1.17	5.66	6	263	250	231	42	82	80	17.4
5	20	408.38	.77	1.39	8.41	7	262	252	229	45	84	80	17.1
6	24	411.13	.75	1.36	1.14	7	260	247	230	47	86	80	17.2
7	28	413.92	.76	1.39	3.91	7	256	245	232	50	88	80	17.1
8	32	416.40	.60	1.10	6.36	5	250	246	230	51	89	80	17.2
B 1	36	419.20	.80	1.46	9.19	7	260	248	233	55	87	81	17.3
2	40	42[illegible].96	.78	1.43	2.00	7	255	245	238	56	90	82	17.3
3	44	424.78	.79	1.45	4.83	7	258	247	237	57	90	82	17.0
4	48	427.56	.75	1.37	7.58	7	259	250	235	58	91	82	17.0
5	52	430.30	.77	1.40	0.36	7	267	248	238	41	92	83	17.1
6	56	433.12	.78	1.42	3.16	7	263	249	237	43	93	83	17.2
7	60	435.91	.78	1.42	5.97	7	265	250	235	44	93	84	17.3
8	64	438.63	.73	1.33	8.68	7	265	250	236	45	94	84	17.3
	(1331)												
	θ = 64	V_m = 45.3		ΔH = 1.48							Avg. = 84.3		

1142 down restart 1330

081194 GASTACK\WPAFORMS\S 518

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / BAGOLA Date 7-23-96 Test C Run 2

Source DRYER RTO STACK No. of traverse points 16

Method 5/202 Filter holder: GLASS Filter type: GLASS

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) MCL2

No. of probe wash bottles: ______

Sample recovered by: SB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	714	475	239
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1440	1435	5
Total	░░░░░░		244

Integrated Gas Sampling Data:

Bag Pump No. 66 Box No. 21 Bag No. 2

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

Pretest leak check: 0 cc/min at 15 IN.HG

Time start: 1135 (HRS) Time end: 1540 (HRS)

Sampling rate: 400 cc/min Operator: SB

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

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[redacted]
(612) 786-6020

EPA Method 5 Field Data Sheet

Job L.P. / SAGOLA
Source DRYER RTO STACK
Date 7-23-96 Test 1 Run 2

Operators J.D. / MP.
Meter Box No. 15 ΔH@ 1.74 in.WC
Gasmeter Coeff. .9964

Nozzle No. 5-2
Nozzle Dia. .245 in.
Bar. Press. 28.35 in.Hg

Pitot No. V27-5
C_p .84
H_2O 28 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1435)	(438.92)											
B 1	4	441.50	.76	1.26	1.55	6	262	273	232	56	83	83	16.8
2	8	444.19	.80	1.31	4.24	6	268	271	235	57	85	83	16.7
3	12	446.85	.77	1.28	6.88	6	263	270	234	58	87	83	17.0
4	16	449.55	.79	1.30	9.56	6	267	265	237	42	90	83	17.0
5	20	452.25	.77	1.27	2.21	6	269	249	241	47	91	83	16.9
6	24	454.89	.78	1.30	4.89	6	265	251	242	48	93	84	17.2
7	28	457.51	.75	1.25	7.52	6	265	253	240	48	93	84	17.0
8	32	459.90	.62	1.04	9.93	5	259	252	241	49	94	85	16.9
A 1	36	462.68	.84	1.41	2.72	6	260	250	243	51	92	85	16.9
2	40	465.50	.86	1.45	5.56	7	257	254	247	53	95	86	17.0
3	44	468.35	.84	1.42	8.36	7	259	253	248	54	95	86	16.9
4	48	470.93	.70	1.18	0.93	6	258	255	249	44	96	86	16.9
5	52	473.60	.75	1.26	3.58	6	262	253	250	45	96	86	17.0
6	56	476.32	.80	1.35	6.32	7	261	252	250	47	96	87	16.8
7	60	478.95	.74	1.24	8.94	6	265	254	251	48	97	87	16.8
8	64	481.33	.62	1.04	1.35	5	265	253	250	49	97	87	16.8
	(1540)												
	θ = 64	V_m = 42.41		ΔH = 1.27							Avg. = 88.6		

081194 GASTACK\WP\FORMS\S-5.18

INTERPOLL LABORATORIES, INC
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/SAGOLA Date 7-23-96 Test 1 Run 3

Source DRYER RTO STACK No. of traverse points 16

Method 5/202 Filter holder: GLASS Filter type: GLASS

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) MCT?

No. of probe wash bottles:

Sample recovered by: JD

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	771	509	262
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1472	1463	9
Total			271

Integrated Gas Sampling Data:

Bag Pump No. B6 Box No. 21 Bag No. 3

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

Pretest leak check: 0 cc/min at 15 IN.HG

Time start: 1645 (HRS) Time end: 1751 (HRS)

Sampling rate: 400 cc/min Operator: JB

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

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[redacted] LE [redacted] L I [redacted] RA [redacted] ES, [redacted]

(612) 786-6020

EPA Method 5 Field Data Sheet

Job LP / SAGOLA   Operators J.B. / M.P.   Nozzle No. 5-2'   Pitot No. U27-5
Source DRYER RTO STACK   Meter Box No. 15 ΔH@ 1.79 in.WC   Nozzle Dia. .245 in. C_p .84
Date 7-23-96 Test 1 Run 3   Gasmeter Coeff. .9964   Bar. Press. 28.35 in.Hg H_2O 23 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1645)	(481.60)											
A 1	4	484.50	.84	1.58	4.55	7	260	245	247	48	86	86	17.1
2	8	487.51	.86	1.61	7.53	7	257	246	250	49	89	85	17.2
3	12	490.37	.80	1.50	0.41	7	261	247	247	51	91	85	17.2
4	16	493.27	.80	1.49	3.28	7	264	246	249	52	93	85	17.1
5	20	496.10	.77	1.44	6.11	7	264	245	251	53	94	85	17.2
6	24	498.93	.79	1.49	8.98	7	257	245	250	54	95	86	17.1
7	28	501.80	.76	1.44	1.81	7	257	247	251	56	96	86	17.2
8	32	504.43	.66	1.25	4.45	6	258	246	251	57	96	86	17.0
B 1	36	507.34	.80	1.51	7.35	7	260	252	257	41	94	87	17.1
2	40	510.22	.79	1.49	0.22	7	259	255	260	42	97	88	16.8
3	44	513.10	.80	1.51	3.13	7	260	257	262	42	97	88	16.6
4	48	515.90	.78	1.46	5.98	7	268	254	260	44	98	88	16.9
5	52	518.78	.79	1.48	8.86	7	267	255	261	45	98	88	16.8
6	56	521.65	.78	1.46	1.71	7	268	257	260	47	98	89	16.8
7	60	524.45	.75	1.42	4.53	7	261	256	262	48	99	89	16.8
8	64	527.34	.75	1.42	7.35	7	263	258	261	49	99	89	16.8
	(1751)												
	θ - 64	V_m - 45.74		ΔH - 1.41							Avg. - 90.9		

C-39

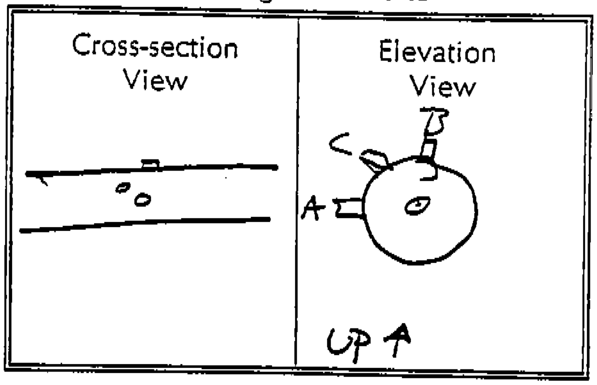
081194 GASTACKWPAFORMS\5 518

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: CP/Sagola
Source: Primary Cyclone Exhaust #1
Test: 4 Run: 2 Date: 7-24-96
Stack Dimen.: 40 IN.
Dry Bulb: ____ °F Wet bulb: ____ °F
Manometer: ☒ Reg. ☐Exp ☐Elec.
Barometric Pressure: 28.33 IN.HG
Static Pressure: -9.0 IN.WC
Operators: SB/SF
Pitot No.: V22.5 C_p: 0.84
CH_2O

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
		Port Length: 6	IN.	Time Start:	HRS
A 1	.032	1.28	7.28		
2	.105	4.20	10.20		
3	.194	7.76	13.76		
4	.323	12.92	18.92		
5	.677	27.08	33.08		
6	.806	32.24	38.24		
7	.895	35.80	41.80		
8	.960	38.72	44.72		
Temp. Meas. Device & S/N: DIGITAL TC - PDT 40				Time End:	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 CP/Sagola Date 7-24-96 Test 4 Run 1

Source Primary Cyclone Exhaust #1 No. of traverse points 16

Method 0011 Filter holder: N/A Filter type: N/A

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒

Post test: 0.00 cfm at 15 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: Recovery solvent(s)

—

—

☐ acetone

☒ other(s) MeCl2

No. of probe wash bottles: 1

Sample recovered by: SUB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	663	464	199
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1513	1493	20
Total			219

Integrated Gas Sampling Data:

Bag Pump No. 22A Box No. 2 Bag No. 1

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

Pretest leak check: 0.00 cc/min at 16 IN.HG

Time start: 1710 (HRS) Time end: 1828 (HRS)

Sampling rate: 400 cc/min Operator: S

S/N of O_2 Analyzer used to monitor train outlet: 8

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 5 Field Data Sheet

Job: ~~Primary Cyclone~~ P/Sagola
Source: Primary Cyclone Exhaust #1
Date: 7-24-96 Test 4 Run 1

Operators: SE/SB
Meter Box No. 13 ΔH@ 1.84 in.WC
Gasmeter Coeff. 1.0024

Nozzle No. 4-3
Nozzle Dia. .189 in.
Bar. Press. 28.53 in.Hg

Pitot No. U22-5
C_p 0.84
H_2O 22 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Stack (°F)	Probe (°F)	Oven (°F)	Imp. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (% v/v)
	(1760)	(966.25)											
A - 8	4	968.74	1.70	1.22	8.80	7	228	254	N/A	49	83	83	18.5
7	8	971.03	1.65	1.17	1.28	8	228	254	↓	49	90	83	18.7
6	12	973.80	1.75	1.24	3.85	9	230	244	↓	48	92	83	18.8
5	16	976.42	1.80	1.28	6.46	9	229	244	↓	48	95	83	18.9
4	20	979.00	1.80	1.28	9.08	9	230	244	↓	48	97	84	18.9
3	24	981.70	1.90	1.36	1.78	10	227	244	↓	48	98	83	18.9
2	28	984.30	1.90	1.36	4.48	10	228	246	↓	47	99	84	18.7
1	32	987.29	2.05	1.48	7.29	11	227	248	↓	46	99	85	18.7
B - 8	36	989.99	1.85	1.34	9.97	10	225	244	↓	46	94	86	17.9
7	40	992.70	1.70	1.22	2.53	11	226	244	↓	47	96	86	18.1
6	44	995.04	1.60	1.15	5.01	10	228	244	↓	47	98	86	18.4
5	48	997.94	1.70	1.22	7.57	10	230	246	↓	47	99	86	18.2
4	52	1000.43	1.70	1.22	0.13	10	230	246	↓	47	99	86	18.1
3	56	1002.81	1.70	1.21	2.68	9	226	244	↓	48	100	87	18.1
2	60	1005.38	1.80	1.30	5.33	9	225	248	↓	49	101	87	18.3
1	64 (1828)	1007.90	1.75	1.26	7.93	9	231	249	↓	49	102	86	17.7
	θ - 64	V_m - 41.65		ΔH - 1.27							Avg. - 90.6		

INTERPOLL LABORATORIES, INC
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/Sagola Date 7-24-96 Test 4 Run 2
Source Primary Cyclone Exhaust #1 No. of traverse points 16
Method 0011 Filter holder: N/A Filter type: N/A

Sample Train Leak Check:
Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: .000 cfm at 15 IN. HG (vac) ☒

Particulate Catch Data:
No. of filters used: Recovery solvent(s)

— ☐acetone ____
— ☒other(s) MeCl₂

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	679	471	208
Impinger No. 3			
Condenser			
Desiccant	1383	1355	28
Total			236

Integrated Gas Sampling Data:

Bag Pump No. 22A Box No. 2 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0.00 cc/min at 16 IN.HG
Time start: 1915 (HRS) Time end: 2020 (HRS)
Sampling rate: 400 cc/min Operator: SF

S/N of O_2 Analyzer used to monitor train outlet: 8

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Field Data Sheet

Job: LP/Sagola
Source: Primary Cyclone Exhaust #1
Date: 7-24-96 Test: 4 Run: 2

Operators: SF/SB
Meter Box No.: 13 ΔH@ 1.84 in.WC
Gasmeter Coeff.: 1.0084

Nozzle No.: 4-3
Nozzle Dia.: .189 in.
Bar. Press.: 28.33 in.Hg

Pitot No.: V22-5
C_p: 0.84
H_2O: 22 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1915)	(1008.60)											
B - 8	4	1011.26	1.85	1.33	1.24	9	227	245	N/A	49	87	86	18.1
7	8	1013.89	1.75	1.24	3.83	9	232	246	↓	49	90	85	18.2
6	12	1016.45	1.65	1.17	6.33	9	232	246		48	92	86	18.2
5	16	1019.07	2.00	1.42	9.08	9	231	246		48	93	85	18.6
4	20	1021.77	2.05	1.46	1.87	9	233	246		47	95	88	18.6
3	24	1024.44	2.15	1.52	4.72	10	236	246		47	97	85	18.8
2	28	1027.37	2.10	1.51	7.56	11	234	247		47	98	88	18.9
1	32	1030.39	2.10	1.49	0.39	11	235	245		50	98	86	18.4
A - 8	36	1032.99	1.70	1.21	2.94	11	235	246		50	97	86	18.4
7	40	1035.82	1.75	1.25	5.53	10	234	246		51	98	86	18.4
6	44	1038.25	1.70	1.22	8.09	9	231	246		50	98	86	18.4
5	48	1040.64	1.60	1.15	0.57	9	230	246		50	99	86	18.0
4	52	1043.09	1.75	1.25	3.17	10	231	240		50	100	86	18.2
3	56	1045.72	1.80	1.29	5.80	11	229	241		50	100	86	18.6
2	60	1048.34	1.75	1.26	8.41	11	227	244		50	101	86	18.2
1	64	1051.00	1.85	1.34	1.09	11	227	244	↓	50	101	87	18.2
	(2020)												
	0 - 64	V_m - 42.40		ΔH - 1.32							Avg. - 91.1		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP - SAGOLA Date 7-24-96 Test 4 Run 3

Source #1 PRIMARY CYCLONE EXHAUST No. of traverse points 16

Method 0011 Filter holder: N/A Filter type: N/A

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☑

Post test: 0.00 cfm at 15 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: — —

Recovery solvent(s)

☐ acetone

☒ other(s) MeCl2

No. of probe wash bottles: 1

Sample recovered by: SLB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	629	421	208
Impinger No. 3			
Condenser			
Desiccant	1578	1555	23
Total			231

Integrated Gas Sampling Data:

Bag Pump No. 22A Box No. 2 Bag No. 3

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

Pretest leak check: 00 cc/min at 15 IN.HG

Time start: 2040 (HRS) Time end: 2144 (HRS)

Sampling rate: 400 cc cc/min Operator: SLB

S/N of O_2 Analyzer used to monitor train outlet: 8

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INTERPOLL LABORATORIES, INC.
(612) 786-6020
EPA Method 5 Field Data Sheet

Job: LP-SAYOLA
Source: #1 PRIMARY CYCLONE EXHAUST
Date: 7-24-96 Test 4 Run 3
Operators: SLB+GF
Meter Box No. 13 ΔH@ 1.84 in.WC
Gasmeter Coeff. 1.0024
Nozzle No. 4-3
Nozzle Dia. .189 in.
Bar. Press. 28.37 in.Hg
Pitot No. V22-5
C_p .840
H_2O 2 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temp. (°F) Stack	Temp. (°F) Probe	Temp. (°F) Oven	Temp. (°F) Imp.	Temp. (°F) Gas/In	Temp. (°F) Gas/Out	Oxygen (% v/v)
	(2010)	(1051.74)											
A-8	4	1054.20	1.50	1.09	4.16	10	233	249	N/A	48	89	86	18.4
7	8	1056.60	1.60	1.16	6.64	10	234	249		48	91	86	18.4
6	12	1059.10	1.60	1.16	9.12	10	235	248		49	94	86	18.4
5	16	1061.70	1.55	1.14	1.60	10	222	249		50	94	85	18.3
4	20	1064.19	1.70	1.25	4.19	10	222	251		51	96	85	18.3
3	24	1066.70	1.65	1.21	6.74	10	225	251		50	96	85	18.2
2	28	1069.20	1.55	1.14	9.21	10	225	250		50	97	85	18.2
1	32	1071.60	1.55	1.14	1.68	10	224	250		51	98	85	18.6
B-8	36	1074.24	1.60	1.18	4.20	10	227	251		52	96	85	18.4
7	40	1076.80	1.75	1.28	6.82	10	227	254		51	96	85	18.4
6	44	1079.49	1.70	1.25	9.10	10	228	254		51	97	85	18.9
5	48	1081.99	1.65	1.21	1.95	11	230	254		51	98	85	18.4
4	52	1084.49	1.55	1.14	4.42	10	224	254		50	98	85	18.8
3	56	1086.99	1.65	1.22	6.98	10	222	254		49	98	86	18.6
2	60	1089.50	1.70	1.26	9.58	10	224	256		48	98	85	18.7
1	64	1092.18	1.70	1.26	2.18	10	223	256		48	98	85	18.6
	(2144)												
	θ - 64	V_m - 40.44		ΔH - 1.19							Avg. - 90.8		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job L.P Sagola
Source No 2 Cyclone Outlet
Test 4 Run ___ Date 7/24/96
Stack Dimen. 41.5 IN.
Dry Bulb ______ °F Wet bulb ______ °F
Manometer ☐ Reg. ☐Exp ☐Elec.
Barometric Pressure 28.33 IN.HG
Static Pressure -8.6 IN.WC
Operators D. Van Hoever & J. Lorenz
Pitot No. V23-5 C_p .84
* CH_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
		Port Length: IN.		Time Start: HRS	
A 1					
2					
3					
4					
5					
6					
B 1					
2					
3					
4					
5					
6					
Temp. Meas. Device & S/N: PDT #35				Time End: HRS	

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

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INTERPOLL LABORATORIES, INC.
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. Sagola Date 7/24/96 Test 4 Run 1
Source No 2 Cyclone Outlet No. of traverse points 12
Method 0011 Filter holder: NA Filter type: NA

Sample Train Leak Check:
Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☐
Post test: 0 cfm at 9 IN. HG (vac) ☐

Particulate Catch Data:
No. of filters used: Recovery solvent(s)

☐acetone
☒other(s) MeCl₂ & DI H_2O

No. of probe wash bottles: 1
Sample recovered by: DAH
Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	346	200	146
Impinger No. 3			
Condenser			
Desiccant	~~1525~~ DAH 1335	~~1515~~ DAH 1317	~~10~~ 18
Total			DAH ~~156~~ 164

Integrated Gas Sampling Data:

Bag Pump No. 29a Box No. 29 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 IN.HG
Time start: 1715 (HRS) Time end: 1830 (HRS)
Sampling rate: 400 cc/min Operator: DAH

S/N of O_2 Analyzer used to monitor train outlet: 4

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[redacted] NTE [redacted] LL L [redacted] RA [redacted] ES, [redacted]
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EPA Method 5 Field Data Sheet

Job L.P. Sagola
Source No. 2 Cyclone Outlet
Date 7/24/96 Test 4 Run 1

Operators DCH & TC
Meter Box No. 5 ΔH@ 1.80 in.WC
Gasmeter Coeff. 1.0056

Nozzle No. 6-3
Nozzle Dia. .179 in.
Bar. Press. 28.33 in.Hg

Pitot No. U23-5
C_p .84
H_2O 2 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1710	170.83											
B 6	5	173.87	2.0	1.10	3.88	6	205	257	NA	53	94	88	16.7
5	10	176.80	2.0	1.09	6.93	6	207				98	90	16.7
4	15	179.96	2.0	1.09	9.98	6	212	258		54	98	90	16.9
3	20	182.88	1.8	.99	2.90	6	204				100	90	17.6
2	25	185.84	1.70	.93	5.72	6	214	261		57	101	90	17.0
1	30	188.20	1.3	.71	8.19	5	214				101	91	17.2
A 6	35	191.31	2.05	1.12	1.29	6	214	264		53	96	90	17.8
5	40	194.46	2.1	1.15	4.42	6	209				100	91	17.7
4	45	197.47	2.0	1.09	7.48	6	212	261		54	101	91	17.7
3	50	200.51	2.05	1.12	0.59	6	212				101	91	16.8
2	55	203.23	1.55	.84	3.27	6	224				102	91	17.3
1	60	205.56	1.05	.57	5.50		211				101	91	16.9
	(1830)												
	0-60	V_m - 34.1		ΔH - .98							Avg. - 94.8		

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. Sagola Date 7/24/86 Test 4 Run 2

Source No 2 Cyclone Outlet No. of traverse points 12

Method 0011 Filter holder: NA Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒

Post test: 0 cfm at 11 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

☐ acetone

☒ other(s) MeCl$_2$ + DI H_2O

No. of probe wash bottles: 1

Sample recovered by: DH

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	420	200	220
Impinger No. 3			
Condenser			
Desiccant	1510	1504	6
Total			226

Integrated Gas Sampling Data:

Bag Pump No. 29a Box No. 29 Bag No. 2

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

Pretest leak check: 0 cc/min at 14 IN.HG

Time start: 1920 (HRS) Time end: 2016 (HRS)

Sampling rate: 400 cc/min Operator: DH

S/N of O_2 Analyzer used to monitor train outlet: 4

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EPA Method 5 Field Data Sheet

Job: L.P. Sagola
Source: No 2 Cyclone Outlet
Date: 7/24/96 Test 4 Run 2

Operators: DH + J.C
Meter Box No.: 5 ΔH@ 1.80 in.WC
Gasmeter Coeff.: 1.0056

Nozzle No.: 6-3
Nozzle Dia.: .179 in.
Bar. Press.: 28.33 in.Hg

Pitot No.: (123-5
C_p: .84
H_2O: 2 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1915	206.60											
A 6	5	209.91	2.10	1.23	9.87	5	211	257	NA	47	89	89	18.0
5	10	212.99	2.0	1.17	2.98	5	205				94	90	17.8
4	15	216.27	2.10	1.22	6.21	5	209	259		49	96	90	17.7
3	20	219.26	1.70	1.0	9.13	5	207				98	90	16.4
2	25	222.23	1.70	1.0	2.05	5	206	261		49	99	91	16.9
1	30	224.86	1.45	.84	4.76	5	206				97	91	16.8
B 6	35	228.10	2.20	1.29	8.09	6	206	260		53	98	91	16.8
5	40	231.40	2.0	1.18	1.26	6	206				100	91	16.8
4	45	234.07	1.70	.99	4.19	6	211	262		53	100	92	16.7
3	50	237.07	1.60	.94	7.04	6	205				100	92	17.5
2	55	239.76	1.60	.94	9.89	6	205	264		54	100	92	16.2
1	60	242.65	1.45	.86	2.60		205				99	92	16.2
	(2017)												
	0 - 60	V_m - 36.05		ΔH - 1.06							Avg. - 94.2		

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INTERPOLL LABORATORIES, INC.
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. Sagola Date 7/24/96 Test 4 Run 3
Source No 2 Cyclone Outlet No. of traverse points 12
Method 0011 Filter holder: NA Filter type: NA

Sample Train Leak Check:
Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: 0 cfm at 10 IN. HG (vac) ☒

Particulate Catch Data:
No. of filters used:

Recovery solvent(s)
☐acetone
☒other(s) MeCl₂ + DI H₂O

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	374	200	174
Impinger No. 3			
Condenser			
Desiccant	1344	1335	9
Total			183

Integrated Gas Sampling Data:

Bag Pump No. 29A Box No. 29 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 14 IN.HG
Time start: 2044 (HRS) Time end: 2142 (HRS)
Sampling rate: 400 cc/min Operator: DJH

S/N of O_2 Analyzer used to monitor train outlet: 4

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(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.P. Segola
Source: No 2 Cyclone Outlet
Date: 7/24/96 Test: 4 Run: 3

Operators: DW + J.C
Meter Box No.: 5 ΔH@ 1.80 in.WC
Gasmeter Coeff.: 1.0056

Nozzle No.: 6-3
Nozzle Dia.: .179 in.
Bar. Press.: 28.33 in.Hg

Pitot No.: U23-5
C_p: .84
H_2O: 23 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	2040	243.70											
A 6	5	246.91	2.10	1.20	6.90	7	209	251	NA	61	90	87	21.1
5	10	250.07	2.0	1.19	0.08	7	209				90	94	17.1
4	15	253.27	2.10	1.20	3.28	7	210	263		54	95	90	16.8
3	20	256.41	2.0	1.14	6.40	7	208				96	90	16.3
2	25	258.90	1.3	.74	8.92	6	208	264		53	97	90	16.2
1	30	261.60	1.3	.74	1.45	6	208				97	90	16.6
B 6	35	264.56	1.95	1.12	4.54	6	208	263		53	95	89	17.0
5	40	267.66	1.95	1.11	7.62	6	208				97	90	17.2
4	45	270.51	1.80	1.03	0.59	6	208	264		54	97	90	17.3
3	50	273.41	1.60	.91	3.39	6	210				97	90	17.3
2	55	276.31	1.70	.97	6.26		213				97	90	17.2
1	60	278.95	1.50	.85	8.97		213				97	90	17.4
	(2142)												
	0 - 60	V_m - 35.25		ΔH - 1.02							Avg. - 92.7		

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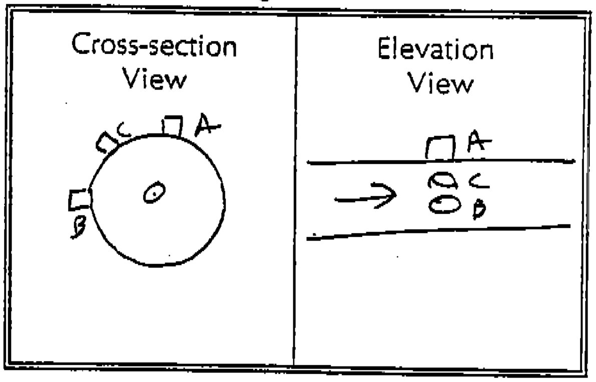
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: L.P Sagola
Source: Dryer Primary Cyclone Exhaust 3
Test: 4 Run: 2 Date: 7-24-96
Stack Dimen.: 40 IN.
Dry Bulb: ____ °F Wet bulb: ____ °F
Manometer: ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.33 IN.HG
Static Pressure: -9.0 IN.WC
Operators: E Ivers + Lee Hansen
Pitot No.: TF-6 C_p .840
CH_2O

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
		Port Length: IN.		Time Start: HRS	
A 1	.044	1.76	11.26		
2	.146	5.84	15.34		
3	.296	11.84	21.34		
4	.704	28.16	37.66		
5	.854	34.16	43.66		
6	.956	38.24	47.74		
B 1					
2					
3					
4					
5					
6					
Temp. Meas. Device & S/N:				Time End: HRS	

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

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INTERPOLL LABORATORIES, INC.
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job C.P. Sagola

Date 7-24-96 Test 4 Run 1

Source Dryer Primary Cyclone Exhaust 3

No. of traverse points 12

Method 0011 Filter holder: —

Filter type: —

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☑

Post test: ≤.02 cfm at 11 IN. HG (vac) ☑

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

☐acetone

☑other(s) DI, MeCl2

No. of probe wash bottles:

Sample recovered by: ES

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	656	475	181
Impinger No. 2	502	473	29
Impinger No. 3			
Condenser			
Desiccant	1529	1515	14
Total			224

Integrated Gas Sampling Data:

Bag Pump No. 29B

Box No. 5 Bag No. 1

Bag Material: 5-layer Aluminized Tedlar

Size: 44 L

Pretest leak check: 0 cc/min at 15 IN.HG

Time start: 1710 (HRS) Time end: 1828 (HRS)

Sampling rate: 400 cc/min Operator: ES

S/N of O_2 Analyzer used to monitor train outlet: 29B

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.P. Sagoler
Source: Boyer Primary Cyclone Exhaust 3
Date: 7-24-96 Test 4 Run 1

Operators: EJ CK
Meter Box No.: 17 ΔH@ 1.73 in.WC
Gasmeter Coeff.: 1.0032

Nozzle No.: 8-3
Nozzle Dia.: .189 in.
Bar. Press.: 28.33 in.Hg

Pitot No.: Tef-6
C_p: .840
H_2O: 24 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1710)	599.20											
B 6	5	602.49	2.15	1.41	2.72	7	215	240	–	45	85	85	16.7
5	10	605.75	1.9	1.21	5.99	7	228	239	–	46	87	85	16.6
4	15	609.20	1.9	1.22	9.27	7	224	241	–	49	88	85	17.2
3	20	612.34	2.0	1.29	2.64	8	221	243	–	51	86	85	17.4
2	25	614.73	1.9	1.22	5.93	8	224	235	–	53	92	85	17.1
1	30	619.10	1.7	1.10	9.05	8	224	240	–	51	93	86	17.1
A 6	35	622.67	2.2	1.43	2.60	9	224	240	–	52	91	87	17.3
5	40	626.28	2.1	1.36	6.08	9	223	241	–	53	99	85	17.3
4	45	629.73	2.0	1.31	9.49	8	222	246	–	54	93	88	17.7
3	50	633.05	1.8	1.17	2.72	7.5	227	243	–	55	94	88	17.6
2	55	636.14	1.7	1.11	5.85	7	223	240	–	50	92	89	17.4
1	60	639.20	1.6	1.05	8.90	7	219	240	–	51	94	89	17.4
	(1820)												
	0-60	V_m - 40		ΔH - 1.24							Avg. - 88.7		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. Sagola Date 7-24-96 Test 4 Run 2
Source Dryer Primary Cyclone Exhaust 3 No. of traverse points 12
Method 0011 Filter holder: ____ Filter type: ____

Sample Train Leak Check:
Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: ≤.02 cfm at 14 IN. HG (vac) ☒

Particulate Catch Data:
No. of filters used: ____

Recovery solvent(s)
☐acetone ____
☒other(s) DI, MeCl2

No. of probe wash bottles: ____
Sample recovered by: ES LH

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	499	472	27
Impinger No. 2	685	472	213
Impinger No. 3			
Condenser			
Desiccant	1510	1498	12
Total			252

Integrated Gas Sampling Data:

Bag Pump No. 29B Box No. 5 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 IN.HG
Time start: 1915 (HRS) Time end: 2015 (HRS)
Sampling rate: 400 cc/min Operator: ES

S/N of O_2 Analyzer used to monitor train outlet: 290

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INTERPOLL LABORATORIES, INC.

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EPA Method 5 Field Data Sheet

Job	C.P. Sagola	Operators	ES LIt	Nozzle No.	8-3
Source	Dryer Primary Cyclone Exhaust 3	Meter Box No.	17 ΔH@ 1.73 in.WC	Nozzle Dia.	.189 in.
Date	7-24-96 Test 4 Run 2	Gasmeter Coeff.	1.0032	Bar. Press.	28.33 in.Hg
Pitot No.	TEFl-6	C_p	.840	H_2O	22 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1915)	(639.90)											
A 6	5	643.39	2.2	1.49	3.53	7	223	234	–	48	87	87	16.8
5	10	647.	2.1	1.42	7.07	8.5	221	238		48	91	87	16.8
4	15	650.37	1.9	1.29	0.45	8	222	240	–	49	92	87	17.0
3	20	653.76	1.8	1.22	3.74	8	222	243	–	51	92	87	16.8
2	25	657.07	1.8	1.22	7.04	8	221	239	–	53	92	87	17.2
1	30	660.17	1.6	1.09	0.14	7.5	221	240	–	55	93	88	16.8
B 6	35	663.67	2.0	1.36	3.62	9	222	240	–	50	92	88	17.0
5	40	667.07	2.0	1.36	7.09	9	224	243	–	50	92	87	17.4
4	45	670.38	1.8	1.22	0.38	8.5	223	241	–	51	92	87	17.4
3	50	673.74	1.9	1.29	3.76	9	223	246	–	49	92	88	17.8
2	55	677.07	1.8	1.22	7.05	8.5	224	255	–	50	92	88	17.7
1	60	680.29	1.6	1.08	0.15	8	224	250	–	52	92	88	17.8
	(2015)												
	0 - 60	V_m - 40.39		ΔH - 1.27							Avg. - 89.5		

INTERPOLL LABORATORIES, INC
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. Sagola
Source Dryer Primary Cyclone Exhaust 3
Method 0011 Filter holder: ________

Date 7-24-96 Test 4 Run 3
No. of traverse points 12
Filter type: ________

Sample Train Leak Check:
Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: ≤.02 cfm at 10 IN. HG (vac) ☒

Particulate Catch Data:
No. of filters used:

____
____

Recovery solvent(s)

☐acetone ________
☒other(s) DI, MeCl2

No. of probe wash bottles: ________
Sample recovered by: ES LH

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	662	471	191
Impinger No. 2	510	467	43
Impinger No. 3			
Condenser			
Desiccant	1497	1486	11
Total			245

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: 2040 (HRS)
Sampling rate: 400 cc/min

Box No. 5 Bag No. 3
Size: 44 L
Time end: 2140 (HRS)
Operator: ES

S/N of O_2 Analyzer used to monitor train outlet: 29B

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INTERPOLL LABORATORIES, INC.

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EPA Method 5 Field Data Sheet

Job: C.P. Sagola
Source: Dryer Primary Cyclone Exhaust 3
Date: 7-24-96 Test 4 Run 3

Operators: ES CH
Meter Box No. 17 ΔH@ 1.73 in.WC
Gasmeter Coeff. 1.0032

Nozzle No. 8-3
Nozzle Dia. .189 in.
Bar. Press. 28.33 in.Hg

Pitot No. TF-6
C_p .870
H_2O 23 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Stack (°F)	Probe (°F)	Oven (°F)	Imp. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (% v/v)
	(2040)	(680.80)											
B 6	5	684.13	2.0	1.33	4.23	7	223	240	N/A	46	86	86	17.2
5	10	687.48	1.9	1.25	7.54	7	226	243		49	89	86	16.9
4	15	690.80	1.7	1.13	0.70	7	222	239		49	90	87	17.2
3	20	693.94	1.6	1.06	3.76	7	225	240		51	91	87	17.3
2	25	697.04	1.8	1.19	7.00	7	225	243		52	91	86	17.2
1	30	700.08	1.7	1.12	0.16	7	224	243		53	91	87	17.4
A 6	35	703.65	2.1	1.39	3.67	9	224	236		50	90	87	17.3
5	40	707.10	2.1	1.39	7.18	9	223	235		51	90	86	17.1
4	45	710.55	2.0	1.32	0.59	9	224	234		47	90	86	17.3
3	50	713.90	1.8	1.19	3.84	8.5	224	236		49	90	85	17.5
2	55	716.98	1.7	1.12	6.99	8	223	240		51	90	86	17.8
1	60	719.98	1.5	.99	9.96	6	222		↓		90	86	17.8
	(2140)												
	0 - 60	V_m - 39.18		ΔH - 1.21							Avg. -	88.0	

INTERPOLL LABORATORIES, INC.
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EPA Method 2 Field Data Sheet

Job LP / SAGOLA
Source DRYER RTO STACK
Test 4 Run 0 Date 7-24-96
Stack Dimen. 96.5 IN.
Dry Bulb 260 °F Wet bulb ______ °F
Manometer ☒ Reg. ☐Exp ☐Elec.
Barometric Pressure 28.35 IN.HG
Static Pressure -.54 IN.WC
Operators JB-\ M.P.
Pitot No. V27-5 C_p .84

Drawing of Test Site

Cross-section View	Elevation View

$(H_2O$

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas
		Port Length: 5.5 IN.		Time Start: 1600 HRS	
A 1				.61	
2				.72	
3				.75	
4				.80	↑
5				.73	
6				.80	
7				.81	
8				.79	
B 1				.67	260
2				.71	↓
3				.74	
4				.80	
5				.76	
6				.81	
7				.84	
8				.80	
Temp. Meas. Device & S/N: POT #2				Time End: HRS	

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

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INTERPOLL LABORATORIES, INC.
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CP/SAGOLA Date 7-24-96 Test 4 Run 1
Source DRYER RTO STACK No. of traverse points 16
Method 0011 Filter holder: ______ Filter type: ______

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: SB.

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	802	579	223
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1512	1470	42
Total			265

Integrated Gas Sampling Data:

Bag Pump No. B6 Box No. 17 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 IN.HG
Time start: 1710 (HRS) Time end: 1830 (HRS)
Sampling rate: 400 cc/min Operator: SB

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

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(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.P. / SAGOLA
Source: DRYER RTO STACK
Date: 7-24-96 Test: 4 Run: 1

Operators: J.S. / M.P.
Meter Box No.: 4 ΔH@ 1.78 in.WC
Gasmeter Coeff.: .9957

Nozzle No.: ~~270~~ GLASS
Nozzle Dia.: .270 in.
Bar. Press.: 28.31 in.Hg

Pitot No.: V27-5
C_p: .84
H_2O: 23 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1510)	(942.79)											
A 1	4	946.02	.74	1.99	6.07	10	260	248	273	41	70	69	
2	8	949.40	.78	2.08	9.42	10	259	250	272	40	71	70	
3	12	952.81	.82	2.18	2.85	10	254	251	270	41	72	70	
4	16	956.25	.86	2.29	6.36	11	260	249	273	42	72	70	
5	20	959.80	.81	2.17	9.78	10	257	250	271	44	73	71	
6	24	963.16	.78	2.09	3.14	10	258	251	272	45	73	71	
7	28	966.50	.80	2.14	6.54	10	258	250	270	46	73	71	
8	32	969.95	.83	2.21	0.00	10	260	252	270	47	74	72	
B 1	36	973.61	.86	2.30	3.53	11	259	254	268	49	73	72	
2	40	977.09	.84	2.23	7.00	10	263	252	271	51	94	73	
3	44	980.45	.79	2.10	0.38	10	265	250	267	52	75	73	
4	48	983.98	.85	2.27	3.88	11	263	253	269	54	75	73	
5	52	987.50	.87	2.30	7.42	11	268	257	265	56	76	73	
6	56	990.01	.86	2.30	0.95	11	261	251	267	47	76	73	
7	60	994.50	.83	2.22	4.42	11	263	260	268	42	76	73	
8	64	997.81	.77	2.04	7.75	11	269	258	268	43	76	74	
		-.11 LEAK CHECK AT PORT CHANGE											
	(1830)	(997.70)											
	θ = 64	V_m = 54.91		ΔH = 2.16							Avg. = 72.7		

Leak check .11

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/SAGINAW CA Date 7-24-96 Test 4 Run 2

Source DRYER RTO STACK No. of traverse points 16

Method 0011 Filter holder: ________ Filter type: ________

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: SB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	740	579	219
Impinger No. 2	192	100	92
Impinger No. 3			
Condenser			
Desiccant	1505	1486	19
Total			330

Integrated Gas Sampling Data:

Bag Pump No.	B6	Box No.	17 Bag No. 2
Bag Material:	5-layer Aluminized Tedlar	Size:	44 L
Pretest leak check:	0	cc/min at	15 IN.HG
Time start:	1915	(HRS) Time end:	2025 (HRS)
Sampling rate:	400	cc/min Operator:	S.B.

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

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HEI. [redacted] L. [redacted] RAT [redacted] ES,
(612) 786-6020

EPA Method 5 Field Data Sheet

Job: LP / SAGULA
Source: DAYTON KTO STACK
Date: 7-24-96 Test 4 Run 2

Operators: SB. / MP
Meter Box No.: 4 ΔH@ 1.78 in.WC
Gasmeter Coeff.: .9957

Nozzle No.: GLASS ~~270~~
Nozzle Dia.: .270 in.
Bar. Press.: 28.31 in.Hg

Pitot No.: V27-5
C_p: .84
H_2O: 22 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1915)	(998.45)											
B 1	4	1002.01	.88	2.40	2.05	8	260	242	255	41	73	73	
2	8	1005.50	.82	2.21	5.51	8	270	250	262	42	75	73	
3	12	1008.94	.79	2.13	8.91	8	270	254	267	44	76	73	
4	16	1012.47	.86	2.33	2.46	8	268	261	270	46	78	74	
5	20	1016.10	.88	2.39	6.07	8	268	265	273	47	79	74	
6	24	1019.60	.85	2.31	9.62	8	267	264	271	48	80	74	
7	28	1023.15	.84	2.30	3.16	8	262	263	270	48	82	75	
8	32	1026.40	.82	2.09	6.42	8	260	267	268	49	83	76	
A 1	36	1029.80	.76	2.10	9.81	8	260	268	271	50	84	76	
2	40	1033.37	.85	2.31	3.37	8	272	270	268	53	85	77	
3	44	1037.00	.88	2.42	7.02	8	267	269	269	55	87	88	
4	48	1040.50	.79	2.18	0.48	8	266	271	265	42	88	99	
5	52	1044.06	.84	2.32	4.06	8	266	268	267	43	89	80	
6	56	1047.54	.80	2.22	7.56	8	263	266	269	44	90	81	
7	60	1051.00	.74	2.17	1.04	8	262	264	270	46	89	81	
8	64	1054.59	.81	2.26	4.57	8	261	267	268	47	88	81	
	(2025)												
	θ = 64	V_m = 56.14		2.26 ΔH =							Avg. = 77.1		

08 1194 GASTACK\WP\FORMS\S 5 1B

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP /SAGNOLG Date 7-24-96 Test 4 Run 3

Source DRYER-LTO STACK No. of traverse points 16

Method 00N Filter holder: ________ Filter type: ________

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: JB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	807	587	220
Impinger No. 2	151	51	100
Impinger No. 3			
Condenser			
Desiccant	1498	1477	21
Total			341

Integrated Gas Sampling Data:

Bag Pump No. BG Box No. 17 Bag No. 3

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

Pretest leak check: 0 cc/min at 15 IN.HG

Time start: 2040 (HRS) Time end: 2142 (HRS)

Sampling rate: 400 cc/min Operator: JB

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

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[redacted]
(612) 786-6020

EPA Method 5 Field Data Sheet

Job LP / SAGULA Operators 3B. / MP Nozzle No. GLASS Pitot No. U27-5
Source DMOR RTO STACK Meter Box No. 4 ΔH@ 1.78 in.WC Nozzle Dia. .270 in. C_p .84
Date 2-24-96 Test 4 Run 3 Gasmeter Coeff. .9957 Bar. Press. 28.31 in.Hg H_2O 23 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(0040)	(1055.22)											
A 1	4	1058.58	.76	2.05	8.56	8	261	232	259	43	79	79	
2	8	1062.10	.84	2.27	2.08	8	260	237	264	44	79	79	
3	12	1065.68	.84	2.27	5.60	8	261	241	267	44	81	79	
4	16	1069.05	.80	2.15	4.04	8	264	245	271	45	81	79	
5	20	1072.44	.77	2.07	2.42	8	264	243	270	46	81	79	
6	24	1075.81	.79	2.14	5.84	8	260	244	269	47	81	79	
7	28	1079.28	.80	2.17	9.29	8	260	245	270	48	82	78	
8	32	1082.65	.76	2.06	2.65	8	261	247	271	49	82	78	
B 1	36	1086.20	.84	2.27	6.18	8	262	246	270	50	80	78	
2	40	1089.63	.80	2.16	9.61	8	261	248	269	51	82	79	
3	44	1093.11	.82	2.23	3.11	8	259	249	271	52	82	79	
4	48	1096.60	.84	2.28	6.64	8	260	250	271	53	82	79	
5	52	1100.05	.80	2.17	0.09	8	261	249	270	54	82	79	
6	56	1103.64	.85	2.31	3.65	8	259	247	269	55	82	79	
7	60	1107.00	.74	2.01	6.97	8	260	250	270	56	82	79	
8	64	1110.24	.72	1.96	0.25	8	259	250	269	58	87	79	
	(2142)												
	θ - 64	V_m - 55.02		2.16 ΔH -							Avg. - 80.0		

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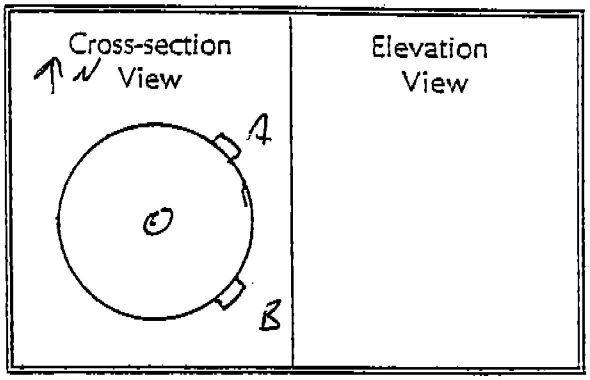
081194 GASTACK\WPAFORMS\5 5 18

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job L.P. / Sagola, MI
Source Press RTO / Stack
Test 5 Run 0 Date 7-25-96
Stack Dimen. 76 IN.
Dry Bulb 255 °F Wet bulb 108 °F
Manometer ☒Reg. ☐Exp ☐Elec.
Barometric Pressure 28.45 IN.HG
Static Pressure -.27 IN.WC
Operators M. Kuehlert D. Kellerman
Pitot No. 445-B C_p .84

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
		Port Length: 4 IN.		Time Start: N/A HRS	
		Refer to test 7			
		for pts and flows			

Temp. Meas. Device & S/N: PDT-45 / T2 | Time End: N/A HRS

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

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INTERPOLL LABORATORIES, INC.
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Sagola, MI
Source Press R/O / stack
Method MDI Filter holder: NA

Date 2-25-96 Test 5 Run 1
No. of traverse points 20
Filter type: ~~NA~~ NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☑
Post test: ≤ 0.02 cfm at 5 IN. HG (vac) ☑

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)

~~Acetone~~ Toluene
☒ other(s) Acetonitrile

No. of probe wash bottles: 0
Sample recovered by: M. Kuehler + D. Hullemann

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	521	540	(19)
Impinger No. 2	397	407	(10)
Impinger No. 3			
Condenser			
Desiccant	1353	1340	13
Charcoal	1445	1410	35
Total			19

Integrated Gas Sampling Data:

Bag Pump No. 31B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0 cc/min at 15 IN.HG
Time start: 1620 (HRS) Time end: 1720 ~~1635~~ (HRS)
Sampling rate: 150 cc/min Operator: M. Kuehler

Box No. 22 Bag No. 2
Size: 44 L

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

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.P./Sagola MI
Source: Press R.T.O. / Stack
Date: 2-25-96 Test 5 Run 1

Operators: M. Kaschbtet? P. Hellmann?
Meter Box No. 10 ΔH@ 1.93 in.WC
Gasmeter Coeff. .9973

Nozzle No. 2-3
Nozzle Dia. .181 in.
Bar. Press. 28.45 in.Hg

Pitot No. 4MS-8
C_p .84
H_2O 2.9 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Stack (°F)	Probe (°F)	Oven (°F)	Imp. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (% v/v)
	1620	231.70											
A-10	3	233.18	.79	.72 ~~2.60~~	3.15	2.5	255	230	253	46	88	89	20.4
9	6	234.72	.91	.82	4.69	2.5	255	237	260	45	89	88	
8	9	236.31	.97	.78	6.20	2.5	256	241	257	45	91	87	
7	12	237.69	.79	.71	7.63	2.5	257	236	245	44	93	87	
6	15	239.22	.83	.75	9.11	2.5	255	229	247	45	94	87	
5	18	240.73	.81	.73	0.57	2.5	255	230	240	47	95	88	
4	21	242.17	.90	.82	2.11	2.5	255	237	251	47	96	87	
3	24	243.70	.86	.78	3.61	2.5	260	240	250	46	97	88	
2	27	245.10	.81	.74	5.08	2.5	254	235	250	48	98	88	
1	30	246.53	.77	.70	6.51	2.5	253	238	247	48	99	88	
A-10	33	248.10	.85	.78	8.01	2.5	254	241	240	49	100	88	
9	36	249.40	.78	.71	9.46	2.5	254	245	245	50	100	89	
8	39	250.85	.75	.68	0.97	2.5	251	240	247	52	100	89	
7	42	252.21	.81	.74	2.34	2.5	252	235	252	51	101	89	
6	45	253.75	.88	.81	3.88	2.5	252	231	251	47	101	89	
5	48	255.31	.90	.83	5.44	2.5	250	237	255	46	101	90	
4	51	256.66	.88	.81	6.97	2.5	251	230	247	46	102	91	
3	54	258.21	.76	.69	8.40	2.5	257	227	246	49	102	91	
2	57	259.63	.72	.66	9.79	2.5	258	236	241	47	103	91	
1	60	260.71	.60	.55	1.06	2.5	258	235	249	48	103	91	
	(1710)												
	θ = 60	V_m = ~~29.0~~ ML		ΔH = .74							Avg. = 93.2		

29.01

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Saginaw, MI
Source Press RTO / Stack
Method MDI Filter holder: NA

Date 2-25-96 Test 5 Run 2
No. of traverse points 20
Filter type: NA

Sample Train Leak Check:
Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: < 0.02 cfm at 6 IN. HG (vac) ☒

Particulate Catch Data:
No. of filters used: NA

Recovery solvent(s)
☒ ~~acetone~~ Toluene
☒ ~~other(s)~~ Acetonitrile

No. of probe wash bottles: 0
Sample recovered by: M. Koehler & D. Holleman

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	561	577	(16)
Impinger No. 2	410	413	(3)
Impinger No. 3			
Condenser			
Desiccant	1487	1485	2
Charcoal	1452	1419	33
Total			16

Integrated Gas Sampling Data:

Bag Pump No. 31B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0 cc/min at 15 IN.HG
Time start: 1800 (HRS)
Sampling rate: 150 cc/min

Box No. 22 Bag No. 2
Size: 44 L
Time end: 1900 ~~2035~~ (HRS)
Operator: M. Koehler

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

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.P. / Sagola, MI
Source: Press RTO / Stack
Date: 2-25-96 Test 5 Run 2

Operators: M. Kuehler + D. Alleman
Meter Box No. 10 ΔH@ 1.93 in.WC
Gasmeter Coeff. .9973

Nozzle No. 1-3
Nozzle Dia. .181 in.
Bar. Press. 28.45 in.Hg

Pitot No. 4MS-8
C_p .84
H_2O 3.3 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1800	260.40											
A-10	3	262.25	.57	.51	2.12	2	256	240	256	45	91	91	20.9
9	6	263.57	.74	.66	3.51	2.5	259	237	257	43	92	90	
8	9	264.99	.77	.69	4.93	2.5	256	246	250	44	95	89	
7	12	266.35	.75	.68	6.34	2.5	253	244	251	44	95	89	
6	15	267.88	.89	.81	7.87	2.5	251	241	247	47	96	89	
5	18	269.46	.83	.75	9.35	2.5	252	239	253	46	97	89	
4	21	270.93	.80	.72	0.80	2.5	255	233	255	47	98	89	
3	24	272.22	.88	.80	2.33	2.5	253	241	259	48	99	89	
2	27	273.66	.79	.71	3.77	2.5	256	239	254	47	100	89	
1	30	275.31	.72	.65	5.15	2.5	257	246	253	45	101	90	
10	33	276.27	.58	.52	6.39	2	260	240	250	46	101	90	
9	36	277.45	.69	.62	7.74	2.5	259	237	255	48	101	90	
8	39	279.15	.78	.70	9.18	3	259	230	247	48	101	90	
7	42	280.74	.91	.83	0.74	3	253	236	249	50	102	91	
6	45	282.31	.82	.75	2.21	3	255	240	250	51	102	91	
5	48	283.53	.84	.76	3.71	3	255	243	253	52	102	91	
4	51	285.31	.89	.81	5.25	3	254	242	255	50	102	91	
3	54	286.53	.64	.58	6.56	2	255	235	247	51	103	92	
2	57	288.00	.80	.73	8.05	3	254	240	244	53	103	92	
1	60	289.57	.78	.71	9.47	3	254	242	238	54	103	91	
	(1900)												
	0 - 60	V_m = 28.67		ΔH = .70							Avg. = 94.6		

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job *L.P. / Sajola, MI*

Source *Press RTO / Stack*

Method *M0?1* Filter holder: *NA*

Date *7-25-96* Test *5* Run *3*

No. of traverse points *20*

Filter type: *NA*

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒

Post test: *<0.02* cfm at *5* IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: *NA*

Recovery solvent(s)

☒ ~~acetone~~ *Toluene*

☒ other(s) *Acetonitrile*

No. of probe wash bottles: ______

Sample recovered by: ______

Condensate Data:

Item	[redacted]		
	[redacted]	[redacted]	Difference
Impinger No. 1	523	540	(17)
Impinger No. 2	392	410	(18)
Impinger No. 3			
Conden[redacted]			
Desiccant	1355	1340	15
Charcoal	1482	1445	37
Total	[redacted]		17

Integrated [redacted] Sampling Data:

Bag Pump No. *31 B*

Bag Material: 5-layer Aluminized Tedlar

Pretest leak check: *0*

Time start: ~~*1620*~~ *1935*

Sampling rate: *150*

Box No. *22* Bag No. *2*

Size: 44 L

cc/min at *15* IN.HG

(HRS) Time end: *2035* (HRS)

cc/min Operator: *M. Koehler*

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

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.P. / Saginaw, MI — Operators: M. Kaehler + D. Hillemann — Nozzle No.: 1-3 — Pitot No.: 445-8

Source: Press NTO / Stack — Meter Box No.: 10 ΔH@ 1.93 in.WC — Nozzle Dia.: .181 in. — C_p: .84

Date: 2-25-96 Test 5 Run 3 — Gasmeter Coeff.: .9973 — Bar. Press.: 28.45 in.Hg — H_2O: 1.8 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1935	291.20											
A-10	3	292.57	.67	.61	2.53	2	255	247	253	53	92	91	20.9
9	6	294.13	.81	.74	4.05	2.5	253	250	250	52	93	91	
8	9	295.37	.89	.81	5.53	3	253	239	251	50	95	90	
7	12	297.00	.85	.78	2.03	3	254	244	255	46	96	90	
6	15	298.50	.88	.80	9.56	3	255	245	260	47	98	90	
5	18	300.01	.87	.80	0.08	3	255	240	261	47	99	89	
4	21	301.60	.92	.84	1.65	3	254	243	259	44	99	89	
3	24	303.21	.82	.75	3.13	3	254	241	253	48	100	89	
2	27	304.50	.79	.72	4.58	3	255	250	247	50	101	89	
1	30	306.13	.75	.68	6.00	2.5	251	245	252	51	101	90	
10	33	307.49	.72	.66	7.39	2.5	253	250	256	49	101	90	
9	36	308.95	.81	.74	8.87	3	253	246	261	46	101	90	
8	39	310.51	.79	.72	0.32	3	256	247	243	46	101	90	
7	42	311.84	.83	.76	1.81	3	260	239	247	46	102	90	
6	45	313.29	.80	.73	3.27	3	261	241	249	47	102	90	
5	48	314.64	.85	.78	4.78	3	257	244	250	48	102	91	
4	51	316.11	.80	.73	6.25	3	254	247	246	48	102	91	
3	54	317.29	.75	.69	7.67	2.5	256	242	244	49	102	91	
2	57	318.99	.65	.60	8.99	2	253	238	239	49	102	91	
1	60	320.30	.57	.52	0.23	2	253	235	248	50	102	91	
	(2035)												
	0 - 60	V_m = 29.10		ΔH = .72							Avg. = 94.8		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job LP SAGOLA
Source PRESS RTO INLET
Date 7-25-96 Test 6 Run 1
Wet Bulb
Dry Bulb 126

Operator(s) SB / MP
Meter Box No. 4 Gasmeter Coef. .9968
ΔH@ 1.78 in.WC Bar.Press 28.45 in.Hg
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC
Post Test: 0 cfm at 10 in.WC

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	O_2 (%v/v)
	(1620)	308.88									
	5	312.60	1.78	5					80	78	
	10	316.32	↓	↓					80	78	
	15	320.04							81	79	
	20	323.76							81	79	
	25	327.48							82	79	
	30	331.19							81	80	
	35	334.91							82	79	
	40	338.63							82	80	
	45	342.35							82	80	
	50	346.07							83	80	
	55	349.79							83	80	
	60	353.51							83	80	
	(1720)										
	θ = 60	V_m = 44.63	$\overline{\Delta H}$ = 1.78		t_s = 126				t_m = 80.75		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers	361	346	15
Condenser	297	290	7
Desiccant	1438	1424	14
		Total	36

Preliminary Results of SO_2 Concentration Determination		
V_{std} =	41.43	DSCF
Moisture Gravimetric =	3.93	%v/v
Moisture Psychrometric =		%v/v
SO_2, DRY =		PPM
SO_2, WET =		PPM
LB/MMBtu =		

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job LP SAGOLA
Source PRESS RTO INLET
Date 7-25-96 Test 6 Run 2
Wet Bulb ______
Dry Bulb 126

Operator(s) SB / MP
Meter Box No. 4 Gasmeter Coef. .9964
ΔH@ 1.78 in.WC Bar.Press 28.45 in.Hg

Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC
Post Test: 0 cfm at 10 in.WC

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	O_2 (%v/v)
	(1800)	356.48									
	5	360.57	1.78	5					80	80	
	10	364.65	↓	↓					80	80	
	15	368.74							80	80	
	20	372.82							80	80	
	25	376.91							80	80	
	30	380.99							81	80	
	35	385.08							82	80	
	40	389.16							83	80	
	45	393.25							83	80	
	50	397.33							83	80	
	55	401.42							83	80	
	60	405.50	↓	↓					83	80	
	(1900)								~~83~~	~~80~~	
	θ = 60	V_m = 49.02	$\overline{\Delta H}$ = 1.78		t_s = 126				$\bar{t}_m$ = 80.75		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers	360	346	14
Condenser	292	290	2
Desiccant	1530	1517	13
		Total	29

Preliminary Results of SO_2 Concentration Determination	
V_{std} = 45.51	DSCF
Moisture Gravimetric = 2.91	%v/v
Moisture Psychrometric =	%v/v
SO_2, DRY =	PPM
SO_2, WET =	PPM
LB/MMBtu =	

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job LP SAGOLA
Source PRESS RTO INLET
Date 7-25-96 Test 6 Run 3
Wet Bulb
Dry Bulb 126

Operator(s) JG/MP
Meter Box No. 4 Gasmeter Coef. .9968
ΔH@ 1.79 in.WC Bar.Press 28.45 in.Hg

Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC
Post Test: 0 cfm at 10 in.WC

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	O_2 (%v/v)
	1935	406.33									
	5	410.28	1.78	5					78	77	
	10	414.24	↓	↓					78	77	
	15	418.19							78	77	
	20	422.14							79	77	
	25	426.10							79	77	
	30	430.05							79	77	
	35	434.00							81	77	
	40	437.96							81	78	
	45	441.91							81	79	
	50	445.86							81	79	
	55	449.82							81	79	
	60	453.77	↓	↓					81	79	
	2035										
	θ = 60	V_m = 47.44	$\overline{\Delta H}$ = 1.78		t_s = 126				t_m = 78.75		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers	367	344	23
Condenser	290	289	1
Desiccant	1418	1413	5
		Total	29

Preliminary Results of SO_2 Concentration Determination	
V_{std} = 44.20	DSCF
Moisture Gravimetric = 3.00	%v/v
Moisture Psychrometric =	%v/v
SO_2, DRY =	PPM
SO_2, WET =	PPM
LB/MMBtu =	

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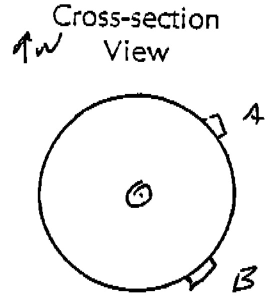
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: L.P. / Sagola MI
Source: Press NTO / Stack
Test: 6 Run: 0 Date: 7-25-96
Stack Dimen.: 76 IN.
Dry Bulb: 255 °F Wet bulb: 108 °F
Manometer: ☒Reg. ☐Exp ☐Elec.
Barometric Pressure: 28.45 IN.HG
Static Pressure: -.27 IN.WC
Operators: M. Koehler + D. Hilleman
Pitot No.: 314-6 C_p .84
Thermal

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
		Port Length: 4 IN.		Time Start: NA HRS	
1	1/6	12.67	16.67		
2	3/6	38.00	42.00		
3	5/6	63.33	67.33		

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. / Sagola, M.I. Date 2-25-96 Test 6 Run 1

Source Press RM / stack No. of traverse points 3

Method Phenol 8270 Filter holder: NA Filter type: NA

Sample Train Leak Check:

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: NA

Recovery solvent(s)

☐acetone ______

☐other(s) ______

No. of probe wash bottles: NA

Sample recovered by: M. Kaehler + D. Holleman

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant			
Total			

Integrated Gas Sampling Data: NA / Ambient

Bag Pump No. ______ Box No. ______ Bag No. ______

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

Pretest leak check: ______ cc/min at ______ IN.HG

Time start: ______ (HRS) Time end: ______ (HRS)

Sampling rate: ______ cc/min Operator: ______

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job L.P. / Sagola, Mi
Source Press Nro 1 Stack
Date 7-25-96 Test 6 Run 1
Wet Bulb
Dry Bulb

Operator(s) M. Kaehler + D. Hellmann
Meter Box No. 14 Gasmeter Coef. .9929
ΔH@ 1.82 in.WC Bar.Press 28.45 in.Hg
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC ☑
Post Test: <0.2 cfm at 7 in.WC ☑

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	O_2 (%v/v)
	1620	979.90									
A-3	5	983.94	1.82	4	255	243	250	49	79	78	20.9
3	10	987.98	1.82	4	257	247	253	46	80	79	↓
3	15	992.01	1.82	4	255	255	249	46	83	78	
3	20	996.05	1.82	4	250	241	244	47	85	78	
2	25	999.67	1.82	4	253	237	251	46	89	79	
2	30	1003.28	1.82	4	260	240	253	46	91	78	
A-2	35	1007.14	1.82	4	254	243	255	47	92	79	
2	40	1011.00	1.82	4	255	237	250	49	93	80	
1	45	1014.94	1.82	4	260	234	256	50	94	80	
1	50	1018.87	1.82	4	253	233	251	50	95	81	
1	55	1023.29	1.82	4	251	240	250	49	96	82	
1	60	1027.71	1.82	4	252	241	245	51	96	82	
	(1720)										
	θ = 60	V_m = 47.81	ΔH = 1.82		$\bar{t}_s$ = 255				$\bar{t}_m$ = 84.39		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
~~Impingers~~ 5A	311	295	16
~~Condenser~~ 5B	292	292	–
Desiccant	1352	1340	12
		Total	28

Preliminary Results of SO_2 Concentration Determination		
V_{std} =	43.99	DSCF
Moisture Gravimetric =	2.91	%v/v
Moisture Psychrometric =		%v/v
SO_2, DRY =		PPM
SO_2, WET =		PPM
LB/MMBtu =		

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Sagola, MI
Date 7-25-96 Test 6 Run 2
Source Press RTO / Stack
No. of traverse points 3
Method Phenol 8270 / Filter holder: NA
Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☑
Post test: 0.004 cfm at 7 IN. HG (vac) ☑

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)

☐acetone
☐other(s)

No. of probe wash bottles: NA
Sample recovered by: M. Koehler + D. Holleman

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant		1493	
Total			

Integrated Gas Sampling Data: NA / Ambient

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

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 4 and 6 Field Data Sheet

Job: L.P. / Sagola, MI
Source: Press RTO / Stack
Date: 7-25-96 Test: 6 Run: 2
Wet Bulb: ______
Dry Bulb: ______

Operator(s): M. Kuehler / D. Holleman
Meter Box No.: 17 Gasmeter Coef.: .9929
ΔH@: 1.82 in.WC Bar.Press: 28.45 in.Hg
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC
Post Test: <0.02 cfm at 7 in.WC

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	O_2 (%v/v)
	1900	27.90									
B-3	5	31.83	1.82	4	252	243	250	53	82	82	20.9
3	10	35.76	1.82	4	254	237	253	50	85	82	↓
3	15	39.69	1.82	4	251	240	246	46	87	82	
3	20	43.62	1.82	4	255	245	247	48	89	82	
2	25	47.55	1.82	4	255	250	253	49	92	82	
2	30	51.49	1.82	4	255	246	250	47	92	82	
2	35	55.42	1.82	4	253	240	248	47	93	82	
2	40	59.44	1.82	4	257	233	247	49	94	82	
1	45	63.65	1.82	4	254	238	251	49	94	82	
1	50	67.86	1.82	4	256	235	255	48	94	82	
1	55	72.06	1.82	4	253	241	256	46	95	83	
1	60	76.27	1.82	4	255	242	257	46	95	84	
	(1960)										
	θ = 60	V_m = 48.37	ΔH = 1.82		T_s = 254				T_m = 86.63		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers 6A	318	304 ~~299~~ ml	~~ml~~ 14
Condenser 6B	300	298	2 ml
Desiccant	1509	1493	16 ml
		Total	ml ~~46~~ 32

Preliminary Results of SO_2 Concentration Determination	
V_{std} = 44.32	DSCF
Moisture Gravimetric = 3.29	%v/v
Moisture Psychrometric =	%v/v
SO_2, DRY =	PPM
SO_2, WET =	PPM
LB/MMBtu =	

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Sagola, MI Date 2-25-96 Test 6 Run 3
Source Press NTO / Stack No. of traverse points 3
Method Phenol 8270 Filter holder: NA Filter type: NA

Sample Train Leak Check:
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: NA

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

No. of probe wash bottles: 0
Sample recovered by: [illegible signature] + D. Hollerman

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant			
Total			

Integrated Gas Sampling Data:
NA / Ambient

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

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

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INTERPOLL LABORATORIES, INC.
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EPA Method 4 and 6 Field Data Sheet

Job L.P. / Sagola, MI
Source Press NTO / Stack
Date 7-25-96 Test 6 Run 3
Wet Bulb ____
Dry Bulb ____

Operator(s) Mikaehlor + D. Hilleman
Meter Box No. 14 Gasmeter Coef. .9929
ΔH@ 1.82 in.WC Bar.Press 28.45 in.Hg
Sample Train Leak Check:
Pretest: < 0.02 cfm at 15 in.WC ☑
Post Test: < 0.02 cfm at 7 in.WC ☑

Trav. Point No.	Sample Time (min)	Sample Volume (cf)	Orif. Meter (in.WC)	Vac. in.Hg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	O_2 (%v/v)
	1935	77.93									
B-3	5	81.96	1.82	4	255	253	250	48	94	83	20.9
3	10	85.89	1.82	4	255	227	255	45	87	93	↓
3	15	89.92	1.82	4	253	231	257	45	90	92	
3	20	93.95	1.82	4	256	235	251	46	93	82	
2	25	97.93	1.82	4	254	240	247	47	95	92	
2	30	101.90	1.82	4	251	241	244	46	95	82	
2	35	105.88	1.82	4	253	240	247	46	96	83	
2	40	109.86	1.82	4	257	245	248	48	96	83	
1	45	113.83	1.82	4	260	244	251	50	96	84	
1	50	117.81	1.82	4	259	239	253	51	97	84	
1	55	121.78	1.82	4	257	237	256	52	97	84	
1	60	125.76	1.82	4	255	235	254	54	97	84	↓
	(2035)										
	θ = 60	V_m = 47.83	$\overline{\Delta H}$ = 1.82		$\bar{t}_s$ = 255				$\bar{t}_m$ = 88.29		

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impingers 7A	314	296	18
Condenser 7B	299	296	3
Desiccant	1364	1352	12
		Total	33

Preliminary Results of SO_2 Concentration Determination		
V_{std} =	43.78	DSCF
Moisture Gravimetric =	3.43	%v/v
Moisture Psychrometric =		%v/v
SO_2, DRY =		PPM
SO_2, WET =		PPM
LB/MMBtu =		

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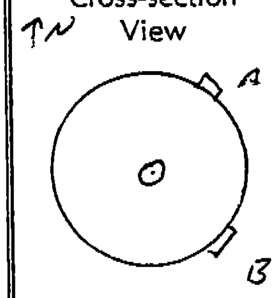
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: L.P. / Sagola, MI
Source: Press RTO / Stack
Test: 2 Run: 0 Date: 7-24-96
Stack Dimen.: 76 IN.
Dry Bulb: 155 °F Wet bulb: 108 °F
Manometer: ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.31 IN.HG
Static Pressure: -.27 IN.WC
Operators: M. Kuehlert D. Helleman
Pitot No.: 445-B C_p .84

Drawing of Test Site

Cross-section View	Elevation View
TN	



Particulate

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: 1810 HRS	
A-1	.026	1.97	5.97	.62	
2	.082	5.90	9.90	.73	
3	.146	10.51	14.51	.80	
4	.226	16.27	20.27	.87	
5	.342	24.62	28.26	.84	
6	.658	47.38	51.38	.83	
7	.774	55.73	59.73	.78	
8	.854	61.49	65.49	.68	↑
9	.918	66.10	70.10	.58	
10	.974	70.13	74.13	.57	155
B-1				.61	↓
2				.70	
3				.81	
4				.83	
5				.74	
6				.80	
7				.75	
8				.64	
9				.57	
10				.55	
Temp. Meas. Device & S/N: PDT-45/TC				Time End: 1915 HRS	

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

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INTERPOLL LABORATORIES, INC.
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Sagola, MI   Date 2-24-96 Test 7 Run 1
Source Press RTO / STACK   No. of traverse points 20
Method 5 202 Filter holder: 6/ass   Filter type: 4" G.F.

Sample Train Leak Check:
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: Recovery solvent(s)

0452

☒ acetone
☒ other(s) MeCl₂

No. of probe wash bottles: 1
Sample recovered by: M. Kaehler + D. Hulleman

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	519	494	25
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1500	1485	15
Total			40

Integrated Gas Sampling Data: NA / Ambient

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

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

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(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.P. / Sagola, MI
Source: Press / RTO stack
Date: 7-24-96 Test 7 Run 1

Operators: M. Kaehler + D. Hulleman
Meter Box No. 10 ΔH@ 1.93 in.WC
Gasmeter Coeff. .9973

Nozzle No. 2-4
Nozzle Dia. .251 in.
Bar. Press. 28.31 in.Hg

Pitot No. 4MT-8
C_p .84
H_2O 8 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1835	848.70											
A-10	3	851.13	.63	1.88	1.80	4	255	233	253	50	79	78	20.9
9	6	853.30	.60	1.79	3.24	3.5	262	227	243	47	81	77	
8	9	855.71	.67	2.00	5.62	4	261	239	242	46	85	77	
7	12	858.27	.78	2.35	8.21	4	256	241	247	45	87	77	
6	15	860.90	.81	2.43	0.81	4.5	259	243	250	46	90	77	
5	18	863.41	.74	2.23	3.36	4	259	239	256	48	93	78	
4	21	865.97	.73	2.21	5.88	4	257	237	249	45	93	78	
3	24	868.75	.84	2.54	8.58	4.5	260	246	257	46	95	79	
2	27	871.44	.83	2.51	1.26	4.5	262	245	240	47	97	80	
1	30	873.28	.63	1.92	3.61	3.5	257	240	237	47	97	80	
B-10	33	875.97	.60	1.83	5.91	3.5	257	237	244	46	97	82	
9	36	878.43	.65	1.97	8.30	4	262	241	240	46	99	82	
8	39	881.19	.90	2.73	1.11	5	263	248	235	48	100	82	
7	42	883.94	.88	2.67	3.89	5	263	251	241	48	102	83	
6	45	886.90	.87	2.65	6.66	5	262	245	247	50	102	83	
5	48	889.65	.92	2.81	9.51	5.5	260	241	253	50	102	84	
4	51	892.37	.81	2.48	2.19	5	260	237	257	51	103	85	
3	54	894.93	.73	2.25	4.75	4	257	244	249	50	104	86	
2	57	897.33	.58	1.79	7.04	3	258	241	244	50	103	86	
1	60	899.31	.52	1.60	9.20	3	258	235	247	51	103	87	
	(1936)												
	0 - 60	V_m - 50.61		2.23 ΔH -							Avg. - 88.3		

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Sagola, MI

Source Press RTO / Stack

Method 5 Filter holder: 6/ucs

Date 2-24-96 Test 7 Run 2

No. of traverse points 20

Filter type: 4" GF

Sample Train Leak Check:

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:

9453

Recovery solvent(s)

☒ acetone

☑ other(s) MeCl₂

No. of probe wash bottles: 1

Sample recovered by: M. Kaehler + D. Halleman

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	535	508	27
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1413	1401	12
Total			39

Integrated Gas Sampling Data: NA / Ambient

Bag Pump No. ____ Box No. ____ Bag No. ____

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

Pretest leak check: ____ cc/min at ____ IN.HG

Time start: ____ (HRS) Time end: ____ (HRS)

Sampling rate: ____ cc/min Operator: ____

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

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[redacted]
(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.R / Sagola, MI
Source: Press ATO / Stack
Date: 2-24-96 Test 7 Run 2

Operators: M. Kuehlbert, D. Hillemann
Meter Box No. 10 ΔH@ 1.93 in.WC
Gasmeter Coeff. .9973

Nozzle No. 2-4
Nozzle Dia. .251 in.
Bar. Press. 28.31 in.Hg

Pitot No. YMS-8
C_p .84
H_2O 3.9 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	2005	899.50											
B-10	3	902.07	.67	2.19	2.01	4	258	237	246	45	89	87	20.9
9	6	904.95	.83	2.69	4.29	4.5	263	243	241	45	93	87	
8	9	907.68	.78	2.56	2.51	4.5	256	245	247	47	96	86	
7	12	910.35	.87	2.85	0.39	4.5	259	260	243	46	97	87	
6	15	913.30	.77	2.53	3.09	4.5	259	261	250	48	99	87	
5	18	915.97	.82	2.70	5.89	4.5	254	253	256	46	101	87	
4	21	918.77	.73	2.42	8.54	4	257	247	249	46	102	88	
3	24	921.24	.67	2.22	1.09	3.5	257	240	253	47	103	88	
2	27	923.47	.53	1.76	3.35	3	256	235	250	47	105	88	
1	30	925.83	.55	1.83	5.67	3	255	235	246	47	103	88	
A-10	33	927.99	.56	1.86	7.99	3	258	240	253	48	100	89	
9	36	930.50	.61	2.02	0.42	3.5	258	243	252	46	103	89	
8	39	933.11	.72	2.39	3.06	4	258	241	261	45	104	89	
7	42	935.47	.62	2.05	5.51	4	261	235	257	46	105	90	
6	45	938.32	.87	2.89	8.41	5	259	244	259	45	105	89	
5	48	941.31	.88	2.93	1.34	5	255	237	256	46	105	90	
4	51	944.20	.83	2.77	4.19	4.5	254	240	253	47	106	90	
3	54	947.23	.90	3.00	7.15	5	256	245	250	47	106	90	
2	57	950.30	.98	2.93	0.07	5	257	241	255	48	107	91	
1	60	952.98	.77	2.57	2.82	4	256	237	251	49	107	91	
	(2108)												
	0 - 60	V_m - 53.48		2.46 ΔH -							Avg. - 95.1		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Sagola, MI

Date 7-24-96 Test 7 Run 3

Source Press RTO / Stack

No. of traverse points 20

Method 5 Filter holder: Glass

Filter type: 4" G.F.

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:

84 54

Recovery solvent(s)

☒ acetone

☒ other(s) MeCl2

No. of probe wash bottles: 1

Sample recovered by: M. Kachelheit D. Holleman

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	537	506	31
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1513	1500	13
Total			44

Integrated Gas Sampling Data: NA / Ambient

Bag Pump No. ______ Box No. ______ Bag No. ______

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

Pretest leak check: ______ cc/min at ______ IN.HG

Time start: ______ (HRS) Time end: ______ (HRS)

Sampling rate: ______ cc/min Operator: ______

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

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(612) 786-6020

EPA Method 5 Field Data Sheet

Job L.P. / Sasola, MI
Source Press RTO / Stack
Date 7-24-96 Test 7 Run 3

Operators M. Kaehler + D. Holleman
Meter Box No. 10 ΔH@ 1.93 in.WC
Gasmeter Coeff. .9973

Nozzle No. 2-4
Nozzle Dia. .251 in.
Bar. Press. 28.31 in.Hg

Pitot No. 4MS-8
C_p .94
H_2O 3.7 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	2137	953.30											
A-10	3	955.97	.67	2.23	5.84	4	258	240	253	47	91	90	20.9
9	6	958.45	.70	2.30	8.42	4	259	237	260	45	95	89	
8	9	961.29	.81	2.68	1.21	4.5	257	245	257	44	97	89	
7	12	963.93	.73	2.44	3.87	4	252	241	253	44	98	89	
6	15	966.64	.74	2.47	6.54	4	253	233	260	46	100	89	
5	18	969.70	.90	2.99	9.49	5	257	240	263	47	101	89	
4	21	972.41	.81	2.67	2.28	4.5	262	246	257	47	102	89	
3	24	975.35	.90	2.98	5.22	5	259	250	251	48	102	89	
2	27	977.97	.74	2.46	7.90	4	261	243	256	48	103	89	
1	30	980.67	.72	2.41	0.55	4	253	240	253	49	104	89	
B-10	33	982.99	.58	1.95	2.94	3	251	246	250	50	101	90	
9	36	985.72	.75	2.50	5.64	4.5	255	243	256	51	104	90	
8	39	988.54	.86	2.88	8.54	5	253	235	259	51	105	90	
7	42	991.43	.83	2.78	1.39	5	255	235	253	48	105	90	
6	45	994.10	.73	2.45	4.07	4.5	253	240	251	47	105	90	
5	48	997.11	.88	2.95	2.01	5	253	241	245	47	106	90	
4	51	999.87	.75	2.52	9.72	4.5	254	235	243	47	106	91	
3	54	1002.67	.87	2.92	2.65	5	254	240	247	48	106	91	
2	57	1005.23	.63	2.12	5.14	4	255	233	253	48	107	92	
1	60	1007.57	.54	1.82	2.45	3.5	253	237	250	48	106	92	
	(2237)												
	0 - 60	V_m - 54.27		ΔH - 2.53							Avg. - 96.0		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: LP SAGOLA
Source: PRESS RTO INLET
Test: 8 Run: 1 Date: 7-25-96
Stack Dimen.: 57.25 IN.
Dry Bulb: ____ °F Wet bulb: ____ °F
Manometer: ☑ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.45 IN.HG
Static Pressure: -4.75 IN.WC
Operators: SB. / MP.
Pitot No.: V27-5 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
		Port Length: 3.75 IN.		Time Start: 1620 HRS	
A 1	.021	1.20	4.95	1.35	
2	.067	3.85	7.60	1.25	
3	.118	6.79	10.54	1.45	
4	.177	10.18	13.93	1.40	
5	.250	14.38	18.13	1.50	
6	.356	20.47	24.22	1.95	
7	.644	37.03	40.78	1.80	
8	.750	43.13	46.88	1.85	
9	.823	47.32	51.07	1.10	
10	.882	50.72	54.47	1.10	
11	.933	53.65	57.40	1.05	
12	.979	56.29	60.04	1.00	
B 1				1.30	
2				1.50	
3				1.45	
4				1.50	
5				1.80	
6				1.80	
7				1.75	
8				1.45	
9				1.35	
10				1.25	
11				1.15	
12				1.00	
Temp. Meas. Device & S/N: PDT #2				Time End: HRS	

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

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INTERPOLL LABORATORIES, INC.
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EPA Method 2 Field Data Sheet

Job: LP/SAGOLA
Source: PRESS RTO INLET
Test: 3 Run 2 Date 7-25-96
Stack Dimen. 57.25 IN.
Dry Bulb ____ °F Wet bulb ____ °F
Manometer ☑Reg. ☐Exp ☐Elec.
Barometric Pressure 28.45 IN.HG
Static Pressure -4.75 IN.WC
Operators SD-/MP
Pitot No. U27-5 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
		Port Length:	IN.	Time Start: 1800	HRS
A 1				2.00	
2				2.10	
3				1.75	
4				1.95	
5				2.00	
6				2.05	
7				2.25	
8				2.35	
9				2.40	
10				2.00	
11				1.30	
12				1.30	
B 1				1.10	
2				1.30	
3				1.45	
4				1.20	
5				1.70	
6				1.40	
7				1.65	
8				1.70	
9				1.30	
10				1.35	
11				1.10	
12				.80	
Temp. Meas. Device & S/N: PDT #2				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 SAGOLA
Source PRESS RTO SHEET
Test 40 Run 3 Date 7-25-96
Stack Dimen. 57.25 IN.
Dry Bulb ____ °F Wet bulb ____ °F
Manometer ☑ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.45 IN.HG
Static Pressure -4.75 IN.WC
Operators S.D. / MP
Pitot No. V27-5 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
		Port Length:	IN.	Time Start: 1935 HRS	
A 1				1.90	
2				2.05	
3				2.20	
4				2.05	
5				2.10	
6				1.70	
7				1.80	
8				2.30	
9				2.15	
10				1.60	
11				1.25	
12				1.70	
D 1				1.65	
2				2.60	
3				2.05	
4				1.75	
5				1.90	
6				2.10	
7				2.15	
8				1.40	
9				1.95	
10				.98	
11				1.05	
12				.97	
Temp. Meas. Device & S/N:				Time End: HRS	

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

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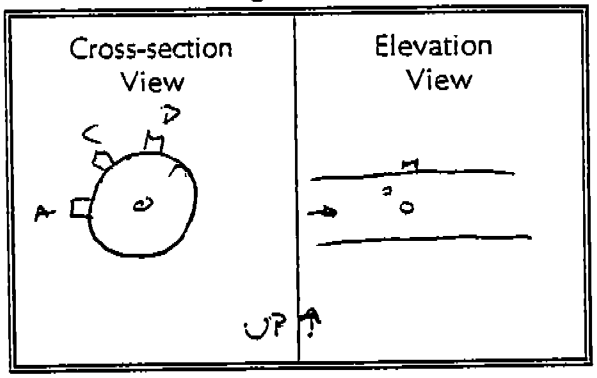
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: LP - SAGOLA
Source: PRESS [redacted] RTO INLET
Test: 9 Run: 0 Date: 7-25-96
Stack Dimen.: 57 IN.
Dry Bulb: 122 °F Wet bulb: ______ °F
Manometer: ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.45 IN.HG
Static Pressure: -4.75 IN.WC
Operators: SB & JB & MK
Pitot No.: V29-6 C_p .840

* Formaldehyde *

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: 10 IN.		Time Start: 0735 HRS	
A-1	.021	1.20	11.20	.60	122
2	.067	3.82	13.82	.98	
3	.118	6.73	16.73	1.08	
4	.177	10.09	20.09	1.05	
5	.250	14.25	24.25	1.55	123
6	.356	20.29	30.29	2.00	
7	.644	36.71	46.71	1.80	
8	.750	42.75	52.75	1.45	
9	.823	46.91	56.91	1.55	124
10	.882	50.27	60.27	1.50	
11	.933	53.18	63.18	1.20	
12	.979	55.80	65.80	1.15	122
Temp. Meas. Device & S/N: Digital TC - PDT 45				0740	Time End: HRS

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

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A = 12" 2.5 dia
B = 24" 4.42 dia

INTERPOLL LABORATORIES, INC
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP - SA Cracn Date 7-25-96 Test 9 Run 1

Source Press Rto Inlet No. of traverse points 24

Method 0011 Filter holder: N/A Filter type: N/A

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒

Post test: 0.00 cfm at 10 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: Recovery solvent(s)

—

—

☐acetone

☒other(s) MeCl2

VOID RUN

No. of probe wash bottles: 1

Sample recovered by: SCB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	580	573	7
Impinger No. 3			
Condenser			
Desiccant	1500	1489	11
Total			18

Integrated Gas Sampling Data: (N/A AMBIENT AIR)

Bag Pump No. ____ Box No. ____ Bag No. ____

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

Pretest leak check: ____ cc/min at ____ IN.HG

Time start: ____ (HRS) Time end: ____ (HRS)

Sampling rate: ____ cc/min Operator: ____

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

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[redacted]
(612) 786-6020

EPA Method 5 Field Data Sheet

Job LP- SAGOLA
Source PRESS RTO INLET
Date 2-25-96 Test 9 Run 1

Operators JB + MP
Meter Box No. 4 ΔH@ 1.78 in.WC
Gasmeter Coeff. .9957

Nozzle No. S-1
Nozzle Dia. .189 in.
Bar. Press. 28.45 in.Hg

Pitot No. V29-6
C_p .840
H_2O 4 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(0805)	(110.90)											
A-12	2.5	112.63	1.35	1.54	2.69	3	122	254	N/A	48	70	70	20.9
11	5	114.39	1.25	1.41	4.43	3	118	254		48	70	69	20.9
10	7.5	116.29	1.45	1.65	6.28	4	124	254		48	71	70	20.9
9	10	118.13	1.40	1.60	8.12	3	120	254		48	72	70	20.9
8	12.5	120.04	1.50	1.72	0.02	4	120	254		48	73	70	20.9
7	15	122.10	1.95	2.22	2.09	4	123	255		49	74	71	20.9
6	17.5	124.20	1.80	2.05	[illegible]	4	124	255		49	74	71	20.9
5	20	126.54	1.85	2.11	2.37	4	125	255		50	75	71	20.9
4	22.5	128.19	1.10	1.25	8.04	4	125	251		50	76	71	20.9
3	25	129.75	1.10	1.26	9.63	3	124	251		51	76	72	20.9
2	27.5	131.15	1.05	1.18	1.22	3	133	250		50	74	72	20.9
1	30	132.58	1.00	1.14	2.77	3	125	251		50	76	73	20.9
B-12	32.5	134.64	1.65	1.90	4.78	4	120	251		50	77	73	20.9
11	35	136.85	2.00	2.30	6.98	5	121	254		50	77	73	20.9
10	37.5	139.20	2.05	2.35	9.21	5	124	254		51	78	74	20.9
9	40	141.20	2.175	2.50	1.27	4	126	250		48	79	75	20.9
8	42.5	143.08	1.90	2.20	3.43	4	120	248		47	80	75	20.9
7	45	145.49	2.10	2.42	5.70	5	123	240		46	79	75	20.9
6	47.5	147.90	2.15	2.46	7.98	5	127	240		45	80	75	20.9
5	50	150.22	1.90	2.16	5.12	5	131	241		44	80	75	20.9
4	52.5	152.35	1.90	2.17	2.27	4	128	245		48	80	76	20.9
3	55	154.40	1.95	2.23	4.45	4	128	246		47	80	75	20.9
2	57.5	155.98	.98	1.12	5.99	3	129	246		47	81	76	20.9
1	60	157.55	.97	1.11	7.53	3	128	246		47	81	76	20.9
	(0908)												
	0 - 60	V_m = 46.65		ΔH = 1.82							Avg. = 74.6		

C-97

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP. SAGOLA Date 7-25-96 Test 9 Run 2
Source PRESS RTO INLET No. of traverse points 24
Method 0011 Filter holder: N/A Filter type: N/A

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: 0.00 cfm at 8 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: —

Recovery solvent(s)

☐acetone
☒other(s) MeCl2

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	581	569	12
Impinger No. 3			
Condenser			
Desiccant	1424	1406	18
Total			30

Integrated Gas Sampling Data: (N/A AMBIENT AIR)

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

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

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[redacted] RPC [redacted] ABC [redacted] LOI [redacted] INC [redacted]
(612) 786-6020

EPA Method 5 Field Data Sheet

Job	LP - SAGOLA	Operators	SB + MP	Nozzle No.	S-1
Source	PRESS RTO INLET	Meter Box No.	4 ΔH@ 1.78 in.WC	Nozzle Dia.	.189 in.
Date	7-25-96 Test 9 Run 2	Gasmeter Coeff.	.9957	Bar. Press.	28.45 in.Hg
Pitot No.	V24-6	C_p	.840	H_2O	2 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Stack (°F)	Probe (°F)	Oven (°F)	Imp. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (% v/v)
	(0937)	(158.52)											
A - 12	2.5	160.70	2.00	2.35	0.72	5	128	240	N/A	48	75	75	20.9
11	5	163.12	2.10	2.47	3.01	5	128	240	↓	47	76	75	20.9
10	7.5	165.09	1.75	2.06	5.09	4	129	241		47	76	76	20.9
9	10	167.38	1.95	2.30	7.30	5	127	240		47	76	75	20.9
8	12.5	169.63	2.00	2.37	7.54	5	124	240		47	78	76	20.9
7	15	171.88	2.05	2.44	1.81	5	124	241		47	79	77	20.9
6	17.5	174.24	2.25	2.68	4.20	6	121	244		47	81	77	20.9
5	20	176.75	2.25	2.68	6.58	6	125	244		47	81	77	20.9
4	22.5	179.02	2.35	2.80	9.02	6	125	244		47	81	78	20.9
3	25	181.50	2.40	2.84	1.48	6	130	244		46	82	78	20.9
2	27.5	183.81	2.00	2.39	3.73	5	125	240		46	82	78	20.9
1	30	185.55	1.30	1.55	5.55	3	126	244		46	82	78	20.9
B - 12	32.5	187.43	1.30	1.57	7.38	4	120	247		47	82	78	20.9
11	35	189.39	1.50	1.81	9.35	4	120	247		47	80	78	20.9
10	37.5	191.31	1.45	1.72	1.24	4	129	242		47	83	79	20.9
9	40	193.24	1.50	1.79	3.22	4	128	241		46	83	79	20.9
8	42.5	195.30	1.80	2.17	5.37	4	122	241		46	84	80	20.9
7	45	197.50	1.80	2.13	7.60	4	133	241		46	84	80	20.9
6	47.5	199.20	1.75	2.09	9.62	4	127	241		46	85	80	20.9
5	50	201.62	1.45	1.72	1.54	4	133	241		46	85	80	20.9
4	52.5	203.45	1.35	1.60	3.39	4	131	241		45	85	81	20.9
3	55	205.20	1.25	1.47	5.18	4	136	240		45	85	81	20.9
2	57.5	206.92	1.15	1.34	6.18	3	136	240		45	85	81	20.9
1	60	208.49	1.00	1.19	8.49	3	130	240	↓	41	85	81	20.9
	(1039)												
	θ = 60	V_m = 49.99		ΔH = 2.06							Avg. = 79.8		

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP- SACTOWN
Date 7-29-96 Test 9 Run 3

Source PRED RTO INLET
No. of traverse points 24

Method 0011 Filter holder: N/A
Filter type: N/A

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒

Post test: 0.0 cfm at 7 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used:

—

—

Recovery solvent(s)

☐ acetone

☒ other(s) MeCl2

No. of probe wash bottles: 1

Sample recovered by: JB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	573	563	10
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1496	1484	12
			-
Total	░░░░░░░░		22

Integrated Gas Sampling Data: (NA AMBIENT AIR

Bag Pump No. ______ Box No. ______ Bag No. ______

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

Pretest leak check: ______ cc/min at ______ IN.HG

Time start: ______ (HRS) Time end: ______ (HRS)

Sampling rate: ______ cc/min Operator: ______

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

052394-C:\STACK\WP\FORMS\S-0046RR

[redacted]
(612) 786-6020

EPA Method 5 Field Data Sheet

Job	LP- SAGOLA	Operators	JB & MK	Nozzle No.	5-1
Source	PRESS RTO INLET	Meter Box No.	4 ΔH@ 1.78 in.WC	Nozzle Dia.	.189 in.
Date	7-25-96 Test 9 Run 3	Gasmeter Coeff.	.9957	Bar. Press.	28.45 in.Hg
Pitot No.	V29-C	C_p	.840	H_2O	3 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1235)	209.64											
A - 12	2.5	211.83	1.90	2.21	1.81	4	130	232	N/A	42	76	76	20.9
11	5	214.04	2.05	2.37	4.05	4	129	234	↓	43	77	76	20.9
10	7.5	216.40	2.20	2.55	6.37	5	129	235		43	77	76	20.9
9	10	218.60	2.05	2.39	8.62	5	126	235		43	78	76	20.9
8	12.5	220.94	2.10	2.44	0.89	4	127	240		45	79	77	20.9
7	15	222.81	1.70	1.99	2.95	3	125	242		45	79	77	20.9
6	17.5	225.04	1.80	2.10	5.06	4	127	242		45	80	77	20.9
5	20	227.41	2.30	2.70	7.46	5	123	245		46	81	78	20.9
4	22.5	229.76	2.15	2.52	9.77	5	126	244		46	82	78	20.9
3	25	231.75	1.60	1.87	1.77	4	128	247		43	82	78	20.9
2	27.5	233.30	1.25	1.47	3.54	3	126	250		43	82	78	20.9
1	30	235.37	1.70	2.01	5.61	4	122	252		44	82	79	20.9
B - 12	32.5	237.24	1.10	1.29	7.27	3	125	251		44	82	79	20.9
11	35	239.08	1.30	1.54	9.09	3	122	254		43	82	79	20.9
10	37.5	241.03	1.45	1.71	1.00	4	122	254		43	83	79	20.9
9	40	242.78	1.20	1.42	2.75	3	122	255		43	83	79	20.9
8	42.5	244.84	1.70	1.98	4.80	3	132	252		44	83	80	20.9
7	45	246.71	1.40	1.66	6.69	4	122	254		44	84	80	20.9
6	47.5	248.72	1.65	1.93	8.72	3	129	254		44	84	80	20.9
5	50	250.78	1.70	2.00	0.80	4	125	253		45	84	80	20.9
4	52.5	252.63	1.30	1.53	2.61	4	126	256		45	84	80	20.9
3	55	254.44	1.35	1.57	4.45	3	132	254		46	84	80	20.9
2	57.5	256.11	1.10	1.29	6.11	4	130	255		46	84	80	20.9
1	60	257.57	.79	0.93	7.53	3	125	256	↓	47	84	80	20.9
	(1335)												
	0 - 60	V_m = 47.93		ΔH = 1.90							Avg. =	TEMP 79.9	

081194-GASTACK\WP\FORMS\S-518

INTERPOLL LABORATORIES, INC
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP SAGOLA Date 7-25-96 Test 9 Run 4

Source PKBSS KTO INLET No. of traverse points 24

Method 0011 Filter holder: N/A 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: Recovery solvent(s)

— ☐acetone

— ☒other(s) MCL

No. of probe wash bottles: 1

Sample recovered by: SB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	592	574	18
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1494	1484	10
Total			28

Integrated Gas Sampling Data: N/A AMBIENT AIR

Bag Pump No. ________ Box No. ________ Bag No. ________

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

Pretest leak check: ________ cc/min at ________ IN.HG

Time start: ________ (HRS) Time end: ________ (HRS)

Sampling rate: ________ cc/min Operator: ________

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

052394-C:\STACK\WP\FORMS\S-0046RR

[redacted]
(612) 786-6020

EPA Method 5 Field Data Sheet

Job	LP SAGOLA	Operators	SD / MP	Nozzle No.	~~V29-6~~ 5-1
Source	PRESS RTO INLET	Meter Box No.	4 ΔH@ 1.78 in.WC	Nozzle Dia.	.189 in.
Date	7-25-96 Test 9 Run 4	Gasmeter Coeff.	.9457	Bar. Press.	28.45 in.Hg
Pitot No.	V29-6	C_p	.84	H_2O	3 %

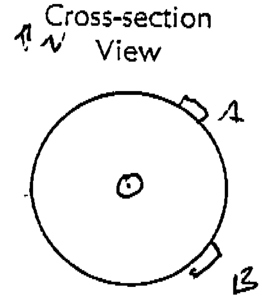
Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Stack (°F)	Probe (°F)	Oven (°F)	Imp. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (% v/v)
	(1410)	(258.20)											
B 1	2.5	259.93	1.2	1.39	9.91	4	125	230	NA	41	79	78	20.9
2	5	261.78	1.4	1.65	1.79	4	122	230		41	79	78	20.9
3	7.5	263.40	1.1	1.30	3.46	3	122	232		41	79	78	20.9
4	10	265.38	1.4	1.65	5.34	4	122	231		42	80	78	20.9
5	12.5	267.40	1.65	1.94	7.37	4	126	231		42	82	79	20.9
6	15	269.62	1.95	2.27	9.58	5	133	232		43	83	79	20.9
7	17.5	271.95	2.15	2.52	1.90	5	129	232		43	84	79	20.9
8	20	273.74	1.30	1.52	3.71	3	131	233		44	84	80	20.9
9	22.5	275.76	1.65	1.93	5.75	4	132	234		43	84	80	20.9
10	25	277.58	1.30	1.52	7.56	3	131	235		44	84	80	20.9
11	27.5	279.10	.92	1.08	9.08	3	130	234		44	84	80	20.9
12	30	280.76	1.05	1.23	0.72	3	130	235		45	85	80	20.9
A 1	32.5	282.88	1.80	2.11	2.85	4	129	232		45	94	81	20.9
2	35	285.12	2.00	2.36	5.10	5	125	234		46	84	81	20.9
3	37.5	287.15	1.60	1.89	7.12	4	125	235		46	84	81	20.9
4	40	289.37	1.95	2.29	9.34	5	129	236		47	84	81	20.9
5	42.5	291.73	2.20	2.60	1.71	5	126	235		46	85	81	20.9
6	45	294.04	2.15	2.52	4.03	5	131	237		47	85	81	20.9
7	47.5	296.55	2.50	2.93	6.54	6	130	236		47	85	81	20.9
8	50	298.91	2.15	2.53	8.88	5	125	236		48	85	81	20.9
9	52.5	301.40	2.50	2.94	1.39	6	127	237		48	85	81	20.9
10	55	303.60	1.90	2.23	3.59	5	129	238		48	85	81	20.9
11	57.5	305.71	1.75	2.07	5.70	4	125	239		49	85	81	20.9
12	60	307.64	1.35	1.61	7.56	4	122	240		48	85	81	20.9
	(1512)												
	θ = 60	V_m = 49.44		ΔH = 2.00							Avg. = 81.7		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: L.P. / Sagola, MI
Source: Press RTO / Stack
Test: 9 Run: 0 Date: 7-24-96
Stack Dimen.: 70 IN.
Dry Bulb: 255 °F Wet bulb: 108 °F
Manometer: ☑Reg. ☐Exp ☐Elec.
Barometric Pressure: 29.45 IN.HG
Static Pressure: -.27 IN.WC
Operators: M. Kaehler + D. Halleman
Pitot No.: 4MS-8 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
		Port Length:	4 IN.	Time Start:	NA HRS
		Refer to	Test 7		
		for pts.	and flows		
Temp. Meas. Device & S/N:		PDT-45 / 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. / Sagola, MI
Source Press R/O / Stack
Method 0011 Filter holder: NA

Date 7-25-96 Test 9 Run 1
No. of traverse points 20
Filter type: NA

Sample Train Leak Check:
Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: <.002 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: M. Koehler & D. Hollerman

Condensate Data:

Item	Weight (g) Final	Tare	Difference
Impinger No. 1	491	476	15
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1424	1413	11
Total			26

Integrated Gas Sampling Data: NA / Ambient

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:

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 5 Field Data Sheet

Job: C.P. / Sasola, MI
Source: Press RTO / Stack
Date: 2-24-96 Test: 9 Run: 1

Operators: M. Huehlart, P. Holleman
Meter Box No.: 10 ΔH@ 1.93 in.WC
Gasmeter Coeff.: .9973

Nozzle No.: 6-4
Nozzle Dia.: .241 in.
Bar. Press.: 28.45 in.Hg

Pitot No.: 445-8
C_p: .84
H_2O: 3.5 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Stack (°F)	Probe (°F)	Oven (°F)	Imp. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (% v/v)
	0905	16.20											
10	3	18.90	.88	2.42	8.80	3	257	243	253	45	77	76	20.5
9	6	21.33	.81	2.24	1.30	3	251	241	249	44	79	76	
8	9	23.94	.85	2.35	3.87	3	253	250	252	47	82	76	
7	12	26.48	.79	2.18	6.35	3	255	241	250	48	85	76	
6	15	28.93	.76	2.11	8.75	3	254	237	250	48	87	77	
5	18	31.59	.92	2.57	1.49	3	251	248	251	47	88	76	
4	21	34.37	.88	2.44	4.12	3	255	241	255	47	89	77	
3	24	36.73	.81	2.25	6.61	3	257	235	260	45	91	77	
2	27	39.15	.72	2.01	9.04	3	253	240	263	46	92	77	
1	30	41.67	.77	2.16	1.52	3	250	248	253	48	93	77	
10	33	44.23	.81	2.27	4.07	3	252	241	240	47	90	78	
9	36	46.67	.77	2.15	6.54	3	254	233	243	48	94	79	
8	39	48.99	.75	2.11	9.99	3	253	227	247	49	95	80	
7	42	51.57	.73	2.05	1.42	3	254	235	250	50	95	81	
6	45	54.22	.83	2.32	4.08	3	257	248	245	50	96	81	
5	48	56.75	.86	2.42	6.65	3	253	250	253	50	96	82	
4	51	59.39	.91	2.57	9.35	4	251	247	253	52	97	82	
3	54	61.73	.80	2.27	1.90	4	250	245	260	52	97	82	
2	57	64.27	.77	2.18	4.40	3.5	253	240	259	51	98	82	
1	60	66.95	.77	2.18	6.90	3.5	253	241	257	52	99	82	
	(0907)												
	0 - 60	V_m = 50.65		ΔH = 2.26							Avg. = 84.8		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Sagola, M.I. Date 7-25-96 Test 9 Run 2

Source Press RTO / Stack No. of traverse points 20

Method 0011 Filter holder: ______ Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ~~Y~~

Post test: <0.02 cfm at 7 IN. HG (vac) ~~Y~~

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)

~~Acetone~~ ______

~~O~~other(s) MeCl2

No. of probe wash bottles: 0

Sample recovered by: M. Koehler + D. Hollemans

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	492	474	18
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1525	1513	~~MK 1513~~ 12
Total	░░░░		30

Integrated Gas Sampling Data: NA / Ambient

Bag Pump No. ______ Box No. ______ Bag No. ______

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

Pretest leak check: ______ cc/min at ______ IN.HG

Time start: ______ (HRS) Time end: ______ (HRS)

Sampling rate: ______ cc/min Operator: ______

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

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 5 Field Data Sheet

Job L.P. / Sasola, MI
Source Press RTO / Stack
Date 7-25-96 Test 9 Run 2

Operators M. Kaehler & D. Halleman
Meter Box No. 10 ΔH@ 1.93 in.WC
Gasmeter Coeff. ~~.999~~ .9923

Nozzle No. 2-4
Nozzle Dia. .251 in.
Bar. Press. 29.45 in.Hg

Pitot No. 4M5-8
C_p .84
H_2O 2.5 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	0937	67.20											
A-10	3	69.60	.63	2.12	9.65	3	251	240	250	48	84	83	20.9
9	6	72.00	.62	2.07	2.08	3	254	233	246	45	98	93	↓
8	9	74.73	.71	2.39	4.68	4	252	241	253	45	92	83	
7	12	77.43	.79	2.65	7.44	4	255	237	255	45	94	83	
6	15	80.12	.75	2.52	0.12	4	255	246	250	47	95	83	
5	18	82.97	.93	2.80	2.95	4.5	254	243	257	48	98	84	
4	21	85.86	.91	3.08	5.93	5	253	235	251	46	99	84	
3	24	88.77	.80	2.71	8.72	4	254	240	247	47	99	84	
2	27	91.35	.68	2.30	1.29	3	254	235	250	47	100	85	
1	30	93.67	.60	2.05	3.73	3	251	233	244	47	101	85	
B-10	33	96.25	.55	1.88	6.06	2.5	251	240	247	48	99	85	
9	36	98.97	.81	2.74	8.87	4	254	245	244	44	100	86	
8	39	101.65	.80	2.71	1.66	4	255	241	248	44	101	87	
7	42	104.43	.77	2.61	4.41	4	255	243	253	45	102	86	
6	45	107.47	.88	2.99	2.35	4.5	254	239	259	44	103	86	
5	48	110.11	.71	2.41	0.00	4	255	246	248	45	104	88	
4	51	112.83	.80	2.71	2.80	4	258	241	253	45	104	88	
3	54	115.47	.65	2.23	5.35	3	252	247	250	46	104	89	
2	57	117.78	.65	2.23	7.89	3	251	247	256	48	103	89	
1	60	120.17	.59	2.02	0.32	3	251	250	253	49	104	89	↓
	(1039)												
	0 - 60	V_m - 52.97		ΔH - 2.46							Avg. - 92.1		

INTERPOLL LABORATORIES, INC
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Saginaw, MI Date 7-15-96 Test 9 Run 3 8MC
Source Press RTO / Stack No. of traverse points 20
Method 0011 Filter holder: NA Filter type: NA

Sample Train Leak Check:
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: NA
Recovery solvent(s)
☐acetone
☒other(s) MeCl2

No. of probe wash bottles: 0
Sample recovered by: M. Koehler + D. Hillzman

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	493	477	16
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1433	1424	9
Total			25

Integrated Gas Sampling Data: NA/Ambient

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

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

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 5 Field Data Sheet

Job: C.P. / Sagola, MI — Operators: M. Koehler & D. Holleman — Nozzle No.: 2-4 — Pitot No.: 445-9

Source: Press RTO / Stack — Meter Box No.: 10 — ΔH@: 1.93 in.WC — Nozzle Dia.: .251 in. — C_p: .84

Date: 7-25-96 — Test: 9 — Run: 3 — Gasmeter Coeff.: .9973 — Bar. Press.: 28.45 in.Hg — H_2O: 2.8 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1235	121.40											
B-10	3	124.31	.93	2.80	4.24	4	253	233	258	49	85	85	20.9
9	6	126.97	.75	2.49	6.90	4	256	246	251	46	88	84	
8	9	129.62	.73	2.44	9.53	4	254	244	258	48	90	84	
7	12	132.21	.70	2.33	2.11	3.5	258	247	255	48	92	84	
6	15	134.83	.72	2.41	4.74	4	255	241	259	47	95	85	
5	18	137.65	.83	2.78	7.56	4	255	247	253	47	96	85	
4	21	140.29	.75	2.52	0.15	4	256	244	250	48	97	85	
3	24	142.99	.77	2.58	2.98	4	257	241	255	48	99	85	
2	27	145.72	.75	2.53	5.67	4	254	245	249	48	99	86	
1	30	148.31	.71	2.39	8.30	4	257	253	245	46	100	86	
A-10	33	150.78	.60	2.03	0.72	3.5	255	249	246	45	99	87	
9	36	153.41	.70	2.36	3.33	3.5	255	258	240	47	101	87	
8	39	156.07	.74	2.50	6.02	4	256	247	237	47	102	88	
7	42	158.85	.77	2.61	8.77	4	255	241	247	48	103	88	
6	45	161.50	.77	2.60	1.51	4	257	247	250	45	103	88	
5	48	164.23	.76	2.59	4.15	4	251	249	256	46	103	88	
4	51	167.35	.88	2.98	7.19	4.5	255	245	253	48	104	90	
3	54	170.10	.81	2.76	0.02	4	253	240	251	49	105	89	
2	57	172.84	.73	2.48	2.71	4	256	236	247	51	105	90	
1	60	175.37	.67	2.28	5.28	3.5	255	243	245	51	105	91	
	(1336)												
	0 - 60	V_m - 53.97		ΔH - 2.52							Avg. - 92.6		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Escoola, MI
Source Press ATO / Stack
Method 0011 Filter holder: NA
Date 7-25-96 Test 9 Run 4
No. of traverse points 20
Filter type: NA

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) MeCl2

No. of probe wash bottles: 6
Sample recovered by: M. Kachlen + D. Hillemann

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	495	477	18
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	~~M~~ ~~3~~ 1539	1525	14
Total			32

Integrated Gas Sampling Data: NA / Ambient

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

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Field Data Sheet

Job: L.P. / Sagola, MI
Source: Press ATO / Stack
Date: 7-25-96 Test: 9 Run: 4

Operators: M. Kroehlert, D. Holleman
Meter Box No.: 10 ΔH@: 1.93 in.WC
Gasmeter Coeff.: .9973

Nozzle No.: 2-4
Nozzle Dia.: .251 in.
Bar. Press.: 28.45 in.Hg

Pitot No.: 4MS-8
C_p: .81
H_2O: 2.3 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1510	176.00											
A-10	3	178.57	.65	2.21	2.52	3	255	240	253	49	89	99	20.9
9	6	181.39	.81	2.73	1.32	4	256	233	249	51	95	90	
8	9	184.12	.77	2.61	4.06	4	258	229	247	51	95	90	
7	12	186.73	.75	2.54	6.77	4	257	237	255	50	98	89	
6	15	189.75	.80	2.71	9.56	4.5	259	235	251	47	100	89	
5	18	192.17	.75	2.54	2.28	4	260	241	255	46	101	90	
4	21	195.05	.85	2.87	5.16	5.5	263	246	250	45	101	90	
3	24	197.73	.72	2.44	7.82	5	261	243	247	46	103	90	
2	27	200.50	.83	2.82	0.68	6	261	244	245	48	103	90	
1	30	203.25	.74	2.54	3.39	5.5	254	246	240	48	104	91	
B-10	33	206.00	.69	2.36	6.02	5	257	245	246	48	102	91	
9	36	208.63	.78	2.67	8.80	6	254	239	250	46	104	91	
8	39	211.62	.77	2.65	1.58	6	253	235	253	46	104	91	
7	42	214.57	.89	3.05	4.56	6.5	254	241	247	46	104	92	
6	45	217.40	.84	2.89	7.46	6	253	240	253	48	105	92	
5	48	220.59	.92	3.15	0.48	6.5	256	235	244	47	105	92	
4	51	223.32	.81	2.76	3.32	6	260	244	245	48	105	92	
3	54	226.20	.80	2.71	6.13	6	264	241	253	49	105	92	
2	57	228.75	.62	2.12	8.62	5	260	237	256	51	106	93	
1	60	231.40	.70	2.40	1.27	5.5	257	245	251	51	106	93	
	(1512)												
	0-60	V_m = 55.40		2.64 ΔH =							Avg. = 96.3		

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Form Number	Page	Of

Continued on VEO Form Number:

...od Used (Circle One): (Method 9 — circled) 203A 203B Other: ______

Company Name: Louisiana Pacific

...ity Name: Sagola

Street Address:

State: MI **Zip:**

Sagola

Process: Dryer **Unit #:** **Operating Mode:**

...rol Equipment: RTC E-Tube **Operating Mode:**

...ibe Emission Point:

Height of Emiss. Pt.: Start End | **Height of Emiss. Pt. Rel. to Observer:** Start End

...nce to Emiss. Pt.: Start End | **Direction to Emiss. Pt. (Degrees):** Start End

...al Angle to Obs. Pt.: Start End | **Direction to Obs. Pt. (Degrees):** Start End

...nce and Direction to Observation Point from Emission Point: Start End

...ibe Emissions: Start End

Emission Color: Start End | **Water Droplet Plume:** Attached ☐ Detached ☐ None ☐

...ibe Plume Background: Start End

Background Color: Start End | **Sky Conditions:** Start End

...d Speed: Start End | **Wind Direction:** Start End

Ambient Temp.: Start End | **Wet Bulb Temp.:** | **RH Percent:**

Source Layout Sketch

Draw North Arrow ☐TN ☐MN

X Observation Point

Observer's Position

140°

Sun Location Line

FEET

FEET

Side View

Stack With Plume

Sun

Wind

...itude: | **Latitude:** | **Declination:**

Additional Information:

EOF1.1

Observation Date	Time Zone	Start Time	End Time
7-23-96	CDST		

Min \ Sec	0	15	30	45	Comments
1					Unable to read due
2					to overcast clouds
3					and intermitant rain
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

Observer's Name (Print): Mark Petersen

Observer's Signature: Mark Petersen **Date:** 7/23/96

Organization: Interpoll Laboratories, Inc.

Certified By: Eastern Technical Associates **Date:** 4-3-96

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Form Number						Page 1	Of 2
Continued on VEO Form Number							

Method Used (Circle One): **(Method 9)** 203A 203B Other: ____

Company Name: Louisiana Pacific Corp.

Facility Name: Sagola Plant

Street Address: Hwy 95

City: Sagola | State: MI | Zip:

Process: Press vent | Unit #: NA | Operating Mode:

Control Equipment: RTO | Operating Mode:

Describe Emission Point: silver stack next to RTO on east side of the building

Height of Emiss. Pt.: Start ~80' End same | Height of Emiss. Pt. Rel. to Observer: Start ~80' End same

Distance to Emiss. Pt.: Start ~160' End same | Direction to Emiss. Pt. (Degrees): Start 330° End same

Vertical Angle to Obs. Pt.: Start ~26° End same | Direction to Obs. Pt. (Degrees): Start 330° End same

Distance and Direction to Observation Point from Emission Point: Start 3' above End same

Describe Emissions: Start None visible End same

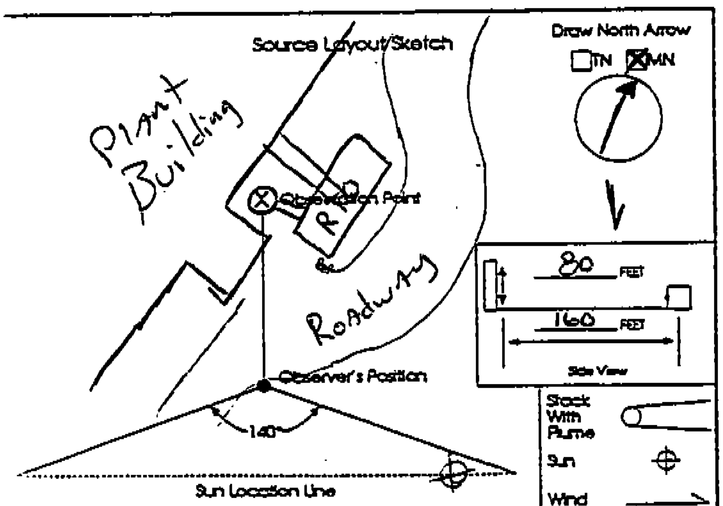
Emission Color: Start None End same | Water Droplet Plume: Attached ☐ Detached ☐ None ☒

Describe Plume Background: Start sky w/clouds End same

Background Color: Start blue & white End same | Sky Conditions: Start Partly cloudy End same

Wind Speed: Start ~4 to 8 mph End same | Wind Direction: Start north End same

Ambient Temp.: Start 83° End same | Wet Bulb Temp.: 69° | RH Percent: 46%



Longitude: | Latitude: | Declination:

Additional Information:

Observation Date	Time Zone	Start Time	End Time
7-25-96	CDST	0937	1007

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Mark Petersen

Observer's Signature: Mark Peter[signature] | Date: 7/25/96

Organization: Interpoll Laboratories, Inc.

Certified By: Eastern Technical Associates | Date: 4-3-96

VEOF1.1

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One): Method 9 (circled) 203A 203B Other: ______

Company Name: Louisiana Pacific

Facility Name: Sayola Plant

Street Address: Hwy 95

City: Sayola State: MI Zip:

Process: Press vent Unit #: NA Operating Mode:

Control Equipment: RTO Operating Mode:

Describe Emission Point: Silver stack next to RTO on east side of building

Height of Emiss. Pt.: Start ~80' End same | Height of Emiss. Pt. Rel. to Observer: Start ~80' End same

Distance to Emiss. Pt.: Start ~160' End same | Direction to Emiss. Pt. (Degrees): Start 330° End same

Vertical Angle to Obs. Pt.: Start ~26° End same | Direction to Obs. Pt. (Degrees): Start 330° End same

Distance and Direction to Observation Point from Emission Point: Start 3' above End same

Describe Emissions: Start None visible End same

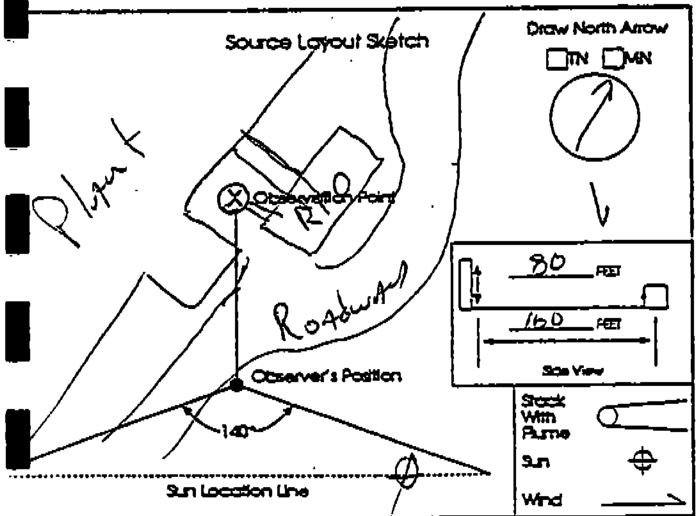
Emission Color: Start None End same | Water Droplet Plume: Attached ☐ Detached ☐ None ☒

Describe Plume Background: Start sky w/clouds End

Background Color: Start bluefwhite End same | Sky Conditions: Start Partly cloudy End same

Wind Speed: Start 4 to 8 mph End same | Wind Direction: Start north End same

Ambient Temp.: Start 83° End same | Wet Bulb Temp.: 69° | RH Percent: 46%



Longitude | Latitude | Declination

Additional Information:

VEOF1.1

Form Number | Page 2 of 2

Continued on VEO Form Number

Observation Date	Time Zone	Start Time	End Time
7-25-96	CDST	1007	1037

Min \ Sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print): Mark Petersen

Observer's Signature: Mark Peterson (signature) Date: 7/25/96

Organization: Interpoll Laboratories Inc.

Certified By: Eastern Technical Associates Date: 4-3-96

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Mark Petersen

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.

[signature] President	252753 Certificate Number
[signature] Vice President	Minneapolis, Minnesota Location
David B. Savage, Jr. Program Manager	April 3, 1996 Date of Issue

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APPENDIX D

INTERPOLL LABORATORIES ANALYTICAL DATA

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job	L.P. / Sagola, MI	Source	No. 1 Primary Cyclone
Team Leader	S. Fjelsta	Test Site	Exhaust
Date Submitted	7-24-96	Date of Test	7-23-96
Test No.	1	No. of Runs Completed	3
Date of Analysis	7-24-96	Technician	Mark Koehler

Test/ Run	Sample Log No. 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_0
1/1		1	0.00	3.00	20.60	3.00	17.60	1.100
		2	0.00	3.00	20.60	3.00	17.60	1.100
	☑B☐F	Avg				3.00	17.60	
1/2		1	0.00	3.40	20.50	3.40	17.10	1.118
		2	0.00	3.40	20.50	3.40	17.10	1.119
	☑B☐F	Avg				3.40	17.10	
1/3		1	0.00	3.70	20.50	3.70	16.90	1.108
		2	0.00	3.70	20.50	3.70	16.80	1.108
	☑B☐F	Avg				3.70	16.90	
		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 $F_0 = \frac{20.9 - O_2}{CO_2}$

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

111595-G:\STACK\WP\FORMS\S-569

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job	LP - SAGOLS	Source	NO. 2 CYCLONE
Team Leader	DU4	Test Site	OUTLET
Date Submitted	7-26-96	Date of Test	7-22-96
Test No.	1	No. of Runs Completed	3
Date of Analysis	7-31-96	Technician	SLD

Test/Run	Sample Log No. 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_0
1/1	8024-	1	0.00	3.2	20.4	3.2	17.2	1.16
		2	0.00	3.2	20.4	3.2	17.2	1.16
	☒B☐F	Avg				3.2	17.2	
1/2		1	0.00	3.8	20.7	3.8	16.9	1.05
		2	0.00	3.8	20.7	3.8	16.9	1.05
	☒B☐F	Avg				3.8	16.9	
1/3		1	0.00	3.2	20.4	3.2	17.2	1.16
		2	0.00	3.2	20.4	3.2	17.2	1.16
	☒B☐F	Avg				3.2	17.2	
		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 $F_0 = \frac{20.9 - O_2}{CO_2}$

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job	L.P. / Sagola, MI	Source	Dryer Primary Cyclone
Team Leader	E. Twers	Test Site	No. 3 Exhaust
Date Submitted	7-24-96	Date of Test	7-23-96
Test No.	1	No. of Runs Completed	3
Date of Analysis	7-24-96	Technician	Mark Koehler

Test/ Run	Sample Log No. and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After 0_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_0
1/1		1	0.00	3.10	20.60	3.10	17.50	1.097
		2	0.00	3.10	20.60	3.10	17.50	1.097
	☒B☐F	Avg				3.10	17.50	
1/2		1	0.00	3.70	20.50	3.70	16.80	1.108
		2	0.00	3.70	20.50	3.70	16.80	1.108
	☒B☐F	Avg				3.70	16.80	
1/3		1	0.00	3.10	20.50	3.10	17.40	1.129
		2	0.00	3.10	20.50	3.10	17.40	1.129
	☒B☐F	Avg				3.10	17.40	
		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 $F_0 = \frac{20.9 - O_2}{CO_2}$

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

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job	LP - SAGOLA	Source	ETUBE
Team Leader	MK	Test Site	OUTLET
Date Submitted	7-26-96	Date of Test	7-23-96
Test No.	1	No. of Runs Completed	3
Date of Analysis	7-31-96	Technician	SWB

Test/ Run	Sample Log No. 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_0
1/1	8021	1	0.00	2.8	20.6	2.8	17.8	1.11
		2	0.00	2.8	20.6	2.8	17.8	1.11
	☑B☐F	Avg				2.8	17.8	
1/2		1	0.00	2.9	20.6	2.9	17.7	1.10
		2	0.00	2.9	20.6	2.9	17.7	1.10
	☑B☐F	Avg				2.9	17.7	
1/3		1	0.00	2.9	20.5	2.9	17.6	1.14
		2	0.00	2.9	20.5	2.9	17.6	1.14
	☑B☐F	Avg				2.9	17.6	
		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 $F_0 = \frac{20.9 - O_2}{CO_2}$

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, INC.

(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job	LP-SAGOLA	Source	E-TUR
Team Leader	MK	Test Site	OUTLET
Date Submitted	8-26-96	Date of Test	7-23-96
Test No.	1	No. of Runs Completed	2
Date of Analysis	7-31-96	Technician	SLB

Test/ Run	Sample Log No. and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After 0_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_0
1/4	8024	1	0.00	2.9	20.5	2.9	17.6	1.14
		2	0.00	2.9	20.5	2.9	17.6	1.14
	☑B☐F	Avg				2.9	17.6	
1/5		1	0.00	2.6	20.5	2.6	17.9	1.15
		2	0.00	2.6	20.5	2.6	17.9	1.15
	☑B☐F	Avg				2.6	17.5	
		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						
		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 $F_0 = \frac{20.9 - O_2}{CO_2}$

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, INC.

(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job	LP SAGOLA	Source	DRYER RTO
Team Leader	S. BAINVILLE	Test Site	~~DRYER RTO~~ STACK
Date Submitted	7-23-96	Date of Test	7-23-96
Test No.	1	No. of Runs Completed	3
Date of Analysis	7-23-96	Technician	SB

Test/ Run	Sample Log No. 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_0
1/1		1	0	3.1	20.4	3.1	17.3	1.16
		2	0	3.1	20.4	3.1	17.3	1.16
	☒B☐F	Avg				3.1	17.3	
1/2		1	0	3.1	20.4	3.1	17.3	1.16
		2	0	3.1	20.4	3.1	17.3	1.16
	☒B☐F	Avg				3.1	17.3	
1/3		1	0	3.0	20.4	3.0	17.4	1.17
		2	0	3.0	20.4	3.0	17.4	1.17
	☒B☐F	Avg				3.0	17.4	
		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 $F_0 = \frac{20.9 - O_2}{CO_2}$

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

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job	LP-SAGOLA	Source	Primary Cyclone No. 1
Team Leader	SLB	Test Site	Exhaust
Date Submitted	7-26-96	Date of Test	~~SLB~~ 7-24-96
Test No.	4	No. of Runs Completed	3
Date of Analysis	8-6-96	Technician	SLB

Test/ Run	Sample Log No. and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After 0_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_0
4/1	90-ct-	1	0.00	3.2	20.4	3.2	17.2	1.15
		2	0.00	3.2	20.4	3.2	17.2	1.15
	☑B☐F	Avg				3.2	17.2	
4/2		1	0.00	3.2	20.4	3.2	17.2	1.16
		2	0.00	3.2	20.4	3.2	17.2	1.16
	☑B☐F	Avg				3.2	17.2	
4/3		1	0.00	3.3	20.3	3.3	17.0	1.18
		2	0.00	3.3	20.3	3.3	17.0	1.18
	☑B☐F	Avg				3.3	17.0	
		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 $F_0 = \frac{20.9 - O_2}{CO_2}$

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

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job	LP-SAGOLA	Source	No 2 CYCLONE
Team Leader	DVH	Test Site	OUTLET
Date Submitted	7-26-96	Date of Test	7-24-96
Test No.	4	No. of Runs Completed	3
Date of Analysis	8-6-96	Technician	SWD

Test/ Run	Sample Log No. 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
4/1	8024-	1	0.00	3.4	20.5	3.4	17.1	1.12
		2	0.00	3.4	20.5	3.4	17.1	1.12
	☒B☐F	Avg				3.4	17.1	
4/2		1	0.00	3.8	20.6	3.8	16.8	1.08
		2	0.00	3.8	20.6	3.8	16.8	1.08
	☒B☐F	Avg				3.8	16.8	
4/3		1	0.00	3.1	19.9	3.1	16.8	1.32
		2	0.00	3.1	19.9	3.1	16.8	1.32
	☒B☐F	Avg				3.1	16.8	
		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 $F_0 = \frac{20.9-O_2}{CO_2}$

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

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job	LP- SAGOLA	Source	No. 3 CYCLONE
Team Leader	EJ	Test Site	OUTLET
Date Submitted	7-26-96	Date of Test	7-24-54
Test No.	4	No. of Runs Completed	3
Date of Analysis	8-6-96	Technician	SLD

Test/ Run	Sample Log No. and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After 0_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_0
4/1	8024-	1	0.00	3.5	20.5	3.5	17.0	1.11
		2	0.00	3.5	20.5	3.5	17.0	1.11
	☒B☐F	Avg				3.5	17.0	
4/2		1	0.00	3.2	20.2	3.2	17.0	1.22
		2	0.00	3.2	20.2	3.2	17.0	1.22
	☒B☐F	Avg				3.2	17.0	
4/3		1	0.00	3.8	20.3	3.8	16.5	1.16
		2	0.00	3.8	20.3	3.8	16.5	1.16
	☒B☐F	Avg				3.8	16.5	
		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 $F_0 = \frac{20.9 - O_2}{CO_2}$

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

111595-G:\STACK\WP\FORMS\S-569

INTERPOLL LABORATORIES, INC.

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EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job: 4D - SACOLA
Team Leader: JB
Date Submitted: 7-26-96
Test No.: 4
Date of Analysis: 7-25-96

Source: Dryer Rto Stack
Test Site: Stack
Date of Test: 7-24-96
No. of Runs Completed: 3
Technician: SLD

Test/ Run	Sample Log No. 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_0
4/1	8024	1	0.00	2.5	20.7	2.5	18.2	1.09
		2	0.00	2.5	20.7	2.5	18.2	1.09
	☒B☐F	Avg				2.5	18.2	
4/2		1	0.00	3.2	20.5	3.2	17.3	1.13
		2	0.00	3.2	20.5	3.2	17.3	1.13
	☒B☐F	Avg				3.2	17.3	
4/3		1	0.00	2.9	20.5	2.9	17.6	1.14
		2	0.00	2.9	20.5	2.9	17.6	1.14
	☒B☐F	Avg				2.9	17.6	
		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 $F_0 = \frac{20.9 - O_2}{CO_2}$

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

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INTERPOLL LABORATORIES, INC.
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Impinger Catch Data Reporting Sheet

REVIEWED AUG 9 1996

Protocol: ☐Minnesota ☐Wisconsin ☐Iowa ☑EPA Method 202 ☐Other

Job: L.P. Sagola — Source/Site: Primary Cyclone Exhaust #1

Date Submitted: 7/26/96 — Test No.:

Date of Analysis: 8/5/96 — Technician: WJ

	Solvent Phase	Aqueous Phase
Test: 1 Run: 0	Dish No: 845	Dish No: 856
Log No: 8024 - 01I	Dish + Sample Wt: 45.4145 g	Dish + Sample Wt: 49.2660 g
Color & Appearance:	Dish Tare Wt: 45.4143 g	Dish Tare Wt: 49.2659 g
	Fraction Wt: 0.0002 g	Fraction Wt: 0.0001 g
Comments:	Smpl Vol: 200 ml, Alqt: 150 ml, Factor: 1.333	Smpl Vol: 200 ml, Alqt: 150 ml, Factor: 1.333
	Sample Wt: 0.0003 g	Sample Wt: 0.0001 g
Test: 1 Run: 1	Dish No: 852	Dish No: 857
Log No: -02I	Dish + Sample Wt: 47.5270 g	Dish + Sample Wt: 42.7720 g
Color & Appearance:	Dish Tare Wt: 47.4072 g	Dish Tare Wt: 42.6674 g
	Fraction Wt: 0.1198 g	Fraction Wt: 0.1046 g
Comments:	Smpl Vol: 415 ml, Alqt: 365 ml, Factor 1.137	Smpl Vol: 415 ml, Alqt: 365 ml, Factor 1.137
	Sample Wt: 0.1362 g	Sample Wt: 0.1189 g
Test: 1 Run: 2	Dish No: 853	Dish No: 868
Log No: -03I	Dish + Sample Wt: 47.5441 g	Dish + Sample Wt: 49.4688 g
Color & Appearance:	Dish Tare Wt: 47.4007 g	Dish Tare Wt: 49.3343 g
	Fraction Wt: 0.1434 g	Fraction Wt: 0.1345 g
Comments:	Smpl Vol: 455 ml, Alqt: 405 ml, Factor 1.123	Smpl Vol: 455 ml, Alqt: 405 ml, Factor 1.123
	Sample Wt: 0.1610 g	Sample Wt: 0.1510 g
Test: 1 Run: 3	Dish No: 854	Dish No: 870
Log No: -04I	Dish + Sample Wt: 45.1827 g	Dish + Sample Wt: 44.2054 g
Color & Appearance:	Dish Tare Wt: 45.0584 g	Dish Tare Wt: 44.0959 g
	Fraction Wt: 0.1243 g	Fraction Wt: 0.1095 g
Comments:	Smpl Vol: 370 ml, Alqt: 320 ml, Factor 1.156	Smpl Vol: 370 ml, Alqt: 320 ml, Factor 1.156
	Sample Wt: 0.1437 g	Sample Wt: 0.1266 g

Note: Factor = Sample Volume/Aliquot Volume

Blank Solvent Wt. ______ g

√SV

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Phase g	0.0003	0.1359	0.1607	0.1434
Results of Aqueous Phase g	0.0001 D-1	0.1188	~~0.1510~~ 0.1509 (WJ 8/8/96)	0.1265

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Solvent Rinse Data Reporting Sheet

☑ EPA Method 5 Probe Wash ☐ EPA Method 29 Probe Wash ☐ EPA Method 202 Cup & Tube Wash

Job LP-SAGOLA
Date Submitted 7-26-96
Date of Analysis 8-9-96
Source/Site No. 1 Cyclone Exhaust
Test No. 1
Technician SB

Transport Leakage ☐ None ☒ ______ ml
Solvent Acetone

Test: 1	Run: 0	Dish No: 2	
Log No: 8024-01		Dish + Sample Wt: 40.0020	g
Volume of Solvent	95 ml	Dish Tare Wt: 40.0018	g
*Solvent Residue	ug/ml	Sample Wt: .0002	g
Test: 1	Run: 1	Dish No: 267	
Vol. of Solvent	100 ml	Dish + Sample Wt: 42.5691	g
Log Number -02		Dish Tare Wt: 42.4108	g
Comments		Sample Wt: .1583	g
Test: 1	Run: 2	Dish No: 854	
Vol. of Solvent	90 ml	Dish + Sample Wt: 47.3274	g
Log Number -03		Dish Tare Wt: 47.2530	g
Comments		Sample Wt: .0744	g
Test: 1	Run: 3	Dish No: 766	
Vol. of Solvent	105 ml	Dish + Sample Wt: ~~42.5671~~ 42.3266	g
Log Number -04		Dish Tare Wt: 42.2461	g
Comments		Sample Wt: .0805	g

*Solvent Residue 2.11 ug/ml = [(Sample Wt. .0002 g) (10^6)]/Vol. of Sol. 95 ml
EPA-M5 Acetone Residue Blank Spec. ≤ 7.8 ug/ml

✓SLL

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Rinse D-82	.0002	0.1581	0.0742	0.0803

INTERPOLL LABORATORIES, INC.
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Filter Gravimetrics Reporting Sheet

Filter Type: ☒ EPA Method 5 ☐ EPA Method 29 ☐ EPA Method 202 ☐ Other______

Job	LP - SACTOWN	Source/Site	No. 1 Cyclone Exhaust
Date Submitted	7-26-96	Test No.	1
Date of Analysis	8-9-96	Technician	SO

Test: 1	Run: 0	Filter No: 8633	
Field Blank: 8024-01		Filter Type: 4" G.F.	
Log No:		Filter + Sample Wt: 1.0499	g
Color: WHITE		Filter Tare Wt: 1.0496	g
		Sample Wt: .0003	g
Test: 1	Run: 1	Filter No: 8535	
Log No: -02		Filter Type: 4" GF.	
Color: DK BRW		Filter + Sample Wt: 1.2249	g
		Filter Tare Wt: .9608	g
		Sample Wt: .2641	g
Test: 1	Run: 2	Filter No: 8351	
Log No: -03		Filter Type: 4" GF	
Color: DK BRW		Filter + Sample Wt: 1.3804	g
		Filter Tare Wt: .9407	g
		Sample Wt: .4397	g
Test: 1	Run: 3	Filter No: 8575	
Log No: -04		Filter Type: 4" GF.	
Color: DK BRW		Filter + Sample Wt: 1.5956	g
		Filter Tare Wt: 1.0473	g
		Sample Wt: .5483	g

VGL

		RUN 0	RUN 1	RUN 2	RUN 3
Results of Filter Analysis	g		0.2641	0.4397	0.5483

		RUN	RUN	RUN	RUN
Total Mass	g				

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JUZ 8/8/96

Interpoll Laboratories, Inc.
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REVIEWED
AUG 15 1996

Ion Chromatography Laboratory

DIONEX MODEL 4000i WITH ANION MICRO MEMBRANE SUPRESSION

Analyst: MVG

Date of Analysis: 8/12/96

Job: 1D020/LP Sagola   Source: Cyclone #1   Site: Exhaust

Chromatography Conditions

Column		Flow Rate	Eluent	Flow Rate		Suppressor Acid
	AS3	ml/min	2.4 mM Na_2CO_3 & 3.0 mM $NaHCO_3$	ml/min		12.5 mM Sulfuric Acid
X	AS4A	2 ml/min	1.8 mM Na_2CO_3 & 1.7 mM $NaHCO_3$	ml/min		
	AS5	ml/min	100 mM NaOH	X	Isocratic	
		ml/min			Gradient(List program below)	

Gradient Program	Time (Min.)									
Eluent	0.0									
% A										
% B										

Results of Sulfate Determination

Sample Name	Interpoll Log Number	Tot. Sample Volume (ml)	Dilution	Solution Conc.(ug/ml)	Total ug Sulfate	meq of Sulfate
Imp. Catch +	8024-01	200	1.0	<0.025	<5.0	<0.00010
MeCl2 Rinse	02	415	1.0	0.620	257	0.0054
	03	455	1.0	0.449	204	0.0042
	04	370	1.0	0.217	80.3	0.0017
METHOD BLANK 8/8/96 400 ml	Blank	400	1.0	<0.025	<10	<0.00021

Total ug = (Sample Vol.) x (Dilution) x (Solution Conc.)
meq = Total ug / 48000

LSC-08RR

	A	B	C	D	E	F	G	H	I	J
1	EPA Method 202 Calculations						Report No. 6-8024			
2	Job:	**LP/Sagola**								
3	Date:	23-Jul-96								
4			*Dryer Primary Cyclone Exhaust 1*							**ENTER IN**
5		Vic	Sulfate	Mc	Mr	Mi	Mo	Mb	CPM	**COMPUTER**
6	RUN	(ml)	(mg/ml)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	**(g)**
7	1	415	6.20E-04	0.05	136.2	136.15	118.9	0.4	254.65	0.2547
8	2	455	4.49E-04	0.04	161	160.96	151	0.4	311.56	0.3116
9	3	370	2.17E-04	0.01	143.7	143.69	126.6	0.4	269.89	0.2699
10										
11										
12	**EPA Method 201A/202 Totals**									
13										
14		Probe	Filter	CPM	Total					
15	RUN	(mg)	(mg)	(mg)	(mg)					
16	1	158.1	264.1	254.65	676.8527					
17	2	74.2	439.7	311.56	825.4624					
18	3	80.3	548.3	269.89	898.4852					

INTERPOLL LABORATORIES, INC.
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AUG 2 0 1996

Impinger Catch Data Reporting Sheet

Protocol: ☐Minnesota ☐Wisconsin ☐Iowa ☒EPA Method 202 ☐Other

Job: LP Sagola — Source/Site: NO. 2 Cyclone /outlet

Date Submitted: 7/26/96 — Test No.: 1

Date of Analysis: 8/5/96 — Technician: YLZ

	Solvent Phase	Aqueous Phase
Test: 1 Run: 0	Dish No: 845	Dish No: 856
Log No: 8024-01I	Dish + Sample Wt: 45.4145 g	Dish + Sample Wt: 49.2660 g
Color & Appearance:	Dish Tare Wt: 45.4143 g	Dish Tare Wt: 49.2659 g
	Fraction Wt: 0.0002 g	Fraction Wt: 0.0001 g
Comments:	Smpl Vol: 200 ml, Alqt: 150 ml, Factor: 1.333	Smpl Vol: 200 ml, Alqt: 150 ml, Factor: 1.333
	Sample Wt: 0.0003 g	Sample Wt: 0.0001 g
Test: 1 Run: 1	Dish No: 32	Dish No: 796
Log No: -35I	Dish + Sample Wt: 57.8615 g	Dish + Sample Wt: 44.8695 g
Color & Appearance:	Dish Tare Wt: 57.8111 g	Dish Tare Wt: 44.7972 g
	Fraction Wt: 0.0504 g	Fraction Wt: 0.0723 g
Comments:	Smpl Vol: 415 ml, Alqt: 365 ml, Factor 1.137	Smpl Vol: 415 ml, Alqt: 365 ml, Factor 1.137
	Sample Wt: 0.0573 g	Sample Wt: 0.0822 g
Test: 1 Run: 2	Dish No: 41	Dish No: 795
Log No: -36I	Dish + Sample Wt: 45.3650 g	Dish + Sample Wt: 44.0937 g
Color & Appearance:	Dish Tare Wt: 45.3211 g	Dish Tare Wt: 44.0318 g
	Fraction Wt: 0.0439 g	Fraction Wt: 0.0619 g
Comments:	Smpl Vol: 405 ml, Alqt: 355 ml, Factor 1.141	Smpl Vol: 405 ml, Alqt: 355 ml, Factor 1.141
	Sample Wt: 0.0501 g	Sample Wt: 0.0706 g
Test: 1 Run: 3	Dish No: 43	Dish No: 771
Log No: -37I	Dish + Sample Wt: 47.4360 g	Dish + Sample Wt: 43.8974 g
Color & Appearance:	Dish Tare Wt: 47.3975 g	Dish Tare Wt: 43.8234 g
	Fraction Wt: 0.0385 g	Fraction Wt: 0.0740 g
Comments:	Smpl Vol: 400 ml, Alqt: 350 ml, Factor 1.143	Smpl Vol: 400 ml, Alqt: 350 ml, Factor 1.143
	Sample Wt: 0.0440 g	Sample Wt: 0.0846 g

Note: Factor = Sample Volume/Aliquot Volume — Blank Solvent Wt. ______ g

VGV	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Phase g	0.0003	0.0570	0.0498	0.0437
Results of Aqueous Phase D-16g	0.0001	0.0821	0.0705	0.0845

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Solvent Rinse Data Reporting Sheet

☒ EPA Method 5 Probe Wash ☐ EPA Method 29 Probe Wash ☐ EPA Method 202 Cup & Tube Wash

Job	LP-SACHLA	Source/Site	No. 2 Cyclone Outlet
Date Submitted	7-26-96	Test No.	1
Date of Analysis	8-9-96	Technician	SCB
Transport Leakage ☐	None ☒ ____ ml	Solvent	Acetone

Test: 1	Run: 1	Dish No: 23	
Log No: 8024-35		Dish + Sample Wt: 46.2111	g
Volume of Solvent	70 ml	Dish Tare Wt: 46.0863	g
*Solvent Residue	ug/ml	Sample Wt: .1248	g
Test: 1	Run: 2	Dish No: # 59	
Vol. of Solvent	80 ml	Dish + Sample Wt: 38.6321	g
Log Number -36		Dish Tare Wt: 38.5853	g
Comments		Sample Wt: .0468	g
Test: 1	Run: 3	Dish No: 749	
Vol. of Solvent	75 ml	Dish + Sample Wt: 43.3510	g
Log Number -37		Dish Tare Wt: 43.2907	g
Comments		Sample Wt: .0603	g
Test:	Run:	Dish No:	
Vol. of Solvent		Dish + Sample Wt:	g
Log Number		Dish Tare Wt:	g
Comments		Sample Wt:	g

*Solvent Residue ____ ug/ml = [(Sample Wt. ____ g) (10^6)]/Vol. of Sol. ____ ml

EPA-M5 Acetone Residue Blank Spec. ≤ 7.8 ug/ml

VGW

	RUN 1	RUN 2	RUN 3	RUN
Results of Solvent Rinse g	0.1247	0.0466	0.0601	

INTERPOLL LABORATORIES, INC.
(612) 786-6020
Filter Gravimetrics Reporting Sheet

Fiter Type: ☒ EPA Method 5 ☐ EPA Method 29 ☐ EPA Method 202 ☐ Other

Job	LP - SAGOLA	Source/Site	No. 2 CYCLONE OUTLET
Date Submitted	7-26-96	Test No.	1
Date of Analysis	8-9-96	Technician	SCR

Test: 1	Run: 1	Filter No: 8585	
Field Blank:		Filter Type: 4" G.F	
Log No: 8024-35		Filter + Sample Wt: 1.2932	g
Color: DK BRN		Filter Tare Wt: 1.0559	g
		Sample Wt: .2373	g
Test: 1	Run: 2	Filter No: 8560	
Log No: -36		Filter Type: 4" G.F	
Color: DK BRN		Filter + Sample Wt: 1.3396	g
		Filter Tare Wt: 1.0401	g
		Sample Wt: .2995	g
Test: 1	Run: 3	Filter No: 8642	
Log No: -37		Filter Type: 4" G.F	
Color: DK BRN		Filter + Sample Wt: 1.3744	g
		Filter Tare Wt: 1.0288	g
		Sample Wt: .3456	g
Test:	Run:	Filter No:	
Log No:		Filter Type:	
Color:		Filter + Sample Wt:	g
		Filter Tare Wt:	g
		Sample Wt:	g

VGN

	RUN 1	RUN 2	RUN 3	RUN
Results of Filter Analysis g	0.2373	0.2995	0.3456	

	RUN	RUN	RUN	RUN
Total Mass g				

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Due 8/8/96

Interpoll Laboratories, Inc.
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AUG 15 1996

Ion Chromatography Laboratory

DIONEX MODEL 4000i WITH ANION MICRO MEMBRANE SUPPRESSION

Analyst: MJG

Date of Analysis: 8/12/96

Job: 1D020/ LP Sample Source: No.2 Cyclone Site: outlet

Chromatography Conditions

Column		Flow Rate	Eluent	Flow Rate		Suppressor Acid
	AS3	ml/min	2.4 mM Na_2CO_3 & 3.0 mM $NaHCO_3$	ml/min		12.5 mM Sulfuric Acid
X	AS4A	2 ml/min	1.8 mM Na_2CO_3 & 1.7 mM $NaHCO_3$	ml/min		
	AS5	ml/min	100 mM NaOH	X	Isocratic	
		ml/min			Gradient(List program below)	

Gradient Program	Time (Min.)									
Eluent	0.0									
% A										
% B										

Results of Sulfate Determination

Sample Name	Interpoll Log Number	Tot. Sample Volume (ml)	Dilution	Solution Conc.(ug/ml)	Total ug Sulfate	meq of Sulfate
Imp. Catch	8024-35	415	1.0	0.625	259	0.0054
↓	36	405	1.0	0.822	333	0.0069
↓	37	400	1.0	0.307	123	0.0026
METHOD BLANK 8/12/96 7:00pm	Blank	400	1.0	<0.025	<10	<0.00021

Total ug = (Sample Vol.) x (Dilution) x (Solution Conc.)
meq = Total ug / 48000

LSC-08RR

	A	B	C	D	E	F	G	H	I	J
19										
20										
21	EPA Method 202 Calculations						Report No. 6-8024			
22	Job:	**LP/Sagola**								
23	Date:	23-Jul-96								
24			***Dryer Primary Cyclone Exhaust 2***							**ENTER IN**
25		Vlc	Sulfate	Mc	Mr	Mi	Mo	Mb	CPM	**COMPUTER**
26	RUN	(ml)	(mg/ml)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	**(g)**
27	1	415	6.25E-04	0.05	57.3	57.25	82.2	0.4	139.05	0.1391
28	2	405	8.22E-04	0.06	50.1	50.04	70.6	0.4	120.24	0.1202
29	3	400	3.07E-04	0.02	44	43.98	84.6	0.4	128.18	0.1282
30										
31										
32	**EPA Method 201A/202 Totals**									
33										
34		Probe	Filter	CPM	Total					
35	RUN	(mg)	(mg)	(mg)	(mg)					
36	1	124.7	237.3	139.05	501.0523					
37	2	46.6	299.5	120.24	466.3387					
38	3	60.1	345.6	128.18	533.8774					
39										

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REVIEWED
AUG 9 1996

Impinger Catch Data Reporting Sheet

Protocol: ☐Minnesota ☐Wisconsin ☐Iowa ☒EPA Method 202 ☐Other

Job: LP Sasola — Source/Site: DRYER 3 PRIMARY CYCLONE EXHAU

Date Submitted: 7/26/96 — Test No.: 1

Date of Analysis: 8/5/96 — Technician: YK

	Solvent Phase	Aqueous Phase
Test: 1 Run: 0	Dish No: 328	Dish No: 872
Log No: 8024-071I	Dish + Sample Wt: 41.9694 g	Dish + Sample Wt: 47.2517 g
Color & Appearance:	Dish Tare Wt: 41.9689 g	Dish Tare Wt: 47.2517 g
	Fraction Wt: 0.0005 g	Fraction Wt: 0.0000 g
Comments:	Smpl Vol: 200 ml, Alqt: 150 ml, Factor: 1.333	Smpl Vol: 200 ml, Alqt: 150 ml, Factor: 1.333
	Sample Wt: 0.0007 g	Sample Wt: 0.0000 g
Test: 1 Run: 1	Dish No: 400	Dish No: 892
Log No: -072I	Dish + Sample Wt: 47.1972 g	Dish + Sample Wt: 38.1744 g
Color & Appearance:	Dish Tare Wt: 47.1036 g	Dish Tare Wt: 38.1005 g
	Fraction Wt: 0.0936 g	Fraction Wt: 0.0739 g
Comments:	Smpl Vol: 430 ml, Alqt: 380 ml, Factor: 1.132	Smpl Vol: 430 ml, Alqt: 380 ml, Factor: 1.132
	Sample Wt: 0.1060 g	Sample Wt: ~~0.0975~~ 0.0836 g
Test: 1 Run: 2	Dish No: 404	Dish No: 896
Log No: -073I	Dish + Sample Wt: 47.7513 g	Dish + Sample Wt: 39.7392 g
Color & Appearance:	Dish Tare Wt: 47.6449 g	Dish Tare Wt: 39.6525 g
	Fraction Wt: 0.1064 g	Fraction Wt: 0.0867 g
Comments:	Smpl Vol: 355 ml, Alqt: 305 ml, Factor: 1.164	Smpl Vol: 355 ml, Alqt: 305 ml, Factor: 1.164
	Sample Wt: 0.1238 g	Sample Wt: 0.1009 g
Test: 1 Run: 3	Dish No: 411	Dish No: 897
Log No: -074I	Dish + Sample Wt: 46.7664 g	Dish + Sample Wt: 39.0629 g
Color & Appearance:	Dish Tare Wt: 46.6882 g	Dish Tare Wt: 38.9856 g
	Fraction Wt: 0.0782 g	Fraction Wt: 0.0773 g
Comments:	Smpl Vol: 350 ml, Alqt: 300 ml, Factor: 1.167	Smpl Vol: 350 ml, Alqt: 300 ml, Factor: 1.167
	Sample Wt: 0.0913 g	Sample Wt: 0.0902 g

Note: Factor = Sample Volume/Aliquot Volume

Blank Solvent Wt. ______ g

VCW

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Phase g	0.0007	0.1053	~~0.1057~~ 0.1232	0.0906
Results of Aqueous Phase g	0.0000	~~0.0975~~ 0.0836	0.1009	0.0902

INTERPOLL LABORATORIES, INC.
(612) 786-6020
Solvent Rinse Data Reporting Sheet

☒ EPA Method 5 Probe Wash ☐ EPA Method 29 Probe Wash ☐ EPA Method 202 Cup & Tube Wash

Job	LP - SAGOLA	Source/Site	NO 3 CYCLONE EXHAUST
Date Submitted	7-26-96	Test No.	1
Date of Analysis	8-9-96	Technician	SJ
Transport Leakage ☐ None ☒	ml	Solvent	ACETONE

Test: 1	Run: 0	Dish No:	700
Log No: 8024 - 71		Dish + Sample Wt:	49.7642 g
Volume of Solvent	155 ml	Dish Tare Wt:	49.7639 g
*Solvent Residue	ug/ml	Sample Wt:	.0003 g
Test: 1	Run: 1	Dish No:	748
Vol. of Solvent -72	120 ml	Dish + Sample Wt:	45.5058 g
Log Number		Dish Tare Wt:	45.3891 g
Comments		Sample Wt:	.1167 g
Test: 1	Run: 2	Dish No:	769
Vol. of Solvent -73	100 ml	Dish + Sample Wt:	45.2736 g
Log Number		Dish Tare Wt:	45.1966 g
Comments		Sample Wt:	.0770 g
Test: 1	Run: 3	Dish No:	616
Vol. of Solvent -74	110 ml	Dish + Sample Wt:	50.9973 g
Log Number		Dish Tare Wt:	50.9300 g
Comments		Sample Wt:	.0673 g

*Solvent Residue 1.94 ug/ml = [(Sample Wt. .0003 g) (10^6)]/Vol. of Sol. 155 ml

EPA-M5 Acetone Residue Blank Spec. ≤ 7.8 ug/ml

VSM

		RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Rinse	D-22	.0003	.1165	0.0768	0.0671

INTERPOLL LABORATORIES, INC.
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Filter Gravimetrics Reporting Sheet

Fiter Type: ☒ EPA Method 5 ☐ EPA Method 29 ☐ EPA Method 202 ☐ Other

Job	LP - SAGOLA	Source/Site	NO. 3 CYCLONE EXHAUST
Date Submitted	7-26-96	Test No.	1
Date of Analysis	8-9-96	Technician	SD

Test: 1	Run: 0	Filter No:	8641
Field Blank:		Filter Type:	4" G.F.
Log No: 8024-71		Filter + Sample Wt:	1.0557 g
Color: WHITE		Filter Tare Wt:	1.0556 g
		Sample Wt:	.0001 g
Test: 1	Run: 1	Filter No:	8586
Log No: -72		Filter Type:	4" G.F.
Color: DRK BRN		Filter + Sample Wt:	1.3385 g
		Filter Tare Wt:	1.0554 g
		Sample Wt:	.2831 g
Test: 1	Run: 2	Filter No:	8639
Log No: -73		Filter Type:	4" G.F.
Color: DRK BRN		Filter + Sample Wt:	1.3371 g
		Filter Tare Wt:	1.0296 g
		Sample Wt:	.3075 g
Test: 1	Run: 3	Filter No:	8640
Log No: -74		Filter Type:	4" G.F.
Color: DRK BRN		Filter + Sample Wt:	1.3364 g
		Filter Tare Wt:	1.0502 g
		Sample Wt:	.2862 g

VGL

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Filter Analysis g		0.2831	0.3075	0.2862

	RUN	RUN	RUN	RUN
Total Mass g				

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AUG 15 1996

Ion Chromatography Laboratory

DIONEX MODEL 4000i WITH ANION MICRO MEMBRANE SUPPRESSION

Analyst: MJG

Date of Analysis: 8/12/96

Job: 1D020 / LP Sagola   Source: No.3 Cyclone   Site: outlet

Chromatography Conditions

Column		Flow Rate	Eluent	Flow Rate	Suppressor Acid
	AS3	ml/min	2.4 mM Na_2CO_3 & 3.0 mM $NaHCO_3$	ml/min	12.5 mM Sulfuric Acid
X	AS4A	2 ml/min	1.8 mM Na_2CO_3 & 1.7 mM $NaHCO_3$	ml/min	
	AS5	ml/min	100 mM NaOH	X	Isocratic
		ml/min			Gradient(List program below)

Gradient Program	Time (Min.)									
Eluent	0.0									
% A										
% B										

Results of Sulfate Determination

Sample Name	Interpoll Log Number	Tot. Sample Volume (ml)	Dilution	Solution Conc.(ug/ml)	Total ug Sulfate	meq of Sulfate
Imp. Catch	8024-71	200	1.0	<0.025	<5.0	<0.00010
	72	430	1.0	0.664	286	0.0060
	73	355	1.0	0.268	95.1	0.0020
	74	350	1.0	0.177	62.0	0.0013
METHOD BLANK 8/12/96 7:00 PM	Blank	400	1.0	<0.025	<10	<0.00021

Total ug = (Sample Vol.) x (Dilution) x (Solution Conc.)
meq = Total ug / 48000

LSC-08RR

	A	B	C	D	E	F	G	H	I	J
40										
41										
42	EPA Method 202 Calculations						Report No. 6-8024			
43	Job:	**LP/Sagola**								
44	Date:	23-Jul-96								
45			***Dryer Primary Cyclone Exhaust 3***							**ENTER IN**
46		Vic	Sulfate	Mc	Mr	Mi	Mo	Mb	CPM	**COMPUTER**
47	RUN	(ml)	(mg/ml)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	**(g)**
48	1	430	6.64E-04	0.05	106	105.95	83.6	0.7	188.85	0.1888
49	2	355	2.68E-04	0.02	123.8	123.78	100.9	0.7	223.98	0.2240
50	3	350	1.77E-04	0.01	91.3	91.29	90.2	0.7	180.79	0.1808
51										
52										
53	**EPA Method 201A/202 Totals**									
54										
55		Probe	Filter	CPM	Total					
56	RUN	(mg)	(mg)	(mg)	(mg)					
57	1	116.5	283.1	188.85	588.4475					
58	2	76.8	307.5	223.98	608.2825					
59	3	67.1	286.2	180.79	534.0886					
60										

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Impinger Catch Data Reporting Sheet

REVIEWED
AUG 9 1996

Protocol: ☐Minnesota ☐Wisconsin ☐Iowa ☒EPA Method 202 ☐Other

Job: L.P Sagola
Date Submitted: 7/26/96
Date of Analysis: 8/6/96

Source/Site: E Tubes / OUTLET
Test No:
Technician: RRJ

	Solvent Phase	Aqueous Phase
Test: 1 Run: 0	Dish No: 754	Dish No: 161
Log No: 8024-105 I	Dish + Sample Wt: 45.2843 g	Dish + Sample Wt: 49.1386 g
Color & Appearance:	Dish Tare Wt: 45.2840 g	Dish Tare Wt: 49.1386 g RRJ 8/8/96
	Fraction Wt: 0.0003 g	Fraction Wt: 0.0000 g
Comments:	Smpl Vol: 200 ml, Alqt: 150 ml, Factor: 1.333	Smpl Vol: 200 ml, Alqt: 150 ml, Factor: 1.333
	Sample Wt: 0.0004 g	Sample Wt: 0.0000 g
Test: 1 Run: 1	Dish No: 751	Dish No: 45
Log No: -106 I	Dish + Sample Wt: 44.2791 g	Dish + Sample Wt: 48.1855 g
Color & Appearance:	Dish Tare Wt: 44.2550 g	Dish Tare Wt: 48.1536 g
	Fraction Wt: 0.0241 g	Fraction Wt: 0.0319 g
Comments:	Smpl Vol: 380 ml, Alqt: 330 ml, Factor 1.152	Smpl Vol: 380 ml, Alqt: 330 ml, Factor 1.152
	Sample Wt: 0.0278 g	Sample Wt: 0.0367 g
Test: 1 Run: 2	Dish No: 755	Dish No: 50
Log No: -107 I	Dish + Sample Wt: 46.0264 g	Dish + Sample Wt: 45.4997 g
Color & Appearance:	Dish Tare Wt: 45.9977 g	Dish Tare Wt: 45.4684 g
	Fraction Wt: 0.0287 g	Fraction Wt: 0.0313 g
Comments:	Smpl Vol: 380 ml, Alqt: 330 ml, Factor 1.152	Smpl Vol: 380 ml, Alqt: 330 ml, Factor 1.152
	Sample Wt: 0.0331 g	Sample Wt: 0.0361 g
Test: 1 Run: 3	Dish No: 702	Dish No: 209
Log No: -108 I	Dish + Sample Wt: 46.2602 g	Dish + Sample Wt: 43.2451 g
Color & Appearance:	Dish Tare Wt: 46.2249 g	Dish Tare Wt: 43.2082 g
	Fraction Wt: 0.0353 g	Fraction Wt: 0.0369 g
Comments:	Smpl Vol: 365 ml, Alqt: 315 ml, Factor 1.159	Smpl Vol: 365 ml, Alqt: 315 ml, Factor 1.159
	Sample Wt: 0.0409 g	Sample Wt: 0.0428 g

Blank Solvent Wt. ______ g

Note: Factor = Sample Volume/Aliquot Volume

VCW

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Phase g	0.0004	0.0274	0.0327	0.0405
Results of Aqueous Phase g	0.0000	0.0367	0.0361	0.0428

INTERPOLL LABORATORIES, INC.
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Solvent Rinse Data Reporting Sheet

☒ EPA Method 5 Probe Wash ☐ EPA Method 29 Probe Wash ☐ EPA Method 202 Cup & Tube Wash

Job: LP - SAGOLA
Date Submitted: 7-26-96
Date of Analysis: 8-9-96
Source/Site: "E" TUBE OUTLET
Test No.: 1
Technician: SCB
Transport Leakage ☐ None ☒ ____ ml
Solvent: ACETON

Test: 1	Run: 0	Dish No: 10	
Log No: 9024-105		Dish + Sample Wt: 32.4740	g
Volume of Solvent	115 ml	Dish Tare Wt: 32.4735	g
*Solvent Residue	ug/ml	Sample Wt: .0005	g
Test: 1	Run: 1	Dish No: 77	
Vol. of Solvent	85 ml	Dish + Sample Wt: 36.0050	g
Log Number -106		Dish Tare Wt: 35.9894	g
Comments		Sample Wt: .0156	g
Test: 1	Run: 2	Dish No: 809	
Vol. of Solvent	95 ml	Dish + Sample Wt: 48.2330	g
Log Number -107		Dish Tare Wt: 48.2227	g
Comments		Sample Wt: .0103	g
Test: 1	Run: 3	Dish No: 816	
Vol. of Solvent	85 ml	Dish + Sample Wt: 43.9360	g
Log Number -108		Dish Tare Wt: 43.9252	g
Comments		Sample Wt: .0108	g

*Solvent Residue 4.35 ug/ml = [(Sample Wt. .0005 g) (10^6)]/Vol. of Sol. 115 ml
EPA-M5 Acetone Residue Blank Spec. ≤ 7.8 ug/ml

Vgr

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Rinse g	.0005	0.0152	0.0099	0.0104

INTERPOLL LABORATORIES, INC.
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Filter Gravimetrics Reporting Sheet

Fiter Type: ☒ EPA Method 5 ☐ EPA Method 29 ☐ EPA Method 202 ☐ Other ______

Job	LP - SAGOLA	Source/Site	E-TUBE OUTLET
Date Submitted	7-26-96	Test No.	1
Date of Analysis	8-9-96	Technician	SWB

Test: 1	Run: 0	Filter No: 8429	
Field Blank:		Filter Type: 4" G.F.	
Log No: 9024-105		Filter + Sample Wt: .9502	g
Color: WHITE		Filter Tare Wt: .9501	g
		Sample Wt: .0001	g
Test: 1	Run: 1	Filter No: 8431	
Log No: -106		Filter Type: 4" G.F.	
Color: TAN		Filter + Sample Wt: .9598	g
		Filter Tare Wt: .9518	g
		Sample Wt: .0080	g
Test: 1	Run: 2	Filter No: 8433	
Log No: -107		Filter Type: 4" GF	
Color: TAN		Filter + Sample Wt: .9560	g
		Filter Tare Wt: .9520	g
		Sample Wt: .0040	g
Test: 1	Run: 3	Filter No: 8432	
Log No: -108		Filter Type: 4" GF	
Color: TAN		Filter + Sample Wt: .9525	g
		Filter Tare Wt: .9468	g
		Sample Wt: .0057	g

VSW

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Filter Analysis g		0.0080	0.0040	0.0057

	RUN	RUN	RUN	RUN
Total Mass g				

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Ion Chromatography Laboratory

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[signature]

DIONEX MODEL 4000i WITH ANION MICRO MEMBRANE SUPPRESSION

Analyst: MJG

Date of Analysis: 8/12/96

Job: 1D020/ LP Sagola

Source: E-Tube

Site: outlet

Chromatography Conditions

Column		Flow Rate	Eluent	Flow Rate	Suppressor Acid
	AS3	ml/min	2.4 mM Na_2CO_3 & 3.0 mM $NaHCO_3$	ml/min	12.5 mM Sulfuric Acid
X	AS4A	2 ml/min	1.8 mM Na_2CO_3 & 1.7 mM $NaHCO_3$	ml/min	
	AS5	ml/min	100 mM NaOH	X	Isocratic
		ml/min			Gradient(List program below)

Gradient Program	Time (Min.)									
Eluent	0.0									
% A										
% B										

Results of Sulfate Determination

Sample Name	Interpoll Log Number	Tot. Sample Volume (ml)	Dilution	Solution Conc.(ug/ml)	Total ug Sulfate	meq of Sulfate
Imp. Catch	8024-105	200	1.0	<0.025	<5.0	<0.00010
	106	380	1.0	0.850	323	0.0067
	107	380	1.0	0.269	102	0.0021
	108	365	1.0	0.277	101	0.0021
METHOD BLANK 8/12/96 2:00 PM	Blank	400	1.0	<0.025	<10	<0.00021

Total ug = (Sample Vol.) x (Dilution) x (Solution Conc.)
meq = Total ug / 48000

LSC-08RR

	A	B	C	D	E	F	G	H	I	J
61										
62										
63	EPA Method 202 Calculations						Report No. 6-8024			
64	Job:	**LP/Sagola**								
65	Date:	23-Jul-96								
66			***E-Tube Outlet***							**ENTER IN**
67		Vic	Sulfate	Mc	Mr	Ml	Mo	Mb	CPM	**COMPUTER**
68	RUN	(ml)	(mg/ml)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	**(g)**
69	1	380	8.50E-04	0.06	27.8	27.74	36.7	0.4	64.04	0.0640
70	2	380	2.69E-04	0.02	33.1	33.08	36.1	0.4	68.78	0.0688
71	3	365	2.77E-04	0.02	40.9	40.88	42.8	0.4	83.28	0.0833
72										
73										
74	**EPA Method 201A/202 Totals**									
75										
76		Probe	Filter	CPM	Total					
77	RUN	(mg)	(mg)	(mg)	(mg)					
78	1	15.2	8	64.04	87.24057					
79	2	9.9	4	68.78	82.68119					
80	3	10.4	5.7	83.28	99.3814					

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AUG 20 1996

Impinger Catch Data Reporting Sheet

Protocol: ☐Minnesota ☐Wisconsin ☐Iowa ☒EPA Method 202 ☐Other

Job: L.P Sagola — Source/Site: DRYER/RTO STACK
Date Submitted: 7/29/96 — Test No: 1
Date of Analysis: 8/6/96 — Technician: VKS

	Solvent Phase	Aqueous Phase
Test: 1 Run: 0	Dish No: 831	Dish No: 208
Log No: 8024-143I	Dish + Sample Wt: 43.6422 g	Dish + Sample Wt: 52.8005 g
Color & Appearance:	Dish Tare Wt: 436419 g	Dish Tare Wt: 52.8004 g
	Fraction Wt: 0.0003 g	Fraction Wt: 0.0001 g
Comments:	Smpl Vol: 200 ml, Alqt: 150 ml, Factor 1.333	Smpl Vol: 200 ml, Alqt: 150 ml, Factor 1.333
	Sample Wt: 0.0004 g	Sample Wt: 0.0001 g
Test: 1 Run: 1	Dish No: 835	Dish No: 797
Log No: -144I	Dish + Sample Wt: 44.9815 g	Dish + Sample Wt: 43.0542 g
Color & Appearance:	Dish Tare Wt: 44.9773 g	Dish Tare Wt: 43.0494 g
	Fraction Wt: 0.0042 g	Fraction Wt: 0.0048 g
Comments:	Smpl Vol: 455 ml, Alqt: 405 ml, Factor 1.123	Smpl Vol: 455 ml, Alqt: 405 ml, Factor 1.123
	Sample Wt: 0.0047 g	Sample Wt: 0.0054 g
Test: 1 Run: 2	Dish No: 843	Dish No: 58
Log No: -145I	Dish + Sample Wt: 49.9355 g	Dish + Sample Wt: 40.7193 g
Color & Appearance:	Dish Tare Wt: 49.9296 g	Dish Tare Wt: 40.7146 g
	Fraction Wt: 0.0059 g	Fraction Wt: 0.0047 g
Comments:	Smpl Vol: 430 ml, Alqt: 380 ml, Factor 1.132	Smpl Vol: 430 ml, Alqt: 380 ml, Factor 1.132
	Sample Wt: 0.0067 g	Sample Wt: 0.0053 g
Test: 1 Run: 3	Dish No: 844	Dish No: 105
Log No: -146I	Dish + Sample Wt: 45.0281 g	Dish + Sample Wt: 38.1345 g
Color & Appearance:	Dish Tare Wt: 45.0225 g	Dish Tare Wt: 38.1297 g
	Fraction Wt: 0.0056 g	Fraction Wt: 0.0048 g
Comments:	Smpl Vol: 490 ml, Alqt: 440 ml, Factor 1.114	Smpl Vol: 490 ml, Alqt: 440 ml, Factor 1.114
	Sample Wt: 0.0062 g	Sample Wt: 0.0053 g

Note: Factor = Sample Volume/Aliquot Volume

Blank Solvent Wt. ______ g

VGN

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Phase g	0.0004	0.0043	0.0063	0.0058
Results of Aqueous Phase D-31 g	0.0001	0.0053	0.0052	0.0052

INTERPOLL LABORATORIES, INC.
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Solvent Rinse Data Reporting Sheet

☒ EPA Method 5 Probe Wash ☐ EPA Method 29 Probe Wash ☐ EPA Method 202 Cup & Tube Wash

Job	LP-SAGOLA	Source/Site	DRYER RTO STACK
Date Submitted	7-26-96	Test No.	1
Date of Analysis	8-9-96	Technician	SLB
Transport Leakage ☐	None ☒ ___ ml	Solvent	ACETONE

Test: 1	Run: 0	Dish No:	28
Log No: 8024-143		Dish + Sample Wt:	42.1765 g
Volume of Solvent	105 ml	Dish Tare Wt:	42.1760 g
*Solvent Residue	ug/ml	Sample Wt:	.0005 g
Test: 1	Run: 1	Dish No:	879
Vol. of Solvent	130 ml	Dish + Sample Wt:	38.6670 g
Log Number -144		Dish Tare Wt:	38.6607 g
Comments		Sample Wt:	.0063 g
Test: 1	Run: 2	Dish No:	793
Vol. of Solvent	85 ml	Dish + Sample Wt:	45.9620 g
Log Number -145		Dish Tare Wt:	45.9563 g
Comments		Sample Wt:	.0057 g
Test: 1	Run: 3	Dish No:	22
Vol. of Solvent	75 ml	Dish + Sample Wt:	51.3657 g
Log Number -146		Dish Tare Wt:	51.3629 g
Comments		Sample Wt:	.0028 g

*Solvent Residue 4.76 ug/ml = [(Sample Wt .0005 g) (10^6)]/Vol. of Sol. 105 ml

EPA-M5 Acetone Residue Blank Spec. ≤ 7.8 ug/ml

VSW

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Rinse g	.0005	0.0057	0.0053	0.0024

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Filter Gravimetrics Reporting Sheet

Fiter Type: ☑ EPA Method 5 ☐ EPA Method 29 ☐ EPA Method 202 ☐ Other ________

Job	LP-SAGOLA	Source/Site	DRYER RTO STACK
Date Submitted	7-26-96	Test No.	1
Date of Analysis	8-9-96	Technician	SLB

Test: 1	Run: 0	Filter No: 8596	
Field Blank:		Filter Type: 4" G.F.	
Log No: 8024-143		Filter + Sample Wt: .9936	g
Color: WHITE		Filter Tare Wt: .9936	g
		Sample Wt: .0000	g
Test: 1	Run: 1	Filter No: 8191	
Log No: -144		Filter Type: 4" G.F.	
Color: Lt. TAN		Filter + Sample Wt: .9175	g
		Filter Tare Wt: .9171	g
		Sample Wt: .0004	g
Test: 1	Run: 2	Filter No: 7976	
Log No: -145		Filter Type: 4" G.F.	
Color: LT. TAN		Filter + Sample Wt: .9468	g
		Filter Tare Wt: .9442	g
		Sample Wt: .0026	g
Test: 1	Run: 3	Filter No: 8594	
Log No: -146		Filter Type: 4" G.F.	
Color: Lt. TAN		Filter + Sample Wt: .8630	g
		Filter Tare Wt: .8616	g
		Sample Wt: .0014	g

VSW

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Filter Analysis g		0.0004	0.0026	0.0014

	RUN	RUN	RUN	RUN
Total Mass g				

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AUG 15 1996

Ion Chromatography Laboratory

DIONEX MODEL 4000i WITH ANION MICRO MEMBRANE SUPPRESSION

Analyst: MJG   Date of Analysis: 8/13/96

Job: 1D020 / LP Sagola   Source: Dryer RTO   Site: STACK

Chromatography Conditions

Column		Flow Rate	Eluent	Flow Rate		Suppressor Acid
	AS3	ml/min	2.4 mM Na_2CO_3 & 3.0 mM $NaHCO_3$	ml/min		12.5 mM Sulfuric Acid
X	AS4A	2 ml/min	1.8 mM Na_2CO_3 & 1.7 mM $NaHCO_3$	ml/min		
	AS5	ml/min	100 mM NaOH		X	Isocratic
		ml/min				Gradient(List program below)

Gradient Program	Time (Min.)									
Eluent	0.0									
% A										
% B										

Results of Sulfate Determination

Sample Name	Interpoll Log Number	Tot. Sample Volume (ml)	Dilution	Solution Conc.(ug/ml)	Total ug Sulfate	meq of Sulfate
Imp. Catch	8024-143	200	1.0	<0.025	<5.0	<0.00010
↓	144	455	1.0	0.109	49.6	0.0010
↓	145	430	1.0	0.0986	42.4	0.00088
↓	146	490	1.0	0.208	102	0.0021
METHOD 8/14/96 BLANK 400ml	BLANK	400	1.0	<0.025	<10	<0.00021

Total ug = (Sample Vol.) x (Dilution) x (Solution Conc.)
meq = Total ug / 48000

LSC-08RR

	A	B	C	D	E	F	G	H	I	J
81										
82	EPA Method 202 Calculations						Report No. 6-8024			
83	Job:	**LP/Sagola**								
84	Date:	23-Jul-96								
85			*Dryer RTO Stack*							**ENTER IN**
86		Vic	Sulfate	Mc	Mr	Mi	Mo	Mb	CPM	**COMPUTER**
87	RUN	(ml)	(mg/ml)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	**(g)**
88	1	455	1.09E-04	0.01	4.7	4.69	5.4	0.5	9.59	0.0096
89	2	430	9.86E-05	0.01	6.7	6.69	5.3	0.5	11.49	0.0115
90	3	490	2.08E-04	0.02	6.2	6.18	5.3	0.5	10.98	0.0110
91										
92										
93	**EPA Method 201A/202 Totals**									
94										
95		Probe	Filter	CPM	Total					
96	RUN	(mg)	(mg)	(mg)	(mg)					
97	1	5.7	0.4	9.59	15.69087					
98	2	5.3	2.6	11.49	19.3922					
99	3	2.4	1.4	10.98	14.78125					

INTERPOLL LABORATORIES, INC.
(612) 786-6020

REVIEW
AUG 20 1996

Impinger Catch Data Reporting Sheet

Protocol: ☐Minnesota ☐Wisconsin ☐Iowa ☑EPA Method 202 ☐Other

Job: L.P. Sagola

Source/Site: Press RTO / Stack

Date Submitted: 7/26/96

Test No.

Date of Analysis: 8/6/96

Technician

Test / Log	Solvent Phase	Aqueous Phase
Test: 1 Run: 0 Log No: 8024-143I Color & Appearance: Comments:	Dish No: 831 Dish + Sample Wt: 43.6422 g Dish Tare Wt: 43.6419 g Fraction Wt: 0.0003 g Smpl Vol: 200 ml, Alqt: 150 ml, Factor: 1.333 Sample Wt: 0.0004 g	Dish No: 208 Dish + Sample Wt: 52.8005 g Dish Tare Wt: 52.8004 g Fraction Wt: 0.0001 g Smpl Vol: 200 ml, Alqt: 150 ml, Factor: 1.333 Sample Wt: 0.0001 g
Test: 7 Run: 1 Log No: -133I Color & Appearance: Comments:	Dish No: 770 Dish + Sample Wt: 45.3828 g Dish Tare Wt: 45.3807 g Fraction Wt: 0.0021 g Smpl Vol: 240 ml, Alqt: 190 ml, Factor: 1.263 Sample Wt: 0.0027 g	Dish No: 55 VCJ 8/20/96 Dish + Sample Wt: 47.7983 g Dish Tare Wt: 47.7781 g Fraction Wt: 0.0202 g Smpl Vol: 240 ml, Alqt: 190 ml, Factor 1.263 Sample Wt: 0.0255 g
Test: 7 Run: 2 Log No: -134I Color & Appearance: Comments:	Dish No: 324 Dish + Sample Wt: 46.2794 g Dish Tare Wt: 46.2182 g Fraction Wt: 0.0612 g Smpl Vol: 230 ml, Alqt: 180 ml, Factor: 1.278 Sample Wt: 0.0782 g	Dish No: 56 Dish + Sample Wt: 47.7590 g Dish Tare Wt: 47.7563 g Fraction Wt: 0.0027 g Smpl Vol: 230 ml, Alqt: 180 ml, Factor 1.278 Sample Wt: 0.0035 g
Test: 7 Run: 3 Log No: 135I Color & Appearance: Comments:	Dish No: 326 Dish + Sample Wt: 43.4989 g Dish Tare Wt: 43.4968 g Fraction Wt: 0.0021 g Smpl Vol: 245 ml, Alqt: 195 ml, Factor 1.256 Sample Wt: 0.0026 g	Dish No: 106 Dish + Sample Wt: 43.0209 g Dish Tare Wt: 43.0170 g Fraction Wt: 0.0039 g Smpl Vol: 245 ml, Alqt: 195 ml, Factor 1.256 Sample Wt: 0.0049 g

Blank Solvent Wt. ______ g

Note: Factor = Sample Volume/Aliquot Volume

VCJ

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Phase g	0.0004	0.0023	0.0778	0.0022
Results of Aqueous Phase D-36 g	0.0001	0.0254	0.0034	0.0048

INTERPOLL LABORATORIES, INC.
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Solvent Rinse Data Reporting Sheet

☒ EPA Method 5 Probe Wash ☐ EPA Method 29 Probe Wash ☐ EPA Method 202 Cup & Tube Wash

Job	LP - SACTON	Source/Site	PRESS RTO STACK
Date Submitted	7-26-96	Test No.	7
Date of Analysis	8-9-96	Technician	SB
Transport Leakage ☐	None ☒ ___ ml	Solvent	ACETONE

Test: 7	Run: 1	Dish No:	845
Log No: 9024-133		Dish + Sample Wt:	42.3572 g
Volume of Solvent	130 ml	Dish Tare Wt:	42.3444 g
*Solvent Residue	ug/ml	Sample Wt:	.0128 g
Test: 7	Run: 2	Dish No:	859
Vol. of Solvent	80 ml	Dish + Sample Wt:	45.0631 g
Log Number -134		Dish Tare Wt:	45.0590 g
Comments		Sample Wt:	.0041 g
Test: 7	Run: 3	Dish No:	792
Vol. of Solvent	90 ml	Dish + Sample Wt:	47.2637 g
Log Number -135		Dish Tare Wt:	47.2585 g
Comments		Sample Wt:	.0052 g
Test:	Run:	Dish No:	
Vol. of Solvent		Dish + Sample Wt:	g
Log Number		Dish Tare Wt:	g
Comments		Sample Wt:	g

*Solvent Residue ____ ug/ml = [(Sample Wt. ____ g) (10^6)]/Vol. of Sol. ____ ml

EPA-M5 Acetone Residue Blank Spec. ≤ 7.8 ug/ml

VGW

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Rinse g		0.0122	0.0037	0.0048

INTERPOLL LABORATORIES, INC.
(612) 786-6020
Filter Gravimetrics Reporting Sheet

Fiter Type: ☑ EPA Method 5 ☐ EPA Method 29 ☐ EPA Method 202 ☐ Other ________

Job: LP-SAGOLA
Date Submitted: 7-26-94
Date of Analysis: 8-9-94

Source/Site: PRESS RTO STACK
Test No.: 7
Technician: SLP

Test: 7 Run: 1	Filter No: 8452
Field Blank:	Filter Type: 4" G.F.
Log No: 9024-133	Filter + Sample Wt: .9506 g
Color: White	Filter Tare Wt: .9505 g
	Sample Wt: .0001 g
Test: 7 Run: 2	Filter No: 8597
Log No: -134	Filter Type: 4" G.F.
Color: WHITE	Filter + Sample Wt: .9918 g
	Filter Tare Wt: .9915 g
	Sample Wt: .0003 g
Test: 7 Run: 3	Filter No: 8598
Log No: -135	Filter Type: 4" GF
Color: WHITE	Filter + Sample Wt: .9938 g
	Filter Tare Wt: .9935 g
	Sample Wt: .0003 g
Test: Run:	Filter No:
Log No:	Filter Type:
Color:	Filter + Sample Wt: g
	Filter Tare Wt: g
	Sample Wt: g

VSL

	RUN 1	RUN 2	RUN 3	RUN
Results of Filter Analysis g	0.0001	0.0003	0.0003	

	RUN	RUN	RUN	RUN
Total Mass g				

112994-G:\STACK\WP\FORMS\S-491

Interpoll Laboratories, Inc.
(612)786-6020

REVIEWED
AUG 15 1996

Ion Chromatography Laboratory

DIONEX MODEL 4000i WITH ANION MICRO MEMBRANE SUPRESSION

Analyst: MOB   Date of Analysis: 8/13/96

Job: 1D020 / LP Sagola   Source: Press RTO   Site: Stack

Chromatography Conditions

	Column	Flow Rate	Eluent
	AS3	ml/min	2.4 mM Na_2CO_3 & 3.0 mM $NaHCO_3$
X	AS4A	2 ml/min	1.8 mM Na_2CO_3 & 1.7 mM $NaHCO_3$
	AS5	ml/min	100 mM NaOH
		ml/min	

Flow Rate	Suppressor Acid
ml/min	12.5 mM Sulfuric Acid
ml/min	
X	Isocratic
	Gradient(List program below)

Gradient Program	Time (Min.)									
Eluent	0.0									
% A										
% B										

Results of Sulfate Determination

Sample Name	Interpoll Log Number	Tot. Sample Volume (ml)	Dilution	Solution Conc.(ug/ml)	Total ug Sulfate	meq of Sulfate
Imp. Catch	8024-133	240	1.0	3.58	859	0.018
	-134	230	1.0	0.0657	15.1	0.00031
	-135	245	1.0	0.210	51.4	0.0011
	x					
METHOD 8/12/96 BLANK 7:00Pm	BLANK	400	1.0	<0.025	<10	<0.00021

Total ug = (Sample Vol.) x (Dilution) x (Solution Conc.)
meq = Total ug / 48000

LSC-08RR

	A	B	C	D	E	F	G	H	I	J
100										
101										
102	EPA Method 202 Calculations						Report No. 6-8024			
103	Job:	**LP/Sagola**								
104	Date:	23-Jul-96								
105			*Press RTO Stack*							**ENTER IN**
106		Vic	Sulfate	Mc	Mr	Mi	Mo	Mb	CPM	**COMPUTER**
107	RUN	(ml)	(mg/ml)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	**(g)**
108	1	240	3.58E-03	0.16	2.7	2.54	25.5	0.5	27.54	0.0275
109	2	230	6.57E-05	0.00	78.2	78.20	3.5	0.5	81.20	0.0812
110	3	245	2.10E-04	0.01	2.6	2.59	4.9	0.5	6.99	0.0070
111										
112										
113	**EPA Method 201A/202 Totals**									
114										
115		Probe	Filter	CPM	Total					
116	RUN	(mg)	(mg)	(mg)	(mg)					
117	1	12.2	0.1	27.54	39.84191					
118	2	3.7	0.3	81.20	85.19722					
119	3	4.8	0.3	6.99	12.09053					

Interpoll Laboratories
(612)786-6020

EPA Method 7A Recovery and Analysis Data Sheet (1)

**************SOURCE**************	**************RECOVERY****************	*************ANALYTICAL************
Job LP / SAGOLA	Date of Recovery 7-31-96	Date of Analysis 8/14/96
Source No. 1 Cyclone Outlet	Recovered by SLB	Analyst MOG
Date of Sampling 7-23-96	Recovery volume 500 ml	Eluent AS4A
Test No(s) 2	Barometric at time 29.10 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

S-340(1)

Interpoll Laboratories
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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 (°F)	+	-	Δ Pg (IN.HG.)	Chrom Run No.	DF	Nitrate Concentration (ug/ml) Uncorr. for blank C_{RS}	Corr. for blank (C_{RS} - $\bar{C}_B$)	Total nitrate in Sample (ug) ($M_{NO_3^-}$)
	8021-											
1	8	1	2-1	72		.7		26	1	0.377	0.377	190
2	9	2	2-1	72		.5		29	1	0.376	0.376	190
3	10	3	2-1	72		.5		30	1	0.385	0.385	190
4	11	4	2-1	72		.9		31	1	0.370	0.370	180
5	12	5	2-2	72		.1		32	1	0.381	0.381	190
6	13	6	2-2	72		.6		33	1	0.353	0.353	180
7	14	19	2-2	72		.9		36	1	0.300	0.300	150
8	15	20	2-2	72		.4		37	1	0.292	0.292	150
9	16	21	2-3	72		.6		38	1	0.324	0.324	160
10	17	22	2-3	72	+.1			39	1	0.298	0.298	150
11	18	23	2-3	72		.85		40	1	0.321	0.321	160
12	19	24	2-3	72		.05		43	1	0.319	0.327	160
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		

$\bar{C}_B$ = <0.020

S-340(2) R-9/85

Interpoll Laboratories
(612)786-6020

EPA Method 7A Recovery and Analysis Data Sheet (1)

**************SOURCE**************	***************RECOVERY****************	*************ANALYTICAL************
Job LP / SAGOLA	Date of Recovery 7-31-96	Date of Analysis 8/14/96
Source No. 2 CYCLONE OUTLET	Recovered by SLB	Analyst MJG
Date of Sampling 7-23-96	Recovery volume 500 ml	Eluent AS4A
Test No(s) 2	Barometric at time 29.10 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

S-340(1)

Interpoll Laboratories
(612)786-6020

EPA Method 7A Recovery and Analysis Data Sheet (2)

	Sample Log ID No.	Flask No.	Test/ Run	Final Flask Conditions t_f (°F)	+	-	ΔP_g (IN.HG.)	Chrom Run No.	DF	Nitrate Concentration (ug/ml) Uncorr. for blank C_{RS}	Corr. for blank ($C_{RS} - C_B$)	Total nitrate in Sample (ug) ($M_{NO_3^-}$)
1	8024-41	55	2-1	72		4.2		46	1	0.339	0.339	170
2	42	56	2-1	72		.2		47	1	0.356	0.356	180
3	43	57	2-1	72	.1			48	1	0.321	0.321	160
4	44	58	2-1	72		.8		49	1	0.242	0.242	120
5	45	59	2-2	72		.05		50	1	0.243	0.243	120
6	46	60	2-2	72		1.0		51	1	0.290	0.290	140
7	47	43	2-2	72		4.2		52	1	0.279	0.279	140
8	48	44	2-2	72		4.1		53	1	0.370	0.370	180
9	49	45	2-3	72		4.3		56	1	0.262	0.262	130
10	50	46	2-3	72		4.0		59	1	0.288	0.288	140
11	51	47	2-3	72		.5		60	1	0.317	0.317	160
12	52	48	2-3	72		3.2		61	1	0.306	0.306	150
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
Blank 1									1	CB1		
Blank 2									1	CB2		$\bar{C}_B$ = <0.020
Blank 3									1	CB3		

S-340(2) R-9/85

Interpoll Laboratories
(612)786-6020

EPA Method 7A Recovery and Analysis Data Sheet (1)

**************SOURCE*************	***************RECOVERY****************	*************ANALYTICAL************
Job LP / SAGOLA	Date of Recovery 7-31-96	Date of Analysis 8/14/96
Source No. 3 Cyclone Outlet	Recovered by SLB	Analyst MJG
Date of Sampling 7-23-96	Recovery volume 500 ml	Eluent AS4A
Test No(s) 2	Barometric at time 29.10 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.

$C_{RS} = DF(C_{DS})$ $\qquad M_{NO_3} = (C_{RS} - \overline{C}_B)V_R$ $\qquad \overline{C}_B = (C_{B1} + C_{B2} + C_{B3})/3$

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

S-340(1)

Interpoll Laboratories
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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 (°F)	+	-	Δ Pg (IN.HG.)	Chrom Run No.	DF	Nitrate Concentration (ug/ml) Uncorr. for blank C_{RS}	Corr. for blank (C_{RS} - $\bar{C}_B$)	Total nitrate in Sample (ug) ($M_{NO_3^-}$)
1	8024-75	25	2-1	72		2.4		62	1	0.598	0.598	300
2	76	26	2-1	72		2.0		63	1	0.549	0.549	270
3	77	27	2-1	72		10.5		66	1	0.516	0.516	260
4	78	28	2-1	72		6.1		67	1	0.548	0.548	270
5	79	29	2-2	72		3.0		68	1	0.509	0.509	250
6	80	30	2-2	72		2.4		69	1	0.460	0.460	230
7	81	37	2-2	72		1.2		70	1	0.300	0.300	150
8	82	38	2-2	72		3.85		71	1	0.287	0.287	140
9	83	39	2-3	72		.7		74	1	0.268	0.268	130
10	84	40	2-3	72		.6		77	1	0.310	0.310	160
11	85	41	2-3	72		.5		78	1	0.281	0.281	140
12	86	42	2-3	72		.3		79	1	0.326	0.326	160
13	175		BLANK					80	1	<0.020	<0.020	<10
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		

$\bar{C}_B$ = <0.020

S-340(2) R-9/85

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 10 NDIR Analysis

Job Name: L.P. / Sagola, MI
Source: No. 1 Primary Cyclone / Exhaust
Date of Analysis: 7-24-96
Technician: Mark Bachellor

NDIR Analyzer:
- ☑ Fugi ACS Model 3300
- ☐ Mon. Lab Model 8310
- ☐ Dasibi Model 3003

Range: 0 - 1000 PPM
Flow rate: 1000 cc/min

Pretest Calibration				
	Concentration	Reading	Vendor	Cyl. No.
Zero Gas	0.0 PPM	0.0 PPM		
Upscale Gas	299 PPM	299 PPM		
Upscale Gas	620 PPM	620 PPM		
Upscale Gas	PPM	PPM		

Sample Description Test/Run	Sample Log No.	CO Conc. (PPM, Dry)		
		Dilution Factor	Reading	Actual PPM
1/1		2	911	1822
1/2		2	897	1794
1/3		2	889	1778

Post-Test Calibration		
	Conc.	Reading
Zero Gas	0.0 PPM	0.0 PPM
Upscale Gas	620 PPM	620 PPM
Upscale Gas	PPM	PPM
Upscale Gas	PPM	PPM

Note 1: If sample dilution is required, 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.

111495-G:\STACK\WP\FORMS\S-570

EPA Method 10 NDIR Analysis

Job Name: LP-Sagola
Source: No. 2 Cyclone Outlet
Date of Analysis: 7-31-96
Technician: S-B

NDIR Analyzer: [X] Fugi ACS Model 3300 / [ ] Mon. Lab Model 8310 / [ ] Dasibi Model 3003
Range: 0 - 1000 PPM
Flow rate: 1000 cc/min

Pretest Calibration				
	Concentration	Reading	Vendor	Cyl. No.
Zero Gas	0 PPM	0 PPM	TCO	[illegible] 7135
Upscale Gas	609 PPM	610 PPM	TCO	SG9164993
Upscale Gas	301 PPM	300 PPM	TCO	ALM014237
Upscale Gas	PPM	PPM		

Sample Description Test/Run	Sample Log No.	CO Conc. (PPM, Dry)		
		Dilution Factor	Reading	Actual PPM
1/1	8024 -	6	265	1590
1/2	-	6	317	1902
1/3	-	6	369	2214

Post-Test Calibration		
	Conc.	Reading
Zero Gas	0 PPM	0 PPM
Upscale Gas	609 PPM	602 PPM
Upscale Gas	301 PPM	300 PPM
Upscale Gas	PPM	PPM

Note 1: If sample dilution is required, 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.

111495-G:\STACK\WP\FORMS\S-570

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 10 NDIR Analysis

Job Name: L.P. / Sagola, MI
Source: Dryer Primary Cyclone / No. 3 Exhaust
Date of Analysis: 7-24-96
Technician: Mark Boehler

NDIR Analyzer:
- ☑ Fugi ACS Model 3300
- ☐ Mon. Lab Model 8310
- ☐ Dasibi Model 3003

Range: 0 - 1000 PPM
Flow rate: 1000 cc/min

Pretest Calibration				
	Concentration	Reading	Vendor	Cyl. No.
Zero Gas	0.0 PPM	0.0 PPM		
Upscale Gas	299 PPM	299 PPM		
Upscale Gas	620 PPM	620 PPM		
Upscale Gas	PPM	PPM		

Sample Description Test/Run	Sample Log No.	CO Conc. (PPM, Dry)		
		Dilution Factor	Reading	Actual PPM
1/2 (1)		2	878	1756
1/3 (2)		2	885	1770
1/4 (3)		2	853	1706

Post-Test Calibration		
	Conc.	Reading
Zero Gas	12.0 PPM	0.0 PPM
Upscale Gas	620 PPM	620 PPM
Upscale Gas	PPM	PPM
Upscale Gas	PPM	PPM

Note 1: If sample dilution is required, 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.

111495-G:\STACK\WP\FORMS\S-570

Due Date: 8/8/96

Interpoll Laboratories
(612)786-6020

Data Reporting Sheet
(With Regulatory Limits)

CLIENT: IDOZO/ LP Sagola

PHONE:

CONTACT:

JOB:
CLIENT NO:
P.O. NO:
PROJECT MGR:

DATE:

LABORATORY REPORT #:
SAMPLES COLLECTED:
SAMPLES RECEIVED:

	Invoicing	Signature	Report Routing
PL			
Lab Mgr			
InO Mgr			
Org Mgr			

Process stack

SAMPLE I.D:	8/2	8/4		
SAMPLE TYPE:	I.G.S.	I.G.S.		
LOG NO:	8024-127	-128		

PARAMETER	UNITS	DET. LIMIT	REG. LIMIT	ANALYSIS DATE & INITIALS	METHOD				
Methane	ppmV	1		8/5/96 mmV	M25	BDL	14		

Footnotes:

In-House Comments:

LCI-14R

Due Date: 8/8/96

Interpoll Laboratories
(612)786-6020

Data Reporting Sheet
(With Regulatory Limits)

CLIENT: 10020 LP Sagola

PHONE:

CONTACT:

LABORATORY REPORT #:
SAMPLES COLLECTED:
SAMPLES RECEIVED:

JOB:
CLIENT NO:
P.O. NO:
PROJECT MGR:

DATE:

Dryer RTO Stack

SAMPLE I.D:	1/2	1/4	1/5	
	IGS. →			
SAMPLE TYPE:				
LOG NO:	6024-147	-148	-149	

	Invoicing	Signature	Report Routing
PL			
Lab Mgr			
InO Mgr			
Org Mgr			

PARAMETER	UNITS	DET. LIMIT	REG. LIMIT	ANALYSIS DATE & INITIALS	METHOD				
Methane	ppmV	1		8/5/96	M25	3.9	4.8	4.2	

Footnotes:

In-House Comments:

LCI-14R

INTERPOLL LABORATORIES INC.

Formaldehyde Results Using EPA Method 0011
For Dept. 20/LP Sagola
Collected 7/24 and 25/96

	Field Spike			Test: 4	Source: Dryer Primary Cyclone Exhaust #1		
	Actual	Found	% Recovery	Run 0	Run 1	Run 2	Run 3
Log #		(8024-28)		(8024-27)	(8024-29)	(8024-30)	(8024-31)
Mass (ug)*	**750**	**560**	**74.7**	**54**	**16000**	**18000**	**19000**

	Field Spike			Test: 4	Source: Dryer Primary Cyclone Exhaust #2		
	Actual	Found	% Recovery	Run 0	Run 1	Run 2	Run 3
Log #		(8024-62)		(8024-61)	(8024-63)	(8024-64)	(8024-65)
Mass (ug)*	**750**	**610**	**81.3**	**25**	**13000**	**16000**	**15000**

	Field Spike			Test: 4	Source: Dryer Primary Cyclone Exhaust #3		
	Actual	Found	% Recovery	Run 0	Run 1	Run 2	Run 3
Log #		(8024-98)		(8024-97)	(8024-99)	(8024-100)	(8024-101)
Mass (ug)*	**750**	**510**	**68.0**	**120**	**18000**	**18000**	**10000**

	Field Spike			Test: 4	Source: Dryer RTO Stack		
	Actual	Found	% Recovery	Run 0	Run 1	Run 2	Run 3
Log #		(8024-158)		(8024-157)	(8024-159)	(8024-160)	(8024-161)
Mass (ug)*	**750**	**510**	**68.0**	**40**	**3300**	**5000**	**5100**

* = Total Mass of formaldehyde in the sample in ug.

Reviewed by:

David J. Schneider

David J. Schneider, Manager
Chemistry Department

INTERPOLL LABORATORIES INC.

Formaldehyde Results Using EPA Method 0011
For Dept. 20/LP Sagola
Collected 7/24 and 25/96

	Field Spike			Test: 9					Source: Press RTO Stack
	Actual	Found	% Recovery	Run 0	Run 00	Run 1	Run 2	Run 3	Run 4
Log #		(8024-137)		(8024-136)	(8024-138)	(8024-139)	(8024-140)	(8024-141)	(8024-142)
Mass (ug)*	**750**	**440**	**58.7**	**13**	**13**	**350**	**280**	**270**	**270**

	Field Spike			Test: 9				Source: Press RTO Inlet
	Actual	Found	% Recovery	Run 0	Run 1	Run 2	Run 3	Run 4
Log #		(8024-167)		(8024-166)	(8024-168)	(8024-169)	(8024-170)	(8024-171)
Mass (ug)*	**750**	**470**	**62.7**	**13**	**9800**	**9500**	**11000**	**7300**

* = Total Mass of formaldehyde in the sample in ug.

Reviewed by:

David J. Schneider

David J. Schneider, Manager
Chemistry Department

INTERPOLL LABORATORIES INC.

Phenol Result By EPA Method 8270
For Dept. 20/ LP Sagola
Collected 7/24 and 25/96

	Test 6			Source: Press RTO Stack
	Run 0	Run 1	Run 2	Run 3
Log #	8024-129	8024-130	8024-131	8024-132
Phenol*	**< 840**	**< 840**	**< 840**	**< 840**
2-Fluorophenol**	79.1	60.0	65.3	55.7
D6-Phenol**	55.9	47.9	59.9	60.2
2,4,6-Tribromophenol***	90.7	96.1	103	92.8

	Test 6			Source: Press RTO Inlet
	Run 0	Run 1	Run 2	Run 3
Log #	8024-162	8024-163	8024-164	8024-165
Phenol*	**< 840**	**< 840**	**< 840**	**< 840**
2-Fluorophenol**	99.4	66.4	69.7	54.2
D6-Phenol**	65.5	55.0	70.7	44.5
2,4,6-Tribromophenol***	49.5	39.0	63.7	89.8

* = Total mass of the specified compound in the sample in ug.
** = Percent recovery of the field surrogate. (60120 ug 2-Fluorophenol and 5006 ug Phenol-D6 was added to the impinger solution before sampling.)
*** = Percent recovery of the lab surrogates.

Reviewed by:

David J Schneider

David J. Schneider, Manager
Chemistry Department

INTERPOLL LABORATORIES INC.

4,4-Methylenebis(phenyl isocyanate) Results
For Dept. 20/LP Sagola
Collected 7/25/96

	Field Spike			Test: 5			Source: Press RTO Stack	
Item	Actual	Found	% Rec.	Run 0	Run 00	Run 1	Run 2	Run 3
EPA Draft Method 1,2-PP								
Log #		8024-122		8024-121	8024-123	8024-124	8024-124	8024-125
MDI (ug)*	**297**	**260**	**87.5**	**< 6.2**	**< 6.2**	**< 6.2**	**< 6.2**	**< 6.2**

* = Total mass of MDI in the sample in ug.

Reviewed by:

David J. Schneider, Manager
Chemistry Department

Interpoll Laboratories
(612) 786-6020

IMPINGER CATCHES

Project Name: LP/ Sagola Order Date: 7-17-96
Date Required: 7-19-96 Delivery Date: 7-18-96

Nature of Spiking Material	Spike Concentration	Spike Volume	Total Mass of Spike
MDI 95204-83-A in Dry Toluene	297 μg/mL	1.0 mL	297 μg

SPECIAL REQUIREMENTS

Spiked 7-18-96 B.D.
Verified 7-18-96 [illegible]

**Please return this form with the samples.

Interpoll Laboratories
(612) 786-6020

IMPINGER CATCHES

Project Name: LPI Sagola
Date Required: 7-19-96
Order Date: 7-17-96
Delivery Date: 7-18-96

Nature of Spiking Material	Spike Concentration	Spike Volume	Total Mass of Spike
* Formaldehyde in ACN #95082-59-A	3.75 mg/mL	200 ul	750 ug

SPECIAL REQUIREMENTS

* Prepared six (6) Field Spikes B.D. 7-18-96
Verified by [illegible] 7/18/96

**Please return this form with the samples.

Interpoll Laboratories
(612) 786-6020

IMPINGER CATCHES

Project Name: LP/Sagola Order Date: 7-17-96
Date Required: 7-19-96 Delivery Date: 7-19-96

Nature of Spiking Material	Spike Concentration	Spike Volume	Total Mass of Spike
D-6 Phenol #95078-26-A	5.006 mg/mL	1.0 mL	5.006 mg
2-fluorophenol #95078-26-B	50.10 mg/mL	1.2 mL	60.120 mg

SPECIAL REQUIREMENTS

Spiked 7-19-96 B.D.
Verified 7-19-96 [illegible]

**Please return this form with the samples.

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job P/Sugola Source Primary Cyclone Exhaust #1 Site ______ Log No. 8027
Field Engineer S. Fjelsta Date of Test 7-24-96 Test No. 1 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 ☐		
5	**Filter:** ☒ 4" Glass ☒SS Thimble	☐Pallflex ☐2.5" Glass	☒EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17		S.S Thimble only on Run 1
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	**Integrated Gas:** ☒Tedlar Bag	☐	☒EPA M-3 ☐	☒EPA M-10		
12	**Oxides of Nitrogen:**		☒EPA M-7A ☐			
–	**Fuel Lab:** ☐Fuel Sample	☐Aggregate	☐Per S-0163			
–	**Particle Sizing:**		☐X-Ray Sdgraph ☐	☐Cascade Imp		
3	**Miscellaneous:**	☒Imp Rinse (MeCl$_2$)	☒ M-202		*	* Run 3's Imp rinse included in Imp Catch *

Fuel Type: Coal: ☐Bituminous ☐Anthracite ☐Lignite Wood: ☐Wood Waste ☐Dust ☐Bark Oil: ☐Waste Oil ☐No. 2 ☐No. 6 Misc: ☐Natural Gas ☐RDF ☐

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Scott Fjelsta Interpoll Labs	[illegible] / Int 1500	7-26-96

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job: L.P. Sagola
Field Engineer: D.H.
Source: No 2 Cyclone
Date of Test: 7/23/96
Site: Outlet
Test No.: 1
Log No.: 8024
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 ☐ $3\%H_2O_2$ ☐ 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 ☒ [illegible]		
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
Duane Van Hoven	[signature] / ILI 1500	7/26/96

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: LP Snyder — Source: Dryer 3 Primary Cyclone Exhaust — Site: Duct — Log No.: 8024

Field Engineer: ES — Date of Test: 7-23-96 — Test No.: 1 — 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 ☐ ____		
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 ☐ ____		
~~7~~	**Integrated Gas:** ☒ Tedlar Bag	☐ ____	☒ EPA M-3 ☐ ____	☐ EPA M-10		Analyzed in Field - By MK
	Oxides of Nitrogen:		☐ EPA M-7A ☐ ____			
	Fuel Lab: ☐ Fuel Sample	☐ Aggregate	☐ Per S-0163			
	Particle Sizing:		☐ X-Ray Sdgraph ☐ ____	☐ Cascade Imp		
4	**Miscellaneous:**	☒ Imp Rinse MeCl$_2$	☒ M-202			* Check for Heavy particulate may have had breakthrough

Fuel Type:
Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
Wood: ☐ Wood Waste ☐ Dust ☐ Bark
Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
Misc: ☐ Natural Gas ☐ RDF ☐ ____

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: L.P. Sagola, Mill
Field Engineer: [illegible]
Source: 'E' Tube
Date of Test: 2-23-96
Site: Outlet
Test No.: 1
Log No.: 8024
No. of Runs: 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
3+1	**Probe Wash:** ☒ Acetone ☐ MeCl₂	☐ 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 3	**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 ☐ ______

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[illegible] / Interpoll Labs	[illegible] / ILI	7/26/96 1500

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: L.P Sagola Source: Dryer RTO Site: Stack Log No.: 8024
Field Engineer: J.B. Date of Test: 7/23/96 Test No.: 1 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 ☐	(143-146)P	
4	Filter: ☒ 4" Glass ☐ SS Thimble	☐Pallflex ☐2.5" Glass	☒EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17	(143-146)F	
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 ☐	(143-146)I	
3	Integrated Gas: ☒Tedlar Bag	☐	☐EPA M-3 ☒ Methane	☐EPA M-10 Run 2,4,5	(147,148,149)	Methane on Run #2,4,5
	Oxides of Nitrogen:		☐EPA M-7A ☐			
	Fuel Lab: ☐Fuel Sample	☐Aggregate	☐Per S-0163			
	Particle Sizing:		☐X-Ray Sdgraph ☐	☐Cascade Imp		
4	Miscellaneous:	☒ MeCl$_2$ Rinse	☒ M-202		(143-146)R	

Fuel Type:
- Coal: ☐Bituminous ☐Anthracite ☐Lignite
- Wood: ☐Wood Waste ☐Dust ☐Bark
- Oil: ☐Waste Oil ☐No. 2 ☐No. 6
- Misc: ☐Natural Gas ☐RDF ☐

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	[signature] / ILI 1200	7/29/96

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job L.P. Sagola Source No. 2 Cyclone Site Outlet Log No. 8024
Field Engineer DW Date of Test ______ Test No. 2 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		
	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 ☐____		
	Integrated Gas: ☐Tedlar Bag	☐____	☐EPA M-3 ☐____	☐EPA M-10		
12	**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 ☐____

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Duane Van Hoever	/ ILI 1500	7/26/96

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job L.P. Sagola — Source No. 3 Dryer Cyclone — Site Duct — Log No. 8024
Field Engineer ______ — Date of Test 7-23-96 — Test No. 2 — 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		
	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 ☐______		
	Integrated Gas: ☐Tedlar Bag	☐______	☐EPA M-3 ☐______	☐EPA M-10		
12	**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 ☐______

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[signature]	[signature] 1500	7-26-96

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INTERPOLL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job: CP/Saybola — Source: Primary Cyclone Exhaust #1 — Site: ______ — Log No.: 8024

Field Engineer: SF — Date of Test: 7-24-96 — Test No.: 4 — 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 ☐$KMnO_4/H_2SO_4$ ☐____	☐MN Protocol ☐WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases ☐IA Protocol ☒Formaldehyde ☐EPA M-29 ☐EPA M-26 ☐____		1 BLANK 1 SPIKE 6 ~~~~ IMP. CATCH
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 ☐____

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[signature] / ICI	[signature] / ILI	7/26/96 1500

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: L.P. Sagola | Source: No 2 Cyclone | Site: Outlet | Log No.: 8024

Field Engineer: Dutt | Date of Test: 7/24/96 | Test No.: 4 | 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 ☒ 0011		
	Filter: ☐ 4" Glass ☐ SS Thimble ☐ Pallflex ☐ 2.5" Glass	☐ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A ☐ EPA M-17		
5	**Impingers:** ☒ DI Water ☐ 3% H_2O_2 ☐ 1N NaOH ☒ 2,4-DNPH ☐ H_2SO_4 ☐ HNO_3/H_2O_2 ☐ $KMnO_4/H_2SO_4$ ☒ $MeCl_2$	☐ MN Protocol ☐ WI Protocol ☐ EPA M-202 ☐ EPA M6,8 ☐ Acid Gases ☐ IA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☒ 0011		1 Blank, 1 Spike, 3 Runs
3	**Integrated Gas:** ☒ Tedlar Bag ☐ ____	☒ EPA M-3 ☐ ____ ☐ EPA M-10		
	Oxides of Nitrogen:	☐ EPA M-7A ☐ ____		
2	**Fuel Lab:** ☒ Fuel Sample ☐ Aggregate	☐ Per S-0163		1 Aspen & 1 Pine Ultimate, 2 See
	Particle Sizing:	☐ X-Ray Sdgraph ☐ ____ ☐ Cascade Imp		Kathy E.
	Miscellaneous: ☐ ____	☐ ____		

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite | Wood: ☐ Wood Waste ☐ Dust ☐ Bark | Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6 | Misc: ☐ Natural Gas ☐ RDF ☐ ____

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: L.P. Sagola Source: No. 3 cyclone Site: outlet Log No.: 8024
Field Engineer: ES Date of Test: 7-24-96 Test No.: 4 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		
9	**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 ☐ ____		1 Blank 1 Spike 3 Runs
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 ☐ ____

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job A.P. /Sagola, MI Source Press RTO Site Stack Log No. 6024
Field Engineer McKracken Date of Test 7-25-96 Test No. 5 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 ☐ ____		Added to Imp
–	**Filter:** ☐ 4" Glass ☐ SS Thimble ☐Pallflex ☐2.5" Glass	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A ☐EPA M-17		
6 + 4	**Impingers:** ☐DI Water ☐3%H_2O_2 ☐1N NaOH ☐2,4-DNPH ☐H_2SO_4 ☐HNO_3/H_2O_2 ☐$KMnO_4/H_2SO_4$ ☒ 1-2 PP	☐MN Protocol ☐WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases ☐IA Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☒ MDI		
2 amb	**Integrated Gas:** ☒Tedlar Bag ☐ ____	☐EPA M-3 ☒ Methane ☐EPA M-10		Ambient Air
–	**Oxides of Nitrogen:**	☐EPA M-7A ☐ ____		
–	**Fuel Lab:** ☐Fuel Sample ☐Aggregate	☐Per S-0163		
–	**Particle Sizing:**	☐X-Ray Sdgraph ☐ ____ ☐Cascade Imp		
–	**Miscellaneous:** ☐ ____	☐ ____		

Fuel Type: NA
Coal: ☐Bituminous ☐Anthracite ☐Lignite
Wood: ☐Wood Waste ☐Dust ☐Bark
Oil: ☐Waste Oil ☐No. 2 ☐No. 6
Misc: ☐Natural Gas ☐RDF ☐ ____

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: L.P. Sagola | Source: Dryer RTO | Site: Stack | Log No.: 8024
Field Engineer: J.B | Date of Test: 7/24/96 | Test No.: 2 | No. of Runs: 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
3	Probe Wash: ☐ Acetone ☒ MeCl₂	☒ DI Water ☐ ___	☐EPA M-5 ☐EPA M-29	☐EPA M-201A ☒ 0011	(159-161)	
	Filter: ☐ 4" Glass ☐ SS Thimble	☐Pallflex ☐2.5" Glass	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17		
5	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 ☒ 0011	(157-161)	1 Blank 1 Spike 3 Runs
3	Integrated Gas: ☐Tedlar Bag	☐ ___	☒EPA M-3 ☐ ___	☐EPA M-10	(172,173,174)	
	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 ☐ ___

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job L.P. Sagola — Source Press RTO — Site INLET — Log No. 8024
Field Engineer J.B — Date of Test 7/25/96 — Test No. 6 — 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		
4 Pairs	**Impingers:** ☐DI Water ☐3% H_2O_2 ☐1N NaOH ☐2,4-DNPH	☐H_2SO_4 ☐HNO_3/H_2O_2 ☐$KMnO_4/H_2SO_4$ ☒ Neutral Buffer	☐MN Protocol ☐WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases	☐IA Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☒ Pheno /8270	(162-165)	
	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 ☐ ______

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: L.P. / Sagola, MI Source: Press RTO Site: Stack Log No.: 6024
Field Engineer: M. Kaehler Date of Test: 7-25-96 Test No.: 6 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		
3 A 3 B 4 2	**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 ☒ Phenol 8270		
—	**Integrated Gas:** ☐ Tedlar Bag ☐ ______	☐ EPA M-3 ☐ ______ ☐ EPA M-10		Ambient Air
—	**Oxides of Nitrogen:**	☐ EPA M-7A ☐ ______		
—	**Fuel Lab:** ☐ Fuel Sample ☐ Aggregate	☐ Per S-0163		
—	**Particle Sizing:**	☐ X-Ray Sdgraph ☐ ______ ☐ Cascade Imp		
—	**Miscellaneous:** ☐ ______	☐ ______		

Fuel Type: NA
Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
Wood: ☐ Wood Waste ☐ Dust ☐ Bark
Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
Misc: ☐ Natural Gas ☐ RDF ☐ ______

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job L.P./Sagola, MI Source Press RTO Site Stack Log No. 6024
Field Engineer Muehlbauer Date of Test 7-24-96 Test No. 7 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 3	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 ☐____		
—	Integrated Gas: ☐Tedlar Bag	☐____	☐EPA M-3 ☐____	☐EPA M-10		Ambient Air
—	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 ☐____

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: LP Sagola — Source: Press RTO — Site: Inlet — Log No.: 802-Y

Field Engineer: J.B — Date of Test: 7/25/96 — Test No.: 9 — 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 ☒ 0011		Added TD 1 Catch
	Filter: ☐ 4" Glass ☐ SS Thimble	☐ Pallflex ☐ 2.5" Glass	☐ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17		
7 / 5	**Impingers:** ☐ DI Water ☐ 3%H_2O_2 ☐ 1N NaOH ☒ 2,4-DNPH + MeCl$_2$	☐ 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 ☒ 0011	(166-171)	1 Blank 1 Spike 3 Runs
	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 ☐ ______

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: L.P. / Sagola, MI — Source: Press #10 — Site: Stack — Log No.: 9024
Field Engineer: M. Koehler — Date of Test: 7-24-96 — Test No.: 9 — No. of Runs: 4

No. Items	Sample Type	Analysis	Sequence No.	Comments
—	**Probe Wash:** ☐ Acetone ☐ $MeCl_2$ ☐DI Water ☐____	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A ☐____		Added to Imp
—	**Filter:** ☐ 4" Glass ☐ SS Thimble ☐Pallflex ☐2.5" Glass	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A ☐EPA M-17		
4 + 2 + 1	**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 0011 ☐EPA M-29 ☐EPA M-26 ☐____		
—	**Integrated Gas:** ☐Tedlar Bag ☐____	☐EPA M-3 ☐____ ☐EPA M-10		Ambient Air
—	**Oxides of Nitrogen:**	☐EPA M-7A ☐____		
—	**Fuel Lab:** ☐Fuel Sample ☐Aggregate	☐Per S-0163		
—	**Particle Sizing:**	☐X-Ray Sdgraph ☐____ ☐Cascade Imp		
—	**Miscellaneous:** ☐____	☐____		

Fuel Type: NA
Coal: ☐Bituminous ☐Anthracite ☐Lignite
Wood: ~~☒Wood Waste~~ MK ☐Dust ~~☒Bark~~ MK
Oil: ☐Waste Oil ☐No. 2 ☐No. 6
Misc: ☐Natural Gas ☐RDF ☐____

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APPENDIX E

COMPUTER DATALOGGER PRINTOUTS

WHEELABRATOR
SAGOLA, MI
7/23/96
TEST 2 / RUN 2 (1)
14:36:00 - 15:35:00

NO. 3 CYCLONE OUTLET		NO. 2 CYCLONE OUTLET		NO. 1 CYCLONE OUTLET
THC PPM		THC PPM		THC PPM
1046		654		623
1059		673.5		616.5
1065		724		613.9
1044		766.5		621.9
1036		778.5		635.4
1363		783.5		684.1
1391		767.1		687.1
1405		721.4		701.4
1454		677		696.8
1484		633.8		705.9
1473		623.9		709.3
1492		619.9		710.4
1480		639.9		736.3
1447		672.7		701.8
1425		682.3		696.3
1419		724.4		690.5
1396		713.1		685
1374		710.5		681.8
1366		683.6		678.2
1364		663.2		684.9
1351		660.8		676.9
1349		664.5		652
1360		685.8		648.2
1353		686.7		636.2
1356		665.8		639.6
1344		640.6		626.7
1344		639		626.3
1379		652.1		621.9
1385		659.6		615.8
1393		668.2		623.7
959.4		689.2		621
889		685.1		613.6
919		685		630.2
948.7		665.4		636.6
929.8		660.1		640.9
909.2		685.8		667.5
870.5		690.9		665.6
888.1		708.2		659.4
918.4		719.5		643.6
940.8		732.4		628.5
938.6		742		619.6
952.7		722.8		630.6
985.7		716.9		652.1
1021		704.7		660.4
1010		693.6		684.7
1020		694.9		696.5
990.1		746.3		713.6
997.4		778.5		699.5
967.2		828.6		698.4
910.9		835.4		674.5
873.9		827.3		646.9
860		806.7		642.1
860.9		771.4		687.4
848.5		740.7		696.1
828.8		718.8		694.8
806.3		700.7		717.5
797.4		692.5		735.8
810.2		702.2		705.2
818.6		717.2		676.8
824.3		723.8		676.2

AVERAGE	AVERAGE	AVERAGE
1124.87	705.39	665.39

WHEELABRATOR
SAGOLA, MI
7/23/96
TEST 2 / RUN 3 (2)
16:46:00 - 17:45:00

NO. 3 CYCLONE OUTLET THC PPM	NO. 2 CYCLONE OUTLET THC PPM	NO. 1 CYCLONE OUTLET THC PPM
977.1	700.3	584.2
979.7	694.4	586.3
984.1	715.2	600.3
997.3	767	617.3
991.6	787	621.6
1019	736.9	616.9
990.2	758.3	607.7
990.7	728.8	608.7
982.7	702.9	630.3
971.3	694	630
966	711.3	627.6
949.2	651.9	647.8
927.2	634.6	659.6
900.4	638.5	613.1
909.2	644.3	600.7
903	635.9	582.3
929.5	679.4	577.2
940.9	711.4	565.7
949.3	732.4	580.5
925.1	761.1	582.9
895.6	799.1	578.8
901.3	795.8	571.6
899.6	792.9	561.7
878.4	784.1	554.3
878.9	742.5	529.8
878.2	693.2	537.1
882.8	652.4	554
852.1	645.7	561.2
832.7	637.6	570.4
813.3	678.5	585.6
810.6	716.7	568.5
797.4	736	568.7
755.6	728.9	557.7
706.8	717.3	568.9
671.1	669.4	572.6
658.4	657.6	571.8
666.5	640.8	561.8
651.1	620.7	546.1
661.7	628.1	535.2
699.6	633.1	525.2
733.5	630.8	542.6
713.7	643.8	547.2
685.2	713.7	549.2
668	724.5	543.3
671.1	693.7	543.2
659.6	672.3	564.4
642	646.2	566.8
705.8	650.4	588.7
1050	668.8	577.7
797.9	685.9	585.1
779.8	692.1	585.1
771	685.8	594
767.6	679.2	583.7
778.9	670	589.2
790.4	661.8	587.1
863	669.7	615.2
953.7	681.8	602.3
940.2	714.4	591.9
887.6	721.7	596.7
832.6	732	593.5

AVERAGE	AVERAGE	AVERAGE
844.41	694.91	580.81

WHEELABRATOR
SAGOLA, MI
7/23/96
TEST 2 / RUN 4 (3)
19:25:00 - 20:24:00

NO. 3 CYCLONE OUTLET	NO. 2 CYCLONE OUTLET	NO. 1 CYCLONE OUTLET
THC PPM	THC PPM	THC PPM
1326	546.9	699.5
1293	557.8	677
1264	603.9	664.9
1224	629.3	681.7
1205	629.7	666.4
1164	596.3	653.6
1161	573.7	638.6
1126	570.4	644.7
1111	584.8	629.8
1094	587.6	623.8
1111	593.5	614.7
1115	584.4	630.8
1096	611.6	647.7
1065	651.2	677.7
1027	670.5	677.8
958.8	673.8	668.8
928.5	679.4	627.7
928.1	671.7	586.8
958.8	675	555.4
990.5	680.8	532.7
1036	686	500.7
1052	673.9	483.6
1086	643.6	470.8
1089	621.4	459.8
1063	592.3	438.5
1060	593.7	419.8
1109	598.9	411.4
1117	594.4	428.6
1107	582.9	426.8
1106	572.5	424.6
1113	574.1	460
1121	592.6	448.9
1119	585.5	432.5
1129	562.7	433.3
1143	542.5	457.3
1145	539.4	494.9
1144	535.2	509.9
1158	550.4	513.6
1170	565.4	536.9
1175	568.2	555
1180	574.7	565
1183	575.7	594.6
1183	582.6	597.5
1189	584.2	581.3
1194	561	581.4
1206	544.5	553.2
1219	507.4	552.1
1231	490.8	522.4
1230	505.7	505.1
1235	537.9	508
1245	574.4	511.6
1249	592.6	508.1
1237	578	528.1
1235	590.4	510.1
1239	570	520
1237	549.1	510.5
1221	538.9	514.6
1188	535.5	516.2
1169	532.6	527.5
1177	543.6	532.3
AVERAGE	AVERAGE	AVERAGE
1143.93	586.96	547.44

WHEELABRATOR
SAGOLA, MI
E TUBE / OUTLET
7/23/96
TEST 2 / RUN 2 (1)
14:36:00-15:35:00

NOX PPM		O2 %		CO PPM		CO2 %
4.16202		17.2416		1813.84		3.25053
4.36257		17.2091		1811.16		3.32895
4.9747		17.1935		1811.32		3.32808
5.135		17.2118		1811.56		3.318
5.44733		17.2299		1812.62		3.28803
4.86377		17.4018		1815.63		3.11883
4.71993		17.4618		1816.4		3.08467
4.50222		17.5374		1815.71		2.9605
4.5023		17.6156		1816.81		2.9155
4.09543		17.6195		1814.78		2.93383
4.36667		17.5309		1808.84		3.05133
4.37897		17.4879		1799.76		3.068
4.82272		17.4996		1791.01		3.02633
4.72002		17.4239		1782.71		3.108
4.87618		17.3171		1777.14		3.2105
4.50228		17.3275		1775.1		3.21467
4.40373		17.4278		1779.99		3.153
4.27215		17.4252		1782.59		3.15133
4.24343		17.5622		1783.77		3.0255
4.21462		17.6963		1799.97		2.88717
4.268		17.6183		1799.64		2.96717
4.16533		17.527		1792.56		3.05383
4.12835		17.4957		1784.14		3.06633
4.05033		17.4474		1784.67		3.078
3.8819		17.433		1783.61		3.10133
4.04208		17.3692		1789.26		3.17717
4.21457		17.3497		1792.8		3.20133
4.09542		17.377		1787.73		3.188
3.98868		17.39		1805.95		3.1455
3.82838		17.4305		1809.45		3.10133
3.7298		17.483		1810.38		3.07883
3.77912		17.4162		1812.01		3.13217
3.77498		17.351		1809.49		3.19718
3.9229		17.2845		1801.72		3.24633
3.93123		17.2702		1807.62		3.24135
3.95585		17.3614		1810.87		3.19633
4.06675		17.3015		1812.09		3.26472
4.16842		17.2573		1811.93		3.30055
4.07492		17.437		1816.61		3.09717
3.71738		17.4827		1816.89		3.06133
3.94755		17.4082		1816.81		3.16383
3.94763		17.3665		1815.63		3.14133
3.86135		17.4642		1814.41		3.14467
3.79967		17.3328		1815.18		3.23052
3.964		17.4304		1815.14		3.14133
3.95993		17.3704		1812.54		3.193
4.02972		17.4096		1812.46		3.1505
4.03798		17.4291		1811.85		3.13715
4.07492		17.3913		1807.94		3.16833
4.1899		17.3732		1802.65		3.19133
4.09962		17.2807		1790.53		3.27135
4.35428		17.2052		1785.6		3.3785
4.35433		17.109		1795.94		3.43312
4.37898		17.1388		1808.1		3.35587
4.36255		17.3236		1814.82		3.22467
4.43247		17.3483		1817.22		3.23467
4.64597		17.3432		1817.06		3.21383
4.48893		17.3758		1817.14		3.1755
4.69532		17.2351		1817.54		3.32388
4.78565		17.2221		1815.43		3.3591

AVERAGE	AVERAGE	AVERAGE	AVERAGE
4.2626	17.384	1804.6	3.1658

WHEELABRATOR
SAGOLA, MI
E TUBE / OUTLET
7/23/96
TEST 2 / RUN 3 (2)
16:46:00-17:45:00

NOX PPM	O2 %	CO PPM	CO2 %
3.18305	17.4213	1830	2.91383
3.25283	17.39	1829.95	2.9855
3.35157	17.3054	1827.76	3.09717
3.35853	17.3119	1827.72	3.0655
3.50342	17.5191	1826.82	2.90717
3.46653	17.2689	1826.37	3.103
3.6968	17.282	1825.56	3.16802
3.81198	17.2963	1826.58	3.11717
3.48293	17.5009	1828.16	2.88717
3.44185	17.5453	1830.04	2.85383
3.72127	17.6117	1829.95	2.82467
3.33092	17.4865	1829.22	2.9105
3.19542	17.5244	1826.9	2.898
3.19945	17.5322	1821.82	2.89383
3.09262	17.613	1819.01	2.843
3.00627	17.484	1819.13	2.928
2.9364	17.3875	1818.68	2.99967
2.91587	17.3887	1818.52	3.00883
2.98982	17.4422	1819.46	2.99633
2.91997	17.3795	1820.76	3.02467
3.01447	17.446	1822.55	2.96467
2.99803	17.4396	1824.67	2.92217
2.9651	17.4737	1825.6	2.878
3.01862	17.5505	1825.32	2.88467
3.24058	17.4588	1823.57	2.92717
3.25705	17.428	1823.16	2.94133
3.27757	17.398	1822.35	2.908
3.29808	17.4774	1820.07	2.94717
3.30207	17.3731	1819.7	3.03715
3.55697	17.2638	1819.78	3.17633
3.69678	17.0934	1816.88	3.29888
3.86133	17.0934	1812.46	3.36672
4.00515	16.9945	1814.66	3.42308
4.07492	17.044	1818.58	3.36257
3.94757	17.135	1823	3.31975
3.74207	17.3067	1824.5	3.09133
3.80367	17.3835	1824.42	3.03133
3.81607	17.2937	1825.4	3.11633
4.0132	17.2481	1826.09	3.11383
4.30912	17.2588	1825.85	3.1655
4.2351	17.0322	1825.03	3.34393
4.0462	17.07	1825.56	3.35568
3.84487	16.9489	1825.07	3.48482
3.91473	16.9789	1826.41	3.4265
4.29273	17.0206	1825.52	3.40465
4.19407	17.0738	1825.15	3.34407
4.02555	17.0869	1825.8	3.31808
3.9312	17.1077	1824.38	3.31388
4.05433	17.1129	1824.05	3.2597
4.03385	17.2755	1823.4	3.13217
3.87365	17.2404	1823.49	3.20467
4.01742	17.1844	1824.1	3.22717
3.96402	17.0986	1824.14	3.28557
3.90657	17.1363	1825.23	3.324
4.2064	17.0934	1825.28	3.33898
4.32147	17.1518	1823.81	3.19633
4.31325	17.2872	1823.93	3.13383
4.35853	17.2963	1824.67	3.17967
4.60498	17.1623	1824.91	3.24718
4.69532	17.2169	1824.14	3.19217

AVERAGE	AVERAGE	AVERAGE	AVERAGE
3.6849	17.29	1823.9	3.1167

WHEELABRATOR
SAGOLA, MI
E TUBE / OUTLET
7/23/96
TEST 2 / RUN 4 (3)
19:25:00-20:24:00

NOX PPM		O2 %		CO PPM		CO2 %
2.74745		17.2755		1829.55		3.09967
2.96513		17.1389		1826.62		3.25885
3.01452		17.0674		1826.58		3.34738
3.0639		17.1389		1829.34		3.25307
3.1461		17.1298		1830.52		3.2205
2.83363		17.3601		1830.52		3.0505
2.83777		17.4057		1830.12		2.92298
2.78022		17.5726		1828.53		2.808
2.92405		17.6494		1829.22		2.75383
2.82542		17.5127		1829.38		2.84967
2.72683		17.4278		1831.18		2.96133
2.4762		17.2		1828.12		3.10133
2.4885		17.2081		1827.68		3.18217
2.55018		17.0999		1827.8		3.28468
2.71463		17.2117		1830.93		3.15633
2.62017		17.2588		1828.57		3.09639
2.53377		17.3835		1830.73		3.00633
2.47213		17.4266		1830.57		2.98883
2.51318		17.4958		1831.95		2.85467
2.36272		17.4967		1830.62		2.86633
2.22338		17.4892		1829.63		2.87133
2.27453		17.4865		1830.16		2.89967
2.1102		17.6247		1830.4		2.798
2.04458		17.4448		1829.38		2.93383
2.11435		17.2546		1824.5		3.1605
2.24992		17.1258		1820.84		3.22867
2.29102		17.3055		1828.33		3.12217
2.27047		17.2183		1830		3.15883
2.41853		17.2664		1831.3		3.128
2.4638		17.4188		1829.06		2.92133
2.38807		17.437		1828.5		2.93633
2.58718		17.2274		1831.18		3.133
2.55435		17.2052		1830.77		3.16633
2.47202		17.178		1830.93		3.23053
2.3774		17.282		1830.97		3.0655
2.25397		17.3849		1830.97		3.06133
2.16772		17.2195		1831.3		3.18717
2.25822		17.1051		1830.24		3.31315
2.60355		17.0713		1830.44		3.34003
2.8584		17.0322		1831.01		3.35583
2.79683		17.0452		1831.58		3.31808
2.89118		17.2377		1832.23		3.13633
2.86242		17.3588		1828.77		2.99217
2.91182		17.4291		1826.09		2.94383
2.70635		17.4122		1827.39		2.9655
2.73108		17.4655		1829.51		2.9455
2.82143		17.3745		1831.66		3.0255
2.62422		17.3366		1826.66		3.07383
2.5172		17.3458		1823.77		3.03383
2.56665		17.3666		1827.59		3.04883
2.51315		17.3991		1827.47		2.95383
2.51727		17.4787		1831.66		2.9105
2.34443		17.4801		1831.05		2.88383
2.21697		17.5387		1831.42		2.8855
2.29515		17.544		1831.05		2.82467
2.28282		17.5478		1831.26		2.83883
2.13893		17.4422		1829.63		2.9805
2.15942		17.3067		1825.44		3.07383
2.24168		17.3847		1825.48		3.01383
2.2869		17.39		1823.89		2.99133

AVERAGE	AVERAGE	AVERAGE	AVERAGE
2.5335	17.335	1829.2	3.0492

E-6

LP / SAGOLA, MI. TEST 2 RUN 2 (1)
DRYER RTO STACK
7/23/96

NOX	O2	CO	CO2	THC
3.662	16.784	221.09	3.62037	33.1722
3.95075	16.7759	225.179	3.5821	29.2249
3.73927	16.786	213.196	3.60403	27.2571
3.79622	16.7768	232.137	3.59843	32.8565
3.7718	16.8673	225.484	3.4921	31.7668
3.62947	17.0077	229.919	3.39593	30.7471
3.45458	17.0351	212.585	3.35273	27.6623
3.4668	17.1551	212.423	3.25512	32.2234
3.48307	17.151	240.153	3.25835	32.9163
3.4668	17.1378	214.966	3.31842	28.2708
3.38953	17.0544	198.059	3.36493	28.1046
3.50748	17.0646	202.983	3.29255	31.4811
3.59287	17.0788	217.529	3.34215	9.89708
3.46273	16.9985	187.236	3.44657	8.44803
3.31227	16.9903	186.096	3.46185	14.259
3.43833	16.9923	191.081	3.42778	19.1251
3.40987	17.0869	196.086	3.39027	21.8187
3.22687	17.0524	184.245	3.3324	20.3234
3.2472	17.2049	188.029	3.19903	24.8625
3.31227	17.1652	217.611	3.23315	28.54
3.19027	17.1093	199.097	3.30807	27.6636
3.11707	17.0422	191.528	3.34135	27.0297
3.296	17.0981	202.148	3.33488	33.1681
3.3326	17.0961	222.941	3.33245	29.2521
3.28787	17.0157	199.992	3.40897	25.6694
3.1984	16.9485	203.349	3.45778	32.2148
3.2472	16.9222	209.086	3.449	29.7013
3.2472	16.9985	214.559	3.41963	32.1611
3.11707	17.0066	205.526	3.4033	18.8644
3.1374	17.0056	208.333	3.38615	23.4835
3.27567	17.0036	234.782	3.39758	25.962
3.21467	16.9507	214.64	3.46863	24.161
3.19027	16.9182	205.485	3.50365	23.6475
3.4058	16.8592	215.129	3.52225	29.9154
3.41393	16.8887	225.037	3.48812	27.5041
3.39767	16.8816	212.118	3.52062	24.4462
3.37327	16.8003	212.83	3.5814	30.1689
3.44647	16.8663	226.115	3.44235	28.6023
3.39767	17.0636	235.474	3.35108	33.3822
3.38953	16.9548	215.23	3.47108	28.807
3.40987	16.8958	209.737	3.46455	33.8859
3.41393	16.9436	234.497	3.44738	34.4731
3.52373	16.9101	212.83	3.51003	30.7735
3.4302	16.8877	202.108	3.45707	30.1912
3.51153	16.9273	214.091	3.45625	31.3375
3.54407	16.9517	219.014	3.43505	21.1556
3.4912	16.9853	204.163	3.4229	21.0335
3.5156	16.9273	197.774	3.44167	28.3597
3.601	16.9782	205.994	3.43595	26.0054
3.56033	16.8887	202.881	3.4938	27.7128
3.53593	16.8114	179.586	3.5846	24.0568
3.61727	16.722	179.972	3.64077	27.8613
3.70267	16.7342	213.196	3.61798	28.7878
3.67013	16.8419	206.685	3.51573	27.0224
3.57253	16.904	204.854	3.50282	28.8204
3.6986	16.8572	222.371	3.4938	34.3661
3.6864	16.9141	230.957	3.43182	30.2877
3.67827	16.8511	219.971	3.55295	26.2683
3.75553	16.7911	213.135	3.57797	31.7712
3.82873	16.7901	220.479	3.56593	29.3217

AVERAGES

NOX	O2	CO	CO2	THC
3.4624	16.952	210.73	3.4434	27.371

LP / SAGOLA, MI. TEST 2 RUN 3 (2)
DRYER RTO STACK
7/23/96

NOX	O2	CO	CO2	THC
3.58067	17.088	264.079	3.34945	26.8331
3.62947	17.0076	236.247	3.42858	28.1628
3.662	16.9751	220.439	3.45222	30.3943
3.68233	17.1764	236.674	3.29485	31.2304
3.7962	17.0717	233.948	3.38873	27.2493
3.6986	16.968	208.964	3.50832	25.8826
3.67013	16.9619	208.374	3.4856	29.8311
3.65387	17.15	243.978	3.27872	30.8789
3.59693	17.2405	232.483	3.25267	25.8382
3.57253	17.209	229.045	3.22272	26.2569
3.662	17.2466	239.38	3.25503	30.4329
3.5766	17.2079	242.879	3.24528	26.4408
3.43833	17.3066	215.78	3.20722	24.3323
3.3814	17.2569	198.669	3.18918	30.2803
3.40987	17.2547	211.507	3.22833	27.5195
3.41393	17.1774	219.421	3.30795	29.4576
3.37327	17.1256	198.812	3.32575	25.8207
3.47087	17.1429	195.292	3.31842	30.2478
3.479	17.0586	226.156	3.3731	30.883
3.418	17.15	215.413	3.31273	19.2615
3.418	17.1591	202.535	3.28112	5.87645
3.46273	17.1673	217.611	3.24863	5.3902
3.60913	17.1886	242.574	3.2259	5.07648
3.6864	17.2242	222.778	3.25437	4.76353
3.56847	17.1573	211.812	3.27542	4.46455
3.6498	17.1835	224.65	3.27468	2.99478
3.601	17.2262	228.963	3.24053	0.37557
3.52373	17.1713	205.017	3.34295	0.06142
3.59287	17.0087	202.474	3.42452	2.07553
3.73113	16.9232	225.159	3.54075	5.25593
3.78807	16.8774	217.916	3.588	4.30418
3.81247	16.7553	196.147	3.66202	1.44777
3.8857	16.8084	204.793	3.6318	0.26813
3.9345	16.8429	239.543	3.5741	0.19613
3.723	16.9294	226.278	3.4643	0.13175
3.69453	17.0849	229.106	3.35757	0.11548
3.97528	16.9843	247.782	3.4229	0.11143
3.90603	16.8286	259.928	3.4433	0.11022
4.02408	16.9365	251.689	3.46283	0.05488
4.00775	16.8276	238.871	3.61797	0.02843
4.0933	16.7402	254.272	3.6473	0.0468
4.12587	16.6537	251.383	3.71508	0.34585
4.04027	16.6343	230.469	3.72243	1.89743
4.13802	16.7056	233.805	3.70528	3.35735
4.1299	16.7128	270.284	3.65308	5.89478
4.00775	16.7392	250.264	3.63178	7.79452
3.86533	16.8053	233.398	3.61875	5.45977
3.9955	16.7391	255.269	3.60863	4.76728
4.0403	16.8835	274.638	3.4929	4.54875
3.9182	16.9476	260.905	3.51723	3.61042
3.90193	16.8569	247.457	3.56527	4.29448
4.10955	16.7562	264.872	3.61487	4.4995
4.07693	16.7512	270.732	3.60345	4.23787
4.19918	16.6933	241.13	3.6563	4.86123
4.18283	16.7991	230.652	3.55785	4.28908
4.15845	16.9304	252.624	3.45463	5.34505
4.1584	16.9477	249.349	3.49282	5.99412
4.19508	16.845	226.746	3.54978	19.5822
4.23175	16.8581	231.059	3.53843	29.8104
4.23178	16.9019	259.094	3.48232	20.7214

AVERAGES

3.7927	16.983	232.69	3.4431	12.381

LP /SAGOLA, MI. TEST 2 RUN 4 (3)
DRYER RTO STACK
7/23/96

NOX	O2	CO	CO2	THC
3.24313	16.2991	240.926	3.50117	25.6644
3.2228	16.1781	215.902	3.60158	22.5687
3.27567	16.1801	216.227	3.56597	26.2911
3.35293	16.233	238.525	3.52627	24.8889
3.32853	16.3571	252.218	3.40573	26.5483
3.174	16.4733	242.676	3.30292	23.2121
3.33667	16.5845	239.746	3.20497	25.5853
3.38547	16.6426	305.603	3.13235	27.0756
3.235	16.6598	291.585	3.19347	23.1677
3.0398	16.5844	240.499	3.27287	22.1208
3.04387	16.4888	231.954	3.37145	26.2491
3.15772	16.4253	247.355	3.44575	25.6274
3.1862	16.3428	224.752	3.53025	21.2528
3.1618	16.3409	226.583	3.49047	24.0889
3.23093	16.3948	243.917	3.45065	27.3914
3.21873	16.5355	254.415	3.34125	24.2997
3.10893	16.5345	236.41	3.3398	25.1766
3.1008	16.6538	229.472	3.2098	26.7317
3.05605	16.6934	254.282	3.2228	26.1987
3.05198	16.7138	270.671	3.20893	22.3034
2.98287	16.6241	245.199	3.2421	21.0766
2.97468	16.8013	229.594	3.12173	24.7518
2.9015	16.7464	262.431	3.20885	25.4244
2.94215	16.5866	227.193	3.36982	20.6864
2.95845	16.4101	207.052	3.4963	21.2117
3.1618	16.4917	218.381	3.418	25.3202
3.1984	16.4571	245.036	3.43433	22.4276
3.174	16.457	232.239	3.4474	20.6336
3.2228	16.5732	242.554	3.32663	25.3634
3.25533	16.6436	285.136	3.28757	23.2589
3.32447	16.5232	291.565	3.43597	23.5889
3.27567	16.4998	251.872	3.44738	20.7386
3.21873	16.406	230.062	3.53353	23.9925
3.26753	16.4927	257.629	3.40168	24.5772
3.23093	16.5814	243.835	3.3543	13.7695
3.113	16.4958	224.203	3.47578	16.0254
3.31633	16.3695	229.248	3.58147	21.0583
3.52373	16.3194	245.341	3.60905	19.9532
3.45867	16.2736	231.242	3.65792	15.9477
3.50747	16.2462	227.641	3.63587	15.4353
3.56033	16.3561	250.59	3.54322	17.5098
3.53593	16.508	275.289	3.40085	18.1685
3.601	16.5875	265.218	3.34205	18.1632
3.50747	16.5854	261.678	3.34613	20.5371
3.53593	16.6354	292.826	3.31352	21.4632
3.45053	16.6283	279.399	3.33308	18.7024
3.3082	16.5763	227.58	3.38288	18.3874
3.25127	16.6384	202.311	3.3176	22.4656
3.357	16.5845	227.763	3.3543	23.0957
3.30413	16.6242	213.806	3.32817	18.9038
3.20653	16.7087	213.257	3.24133	21.0014
3.21873	16.727	243.734	3.24535	24.1781
3.20653	16.723	257.345	3.2421	21.2028
3.17807	16.7769	240.743	3.18862	21.7074
3.113	16.8104	231.14	3.19442	22.5443
3.1252	16.7484	254.598	3.27383	18.1209
3.20247	16.6405	241.781	3.347	18.1168
3.12113	16.6578	202.596	3.33472	18.6694
3.14553	16.6628	196.493	3.307	22.7686
3.18213	16.7097	225.973	3.28263	23.9868

AVERAGES

3.23384	16.5369	242.438	3.36871	22.2061

LP SAGOLA, MI. TEST 8 RUN 1
PRESS RTO INLET
7/25/96

DATE	TIME	NOX	O2	CO	CO2	THC
725.96	421.02	1.099	20.916	5.493	0.024	50.049
725.96	422.02	1.058	20.894	4.476	0.033	76.497
725.96	423.02	2.645	20.926	4.679	0.065	274.658
725.96	424.02	4.395	20.958	5.697	0.09	388.997
725.96	425.02	5.005	20.916	6.104	0.024	111.898
725.96	426.02	4.557	20.958	5.697	0.033	83.008
725.96	427.02	5.859	20.958	5.697	0.057	288.086
725.96	428.02	8.016	20.947	6.51	0.09	405.273
725.96	429.02	8.138	20.905	5.29	0.049	110.27
725.96	430.02	6.999	20.937	3.662	0.041	135.498
725.96	431.02	8.179	20.916	4.272	0.081	400.798
725.96	432.02	9.725	20.937	4.883	0.041	290.527
725.96	433.02	8.789	20.958	3.662	0.033	91.553
725.96	434.02	7.528	20.979	2.848	0.049	242.92
725.96	435.02	9.644	20.905	3.459	0.09	424.398
725.96	436.02	10.539	20.958	6.104	0.049	128.581
725.96	437.02	8.219	20.916	5.697	0.008	111.898
725.96	438.02	8.87	20.968	6.714	0.065	362.142
725.96	439.02	10.62	20.905	7.324	0.073	335.693
725.96	440.02	10.213	20.894	6.51	0.033	89.518
725.96	441.02	8.301	20.937	5.9	0.033	193.278
725.96	442.02	10.254	20.926	6.104	0.098	445.964
725.96	443.02	11.353	20.968	7.121	0.065	181.478
725.96	444.02	9.44	20.968	6.714	0.033	102.539
725.96	445.02	9.196	20.916	5.697	0.073	324.707
725.96	446.02	10.742	20.873	6.51	0.081	360.514
725.96	447.02	10.62	20.937	5.29	0.033	98.436
725.96	448.02	8.423	20.937	4.883	0.033	150.553
725.96	449.02	10.091	20.905	5.493	0.081	406.494
725.96	450.02	10.986	20.926	5.697	0.057	234.375
725.96	451.02	9.766	20.947	4.272	0.033	90.739
725.96	452.02	8.911	20.894	4.272	0.057	249.837
725.96	453.02	11.434	20.894	5.086	0.098	426.025
725.96	454.02	11.312	20.926	4.883	0.033	121.663
725.96	455.02	8.789	20.937	3.052	0.041	120.85
725.96	456.02	10.254	20.916	4.272	0.081	363.383
725.96	457.02	11.434	20.937	6.307	0.057	298.258
725.96	458.02	10.132	20.894	5.493	0.033	91.146
725.96	459.02	8.952	20.958	5.29	0.041	220.133
725.96	500.02	11.271	20.884	6.917	0.09	432.536
725.96	501.02	11.393	20.926	6.917	0.041	133.057
725.96	502.02	9.481	20.926	5.493	0.049	107.015
725.96	503.02	9.644	20.916	6.104	0.081	328.369
725.96	504.02	12.004	20.894	7.121	0.081	369.873
725.96	505.02	11.23	20.947	5.697	0.024	94.808
725.96	506.02	8.748	20.947	4.476	0.033	175.781
725.96	507.02	11.149	20.926	5.086	0.098	444.743
725.96	508.02	12.248	20.937	5.086	0.041	215.251
725.96	509.02	10.254	20.926	3.459	0.024	99.691
725.96	510.02	9.44	20.979	3.459	0.057	305.583
725.96	511.02	10.824	20.884	3.662	0.081	384.115
725.96	512.02	11.108	20.937	2.848	0.024	102.946
725.96	513.02	8.952	20.947	3.052	0.024	139.567
725.96	514.02	10.132	20.926	3.866	0.073	403.239
725.96	515.02	11.637	20.926	4.679	0.065	320.231
725.96	516.02	10.213	20.916	3.459	0.016	91.96
725.96	517.02	8.952	20.926	2.645	0.049	255.534
725.96	518.02	10.986	20.937	3.459	0.09	455.729
725.96	519.02	11.393	20.926	3.459	0.024	131.022
725.96	520.02	8.993	20.937	2.645	0.033	131.836

AVERAGES

9.1757	20.929	5.0117	0.0531	233.39

LP SAGOLA MI. TEST 8 RUN 2
PRESS RTO INLET
7/25/96

DATE	TIME	NOX	O2	CO	CO2	THC
725.96	601.02	6.999	20.947	6.307	0.09	479.736
725.96	602.02	7.446	20.968	5.9	0.033	141.602
725.96	603.02	6.388	20.937	4.476	0.016	136.719
725.96	604.02	7.08	20.958	5.697	0.073	415.446
725.96	605.02	8.83	20.947	6.307	0.073	380.859
725.96	606.02	7.935	21.011	3.866	0.033	104.98
725.96	607.02	6.144	20.958	3.662	0.049	240.479
725.96	608.02	7.65	20.979	5.493	0.09	520.833
725.96	609.02	8.26	20.979	5.697	0.057	173.747
725.96	610.02	7.365	20.916	4.679	0.016	125.326
725.96	611.02	7.08	20.958	5.493	0.073	381.256
725.96	612.02	7.812	20.99	6.917	0.073	364.176
725.96	613.02	8.057	20.947	5.697	0.024	101.725
725.96	614.02	6.307	20.916	4.272	0.016	188.395
725.96	615.02	6.989	20.979	5.9	0.081	474.04
725.96	616.02	8.26	20.99	5.697	0.041	215.658
725.96	617.02	7.487	21	4.883	0.024	103.76
725.96	618.02	6.836	20.916	5.086	0.049	323.079
725.96	619.02	8.016	20.905	5.9	0.081	439.86
725.96	620.02	8.87	20.968	5.9	0.024	115.153
725.96	621.02	6.989	20.958	5.086	0.024	157.064
725.96	622.02	6.999	20.958	5.697	0.09	444.336
725.96	623.02	8.423	20.926	6.51	0.057	295.003
725.96	624.02	7.853	20.937	5.493	0.024	98.691
725.96	625.02	6.592	20.947	5.086	0.041	279.541
725.96	626.02	7.324	20.947	5.9	0.081	441.081
725.96	627.02	9.074	20.979	5.29	0.024	122.07
725.96	628.02	7.284	20.979	4.679	0.008	125.732
725.96	629.02	7.324	20.905	5.086	0.057	386.149
725.96	630.02	8.993	20.894	5.493	0.057	349.528
725.96	631.02	8.952	20.968	5.29	0.016	91.553
725.96	632.02	7.243	20.958	4.272	0.041	220.133
725.96	633.02	7.731	20.968	5.493	0.09	476.074
725.96	634.02	9.44	20.926	5.493	0.041	149.333
725.96	635.02	7.975	20.916	4.272	0.024	116.374
725.96	636.02	7.65	20.947	6.307	0.049	365.397
725.96	637.02	8.382	20.947	7.324	0.057	347.087
725.96	638.02	8.708	20.926	7.528	0.024	93.587
725.96	639.02	7.08	21	7.324	0.041	177.408
725.96	640.02	8.138	21	7.528	0.09	445.964
725.96	641.02	9.888	20.905	8.341	0.041	209.554
725.96	642.02	8.26	20.947	6.104	0.033	95.215
725.96	643.02	7.406	20.905	5.493	0.065	305.99
725.96	644.02	9.074	21.011	6.307	0.073	405.273
725.96	645.02	9.582	20.947	5.086	0.024	104.167
725.96	646.02	7.568	20.979	4.272	0.024	148.519
725.96	647.02	8.341	20.947	4.476	0.081	406.494
725.96	648.02	9.074	20.937	5.086	0.057	273.437
725.96	649.02	8.993	20.968	3.052	0.033	91.96
725.96	650.02	7.69	20.926	3.052	0.049	277.1
725.96	651.02	9.359	20.947	3.866	0.098	433.35
725.96	652.02	9.969	20.979	3.866	0.041	119.629
725.96	653.02	8.138	20.947	3.052	0.024	118.001
725.96	654.02	8.83	20.968	3.866	0.081	393.066
725.96	655.02	9.806	20.968	5.086	0.049	332.438
725.96	656.02	9.359	20.979	3.866	0.024	85.449
725.96	657.02	7.853	20.968	3.052	0.041	231.527
725.96	658.02	9.928	20.958	4.476	0.073	446.37
725.96	659.02	10.213	20.968	4.679	0.041	142.415
725.96	700.02	8.708	20.937	3.459	0.024	112.305
		AVERAGES				
		8.1001	20.954	5.2253	0.0488	255.7

LP SAGOLA, MI. TEST 8 RUN 3
PRESS RTO INLET
7/25/96

DATE	TIME	NOX	O2	CO	CO2	THC
725.96	735.22	7.161	20.905	5.086	0.073	431.722
725.96	736.22	7.731	20.979	3.866	0.024	117.594
725.96	737.22	6.429	21.042	2.441	0.024	132.243
725.96	738.22	6.714	21	4.679	0.081	399.17
725.96	739.22	7.202	21.011	5.697	0.057	304.769
725.96	740.22	7.08	20.979	5.086	0.008	87.077
725.96	741.22	5.778	21.074	3.052	0.049	215.658
725.96	742.22	7.243	20.99	3.459	0.09	487.061
725.96	743.22	7.935	21.064	3.866	0.033	141.602
725.96	744.22	6.673	20.979	3.866	0.024	111.898
725.96	745.22	6.755	20.979	5.29	0.057	362.956
725.96	746.22	6.958	20.99	5.697	0.073	358.073
725.96	747.22	7.365	20.99	4.679	0.016	93.18
725.96	748.22	6.144	20.958	4.272	0.008	196.533
725.96	749.22	6.958	21	5.29	0.09	459.391
725.96	750.22	7.65	20.958	7.121	0.041	194.906
725.96	751.22	7.121	21	7.121	0.033	95.622
725.96	752.22	6.877	20.99	8.138	0.073	314.535
725.96	753.22	7.284	20.979	8.341	0.09	418.294
725.96	754.22	7.975	20.979	6.104	0.033	109.863
725.96	755.22	6.307	20.99	4.476	0.024	139.567
725.96	756.22	7.121	21.011	4.883	0.081	421.549
725.96	757.22	8.097	20.979	5.086	0.065	315.755
725.96	758.22	8.097	20.958	3.662	0.024	97.656
725.96	759.22	7.08	21	2.848	0.065	270.589
725.96	800.22	7.487	21	4.069	0.081	453.695
725.96	801.22	8.464	21.053	4.272	0.033	127.767
725.96	802.22	6.673	21	3.866	0.024	125.732
725.96	803.22	6.836	21.021	4.272	0.09	392.66
725.96	804.22	8.097	20.968	4.476	0.065	347.9
725.96	805.22	8.016	21	4.272	0.024	89.925
725.96	806.22	6.877	21.032	4.272	0.041	212.402
725.96	807.22	7.609	20.99	4.476	0.081	493.164
725.96	808.22	8.016	20.99	4.272	0.033	163.574
725.96	809.22	7.039	21.011	2.238	0.024	112.712
725.96	810.22	6.917	21.011	2.645	0.065	354.004
725.96	811.22	7.284	20.979	4.272	0.057	382.894
725.96	812.22	7.935	20.968	3.459	0.016	100.098
725.96	813.22	6.47	20.99	3.459	0.033	171.305
725.96	814.22	7.121	21.042	4.476	0.081	448.812
725.96	815.22	7.609	21.011	4.272	0.057	226.237
725.96	816.22	6.877	20.99	2.848	0.041	98.877
725.96	817.22	6.632	20.979	2.848	0.057	318.604
725.96	818.22	6.714	20.968	3.866	0.081	423.584
725.96	819.22	7.935	21.053	3.052	0.024	109.456
725.96	820.22	6.47	21.011	2.848	0.024	135.498
725.96	821.22	6.877	20.947	3.459	0.073	413.818
725.96	822.22	7.568	20.937	3.866	0.049	301.921
725.96	823.22	8.097	20.979	3.459	0.033	76.904
725.96	824.22	6.144	21	4.476	0.024	93.587
725.96	825.22	6.144	21.011	5.29	0.073	347.493
725.96	826.22	6.348	21.011	5.086	0.081	379.232
725.96	827.22	7.853	20.937	3.662	0.024	98.063
725.96	828.22	5.859	21.042	2.645	0.041	105.794
725.96	829.22	6.144	21	3.052	0.081	370.28
725.96	830.22	7.243	20.968	4.069	0.065	379.639
725.96	831.22	8.341	21	3.662	0.016	97.656
725.96	832.22	6.714	21.042	2.645	0.033	216.878
725.96	833.22	7.406	20.947	4.272	0.106	502.116
725.96	834.22	8.097	20.99	7.121	0.041	186.361
		AVERAGES				
		7.1608	20.994	4.3233	0.0501	252.27

L.P.
SAGOLA, MI
PRESS RTO / STACK
7/25/96
TEST 8 / RUN 1

TIME		NOX PPM		CO PPM
421.11		15.689		9.742
422.11		25.739		32.325
423.11		49.258		19.914
424.11		51.333		6.283
425.11		20.856		19.304
426.11		26.228		27.442
427.11		50.072		8.945
428.11		48.078		11.573
429.11		21.792		28.866
430.11		35.993		19.1
431.11		57.233		5.673
432.11		27.245		22.559
433.11		24.193		28.628
434.11		47.02		11.166
435.11		50.316		11.166
436.11		22.565		28.256
437.11		32.412		20.321
438.11		57.64		6.283
439.11		32.88		22.355
440.11		21.914		28.424
441.11		42.951		12.59
442.11		53.164		10.148
443.11		22.443		28.459
444.11		28.181		20.321
445.11		50.926		5.673
446.11		39.899		21.338
447.11		20.694		26.831
448.11		37.743		15.438
449.11		53.937		9.335
450.11		24.681		30.9
451.11		25.088		21.948
452.11		47.386		7.3
453.11		48.729		20.728
454.11		22.118		29.68
455.11		35.057		15.845
456.11		55.24		7.707
457.11		27.611		32.121
458.11		23.949		24.797
459.11		43.433		7.097
500.11		50.235		18.693
501.11		22.118		29.68
502.11		31.68		16.252
503.11		54.304		5.469
504.11		37.214		31.104
505.11		22.81		26.221
506.11		40.266		8.114
507.11		54.548		15.235
508.11		23.298		32.528
509.11		26.879		17.473
510.11		46.939		5.673
511.11		40.998		30.697
512.11		21.487		29.68
513.11		36.563		9.945
514.11		57.478		13.404
515.11		27.367		35.783
516.11		25.251		17.676
517.11		43.806		6.079
518.11		47.997		28.459
519.11		20.287		31.511
520.11		32.819		9.742

AVERAGE	AVERAGE
36.433	18.883

L.P.
SAGOLA, MI
PRESS RTO / STACK
7/25/96
TEST 8 / RUN 1

TIME		THC PPM
16:21:00		4.15
16:22:00		4.493
16:23:00		6.133
16:24:00		5.645
16:25:00		3.913
16:26:00		3.139
16:27:00		4.788
16:28:00		6.006
16:29:00		2.968
16:30:00		7.307
16:31:00		12.78
16:32:00		4.379
16:33:00		2.739
16:34:00		3.856
16:35:00		5.386
16:36:00		2.686
16:37:00		3.086
16:38:00		5.417
16:39:00		4.933
16:40:00		3.148
16:41:00		3.776
16:42:00		6.648
16:43:00		4.234
16:44:00		4.163
16:45:00		6.828
16:46:00		15.87
16:47:00		12.79
16:48:00		13.32
16:49:00		14.88
16:50:00		4.005
16:51:00		3.038
16:52:00		9.013
16:53:00		15.8
16:54:00		12.98
16:55:00		10.81
16:56:00		10.53
16:57:00		13.4
16:58:00		5.337
16:59:00		3.983
17:00:00		5.68
17:01:00		2.612
17:02:00		2.194
17:03:00		3.75
17:04:00		5.113
17:05:00		1.301
17:06:00		2.211
17:07:00		12.4
17:08:00		12.48
17:09:00		11.53
17:10:00		13.49
17:11:00		5.021
17:12:00		2.379
17:13:00		2.88
17:14:00		5.79
17:15:00		4.462
17:16:00		2.255
17:17:00		3.645
17:18:00		5.948
17:19:00		2.264
17:20:00		2.405

AVERAGE

6.302783333

LP.
SAGOLA, MI
PRESS RTO / STACK
7/25/96
TEST 8 / RUN 2

TIME		NOX PPM		CO PPM
601.11		43.48		43.311
602.11		20.531		18.897
603.11		30.419		6.893
604.11		51.293		31.918
605.11		27.449		38.021
606.11		22.972		10.759
607.11		36.848		14.421
608.11		48.892		42.701
609.11		22.443		19.1
610.11		28.018		6.283
611.11		46.979		28.459
612.11		31.07		38.835
613.11		22.159		12.58
614.11		34.691		12.386
615.11		48.688		43.718
616.11		23.339		22.762
617.11		27.082		6.893
618.11		45.393		24.797
619.11		39.615		39.852
620.11		21.955		14.828
621.11		32.372		10.148
622.11		51.252		41.48
623.11		26.024		27.238
624.11		24.803		7.91
625.11		41.975		21.338
626.11		45.148		41.887
627.11		21.955		17.473
628.11		29.239		7.91
629.11		52.92		38.021
630.11		30.012		30.697
631.11		21.874		8.521
632.11		38.19		18.49
633.11		48.2		42.294
634.11		22.769		19.1
635.11		26.512		9.335
636.11		48.322		35.376
637.11		34.488		35.987
638.11		21.792		8.928
639.11		36.685		16.659
640.11		53.164		42.904
641.11		25.576		20.118
642.11		25.943		5.469
643.11		44.375		32.731
644.11		43.277		36.8
645.11		20.409		10.759
646.11		32.901		14.828
647.11		52.432		43.107
648.11		26.594		20.728
649.11		24.6		7.087
650.11		42.137		29.273
651.11		48.688		38.428
652.11		22.81		11.573
653.11		30.626		11.776
654.11		53.118		43.921
655.11		31.151		20.728
656.11		21.141		6.893
657.11		39.004		26.221
658.11		51.781		38.225
659.11		22.728		14.421
700.11		27.814		9.742

	AVERAGE	AVERAGE
	34.506	23.366

L.P.
SAGOLA, MI
PRESS RTO / STACK
7/25/96
TEST 8 / RUN 2

TIME		THC PPM
18:01:00		4.986
18:02:00		2.071
18:03:00		2.101
18:04:00		6.415
18:05:00		2.941
18:06:00		1.631
18:07:00		4.041
18:08:00		5.742
18:09:00		5.057
18:10:00		11.76
18:11:00		10.2
18:12:00		2.836
18:13:00		0.7782
18:14:00		2.541
18:15:00		4.933
18:16:00		1.759
18:17:00		1.196
18:18:00		3.698
18:19:00		4.308
18:20:00		1.587
18:21:00		3.091
18:22:00		11.51
18:23:00		12.7
18:24:00		11.71
18:25:00		15.11
18:26:00		16.74
18:27:00		11.83
18:28:00		12.76
18:29:00		16.68
18:30:00		12.86
18:31:00		11.75
18:32:00		14.09
18:33:00		15.8
18:34:00		11.91
18:35:00		11.96
18:36:00		14.7
18:37:00		1.521
18:38:00		0.3958
18:39:00		7.575
18:40:00		16.45
18:41:00		11.69
18:42:00		11.24
18:43:00		15.48
18:44:00		13.96
18:45:00		11.04
18:46:00		12.35
18:47:00		5.258
18:48:00		1.662
18:49:00		0.8309
18:50:00		13.52
18:51:00		14.23
18:52:00		7.733
18:53:00		12.31
18:54:00		16.42
18:55:00		13.18
18:56:00		10.78
18:57:00		14.74
18:58:00		6.12
18:59:00		1.051
19:00:00		1.618

AVERAGE

8.448948333

L.P.
SAGOLA, MI
PRESS RTO / STACK
7/25/96
TEST 8 / RUN 3

TIME		NOX PPM		CO PPM
735.51		24.03		14.421
736.51		44.009		41.887
737.51		44.619		18.49
738.51		20.124		7.3
739.51		31.354		32.325
740.51		55.85		30.697
741.51		27.285		9.742
742.51		21.507		12.59
743.51		39.981		39.852
744.51		51.577		18.083
745.51		19.961		7.097
746.51		27.285		28.662
747.51		54.263		34.969
748.51		32.168		9.742
749.51		19.921		12.183
750.51		38.231		39.445
751.51		51.374		18.897
752.51		20.938		6.283
753.51		23.868		24.187
754.51		49.014		35.173
755.51		39.248		11.166
756.51		19.392		9.538
757.51		33.47		38.428
758.51		54.182		18.897
759.51		24.519		8.114
800.51		22.565		20.524
801.51		42.87		37.004
802.51		44.66		12.59
803.51		18.252		8.114
804.51		31.029		35.783
805.51		56.664		20.728
806.51		27.53		7.3
807.51		20.531		16.659
808.51		39.37		33.138
809.51		52.473		12.997
810.51		20.734		8.724
811.51		27.204		33.138
812.51		52.432		23.169
813.51		33.267		7.097
814.51		19.514		14.828
815.51		36.359		33.342
816.51		54.507		14.624
817.51		21.711		6.079
818.51		24.152		29.273
819.51		48.566		23.78
820.51		41.893		6.283
821.51		18.903		12.997
822.51		33.308		31.511
823.51		55.524		15.642
824.51		24.6		6.283
825.51		22.077		26.424
826.51		43.317		27.238
827.51		46.817		6.283
828.51		18.008		11.776
829.51		29.076		31.714
830.51		55.362		15.845
831.51		27.814		5.876
832.51		19.758		22.966
833.51		40.998		28.256
834.51		53.042		7.707

	AVERAGE	AVERAGE
	34.884	19.731

L.P.
SAGOLA, MI
PRESS RTO / STACK
7/25/98
TEST 8 / RUN 3

TIME		THC PPM
19:35:00		3.394
19:36:00		5.065
19:37:00		6.595
19:38:00		5.21
19:39:00		3.733
19:40:00		5.878
19:41:00		7.645
19:42:00		3.469
19:43:00		4.906
19:44:00		6.768
19:45:00		6.586
19:46:00		3.662
19:47:00		5.724
19:48:00		7.927
19:49:00		3.689
19:50:00		3.926
19:51:00		6.379
19:52:00		5.992
19:53:00		3.653
19:54:00		4.709
19:55:00		7.667
19:56:00		3.952
19:57:00		3.579
19:58:00		6.005
19:59:00		7.278
20:00:00		3.566
20:01:00		4.876
20:02:00		7.709
20:03:00		4.322
20:04:00		3.337
20:05:00		6.108
20:06:00		6.551
20:07:00		3.579
20:08:00		3.944
20:09:00		5.734
20:10:00		5.695
20:11:00		3.491
20:12:00		4.951
20:13:00		6.969
20:14:00		3.522
20:15:00		4.186
20:16:00		5.645
20:17:00		6.288
20:18:00		3.478
20:19:00		5.092
20:20:00		6.666
20:21:00		3.949
20:22:00		3.654
20:23:00		5.034
20:24:00		6.081
20:25:00		3.632
20:26:00		3.852
20:27:00		6.793
20:28:00		4.287
20:29:00		3.834
20:30:00		4.696
20:31:00		6.723
20:32:00		4.028
20:33:00		4.05
20:34:00		6.732

AVERAGE

5.10735

APPENDIX F

THC ANALYZER SPECIFICATIONS

Rattisch INSTRUMENTE

TOTAL HYDROCARBON ANALYZER (FLAME IONIZATION
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:

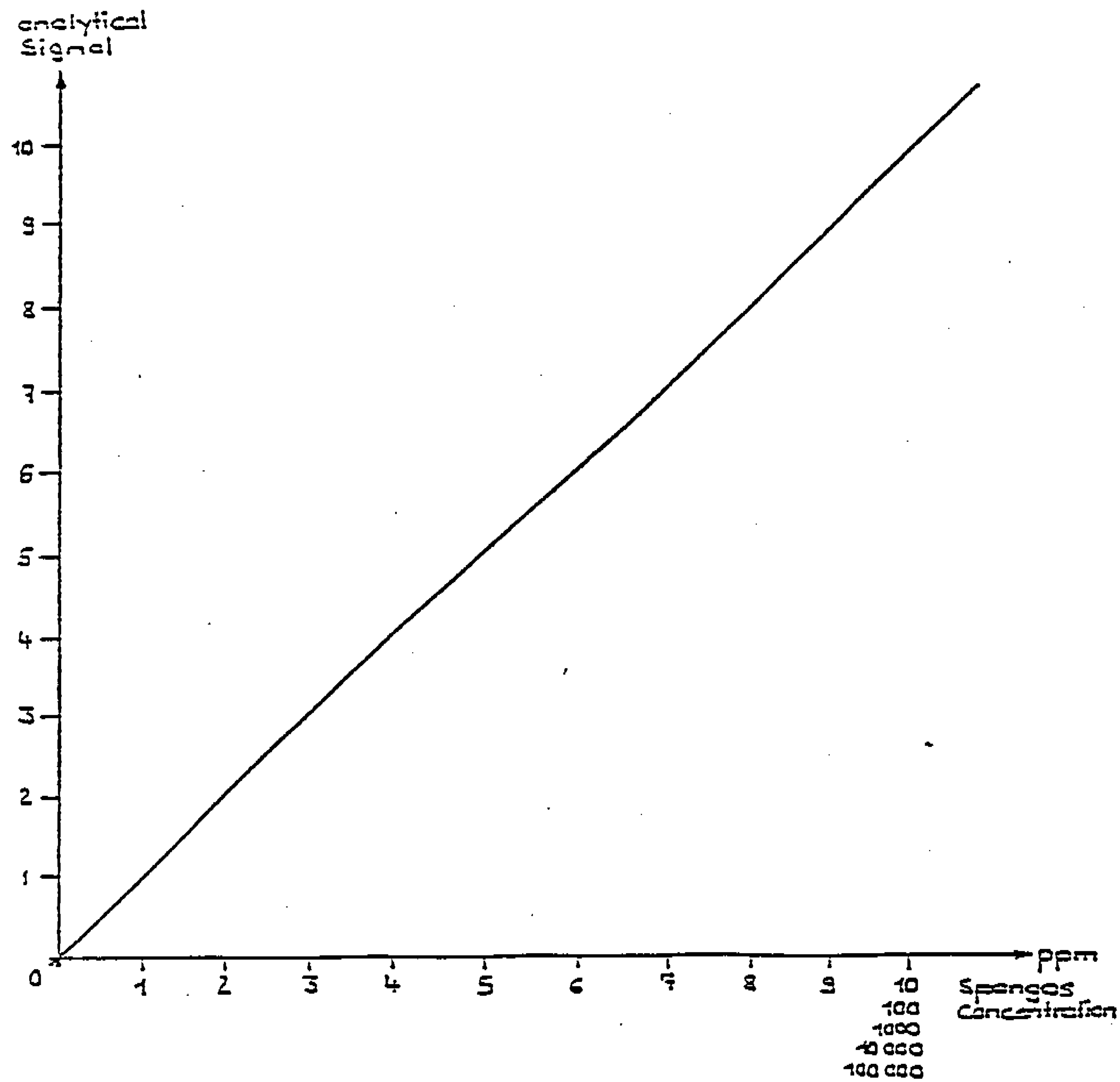
Temperature: ..160.°C

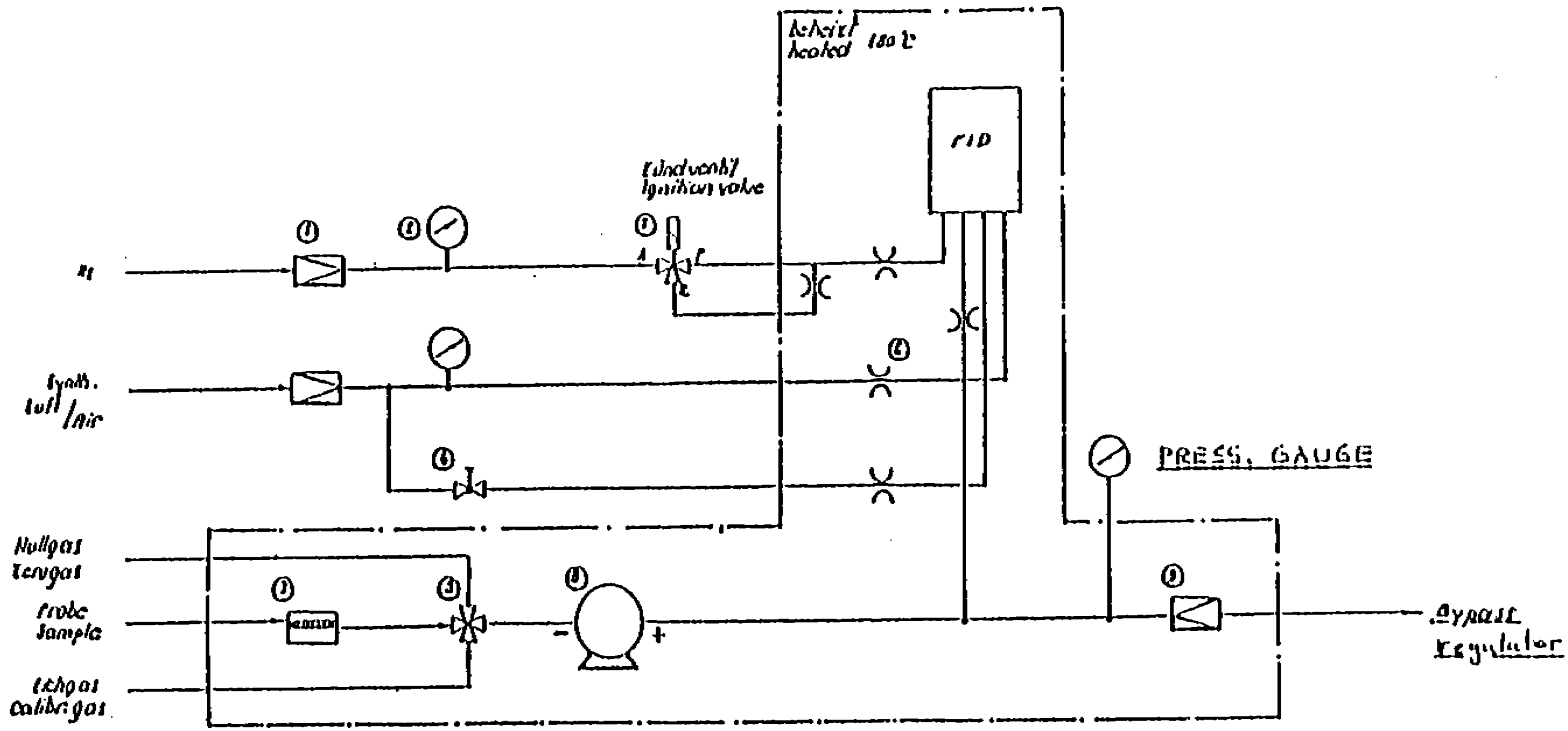
Zero Point : .3,90...
Gain : ....7,70....

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
energized

R-A stromlos
at rest

Handumschaltung
manuel switching

Ratfisch	FLAMMEN IONISATIONS DETEKTOR Flame Ionisation Detector	
	Fließplan Flowdiagram	RS 55 13.06.88

APPENDIX G

MEASUREMENT SYSTEMS PERFORMANCE SPECIFICATIONS

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job L.P. Sagola
Source No. 1,2,3 Cyclone Outlets
Test 2 Run ___ Date 7/23, 24/96
Stack Dimen. 41.5 IN.
Dry Bulb ______ °F Wet bulb ______ °F
Manometer ☐ Reg. ☐Exp ☐Elec.
Barometric Pressure 28.33 IN.HG
Static Pressure 8.6 – 9.0 IN.WC
Operators D. Van Hoever
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
		Port Length:	9 IN.	Time Start:	HRS
A 1	1/6	6.92	15.92		
2	3/6	20.75	29.75		
3	5/6	34.58	43.58		
Temp. Meas. Device & S/N:				Time End:	HRS

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

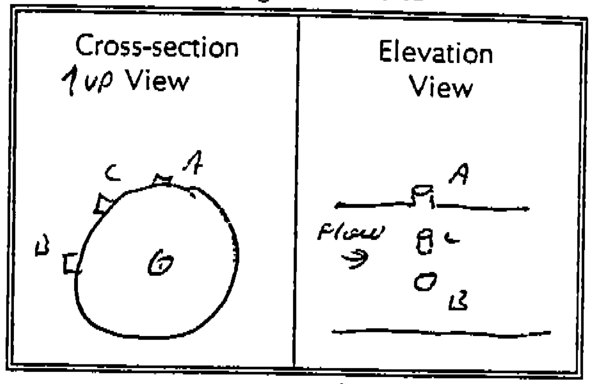
032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: L.P. / Sagola, MI
Source: E-Tube / Outlet
Test: 2 Run: 0 Date: 7-23-96
Stack Dimen.: 81.5 IN.
Dry Bulb: 155 °F Wet bulb: 143 °F
Manometer: ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.35 IN.HG
Static Pressure: -1.93 IN.WC
Operators: Mikuehlbert D Hilleman
Pitot No.: ENST C_p NA

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: 6.0 IN.		Time Start: NA HRS	
C-1	.4 m	15.60	21.60		
2	1.2 m	46.80	52.00		155
3	2 m	78.00	84.00		

Temp. Meas. Device & S/N: PDT-45 / TC Time End: NA 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/SAGOLE
Source: DRYER RTO STACK
Test: 2 Run: 0 Date: 7-23-96
Stack Dimen.: 96.5 IN.
Dry Bulb: ______ °F Wet bulb: ______ °F
Manometer: ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: ______ IN.HG
Static Pressure: ______ IN.WC
Operators: J.D.\M.P.
Pitot No.: ______ C_p: ~~[illegible]~~

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
		Port Length: 5.5 IN.		Time Start: HRS	
1	.16	15.44	19.94		
2	.50	48.25	53.75		
3	.83	80.01	85.51		
Temp. Meas. Device & S/N:				Time End: HRS	

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

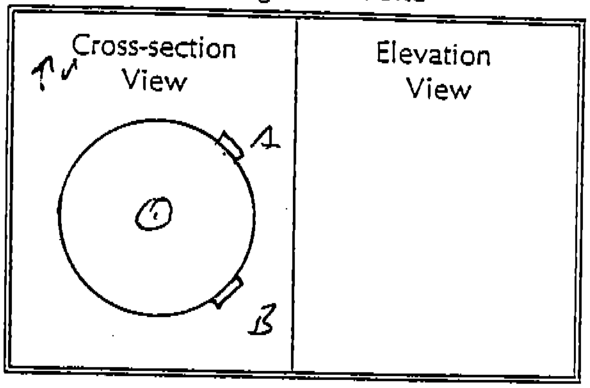
032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: L.P. / Saginaw, MI
Source: Press RTO / Stack
Test: 8 Run: 0 Date: 7-25-96
Stack Dimen.: 76 IN.
Dry Bulb: 255 °F Wet bulb: 108 °F
Manometer: ☒Reg. ☐Exp ☐Elec.
Barometric Pressure: 29.45 IN.HG
Static Pressure: -.27 IN.WC
Operators: M. Kuehler + D. Holleman
Pitot No.: INST C_p: NA

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
		Port Length: IN.		Time Start: NA HRS	
1	1/6	12.67	16.67		
2	3/6	38.00	42.00		
3	5/6	63.33	67.33		
Temp. Meas. Device & S/N: PDT-31 / T2				Time End: NA HRS	

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Calibration Error Check

Job: L.P. / Saegula, NI
Test: 2 Run: 0 Date: 7-22-96
Operator: M. Kuehler

~~SO~~ NOx Calibration: Time (HRS) ______

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	Ø				
Mid Level					
Low Level ~~High Level~~ NOx	91.9	93.2	1.3	250	.52

NO_x Calibration: Time (HRS) 1740

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	Ø	0	0	250	0
Mid Level	139.7	143.1	3.4	250	1.36
High Level	239	240	1	250	.40

O_2 Calibration: Time (HRS) 0730

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	Ø	0.0	0	25%	0
Mid Level	13.5	13.6	0.1	25%	.4
High Level	20.8	20.8	0	25%	0

CO_2 Calibration Time (HRS) 0730

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	Ø	0.0	0	20%	0
Mid Level	10.8	10.9	0.1	20%	.5
High Level	16.6	16.6	0	20%	0

CO Calibration Time (HRS) 0730

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	Ø	1	1	1000	.1
Mid Level	289 ~~300~~ MK	299	10	1000	1
High Level	620	620	0	1000	0

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INTERPOLL LABORATORIES, INC
(612) 786-6020

_______ System Bias Check

Job L.P. / Sasola, MN Source 'E' Tube
Test 2 Run 0 Date 7-22-96 Site Outlet
Operator M. Kuehler

Instrument	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
			Cal. Err.	Sys. Bias			
NO_x	Zero Gas	0	0	0	0	100	0
	Upscale	91.9	93.2	92.1	1.1	100	1.1
O_2	Zero Gas	0	0.2	0.2	0	25%	0
	Upscale	13.5	13.5	13.5	0	25%	0
CO_2	Zero Gas	0	0.2	0.2	0	20%	0
	Upscale	10.8	10.8	10.8	0	20%	0
CO	Zero Gas	0	0	0	0	1000	0
	Upscale	620	609	612	3	1000	.3
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	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

EPA Method 25 A
Calibration Error Check & Drift Determination

Datalogger Channel 1 (A.)

Job: L.P Sagola No. 1 Cyclone Outlet

Test: 0 Run: 0 Date: 7/22/96

Operator: Dut

THC Calibration (Low Range): Time (HRS)______

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	0	0	0	100	0
Low Level	30.6	31.24	.64	100	.64
Mid Level	287	287	0	1000	0
High Level	2972	2952	20	10,000	.2

THC Calibration (High Range): Time (HRS)______

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	0				
Span					

O_2 Calibration: Time (HRS)______

***	Cylinder Value (%)	Analyzer Response (%)	Difference (%)	Span Value (%)	Percent of Span
Zero Gas	0				
Mid Level					
High Level					

CO_2 Calibration: Time: (HRS)______

***	Cylinder Value (%)	Analyzer Response (%)	Difference (%)	Span Value (%)	Percent of Span
Zero Gas	0				
Mid Level					
High Level					

Must be within 2% of the span for each calibration gas.

052394-G:\STACK\WP\FORMS\S-420-14

INTERPOLL LABORATORIES, INC
(612) 786-6020

________ System Bias Check

Job L.P. Sagola — Source No. 1 Cyclone Outlet
Test 2 Run 0 Date 7/22/96 — Site -"-
Operator D. Van Hoever

Instrument	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
			Cal. Err.	Sys. Bias			
Ratfisch #3	Zero Gas	0	0	1	1	100	1
	Upscale	287	287	284	3	1000	.3
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	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

EPA Method 25 A

Calibration Error Check & Drift Determination

Job L. P. Saqola No 1 Cyclone Outlet (A2) MK

Test 2 Run 0 Date 7/22/96

Operator E. D. Van Hoever

THC Calibration (Low Range): Time (HRS)

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	0	0	0	100	0
Low Level	30.6	29.5	1.1	100	1.1
Mid Level	287	287	0	1000	0
High Level	2972	2973	1	1000	.01

THC Calibration (High Range): Time (HRS)

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	0				
Span					

O_2 Calibration: Time (HRS)

***	Cylinder Value (%)	Analyzer Response (%)	Difference (%)	Span Value (%)	Percent of Span
Zero Gas	0				
Mid Level					
High Level					

CO_2 Calibration: Time: (HRS)

***	Cylinder Value (%)	Analyzer Response (%)	Difference (%)	Span Value (%)	Percent of Span
Zero Gas	0				
Mid Level					
High Level					

Must be within 2% of the span for each calibration gas.

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INTERPOLL LABORATORIES, INC
(612) 786-6020
______ System Bias Check

Job L.P. Sagola Source No. 2 Cyclone
Test 2 Run 1 Date 7/23,24/96 Site Outlet
Operator D. Van Hoever

Instrument	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Cal. Err.	Analyzer Resp (PPM) Sys. Bias	Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
Rattisch No. 2	Zero Gas	0	0	1	1	100	1
	Upscale	287	287	284	3	1000	.3
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	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
________ System Bias Check

Job L.P. Sagola Source No 3 Cyclone
Test 2 Run 1 Date________ Site Outlet
Operator D. Van Hoever

Instrument	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
			Cal. Err.	Sys. Bias			
	Zero Gas	0	0	.5	.5	100	.5
	Upscale	287	286	290	4	1000	.4
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	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

EPA Method 25 A
Calibration Error Check & Drift Determination

Job L.P. Sagola No 3 Cyclone Outlet A3

Test 2 Run 0 Date 07/22/96

Operator D. Van Hoever

THC Calibration (Low Range): Time (HRS)

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	0	0	0	100	0
Low Level	30.6	30.7	.1	100	.1
Mid Level	287	286	1	1000	.1
High Level	2972	3083	111	1000	1.11

THC Calibration (High Range): Time (HRS)

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	0				
Span					

O_2 Calibration: Time (HRS)

***	Cylinder Value (%)	Analyzer Response (%)	Difference (%)	Span Value (%)	Percent of Span
Zero Gas	0				
Mid Level					
High Level					

CO_2 Calibration: Time: (HRS)

***	Cylinder Value (%)	Analyzer Response (%)	Difference (%)	Span Value (%)	Percent of Span
Zero Gas	0				
Mid Level					
High Level					

Must be within 2% of the span for each calibration gas.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Calibration Error Check

Job: L.P. / SAGOLA
Test: 2 Run: 0 Date: 7-23-96
Operator: J. BAINVILLE

~~SO_2~~ THC Calibration: Time (HRS)________

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	Ø	0	0	11,000	0
~~Low Level~~	30	30	0	100	0
Mid Level	285	282	3	1,000	0.3%
High Level	2960	2960	0	10,000	0

NO_x Calibration: Time (HRS)________

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	Ø	0	0	250	0
Mid Level	90.6	90.6	0	250	0
High Level	143	148	5	250	2%

O_2 Calibration: Time (HRS)________

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value ~~(PPM)~~ %	Percent of Span
Zero Gas	Ø	0	0	25	0
Mid Level	13.5	13.5	0	25	0
High Level	21	21	0	25	0

CO_2 Calibration Time (HRS)________

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value ~~(PPM)~~ %	Percent of Span
Zero Gas	Ø	0	0	20	0
Mid Level	10.8	10.8	0	20	0
High Level	16.8	17.2	.4	20	2%

CO Calibration Time (HRS)________

***	Cylinder Value (PPM)	Analyzer Response (PPM)	Difference (PPM)	Span Value (PPM)	Percent of Span
Zero Gas	Ø	0	0	1000	0
Mid Level	147	147	0	1000	0
High Level		292	10	1000	1.0%

INTERPOLL LABORATORIES, INC
(612) 786-6020

________ System Bias Check

Job LP / SAGOLA Source ONYEA RIO
Test 2 Run 0 Date 7-23-96 Site STACK
Operator S. BAI-VILLE

Instrument	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
			Cal. Err.	Sys. Bias			
THC	Zero Gas	0	0	0	0	100	0
	Upscale	30	30	30	0	100	0
CO	Zero Gas	0	0	1	1	500	0
	Upscale	147	147	148	1	500	.2%
NOX	Zero Gas	0	0	1	1	100	1%
	Upscale	90.6	90.6	90.6	0	100	0
O2	Zero Gas	0	0	-.1	.1	25%	.4%
	Upscale	13.5	13.5	13.5	0	25%	0.
CO2	Zero Gas	0	0	0	0	20%	0
	Upscale	10.8	10.8	10.6	.2	20%	1%
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						
	Zero Gas	0					
	Upscale						

Must be within [illegible] of the span for the zero or upscale cal. gas.
3%

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INTERPOLL LABORATORIES, INC.
(6120 786-6020

EPA Method 6C/7E Response Time

Job LP / SAGULA Technician J. BARNVELLE
Source DRYER RTO STACK System Flow Rate 1l / min
Date of Test 7-23-96

Moisture removal: Via Model MK-1 Condenser

	Response Time (secs)		
Analyzer Type	SO_2/NO_x	O_2	CO_2
Analyzer S/N			
Analyzer Range			
High Level Span Gas Conc. (PPM or %)			
Upscale 1			
Upscale 2			
Upscale 3			
Average			
Downscale 1			
Downscale 2			
Downscale 3			
Average			

System response time 60 seconds

1. Introduce gases at the 3-way valve on the probe. Use zero and stack gas for the upscale tests and high-level span gas and stack gas for the downscale tests. Alternatively, use zero and high-level gases for a more stringent test. Record the time in seconds from the moment of introduction until a stable response is achieved.
2. The response time test need only be conducted prior to the initial field use of the measurement system.
3. Attach a copy of the flow system schematic to this test.

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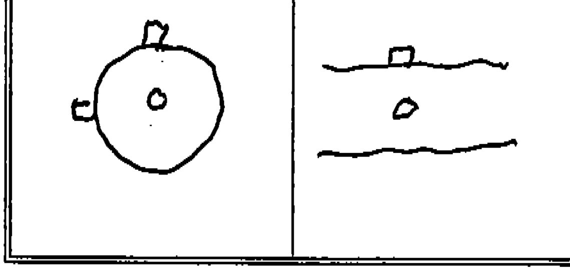
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job LP SAGOLA
Source PRESS RJO INLET
Test 6 Run 0 Date 9-25-96
Stack Dimen. 57.25 IN.
Dry Bulb ______ °F Wet bulb ______ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure ______ IN.HG
Static Pressure ______ IN.WC
Operators JB / MP
Pitot No. ______ C_p ______
A = 260 B = 119

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: 3.75 IN.		Time Start:	HRS
1	.16	9.16	12.91		
2	.50	28.62	32.37		
3	.83	47.52	51.27		
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

THC Cal Drift Check

Job: L.P Sagola
Test: 2 Run: 1-6 Date: 7/23,24/96
Operator: D. Van Hoever
Source: No. 1 Cyclone
Site: Outlet
Channel 3 MC

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}
1		Zero Gas	0	1	-10			
		Upscale	287	284	110			
2 2/2	665.39	Zero Gas	0	1	8.6	4.8		645.52
		Upscale	287	287	310		298.5	
3 2/3	580.81	Zero Gas	0	0	2.4	1.2		598.81
		Upscale	287	288	270		279	
4 2/4	547.44	Zero Gas	0	2.4	7.65	5.025		559.02
		Upscale	287	287	280		283.5	
5		Zero Gas	0	0	10			
		Upscale	287	287	297			
6		Zero Gas	0	1.8	10.8			
		Upscale	287	287	283			
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's Cal Drift Check

Job: L.P. Sagola Source: No. 2 Cyclone

Test: 2 Run: 1-6 Date: 7/23,24/96 Site: Outlet

Operator: D. Van Hoever ~~Channel 2~~ Channel 2

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}
1		Zero Gas	0	1	10.3			
		Upscale	287	284	260			
2	705.39	Zero Gas	0	1	5.5	3.25		
2/2	~~665.39~~ ML	Upscale	287	283	282		282.5	721.63
3		Zero Gas	0	1	4	2.5		
2/3	694.91	Upscale	287	284	282		283	708.46
4		Zero Gas	0	1	4	2.5		613.31
2/4	586.96	Upscale	287	282	270		276	
5		Zero Gas	0	2	1.8			
		Upscale	287	287	290			
6		Zero Gas	0	0	1			
		Upscale	287	290	286			
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's Cal Drift Check

Job L.P. Sagola   Source NO 3 Cyclone Outlet
Test 2 Run 1 - 6 Date 7/23,24/96   Site
Operator D. Van Hoever   Channel 1

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Final	C_o	C_m	C_{gas}
1		Zero Gas	0	1	10			
		Upscale	287	287	300			
2	1124.87	Zero Gas	0	2	1	1.5		
2/2	~~1125~~	Upscale	287	287	269		278	1166.03
3		Zero Gas	0	0	10	5		
2/3	844.41	Upscale	287	287	280		283.5	865.03
4		Zero Gas	0	0	0	0		
2/4	1143.93	Upscale	287	283	284		283.5	1158.05
5		Zero Gas	0	0	0			
		Upscale	287	284	299			
6		Zero Gas	0	0	6.3			
		Upscale	287	286	283			
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.

Jim Jordan
Phoenix Test

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INTERPOLL LABORATORIES, INC
(612) 786-6020

THC Cal Drift Check

Job LP SAGOLA
Source DRYER RTO
Test 2 Run Date 7-23-96
Site STACK
Operator S.B. / M.P.

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Final	C_o	C_m	C_{gas}
1		Zero Gas	0	0	0	0		
		Upscale	30	30	28		29	
2 Good	27.37	Zero Gas	0	0	0	0		28.81
		Upscale	30	30	27		28.5	
3 Good	12.36	Zero Gas	0	0	1	.5		12.27
		Upscale	30	30	29			
4 Good	22.21	Zero Gas	0	0	2	1		23.14
		Upscale	30	30	27		28.5	
5		Zero Gas	0	0	0	0		
		Upscale	30	30	27		28.5	
6		Zero Gas	0	0	0	0		
		Upscale	30	30	31		30.5	
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.

BAD 30 min Run 1 DVH

BAD 30 min IN Run 3 JB

BAD 10 min IN Run 5

Run with 3 Run 2 for flows

* 2 file names .XLS .XLA

Run 6 2 file names LPSAT2R6.XLS 1st ½ hour
.XLA 2nd ¾ hour

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INTERPOLL LABORATORIES, INC
(612) 786-6020

THC Cal Drift Check

Job LP SAGOLA Source PRESS RTO
Test 8 Run ______ Date 7-25-96 Site INLET
Operator S-BALVINE / M. PATTERSON

1620
720
1800
900
935
035
2100
145

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Final	C_o	C_m	C_{gas}
1	233.39	Zero Gas	0	0	0	0		235.04
		Upscale	285	285	281		283	
2	255.70	Zero Gas	0	0	1	.5		254.75
		Upscale	285	285	287		286	
3	252.27	Zero Gas	0	0	0	0		248.35
		Upscale	285	287	292		289.5	
4		Zero Gas	0	0				
		Upscale	285	285				
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.

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INTERPOLL LABORATORIES, INC

(612) 786-6020

THC Cal Drift Check

Job: L.P. / Sagola, MI
Source: Press RTO

Test: 8 Run: 1, 2, 3 Date: 2-25-96
Site: Stack

Operator: M. Kaehler

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}
1 8/1	6.30	Zero Gas	0	0.4	0.0	0.2		6.30
		Upscale	30.4	29.7	29.6		29.65	
2 8/2	8.45 ~~6.30~~ MK	Zero Gas	0	0.0	0.0	0.0		8.81
		Upscale	30.4	~~28.~~ 29.5	28.8		29.15	
3 8/3	5.11	Zero Gas	0	0.0	1.5	0.75		4.59
		Upscale	30.4	30.0	29.2		29.6	
4		Zero Gas	0					
		Upscale						
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.

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INTERPOLL LABORATORIES, INC
(612) 786-6020

NOx Cal Drift Check

Job: L.P. / Saginaw, MI Source: 'E' Tube
Test: 2 Run: 1, 2, 3 Date: 2-23-96 Site: Outlet
Operator: M. Koehler

Time	Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}
1230	1	2.18	Zero Gas	0	0.2	0.9	0.55		
1330	2/1		Upscale	91.9	92.5	91.7		92.1	
1435	2	4.26	Zero Gas	0	0.9	1.3	1.1		3.18
1535	2/2		Upscale	91.9	91.7	92.9		92.3	
1645	3	3.66	Zero Gas	0	1.3	1.3	1.3		2.37
1745	2/3		Upscale	91.9	92.9	92.5		92.7	
1925	4	2.53	Zero Gas	0	1.3	.4	0.85		1.69
2025	2/4		Upscale	91.9	92.5	92.0		92.25	
2115	5	2.53	Zero Gas	0	.4	.5	0.45		2.08
2215	2/5		Upscale	91.9	92.0	92.4		92.2	
(2-24-96) 130 →	6	8.13	Zero Gas	0	0.0	1.2	0.6		7.60
230	2/6		Upscale	91.9	91.8	91.7		91.75	
	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 Cal Drift Check

Job: LP / SAGOLA
Source: DRYER RTO
Test: 2 Run: Date: 7-23-96
Site: STACK
Operator: SB / MP

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}
1		Zero Gas	0	0	1	.5		
		Upscale	90.6	90.6	90.6		90.6	
2	3.46	Zero Gas	0	1	0	1		2.49
		Upscale	90.6	90.6	90.6		90.6	
3	3.79	Zero Gas	0	1	1	1		2.82
		Upscale	90.6	90.6	90.6		90.6	
4	3.23	Zero Gas	0	1	-1	0		3.23
		Upscale	90.6	90.6	90.6		90.6	
5		Zero Gas	0	-1	-2	-1		
		Upscale	90.6	90.6	90.6		90.6	
6		Zero Gas	0	0	0	0		
		Upscale	90.6	90.6	89.6		90.1	
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.

091595-G:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC
(612) 786-6020

NOx Cal Drift Check

Job CP / SAGOLA Source PRESS RTO
Test 8 Run ______ Date 2-25-96 Site Inlet
Operator SB / MP

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}
1	9.10	Zero Gas	0	0	2	1		8.16
		Upscale	90.6	90.6	93		91.8	
2	8.10	Zero Gas	0	0	1	.5		7.64
		Upscale	90.6	90.6	90.6		90.6	
3	7.16	Zero Gas	0	1	1	1		6.16
		Upscale	90.6	90.6	92.6		91.6	
4		Zero Gas	0	1				
		Upscale	90.6	90.6				
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.

091595-G:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC
(612) 786-6020

NOx Cal Drift Check

Job: H.P. / Sagola, MI — Source: Press RTO
Test: 8 Run: 1,2,3 Date: 2-25-96 — Site: stack
Operator: Mikus Uler

	Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Final	C_o	C_m	C_{gas}
1600	1	36.43	Zero Gas	0	0.2	0.2	0.2		36.31
1700	8/1		Upscale	91.9	91.4	92.4		91.9	
1800	2	34.51	Zero Gas	0	0.2	-0.1	0.05		34.27
1900	8/2		Upscale	91.9	92.4	92.5		92.45	
1935	3	34.88	Zero Gas	0	-0.1	-0.6	-0.35		34.91
2035	8/3		Upscale	91.9	92.5	92.3		92.4	
	4		Zero Gas	0					
			Upscale						
	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.

091595-G:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO Cal Drift Check

Job: L.P. / Sagola, MI   Source: 'E' T-be
Test: 2 Run: ∅, 2, 3 Date: 7-23-96   Site: Outlet
Operator: M. Kaehler

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Final	C_o	C_m	C_{gas}
1 2/1	1697	Zero Gas	0	2	-3	-0.5		
		Upscale	620	~~XX~~ 615	603		609	
2 2/2	1805	Zero Gas	0	-1	3	1		1817
		Upscale	620	616	617		616.5	
3 2/3	1824	Zero Gas	0	3	1	2		1841
		Upscale	620	617	614		615.5	
4 2/4	1829	Zero Gas	0	1	0	0.5		1851
		Upscale	620	614	612		613	
5 2/5	1739 ~~1730~~	Zero Gas	0	0	0	0		
		Upscale	620	612	610		611	
6 2/6	1750	Zero Gas	0	1	2	1.5		
		Upscale	620	610	616		613	
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.

091595-G:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO Cal Drift Check

Job: LP SAGOLA
Source: DRYER RTO
Test: 2 Run: ____ Date: 7-23-96
Site: STACK
Operator: J.D. / MP

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}
1		Zero Gas	0	0	2	1		
		Upscale	147	147	147		147	
2	210.73	Zero Gas	0	2	0	1		212
		Upscale	147	147	146		146.5	
3	232.69	Zero Gas	0	0	0	0		234
		Upscale	147	146	146		146	
4	242.44	Zero Gas	0	0	0	0		241
		Upscale	147	146	150		148	
5		Zero Gas	0	0	3	1.5		
		Upscale	149	150	150		150	
6		Zero Gas	0	0	2	1		
		Upscale	147	147	146		146.5	
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						

DATA LOG ON 1st 14 MIN OF RUN WAS ON RANGE SEE STRIPCHART

Must be within 3% of the span for the zero or upscale cal. gas.

091595-G:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC

(612) 786-6020

CO Cal Drift Check

Job: LP/SAGOLA
Test: 8 Run: ______ Date: 7-25-96
Operator: S.D. / M.P.

Source: PACKS RTO
Site: INLET

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}
1	5.01	Zero Gas	0	0	0	0		5.04
		Upscale	147	147	145		146	
2	5.23	Zero Gas	0	0	0	0		5.32
		Upscale	147	145	144		144.5	
3	4.37	Zero Gas	0	0	0	0		4.39
		Upscale	147	144	145		144.5	
4		Zero Gas	0	0				
		Upscale	147	145				
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.

091595-G:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO Cal Drift Check

Job: L.P. / Sagola, MI
Test: C Run: 1, 2, 3 Date: 9-25-96
Operator: M. Koehler
Source: Proc. RTO
Site: Stack

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}
1 0/1	18.88	Zero Gas	0	0.0	0.0	0.0		19.21
		Upscale	143.3	141.5	140.2		140.85	
2 0/2	23.37	Zero Gas	0	0.0	-0.6	-0.3		24.18
		Upscale	143.3	140.2	139.8		140.0	
3 0/3	19.73	Zero Gas	0	-0.6	-0.6 ~~-0.6~~ MK	-0.6		20.76
		Upscale	143.3	139.8	139.6		139.7	
4		Zero Gas	0					
		Upscale						
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.

091595-G:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC

(612) 786-6020

O_2 Cal Drift Check

Job: I.P. / Sagola, MI Source: 'E' Tube

Test: 2 Run: 1, 2, 3 Date: 2-23-96 Site: Outlet

Operator: M. Koehler

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Final	C_o	C_m	C_{gas}
1 2/1	17.49	Zero Gas	0	0.0	0.0	0.0		
		Upscale	13.5	13.5	13.6		13.55	
2 2/2	17.38	Zero Gas	0	0.0	0.0	0.0		17.44
		Upscale	13.5	13.5	13.4		13.45	
3 2/3	17.29	Zero Gas	0	0.0	0.0	0.0		17.42
		Upscale	13.5	13.4	13.4		13.4	
4 2/4	17.34	Zero Gas	0	0.0	0.0	0.0		17.47
		Upscale	13.5	13.4	13.4		13.4	
5 2/5	17.62	Zero Gas	0	0.0	0.0	0.0		
		Upscale	13.5	13.4	13.4		13.4	
6 2/6	17.48	Zero Gas	0	0.0	0.0	0.0		
		Upscale	13.5	13.5	13.4		13.45	
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.

091595-C:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC

(612) 786-6020

O2 Cal Drift Check

Job: LP SAGOLA
Source: LP SAGOLA DEYHERTO
Test: 2 Run: ____ Date: 7-23-96
Site: STACK
Operator: S.D. / MP

Run	$\bar{C}$		Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Final	C_o	C_m	C_{gas}
1		Zero Gas	0	0	-.1	-.05		
		Upscale	13.5	13.5	13.5		13.5	
2	16.95	Zero Gas	0	0	0	0		16.95
		Upscale	13.5	13.5	13.5		13.5	
3	16.98	Zero Gas	0	0	0	0		16.92
		Upscale	13.5	13.5	13.6		13.55	
4	16.54	Zero Gas	0	0	0	0		16.54
		Upscale	13.5	13.5	13.5		13.5	
5		Zero Gas	0	0	0	0		
		Upscale	13.5	13.5	13.4		13.45	
6		Zero Gas	0	0	0	0		
		Upscale	13.5	13.5	13.6		13.55	
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.

091595-G:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC
(612) 786-6020

O2 Cal Drift Check

Job: LP/SABICO
Source: PRESS KTO
Test: 8 Run: ______ Date: 7-25-96
Site: INLET
Operator: S.B. / M.P.

Run	$\bar{C}$	•••	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Final	C_o	C_m	C_{gas}
1	20.9	Zero Gas	0	0	0	0		20.9
		Upscale	13.5	13.5	13.5		13.5	
2	20.9	Zero Gas	0	0	0	0		20.9
		Upscale	13.5	13.5	13.5		13.5	
3	20.9	Zero Gas	0	0	.1	.05		20.9
		Upscale	13.5	13.5	13.5		13.6	
4		Zero Gas	0	.1				
		Upscale	13.5	13.5				
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.

091595-G:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO_2 Cal Drift Check

Job L.P. / Sazola, MI Source "E" Tube
Test 2 Run 0 Date 2-23-96 Site Outlet
Operator M. Koehler

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Final	C_o	C_m	C_{gas}
1 2/1	2.95	Zero Gas	0	0.1	0.0	0.05	▒▒▒	
		Upscale	10.8	10.8	10.8	▒▒▒	10.8	
2 2/2	3.17	Zero Gas	0	0.0	0.2	0.1	▒▒▒	3.08
		Upscale	10.8	10.8	10.9	▒▒▒	10.85	
3 2/3	3.12	Zero Gas	0	0.2	0.2	0.2	▒▒▒	2.95
		Upscale	10.8	10.9	10.9	▒▒▒	10.9	
4 2/4	3.05	Zero Gas	0	0.2	0.2	0.2	▒▒▒	2.89
		Upscale	10.8	10.9	10.8	▒▒▒	10.85	
5 2/5	2.89	Zero Gas	0	0.2	0.1	0.15	▒▒▒	
		Upscale	10.8	10.8	10.8	▒▒▒	10.8	
6 2/6	3.14	Zero Gas	0	0.0	0.2	0.1	▒▒▒	
		Upscale	10.8	10.9	10.8	▒▒▒	10.85	
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.

091595-G:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC
(612) 786-6020

CO Cal Drift Check

Job LP/SAGOLA
Test 2 Run ______ Date 7-23-96
Operator S.O. / M.P.

Source DRYER RTO
Site STACK

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Analyzer Resp (PPM) Final	C_o	C_m	C_{gas}
1		Zero Gas	0	0	0	0		
		Upscale	10.8	10.8	10.8		10.8	
2	3.44	Zero Gas	0	0	0	0		3.44
		Upscale	10.8	10.8	10.8		10.8	
3	3.44	Zero Gas	0	0	0	0		3.46
		Upscale	10.8	10.8	10.7		10.75	
4	3.37	Zero Gas	0	0	0	0		3.39
		Upscale	10.8	10.8	10.7		10.75	
5		Zero Gas	0	0	0	0		
		Upscale	10.8	10.8	10.7		10.75	
6		Zero Gas	0	0	0	0		
		Upscale	10.8	10.8	10.8		10.8	
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.

091595-G:\STACK\WP\FORMS\S-559a

INTERPOLL LABORATORIES, INC
(612) 786-6020
CO_2 Cal Drift Check

Job: LP Sagolo Source: Press RTO
Test: 8 Run: ____ Date: 7-25-96 Site: Inlet
Operator: SD. / MP.

Run	$\bar{C}$	***	Cylinder Value (PPM)	Analyzer Resp (PPM) Initial	Final	C_o	C_m	C_{gas}
1	0	Zero Gas	0	0	0	0		0
		Upscale	10.8	10.8	10.8		10.8	
2	0	Zero Gas	0	0	0	0		0
		Upscale	10.8	10.8	10.8		10.8	
3	0	Zero Gas	0	0	0	0		0
		Upscale	10.8	10.6	10.6		10.8	
4		Zero Gas	0	0				
		Upscale	10.8	10.8				
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.

091595-G:\STACK\WP\FORMS\S-559a

APPENDIX H

CALIBRATION GAS CERTIFICATION SHEETS

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919)544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-40607 CYLINDER #:CC46348 CYL. PRESSURE:2000PSIG
EXPIRATION DATE: 6/2/98 LAST ANALYSIS DATE:6/2/95
CUSTOMER: TWIN CITY OXYGEN P.O.# 17405

METHOD: ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS-SEPTEMBER 1993:G-1.
THIS STANDARD SHOULD NOT BE USED WHEN ITS GAS PRESSURE IS BELOW 1.0 MEGAPASCALS (150 PSIG).

STANDARD:			INSTRUMENT:BECKMAN NDIR	BECKMAN PARAMAGNETIC
SRM #:	1675B	2659A	MODEL #:880	755
CYL #:	CLM6413	CLM6737	SERIAL #:2000418	1001419
CONC.:	14.01%	20.72%	LAST CAL.:5/22/95	6/1/95

COMPONENT:CO2		COMPONENT: O2		COMPONENT:	
MEAN CONC:16.8%		MEAN CONC: 21.0%		MEAN CONC:	
REPLICATE CONC.		REPLICATE CONC.		REPLICATE CONC.	
DATE:6/2/95	DATE:	DATE:6/2/95	DATE:	DATE:	DATE:
16.8%		21.0%			
16.8%		21.0%			
16.9%		21.1%			

BALANCE GAS:N2

REPLICATE DATA — COMPONENT:CO2

DATE:	6/2/95					DATE:					
Z	0	R	168.0	C	201.5	Z		R		C	
R	168.5	Z	0	C	202.1	R		Z		C	
Z	0	C	203.9	R	169.0	Z		C		R	

REPLICATE DATA — COMPONENT:O2

DATE:	6/2/95					DATE:					
Z	0	R	210.0	C	212.8	Z		R		C	
R	210.5	Z	0	C	213.0	R		Z		C	
Z	0	C	214.9	R	211.0	Z		C		R	

REPLICATE DATA — COMPONENT:

DATE:						DATE:					
Z		R		C		Z		R		C	
R		Z		C		R		Z		C	
Z		C		R		Z		C		R	

Z=ZERO C=CANDIDATE R=REFERENCE

ANALYST: Tracy A. Savage APPROVED BY: Tina Rowe

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC
27713
(919)544-3772

CERTIFICATE OF ANALYSIS • EPA PROTOCOL MIXTURES

REFERENCE #:	88-46474	CYLINDER #:	CC 35931	CYL. PRESSURE:	2000 PSIG	P.O. #:	22209
EXP. DATE:	3/14/99	LAST ANALYSIS DATE:	3/14/96	CUSTOMER:	TWIN CITY OXYGEN		

METHOD: ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS-SEPTEMBER 1993,G-1 THIS STANDARD SHOULD NOT BE USED WHEN ITS GAS PRESSURE IS BELOW 1.0 MEGAPASCALS (150 PSIG).

COMPONENT:	CARBON DIOXIDE	COMPONENT:	OXYGEN	COMPONENT:	
STANDARD		STANDARD		STANDARD	
SRM #:	1675B	SRM #:	2659A	SRM #:	
CYL. #:	CLM 6481	CYL. #	CLM 6737	CYL. #	
CONC:	14.01 %	CONC:	20.72 %	CONC:	
INSTRUMENT:	ROSEMOUNT NDIR	INSTRUMENT:	BECKMAN PARAMAGNETIC	INSTRUMENT:	
MODEL #:	880	MODEL #:	755	MODEL #:	
SERIAL #:	2000418	SERIAL #:	1001419	SERIAL #:	
LAST CAL.:	2/20/96	LAST CAL.:	3/1/96	LAST CAL.:	
MEAN CONC.:	10.8% +/- 0.09 %	MEAN CONC.:	13.5% +/- 0.11 %	MEAN CONC.:	
REPLICATE CONC.		REPLICATE CONC.		REPLICATE CONC.	
DATE: 3/14/96	DATE:	DATE: 3/14/96	DATE:	DATE:	DATE:
10.8 %		13.5 %			
10.9 %		13.4 %			
10.8 %		13.5 %			

BALANCE GAS: NITROGEN

REPLICATE DATA						REPLICATE DATA						REPLICATE DATA		
DATE: 3/14/96						DATE: 3/14/96						DATE:		
Z	0	R	14.1	C	10.9	Z	0	R	400.2	C	260.7	Z	R	C
R	14.1	Z	0	C	11.0	R	400.3	Z	0	C	258.9	R	Z	C
Z	0	C	10.8	R	14.0	Z	0	C	260.9	R	400.4	Z	C	R
DATE						DATE:						DATE:		
Z		R		C		Z		R		C		Z	R	C
R		Z		C		R		Z		C		R	Z	C
Z		C		R		Z		C		R		Z	C	R

Z= ZERO C=CANDIDATE R=REFERENCE

ANALYST: [signature] APPROVED BY: [signature]

THIS REPORT STATES ACCURATELY THE RESULTS OF THE INVESTIGATION MADE UPON THE MATERIAL SUBMITTED TO THE ANALYTICAL LABORATORY. EVERY EFFORT HAS BEEN MADE TO DETERMINE OBJECTIVELY THE INFORMATION REQUESTED. HOWEVER, IN CONNECTION WITH THIS REPORT, NATIONAL SPECIALTY GASES SHALL HAVE NO LIABILITY IN EXCESS OF ITS ESTABLISHED CHARGE FOR THE SERVICE.
ASSAYED AT: NATIONAL SPECIALTY GASES 630 UNITED DRIVE, DURHAM, NC 27713 (919)544-3772

[redacted]

SPECIALTY GAS DEPARTMENT
12722 S. WENTWORTH AVENUE
CHICAGO, IL 60628

Certificate of Analysis - EPA Protocol Gas Standard

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
AIR PRODUCTS & CHEMICALS, INC.
373 CANTERBURY ROAD
SHAKOPEE MN 55379

Notes:

Order No: CSS-188055-01
Batch No: 861-26103

Cylinder No: SG9150306BAL
Cylinder Pressure*: 2000 psig
Certification Date: 06/13/95
Expiration Date: 06/13/98

PO: Rel:

*** Certified Concentration ***		********* Reference Standards *********			************* Analytical Instrumentation ************			
Component	Certified Concentration	Cylinder #	Standard Number	Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
CARBON MONOXIDE	147 ±0.4 PPM	SG9113611BAL	GMIS	151.5000 PPM	Horiba VIA-510	405079	05/20/95	INFRARED HORIBA

Balance Gas: Nitrogen

---

* Standard should not be used below 150 psig

Analyst: Shaher Aboor

Approved By: Robert McNear

Customer :
GENEX
2455 CLEVELAND AVENUE
ROSEVILLE MN 55113

Shipped From : Scott Michigan
Our Project # : 542740
Your P.O. # : 40643
Expiration Date : 4-19-94
Cylinder Number : ALM011467
Cylinder Pressure : 1900 psig
Certification Date : 10-19-92
1 of 1 Component(s)

* * * * CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES * * * *

PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability Protocol # 1 Procedure # G1

LAB # 5302

Certified Accuracy 1 % NIST Traceable

ANALYZED CYLINDER

COMPONENT	CERTIFIED CONCENTRATION
CARBON MONOXIDE	282.3 PPM

BALANCE GAS : NITROGEN

REFERENCE STANDARDS

SRM # (CRM #)	CYLINDER NUMBER	CONCENTRATION
1680	AAL16199	475.0 PPM
2636	ALM013383	243.4 PPM
1679	AAL1355	96.67 PPM

INSTRUMENTATION

INSTRUMENT/ MODEL/SERIAL #	LAST CALIBRATION DATE	ANALYTICAL PRINCIPLE
BECKMAN 867 0100157	10-14-92	NON-DISPERSIVE INFRARED

FIRST ANALYSIS DATE : 10-13-92

ZERO GAS [illegible]	TEST GAS (mV)	CURVE RESULTS PPM	REFERENCE GAS CONCENTR.	REFERENCE GAS [illegible]	CURVE RESULTS [illegible]
0.0[illegible]	[illegible]	282.3	475.0 PPM	100.0	[illegible]
0.00	65.2[illegible]			100.0	475.0
0.00	65.20	282.3		100.0	475.0

CALCULATED RESULTS 282.3 282.3 282.3

AVERAGE : 282.3 PPM

SECOND ANALYSIS DATE : 10-19-92

ZERO GAS (mV)	TEST GAS (mV)	CURVE RESULTS PPM	REFERENCE GAS CONCENTR.	REFERENCE GAS (mV)	CURVE RESULTS PPM
[illegible]	[illegible]	[illegible]	[illegible] PPM	100.0	475.0
0.00	[illegible]	282.3		[illegible]	[illegible]
0.00	65.20	282.3		100.0	[illegible]

CALCULATED RESULTS 282.3 282.3 282.3

AVERAGE : 282.3 PPM

CALIBRATION CURVE 2 nd DEGREE

SRM #	CONC.	SPLIT	DVM	FITTED	PERCENT
1680	475.0	100	100.0	475.0	-0.00
2636	243.4	51	57.50	243.6	0.10
[illegible]	240.2	51	[illegible]	240.7	0.20
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1679A	96.21	20	24.87	95.78	-0.45
	0.0000	0	0.0000	0.0000	0.00
		0		0.00	0.00
GMIS	243.4	LOW	57.50	243.6	0.10
1680	475.0	HIGH	100.0	475.0	-0.00

* GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : [signature]
FRANK P. DORAN

Approved By : [signature]

Revised : 3/31/92 RML

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Certificate of Analysis for Standard Gas

Vendor: Air Products
Cylinder No.: SG 916 2775
Date of Preparation: 11-9-95
Label: Nitric Oxide
Blend Specification: 145 ppm Balance N_2

Results of Analysis of Standard Gas			
Date of Analysis	Run	NOx	
4-5-96	1	143.3031	
4-5-96	2	142.8554	
4-5-96	3	142.9571	
	4		
	5		
	6		
	Avg	143.0385	-1.35%

Analyst: BB3A

☒ Results are within 2% of the vendor tag value; use tag value.

☐ Results are not within 2% of the vendor tag value; conduct another set of triplicate analyses.

☐ All results within ± 2% of the average; relabel as above.

☐ All results not within ± 2% of the average; perform another set of triplicate analyses.

Date: April 5, 1996

Approved by: [signature]

012696-G:\STACK\WP\FORMS\S-425

INTERPOLL LABS

TANK CERT
TANK NUMBER SG9162775
4/5/96

4/5/96	12:29:00 PM			
0	144.809	0	0	0
4/5/96	12:29:06 PM			
0	144.809	0	0	0
4/5/96	12:29:12 PM			
0	144.809	0	0	0
4/5/96	12:29:18 PM			
0	143.995	0	0	0
4/5/96	12:29:24 PM			
0	143.588	0	0	0
4/5/96	12:29:30 PM			
0	143.181	0	0	0
4/5/96	12:29:36 PM			
0	143.995	0	0	0
4/5/96	12:29:42 PM			
0	143.181	0	0	0
4/5/96	12:29:48 PM			
0	143.588	0	0	0
4/5/96	12:29:54 PM			
0	142.774	0	0	0
4/5/96	12:30:00 PM			
0	143.588	0	0	0
4/5/96	12:30:06 PM			
0	142.774	0	0	0
4/5/96	12:30:12 PM			
0	142.367	0	0	0
4/5/96	12:30:18 PM			
0	142.774	0	0	0
4/5/96	12:30:24 PM			
0	142.774	0	0	0
4/5/96	12:30:30 PM			
0	142.774	0	0	0
4/5/96	12:30:36 PM			
0	142.367	0	0	0
4/5/96	12:30:42 PM			
0	143.181	0	0	0
4/5/96	12:30:48 PM			
0	142.367	0	0	0
4/5/96	12:30:54 PM			
0	142.367	0	0	0
	143.3031			

INTERPOLL LABS

TANK CERT
TANK NUMBER SG9162776
4/5/96

4/5/96	12:36:00 PM			
0	144.402	0	0	0
4/5/96	12:36:06 PM			
0	144.809	0	0	0
4/5/96	12:36:12 PM			
0	143.181	0	0	0
4/5/96	12:36:18 PM			
0	143.588	0	0	0
4/5/96	12:36:24 PM			
0	143.181	0	0	0
4/5/96	12:36:30 PM			
0	142.367	0	0	0
4/5/96	12:36:36 PM			
0	142.367	0	0	0
4/5/96	12:36:42 PM			
0	142.774	0	0	0
4/5/96	12:36:48 PM			
0	143.181	0	0	0
4/5/96	12:36:54 PM			
0	142.367	0	0	0
4/5/96	12:37:00 PM			
0	143.181	0	0	0
4/5/96	12:37:06 PM			
0	142.367	0	0	0
4/5/96	12:37:12 PM			
0	142.367	0	0	0
4/5/96	12:37:18 PM			
0	142.367	0	0	0
4/5/96	12:37:24 PM			
0	142.367	0	0	0
4/5/96	12:37:30 PM			
0	142.367	0	0	0
4/5/96	12:37:36 PM			
0	142.367	0	0	0
4/5/96	12:37:42 PM			
0	141.96	0	0	0
4/5/96	12:37:48 PM			
0	142.774	0	0	0
4/5/96	12:37:54 PM			
0	142.774	0	0	0
	142.8554			

INTERPOL LABS

TANK CERT
TANK NUMBER SG9162775
4/5/96

4/5/96	12:42:00 PM			
0	144.809	0	0	0
4/5/96	12:42:06 PM			
0	144.402	0	0	0
4/5/96	12:42:12 PM			
0	143.995	0	0	0
4/5/96	12:42:18 PM			
0	143.181	0	0	0
4/5/96	12:42:24 PM			
0	143.588	0	0	0
4/5/96	12:42:30 PM			
0	143.995	0	0	0
4/5/96	12:42:36 PM			
0	142.774	0	0	0
4/5/96	12:42:42 PM			
0	143.181	0	0	0
4/5/96	12:42:48 PM			
0	142.367	0	0	0
4/5/96	12:42:54 PM			
0	142.774	0	0	0
4/5/96	12:43:00 PM			
0	142.367	0	0	0
4/5/96	12:43:06 PM			
0	141.96	0	0	0
4/5/96	12:43:12 PM			
0	143.181	0	0	0
4/5/96	12:43:18 PM			
0	142.774	0	0	0
4/5/96	12:43:24 PM			
0	142.367	0	0	0
4/5/96	12:43:30 PM			
0	142.367	0	0	0
4/5/96	12:43:36 PM			
0	142.367	0	0	0
4/5/96	12:43:42 PM			
0	142.367	0	0	0
4/5/96	12:43:48 PM			
0	141.96	0	0	0
4/5/96	12:43:54 PM			
0	142.367	0	0	0

142.95715

[redacted] P[redacted]uc[redacted]and[redacted]em[redacted]s, [redacted]c. [redacted]
SPECIALTY GAS DEPARTMENT
12722 S. WENTWORTH AVENUE
CHICAGO, IL 60628

Certificate of Analysis - EPA Protocol Gas Standard

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
TWIN CITY OXYGEN (MAIN ACCT.)
305 2ND STREET NW
NEW BRIGHTON MN 55112-

Notes:

PO: 20013 Rel:

Order No: CSS-296700-01
Batch No: 861-28757

Cylinder No: SG9162775BAL
Cylinder Pressure*: 2000 psig
Certification Date: 11/09/95
Expiration Date: 11/09/97

*** Certified Concentration ***		********* Reference Standards *********			************* Analytical Instrumentation ************			
Component	Certified Concentration	Cylinder #	Standard Number	Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
NITRIC OXIDE	145 ±1.0 PPM	SG9151688BAL	GMIS	145.5000 PPM	Rosemount 951a	0101877	10/19/95	CHEMILUMINESCENCE

Balance Gas: NITROGEN

Contaminent
Nitrogen Dioxide 1.80 PPM

---

* Standard should not be used below 150 psig

Analyst: Shaher Aboor

Approved By: Richard Fry

Air Products and Chemicals, Inc.
SPECIALTY GAS DEPARTMENT
12722 S. WENTWORTH AVENUE
CHICAGO, IL 60628

Certificate of Analysis - EPA Protocol Gas Standard

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
AIR PRODUCTS & CHEMICALS, INC.
373 CANTERBURY ROAD
SHAKOPEE MN 55379

Notes:

PO: Rel:

Order No: CSS-411663-0
Batch No: 861-31683

Cylinder No: SG9136041BAL
Cylinder Pressure*: 2000 psig
Certification Date: 04/29/96
Expiration Date: 04/29/98

*** Certified Concentration ***		********* Reference Standards *********			************** Analytical Instrumentation ************			
Component	Certified Concentration	Cylinder #	Standard Number	Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
NITRIC OXIDE	90.6 ±.27 PPM	SG9148169BAL	GMIS	96.0200 PPM	Rosemount 951a	0101877	04/19/96	CHEMILUMINESCENCE

Balance Gas: NITROGEN

Contaminent
Nitrogen Dioxide .400 PPM

---

* Standard should not be used below 150 psig

Analyst: James Laas

Approved By: Richard Fry

NATIONAL SPECIALTY GASES•630 UNITED DRIVE•DURHAM, N.C. 27713•(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-41643 CYLINDER #: CC46326 CYL. PRESSURE:2000PSIG CUSTOMER:TWIN CITY
EXPIRATION DATE: 7/25/98 LAST ANALYSIS DATE: 7/25/95 P.O.#:SHELIA
METHOD: ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS-SEPTEMBER 1993:G-1.
THIS STANDARD SHOULD NOT BE USED WHEN ITS GAS PRESSURE IS BELOW 1.0 MEGAPASCALS (150PSIG).

STANDARD:	STANDARD:	STANDARD:
SRM #: 1667B	SRM #:	SRM #:
CYL. #: CLM5293	CYL. #:	CYL. #:
CONC.: 47.3PPM	CONC.:	CONC.:
INSTRUMENT:ROSEMOUNT THC	INSTRUMENT:	INSTRUMENT:
MODEL#:400A	MODEL #:	MODEL #:
SERIAL #:2000335	SERIAL #:	SERIAL #:
LAST CAL.:7/14/95	LAST CAL.:	LAST CAL.:

COMPONENT:PROPANE	COMPONENT:	COMPONENT:
MEAN CONC:30.5 $\pm$ 0.31PPM	MEAN CONC:	MEAN CONC:
REPLICATE CONC.	REPLICATE CONC.	REPLICATE CONC.
DATE:7/25/95 DATE:	DATE: DATE:	DATE: DATE:
30.5PPM		
30.5PPM		
30.6PPM		

BALANCE GAS:AIR

COMPONENT:PROPANE						COMPONENT:						COMPONENT:					
REPLICATE DATA						REPLICATE DATA						REPLICATE DATA					
DATE:	7/25/95					DATE:						DATE:					
Z	0	R	47.3	C	30.5	Z		R		C		Z		R		C	
R	47.3	Z	0	C	30.5	R		Z		C		R		Z		C	
Z	0	C	30.6	R	47.3	Z		C		R		Z		C		R	
DATE:						DATE:						DATE:					
Z		R		C		Z		R		C		Z		R		C	
R		Z		C		R		Z		C		R		Z		C	
Z		C		R		Z		C		R		Z		C		R	

Z=ZERO C=CANDIDATE R=REFERENCE

ANALYST: Richard Sykes APPROVED BY: [signature]

"THIS REPORT STATED ACCURATELY THE RESULTS OF THE INVESTIGATION MADE UPON THE MATERIAL SUBMITTED TO THE ANALYTICAL LABORATORY. EVERY EFFORT HAS BEEN MADE TO DETERMINE OBJECTIVELY THE INFORMATION REQUESTED; HOWEVER, IN CONNECTION WITH ITS RENDERING OF THIS REPORT, NATIONAL SPECIALTY GASES SHALL HAVE NO LIABILITY IN EXCESS OF ITS ESTABLISHED CHARGE FOR THE SERVICE."

Air Products and Chemicals, Inc.
SPECIALTY GAS DEPARTMENT
12722 S. WENTWORTH AVENUE
CHICAGO, IL 60628

Certificate of Analysis - EPA Protocol Gas Standard

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
AIR PRODUCTS & CHEMICALS, INC.
373 CANTERBURY ROAD
SHAKOPEE MN 55379

Notes:

PO: Rel:

Order No: CSS-320133-01
Batch No: 861-29310

Cylinder No: SG9170128BAL
Cylinder Pressure*: 2000 psig
Certification Date: 12/04/95
Expiration Date: 12/04/98

*** Certified Concentration ***		********* Reference Standards *********			************* Analytical Instrumentation *************			
Component	Certified Concentration	Cylinder #	Standard Number	Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
PROPANE	286 ±3.2 PPM	SG9128611BAL	GMIS	351.5000 PPM	Gow-Mac 750	59405U	11/14/95	GC-FID

Balance Gas: AIR
Oxygen Concentration 20.1 %

* Standard should not be used below 150 psig

H-12

Analyst: Richard VanDyke
Approved By: Richard Fry

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC
27713
(919)544-3772

CERTIFICATE OF ANALYSIS - EPA PROTOCOL MIXTURES

REFERENCE #:	88-44768	CYLINDER #:	CC112043	CYL. PRESSURE:	2000 PSIG	P. O. #	20694
EXP. DATE:	12/19/98	LAST ANALYSIS DATE:	12/19/95	CUSTOMER:	TWIN CITY OXYGEN		

METHOD: ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS-SEPTEMBER 1993:G-1 THIS STANDARD SHOULD NOT BE USED WHEN ITS GAS PRESSURE IS BELOW 1.0 MEGAPASCALS (150 PSIG).

COMPONENT: PROPANE

STANDARD

SRM #: 2648A

CYL. #: FF 26617

CONC: 4892 PPM

INSTRUMENT: ROSEMOUNT THC

MODEL #: 400A

SERIAL #: 2000335

LAST CAL.: 11/28/95

MEAN CONC.: 2960 PPM +/- 23.7 PPM

REPLICATE CONC.

DATE: 12/19/95

2961 PPM

2963 PPM

2965 PPM

BALANCE GAS: AIR

REPLICATE DATA						REPLICATE DATA	REPLICATE DATA
DATE:	12/19/95						
Z	0	R	183.6	C	111.1		
R	183.7	Z	0	C	111.3		
Z	0	C	111.4	R	183.8		
DATE							
Z		R		C			
R		Z		C			
Z		C		R			

Z= ZERO C=CANDIDATE R=REFERENCE

ANALYST: Mary A. Savage APPROVED BY: Laura Hawkins

ASSAYED AT: NATIONAL SPECIALTY GASES, 630 UNITED DRIVE, DURHAM, NC 27713. (919)544-3772

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Certificate of Analysis for Standard Gas

Vendor SCOTT SPECIALTY GASES
Cylinder No. ALM 030977
Date of Preparation 11-2-92
Label NITRIC OXIDE
Blend Specification 144.1 PPM BALANCE N2

Results of Analysis of Standard Gas			
Date of Analysis	Run		
4-24-96	1	140.12	
4-24-96	2	138.04	
4-24-96	3	139.48	
4-24-96	4	140.30	
4-24-96	5	140.58	
4-24-96	6	139.47	
	Avg	139.738	

Analyst JAMES BAINVILLE

☐ Results are within 2% of the vendor tag value; use tag value.

☐ Results are not within 2% of the vendor tag value; conduct another set of triplicate analyses.

☒ All results within ± 2% of the average; relabel as above.

☐ All results not within ± 2% of the average; perform another set of triplicate analyses.

Date: APRIL 24, 1996
Approved by: [signature]

012696-G:\STACK\WP\FORMS\S-425

Shipped From : Scott Michigan
Our Project # : 542740
Your P.O. # : 40643
Expiration Date : 4-19-94
Cylinder Number : ALM030977
Cylinder Pressure : 1900 psig
Certification Date : 10-19-92
1 of 1 Component(s)

Customer :
GENEX
2455 CLEVELAND AVENUE
ROSEVILLE MN 55113

**** CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES ****

PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability Protocol # 1 — Procedure # G1 — LAB # 5299

Certified Accuracy 1 % NIST Traceable

ANALYZED CYLINDER

COMPONENT	CERTIFIED CONCENTRATION
NITRIC OXIDE	144.1 PPM

BALANCE GAS : NITROGEN

REFERENCE STANDARDS

SRM # (CRM #)	CYLINDER NUMBER	CONCENTRATION
1685	ALM-008716	250.3 PPM
1684	ALM-010464	95.26 PPM

INSTRUMENTATION

INSTRUMENT/ MODEL/SERIAL #	LAST CALIBRATION DATE	ANALYTICAL PRINCIPLE
BECKMAN 951A 270-082899B	10-1-92	CHEMILUNINESCENCE

NITROGEN DIOXIDE 1.00 PPM (FROM SECOND ANALYSIS)

FIRST ANALYSIS — DATE : 10-13-92

ZERO GAS (mV)	TEST GAS (mV)	CURVE RESULTS PPM	REFERENCE GAS CONCENTR.	REFERENCE GAS (mV)	CURVE RESULTS PPM
0.00	57.60	144.2	250.3 PPM	100.0	250.3
0.00	57.50	143.9		100.0	250.3
0.00	57.50	143.9		100.0	250.3

CALCULATED RESULTS 144.2 143.9 143.9

AVERAGE : 144.0 PPM

SECOND ANALYSIS — DATE : 10-19-92

ZERO GAS (mV)	TEST GAS (mV)	CURVE RESULTS PPM	REFERENCE GAS CONCENTR.	REFERENCE GAS (mV)	CURVE RESULTS PPM
0.00	57.60	144.2	250.3 PPM	100.0	250.3
0.00	57.60	144.2		100.0	250.3
0.00	57.60	144.2		100.0	250.3
0.00	58.00 NOX	145.2			

CALCULATED RESULTS 144.2 144.2 144.2 — 145.2 PPM NOX

AVERAGE : 144.2 PPM

CALIBRATION CURVE — 1 st DEGREE

SRM # (CRM #)	CONC. PPM	SPLIT PT (%)	DVM (mV)	FITTED VALUE	PERCENT ERROR
1685	250.3	100	100.0	250.3	0.00
1684	95.26	38	38.05	95.24	-0.02
	0.0000	0	0.0000	0.0000	0.00
		0		0.00	0.00
		0		0.00	0.00
		0		0.00	0.00
		0		0.00	0.00
1684	95.26	LOW	38.05	95.24	-0.02
1685	250.3	HIGH	100.0	250.3	0.00

* GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

Analyst : [signature] DON EICHLER, JR

Approved By : [signature] Shapiro

Revised : 3/31/92 RML

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Certificate of Analysis for Standard Gas

Vendor: National Specialty Gases
Cylinder No.: CC 114192
Date of Preparation: ~~4-4-96~~ 3-23-93
Label: Nitric Oxide
Blend Specification: 239 ppm Balance N_2

Results of Analysis of Standard Gas			
Date of Analysis	Run	NOx	
4-5-96	1	236.5035	
4-5-96	2	235.5680	
4-5-96	3	234.6729	
	4		
	5		
	6		
	Avg	235.5815	1.43%

Analyst: Bos A

☒ Results are within 2% of the vendor tag value; use tag value.

☐ Results are not within 2% of the vendor tag value; conduct another set of triplicate analyses.

☐ All results within ± 2% of the average; relabel as above.

☐ All results not within ± 2% of the average; perform another set of triplicate analyses.

Date: April 5, 1996

Approved by: [signature]

012696-G:\STACK\WP\FORMS\S-425

INTERPOL LABS

TANK CERT
TANK NUMBER CC114192
4/5/96

4/5/96	7:54:00 AM			
0	237.175	0	0	0
4/5/96	7:54:06 AM			
0	236.361	0	0	0
4/5/96	7:54:12 AM			
0	236.768	0	0	0
4/5/96	7:54:18 AM			
0	236.361	0	0	0
4/5/96	7:54:24 AM			
0	237.175	0	0	0
4/5/96	7:54:30 AM			
0	236.361	0	0	0
4/5/96	7:54:36 AM			
0	236.768	0	0	0
4/5/96	7:54:42 AM			
0	236.361	0	0	0
4/5/96	7:54:48 AM			
0	235.954	0	0	0
4/5/96	7:54:54 AM			
0	236.768	0	0	0
4/5/96	7:55:00 AM			
0	236.361	0	0	0
4/5/96	7:55:06 AM			
0	236.768	0	0	0
4/5/96	7:55:12 AM			
0	236.361	0	0	0
4/5/96	7:55:18 AM			
0	235.548	0	0	0
4/5/96	7:55:24 AM			
0	235.954	0	0	0
4/5/96	7:55:30 AM			
0	237.582	0	0	0
4/5/96	7:55:36 AM			
0	235.548	0	0	0
4/5/96	7:55:42 AM			
0	235.954	0	0	0
4/5/96	7:55:48 AM			
0	236.361	0	0	0
4/5/96	7:55:54 AM			
0	237.582	0	0	0
	236.50355			

INTERPOLL LABS

TANK CERT
TANK NUMBER CC114192
4/5/96

4/5/96	8:09:00 AM			
0	234.327	0	0	0
4/5/96	8:09:06 AM			
0	234.734	0	0	0
4/5/96	8:09:12 AM			
0	235.141	0	0	0
4/5/96	8:09:18 AM			
0	235.141	0	0	0
4/5/96	8:09:24 AM			
0	235.548	0	0	0
4/5/96	8:09:30 AM			
0	235.141	0	0	0
4/5/96	8:09:36 AM			
0	235.141	0	0	0
4/5/96	8:09:42 AM			
0	234.734	0	0	0
4/5/96	8:09:48 AM			
0	234.734	0	0	0
4/5/96	8:09:54 AM			
0	235.141	0	0	0
4/5/96	8:10:00 AM			
0	234.734	0	0	0
4/5/96	8:10:06 AM			
0	234.734	0	0	0
4/5/96	8:10:12 AM			
0	235.141	0	0	0
4/5/96	8:10:18 AM			
0	235.141	0	0	0
4/5/96	8:10:24 AM			
0	235.141	0	0	0
4/5/96	8:10:30 AM			
0	234.734	0	0	0
4/5/96	8:10:36 AM			
0	233.106	0	0	0
4/5/96	8:10:42 AM			
0	233.513	0	0	0
4/5/96	8:10:48 AM			
0	233.92	0	0	0
4/5/96	8:10:54 AM			
0	233.513	0	0	0

234.67295

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-23182 CYLINDER #: CC114192 CYL. PRESSURE: 2000PSIG

EXPIRATION DATE: 3-23-95 LAST ANALYSIS DATE: 3-23-93

CUSTOMER: TWIN CITY OXYGEN P.O.#
METHOD: EPA PROTOCOL # 1 3.0.4. G-1

STANDARD:

SRM #: 1685B

CYL #: CLM-4728

CONC.: 248 PPM

INSTRUMENT:

COMPONENT: BECKMAN CHEMILUMINESCENT

MODEL #: 951A

SERIAL #: 100532

LAST CAL.: 1-2-93

COMP: NO
MEAN CONC: 239 PPM

REPLICATE CONC.

DATE: 3-16-93	DATE: 3-23-93
240 PPM	236 PPM
240 PPM	237 PPM
241 PPM	238 PPM

COMP: NO2
MEAN CONC: 2.99 PPM

REPLICATE CONC.
DATE: DATE:

COMP:
MEAN CONC:

REPLICATE CONC.
DATE: DATE:

BALANCE GAS: NITROGEN

Air Products and Chemicals, Inc.
SPECIALTY GAS DEPARTMENT
12722 S. WENTWORTH AVENUE
CHICAGO, IL 60628

Certificate of Analysis - EPA Protocol Gas Standard

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
AIR PRODUCTS & CHEMICALS, INC.
373 CANTERBURY ROAD
SHAKOPEE MN 55379

Notes:

PO: Rel:

Order No: CSS-411663-01
Batch No: 861-31683

Cylinder No: SG9169061BAL
Cylinder Pressure*: 2000 psig
Certification Date: 04/29/96
Expiration Date: 04/29/98

*** Certified Concentration ***		********* Reference Standards *********			************* Analytical Instrumentation ************			
Component	Certified Concentration	Cylinder #	Standard Number	Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
NITRIC OXIDE	91.9 ±.39 PPM	SG9148169BAL	GMIS	96.0200 PPM	Rosemount 951a	0101877	04/19/96	CHEMILUMINESCENCE

Balance Gas: NITROGEN

Contaminent	
Nitrogen Dioxide	1.40 PPM

---

* Standard should not be used below 150 psig

Analyst: James Laas

Approved By: Richard Fry

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC
27713
(919)544-3772

CERTIFICATE OF ANALYSIS * EPA PROTOCOL MIXTURES

REFERENCE #:	88-46472	CYLINDER #:	CC 61434	CYL. PRESSURE:	2000 PSIG	P.O. #:	22209
EXP. DATE:	3/14/99	LAST ANALYSIS DATE:	3/14/96	CUSTOMER:	TWIN CITY OXYGEN		

METHOD: ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS-SEPTEMBER 1993.G-1 THIS STANDARD SHOULD NOT BE USED WHEN ITS GAS PRESSURE IS BELOW 1.0 MEGAPASCALS (150 PSIG).

COMPONENT:	CARBON DIOXIDE	COMPONENT:	OXYGEN	COMPONENT:	
STANDARD		STANDARD		STANDARD	
SRM #:	1675B	SRM #:	2659A	SRM #:	
CYL. #:	CLM 6481	CYL. #	CLM 6737	CYL. #	
CONC:	14.01 %	CONC:	20.72 %	CONC:	
INSTRUMENT:	ROSEMOUNT NDIR	INSTRUMENT:	BECKMAN PARAMAGNETIC	INSTRUMENT:	
MODEL #:	880	MODEL #:	755	MODEL #:	
SERIAL #:	2000418	SERIAL #:	1001419	SERIAL #:	
LAST CAL.:	2/20/96	LAST CAL.:	3/1/96	LAST CAL.:	
MEAN CONC.:	16.6% +/- 0.13 %	MEAN CONC.:	20.8% +/- 0.17 %	MEAN CONC.:	
REPLICATE CONC.		REPLICATE CONC.		REPLICATE CONC	
DATE: 3/14/96	DATE:	DATE: 3/14/96	DATE:	DATE:	DATE:
16.6 %		20.8 %			
16.7 %		20.9 %			
16.6 %		20.8 %			

BALANCE GAS: NITROGEN

REPLICATE DATA						REPLICATE DATA						REPLICATE DATA					
DATE: 3/14/96						DATE: 3/14/96						DATE:					
Z	0	R	14.1	C	16.7	Z	0	R	400.2	C	401.7	Z		R		C	
R	14.1	Z	0	C	16.8	R	400.3	Z	0	C	403.8	R		Z		C	
Z	0	C	16.6	R	14.0	Z	0	C	401.9	R	400.4	Z		C		R	
DATE						DATE:						DATE:					
Z		R		C		Z		R		C		Z		R		C	
R		Z		C		R		Z		C		R		Z		C	
Z		C		R		Z		C		R		Z		C		R	

Z-ZERO C-CANDIDATE R-REFERENCE

ANALYST: [signature] APPROVED BY: [signature]

NATIONAL SPECIALTY GASES

630 UNITED DRIVE
DURHAM, NC
27713
(919)544-3772

CERTIFICATE OF ANALYSIS * EPA PROTOCOL MIXTURES

REFERENCE #:	88-46474	CYLINDER #:	CC 47432	CYL. PRESSURE:	2000 PSIG	P.O. #:	22209
EXP. DATE:	3/14/99	LAST ANALYSIS DATE:	3/14/96	CUSTOMER:	TWIN CITY OXYGEN		

METHOD: ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS-SEPTEMBER 1993:G-1 THIS STANDARD SHOULD NOT BE USED WHEN ITS GAS PRESSURE IS BELOW 1.0 MEGAPASCALS (150 PSIG).

COMPONENT:	CARBON DIOXIDE	COMPONENT:	OXYGEN	COMPONENT:	
STANDARD		STANDARD		STANDARD	
SRM #:	1675B	SRM #:	2659A	SRM #:	
CYL. #:	CLM 6481	CYL. #	CLM 6737	CYL. #	
CONC:	14.01 %	CONC:	20.72 %	CONC:	
INSTRUMENT:	ROSEMOUNT NDIR	INSTRUMENT:	BECKMAN PARAMAGNETIC	INSTRUMENT:	
MODEL #:	880	MODEL #:	755	MODEL #:	
SERIAL #:	2000418	SERIAL #:	1001419	SERIAL #:	
LAST CAL.:	2/20/96	LAST CAL.:	3/1/96	LAST CAL.:	
MEAN CONC.:	10.8% +/- 0.09 %	MEAN CONC.:	13.5% +/- 0.11 %	MEAN CONC.:	
REPLICATE CONC.		REPLICATE CONC.		REPLICATE CONC	
DATE: 3/14/96	DATE:	DATE: 3/14/96	DATE:	DATE:	DATE:
10.8 %		13.5 %			
10.9 %		13.4 %			
10.8 %		13.5 %			

BALANCE GAS: NITROGEN

REPLICATE DATA						REPLICATE DATA						REPLICATE DATA		
DATE: 3/14/96						DATE: 3/14/96						DATE:		
Z	0	R	14.1	C	10.9	Z	0	R	400.2	C	260.7	Z	R	C
R	14.1	Z	0	C	11.0	R	400.3	Z	0	C	258.9	R	Z	C
Z	0	C	10.8	R	14.0	Z	0	C	260.9	R	400.4	Z	C	R
DATE						DATE:						DATE:		
Z		R		C		Z		R		C		Z	R	C
R		Z		C		R		Z		C		R	Z	C
Z		C		R		Z		C		R		Z	C	R

Z= ZERO C=CANDIDATE R=REFERENCE

ANALYST: Robert McK[illegible] APPROVED BY: Laura [illegible]

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC
27713
(919)544-3772

CERTIFICATE OF ANALYSIS : EPA PROTOCOL MIXTURES

REFERENCE #:	88-45052	CYLINDER #:	CC50725	CYL. PRESSURE:	2000PSIG	P.O. #:	
EXP. DATE:	1/5/99	LAST ANALYSIS DATE:	1/5/96	CUSTOMER:	TWIN CITY OXYGEN		

METHOD: ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS-SEPTEMBER 1993:G-1 THIS STANDARD SHOULD NOT BE USED WHEN ITS GAS PRESSURE IS BELOW 1.0 MEGAPASCALS (150 PSIG).

COMPONENT:	CARBON MONOXIDE	COMPONENT:		COMPONENT:	
STANDARD		STANDARD		STANDARD	
SRM #:	1680B	SRM #:		SRM #:	
CYL. #:	FF 34077	CYL. #		CYL. #	
CONC:	477 PPM	CONC:		CONC:	
INSTRUMENT:	ROSEMOUNT NDIR	INSTRUMENT:		INSTRUMENT:	
MODEL #:	880A	MODEL #:		MODEL #:	
SERIAL #:	2000172	SERIAL #:		SERIAL #:	
LAST CAL.:	12/13/95	LAST CAL.:		LAST CAL.:	

MEAN CONC.: 289 PPM +/- 2.31 PPM		MEAN CONC.:		MEAN CONC.:	
REPLICATE CONC.		REPLICATE CONC.		REPLICATE CONC	
DATE: 12/28/95	DATE: 1/5/96	DATE:	DATE:	DATE:	DATE:
289 PPM	289 PPM				
289 PPM	289 PPM				
290 PPM	289 PPM				

BALANCE GAS: NITROGEN

REPLICATE DATA						REPLICATE DATA			REPLICATE DATA		
DATE: 12/28/95						DATE:			DATE:		
Z	0	R	478	C	289.6	Z	R	C	Z	R	C
R	477	Z	0	C	289.0	R	Z	C	R	Z	C
Z	0	C	290.0	R	477	Z	C	R	Z	C	R
DATE 1/5/96						DATE:			DATE:		
Z	0	R	478	C	289.6	Z	R	C	Z	R	C
R	477	Z	0	C	289	R	Z	C	R	Z	C
Z	0	C	289.6	R	478	Z	C	R	Z	C	R

Z= ZERO C=CANDIDATE R=REFERENCE

ANALYST: [signature] APPROVED BY: [signature]

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC 27713
(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-25249 CYLINDER #:CC44391 CYL. PRESSURE: 2000PSIG

EXPIRATION DATE: 7-7-96 LAST ANALYSIS DATE:7-7-93

CUSTOMER:TWIN CITY OXYGEN P.O.# 5337
METHOD: EPA PROTOCOL # 13.0.4.G-1

STANDARD:

SRM #:1681B

CYL #:CLM4470

CONC.:975PPM

INSTRUMENT:
BECKMAN
COMPONENT: NDIR

MODEL #: 865

SERIAL #: 0103409

LAST CAL.: 4-2-93

		REPLICATE CONC.	
COMPONENT:	CO		
MEAN CONC:	620PPM	DATE: 6-30-93	DATE: 7-7-93
		623PPM	618PPM
		620PPM	616PPM
		621PPM	619PPM

		REPLICATE CONC.	
COMPONENT:			
MEAN CONC:		DATE:	DATE:

		REPLICATE CONC.	
COMPONENT:			
MEAN CONC:		DATE:	DATE:

BALANCE GAS:N2

NATIONAL SPECIALTY GASES•630 UNITED DRIVE•DURHAM, N.C. 27713•(919) 544-3772

CERTIFICATE OF ANALYSIS-EPA PROTOCOL MIXTURES

REFERENCE #: 88-41643 CYLINDER #: CC35905 CYL. PRESSURE:2000PSIG CUSTOMER:TWIN CITY
EXPIRATION DATE: 7/25/98 LAST ANALYSIS DATE: 7/25/95 P.O.#:SHELIA
METHOD: ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS-SEPTEMBER 1993:G-1.
THIS STANDARD SHOULD NOT BE USED WHEN ITS GAS PRESSURE IS BELOW 1.0 MEGAPASCALS (150PSIG).

STANDARD:
SRM #: 1667B
CYL. #: CLM5293
CONC.: 47.3PPM
INSTRUMENT:ROSEMOUNT THC
MODEL#:400A
SERIAL #:2000335
LAST CAL.:7/14/95

COMPONENT:PROPANE
MEAN CONC:30.6 ± 0.31PPM
REPLICATE CONC.
DATE:7/25/95 DATE:
30.6PPM
30.5PPM
30.6PPM

STANDARD:
SRM #:
CYL. #:
CONC.:
INSTRUMENT:
MODEL #:
SERIAL #:
LAST CAL.:

COMPONENT:
MEAN CONC:
REPLICATE CONC.
DATE: DATE:

STANDARD:
SRM #:
CYL. #:
CONC.:
INSTRUMENT:
MODEL #:
SERIAL #:
LAST CAL.:

COMPONENT:
MEAN CONC:
REPLICATE CONC.
DATE: DATE:

BALANCE GAS:AIR

COMPONENT:PROPANE
REPLICATE DATA
DATE: 7/25/95

Z	0	R	47.3	C	30.6
R	47.3	Z	0	C	30.5
Z	0	C	30.6	R	47.3

DATE:

Z	R	C
R	Z	C
Z	C	R

COMPONENT:
REPLICATE DATA
DATE:

Z	R	C
R	Z	C
Z	C	R

DATE:

Z	R	C
R	Z	C
Z	C	R

COMPONENT:
REPLICATE DATA
DATE:

Z	R	C
R	Z	C
Z	C	R

DATE:

Z	R	C
R	Z	C
Z	C	R

Z=ZERO C=CANDIDATE R=REFERENCE

ANALYST: Richard Sykes APPROVED BY: [illegible]

"THIS REPORT STATED ACCURATELY THE RESULTS OF THE INVESTIGATION MADE UPON THE MATERIAL SUBMITTED TO THE ANALYTICAL LABORATORY. EVERY EFFORT HAS BEEN MADE TO DETERMINE OBJECTIVELY THE INFORMATION REQUESTED; HOWEVER, IN CONNECTION WITH ITS RENDERING OF THIS REPORT, NATIONAL SPECIALTY GASES SHALL HAVE NO LIABILITY IN EXCESS OF ITS ESTABLISHED CHARGE FOR THE SERVICE."

Air Products and Chemicals, Inc.
SPECIALTY GAS DEPARTMENT
12722 S. WENTWORTH AVENUE
CHICAGO, IL 60628

Certificate of Analysis - EPA Protocol Gas Standard

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
AIR PRODUCTS & CHEMICALS, INC.
373 CANTERBURY ROAD
SHAKOPEE MN 55379

Notes:

PO: Rel:

Order No: CSS-320133-01
Batch No: 861-29310

Cylinder No: SG9165627BAL
Cylinder Pressure*: 2000 psig
Certification Date: 12/04/95
Expiration Date: 12/04/98

*** Certified Concentration ***		********* Reference Standards *********			************** Analytical Instrumentation **************			
Component	Certified Concentration	Cylinder #	Standard Number	Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
PROPANE	287 ±3.2 PPM	SG9128611BAL	GMIS	351.5000 PPM	Gow-Mac 750	59405U	11/14/95	GC-FID

Balance Gas: AIR
Oxygen Concentration 20.2 %

* Standard should not be used below 150 psig

Analyst: Richard VanDyke

Approved By: Richard Fry

APPENDIX I

PROCESS RATE INFORMATION

SAGOLA DRYER/PRESS TESTS

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SAGOLA TEST SCHEDULE JULY 23-25,1996

Dryer

	POLLUTANT	RUN #1	RUN #2	RUN #3
7-23	PM,CO,NOX	*1130-1330*	*1436-1543*	*1645-1751*
(100% PINE)		*shutdown 1138-1230*		
7-23	VOC	*1435-1535*	*1645-1745*	*1925-2025*
(100% PINE)				
7-24	HCHO	*1710-1828*	*1915-2020*	*2040-2144*

E-Tube/RTO

	POLLUTANT	RUN #1	RUN #2	RUN #3
7-23	NOX,CO,VOC	*1435-1535*	*1645-1745*	*1925-2025*
(100% PINE)				
7-24	HCHO	*1710-1828*	*1915-2020*	*2040-2144*

Press

	POLLUTANT	RUN #1	RUN #2	RUN #3
7-24	PM	*1835-1936*	*2005-2108*	*2137-2237*
7-25	HCHO	*0937-1039*	*1235-1336*	*1410-1512*
(100% PINE)				
7-25	MDI,PHENOL,VOC,	*1620-1720*	*1800-1900*	*1935-2035*
(100% PINE)	NOX,CO			

SAGOLA TESTING JULY 23-25, 1996
Process data summary

DRYER JULY 23, 1996 - PM,CO,NOX
29.02 =PressProduction rate in Tons per hour
70,689 =Production rate of both dryers in pounds per hour
6.33 =Total fuel burned in tons per hour
43.84% =average incoming moisture percent
6.04% =average dry moisture percent
984 =average inlet temperature
1,548 =average RTO burner temperature #1
1,558 =average RTO burner temperature #2
1,542 =average RTO burner temperature #3

DRYER JULY 23, 1996 - VOC
31.80 =PressProduction rate in Tons per hour
77,163 =Production rate of both dryers in pounds per hour
6.78 =Total fuel burned in tons per hour
39.91% =average incoming moisture percent
5.77% =average dry moisture percent
992 =average inlet temperature
1,557 =average RTO burner temperature #1
1,569 =average RTO burner temperature #2
1,551 =average RTO burner temperature #3

DRYER JULY 24, 1996 - HCHO
31.31 =PressProduction rate in Tons per hour
75,385 =Production rate of both dryers in pounds per hour
6.39 =Total fuel burned in tons per hour
32.31% =average incoming moisture percent
6.37% =average dry moisture percent
886 =average inlet temperature
1,539 =average RTO burner temperature #1
1,540 =average RTO burner temperature #2
1,540 =average RTO burner temperature #3

E-TUBE/RTO JULY 23, 1996 - NOX,CO,VOC
31.80 =PressProduction rate in Tons per hour
77,163 =Production rate of both dryers in pounds per hour
6.78 =Total fuel burned in tons per hour
39.91% =average incoming moisture percent
5.77% =average dry moisture percent
992 =average inlet temperature
1,557 =average RTO burner temperature #1
1,569 =average RTO burner temperature #2
1,551 =average RTO burner temperature #3

E-TUBE/RTO JULY 24, 1996 - HCHO
31.31 =PressProduction rate in Tons per hour
75,385 =Production rate of both dryers in pounds per hour
6.39 =Total fuel burned in tons per hour
32.31% =average incoming moisture percent
6.37% =average dry moisture percent
886 =average inlet temperature
1,539 =average RTO burner temperature #1
1,540 =average RTO burner temperature #2
1,540 =average RTO burner temperature #3

PRESS JULY 24, 1996 - PM
30.34 =Plant Production rate in Tons per hour
792.33 =MDI resin usage in pounds per hour
1.31% =MDI resin usage as % of finished product
1,502.67 =Liquid phenolic resin usage in pounds per hour (100% solids)
2.48% =Liquid phenolic resin usage as % of finished product (100% solids)
693.67 =Wax usage in pounds per hour
1.14% =Wax usage as % of finished product

PRESS JULY 25, 1996 - HCHO
28.50 =Plant Production rate in Tons per hour
836.67 =MDI resin usage in pounds per hour
1.47% =MDI resin usage as % of finished product
1,761.67 =Liquid phenolic resin usage in pounds per hour (100% solids)
3.09% =Liquid phenolic resin usage as % of finished product (100% solids)
696.33 =Wax usage in pounds per hour
1.22% =Wax usage as % of finished product

PRESS JULY 25, 1996 - MDI,PHENOL
30.48 =Plant Production rate in Tons per hour
793.00 =MDI resin usage in pounds per hour
1.30% =MDI resin usage as % of finished product
1,706.33 =Liquid phenolic resin usage in pounds per hour (100% solids)
2.80% =Liquid phenolic resin usage as % of finished product (100% solids)
677.00 =Wax usage in pounds per hour
1.11% =Wax usage as % of finished product

DRYER JULY 23rd, 1996
PM,NOX,CO

DATA TIME:						
START=	11:30	END=	11:38	HOURS=	0.13
START=	12:30	END=	13:30	HOURS=	1.00
START=	14:36	END=	15:43	HOURS=	1.12
START=	16:45	END=	17:51	HOURS=	1.10
				TOTAL=	3.35

BOARD WEIGHTS - LBS
average weights determined by taking finished bundle weghts.

7/16"	
per/peice	50.01
per/ 8' x 24'	300.03

4500.5 lb= average bundle weight
90 piece units

PLANT PRODUCTION RATE
3.35 =hours during testing
54 =pressloads
648 =no. of 8'x24' boards produced (pressloads x 12 boards per load)
124,416 =volume produced in surface footage (pressloads x 8'x24'x12 openings)
145,156 =volume produced 3/8" basis (pressloads x 8'x24'x 12 openings x 1.1667)
194,422 =lbs of finished product (boards produced x weight of finished board)
58,037 =lbs of finished product per hour (lbs of finshed product / hours)
29.02 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT
SURFACE
8 =SURFACE fuel calibration in pounds per count
1,882 =SURFACE counts during testing hours
15,056 =SURFACE lbs of fuel burned during testing
3.35 =hours during testing
4,494 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.25 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8,500 =estimated BTU content per pound of dry fuel,
38.2 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
888 =average inlet temperature
32.33 =average incoming moisture percent
6.17 =average dry moisture percent
CORE
7.96 =CORE fuel calibration in pounds per count
1,709 =CORE counts during testing hours
13,604 =CORE lbs of fuel burned during testing
3.35 =hours during testing
4,061 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.03 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8,500 =estimated BTU content per pound of dry fuel,
34.5 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1,033 =average inlet temperature
49.60 =average incoming moisture percent
6.40 =average dry moisture percent
SURFACE/CORE
7.42 =SURFACE/CORE fuel calibration in pounds per count
1,850 =SURFACE/CORE counts during testing hours
13,727 =SURFACE/CORE lbs of fuel burned during testing
3.35 =hours during testing
4,098 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.05 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8,500 =estimated BTU content per pound of dry fuel,
34.8 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1,032 =average inlet temperature
49.60 =average incoming moisture percent
5.54 =average dry moisture percent

DRYER THROUGHPUT RATE
12,653 =Total pounds of fuel burned per hour in Core,Surface and Surface/Core Dryers
58,037 =lbs of finished product per hour (lbs of finshed product / hours)
70,689 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
3,055 = weight of trim per hour at 5.0% of finished product
9,598 =weight of screened fines per hour (total fuel - trim)
13.58% =resulting loss to fines as percentage of dryer throughput

11.78 ODTPH

DRYER JULY 23rd, 1996
VOC

DATA TIME	START=	14:35	END=	15:35	HOURS=	1.00
	START=	16:45	END=	17:45	HOURS=	1.00
	START=	19:25	END=	20:25	HOURS=	1.00
					TOTAL=	3.00

BOARD WEIGHTS - LBS
average weights determined by taking finished bundle weghts.

7/16"
per/peice 50.01
per/ 8' x 24' 300.03

4500.5 lb= average
bundle weight
90 piece units

PLANT PRODUCTION RATE
3.00 =hours during testing
53 =pressloads
636 =no. of 8'x24' boards produced (pressloads x 12 boards per load)
122,112 =volume produced in surface footage (pressloads x 8'x24'x12 openings)
142,468 =volume produced 3/8" basis (pressloads x 8'x24'x 12 openings x 1.1667)
190,822 =lbs of finished product (boards produced x weight of finished board)
63,607 =lbs of finished product per hour (lbs of finshed product / hours)
31.80 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT
SURFACE
8 =SURFACE fuel calibration in pounds per count
1,804 =SURFACE counts during testing hours
14,432 =SURFACE lbs of fuel burned during testing
3.00 =hours during testing
4,811 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.41 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8,500 =estimated BTU content per pound of dry fuel,
40.9 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
877 =average inlet temperature
29.93 =average incoming moisture percent
5.99 =average dry moisture percent
CORE
7.96 =CORE fuel calibration in pounds per count
1,591 =CORE counts during testing hours
12,664 =CORE lbs of fuel burned during testing
3.00 =hours during testing
4,221 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.11 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8,500 =estimated BTU content per pound of dry fuel,
35.9 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1,004 =average inlet temperature
44.90 =average incoming moisture percent
5.87 =average dry moisture percent
SURFACE/CORE
7.42 =SURFACE/CORE fuel calibration in pounds per count
1,829 =SURFACE/CORE counts during testing hours
13,571 =SURFACE/CORE lbs of fuel burned during testing
3.00 =hours during testing
4,524 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.26 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8,500 =estimated BTU content per pound of dry fuel,
38.5 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1,096 =average inlet temperature
44.90 =average incoming moisture percent
5.44 =average dry moisture percent

DRYER THROUGHPUT RATE
13,556 =Total pounds of fuel burned per hour in Core,Surface and Surface/Core Dryers
63,607 =lbs of finished product per hour (lbs of finshed product / hours)
77,163 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances) 12.85 ODT
3,348 = weight of trim per hour at 5.0% of finished product
10,208 =weight of screened fines per hour (total fuel - trim)
13.23% =resulting loss to fines as percentage of dryer throughput

E-TUBE/RTO JULY 23rd, 1996
VOC

DATA TIME	START=	14:35	END=	15:35	HOURS=	1.00
	START=	16:45	END=	17:45	HOURS=	1.00
	START=	19:25	END=	20:25	HOURS=	1.00
					TOTAL=	3.00

BOARD WEIGHTS - LBS
average weights determined by taking finished bundle weghts.

7/16"
per/peice 50.01
per/ 8' x 24' 300.03

4500.5 lb= average bundle weight 90 piece units

PLANT PRODUCTION RATE
3.00 =hours during testing
53 =pressloads
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122,112 =volume produced in surface footage (pressloads x 8'x24'x12 openings)
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29.93 =average incoming moisture percent
5.99 =average dry moisture percent
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7.96 =CORE fuel calibration in pounds per count
1,591 =CORE counts during testing hours
12,664 =CORE lbs of fuel burned during testing
3.00 =hours during testing
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2.11 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8,500 =estimated BTU content per pound of dry fuel,
35.9 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1,004 =average inlet temperature
44.90 =average incoming moisture percent
5.87 =average dry moisture percent
SURFACE/CORE
7.42 =SURFACE/CORE fuel calibration in pounds per count
1,829 =SURFACE/CORE counts during testing hours
13,571 =SURFACE/CORE lbs of fuel burned during testing
3.00 =hours during testing
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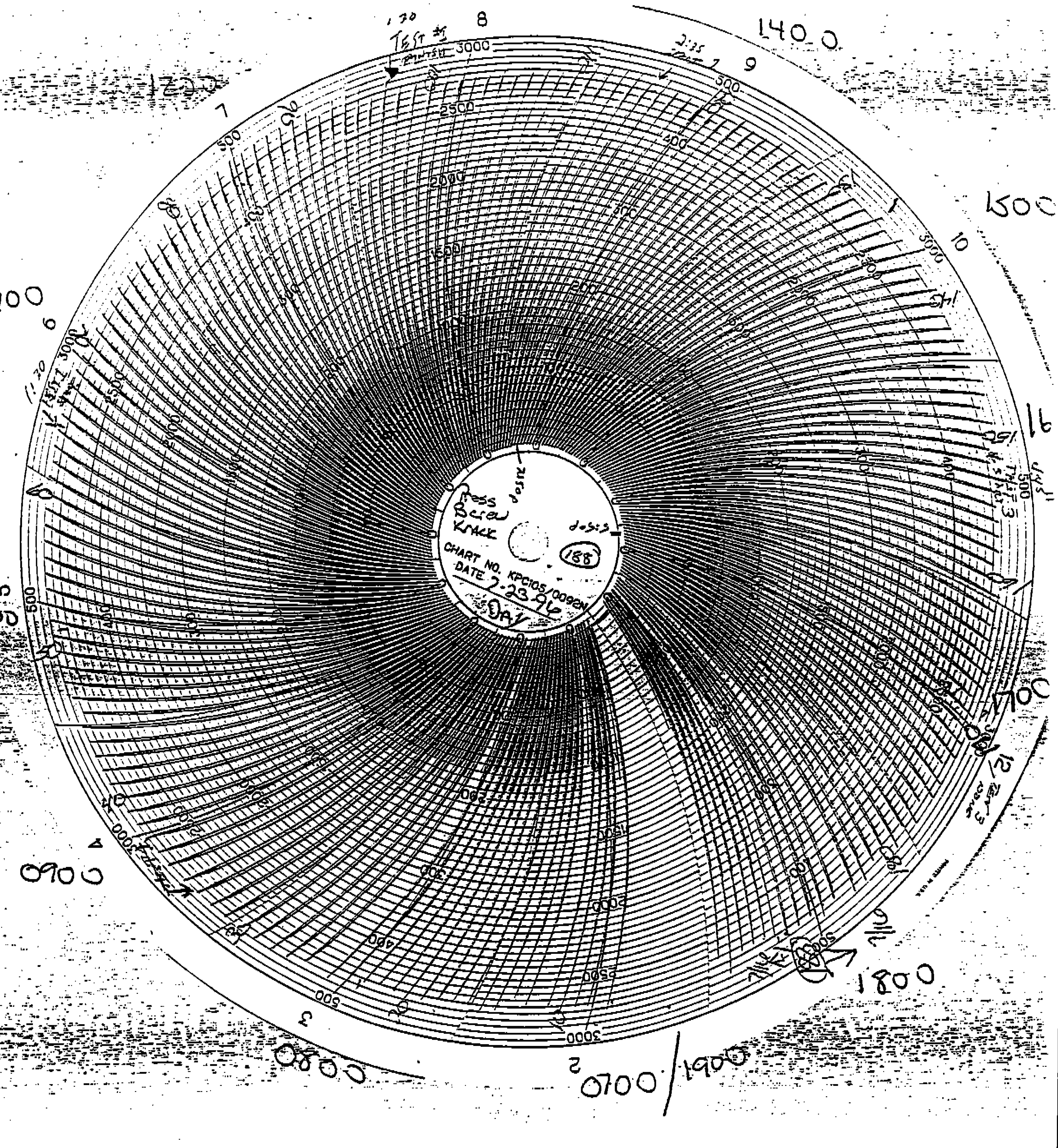
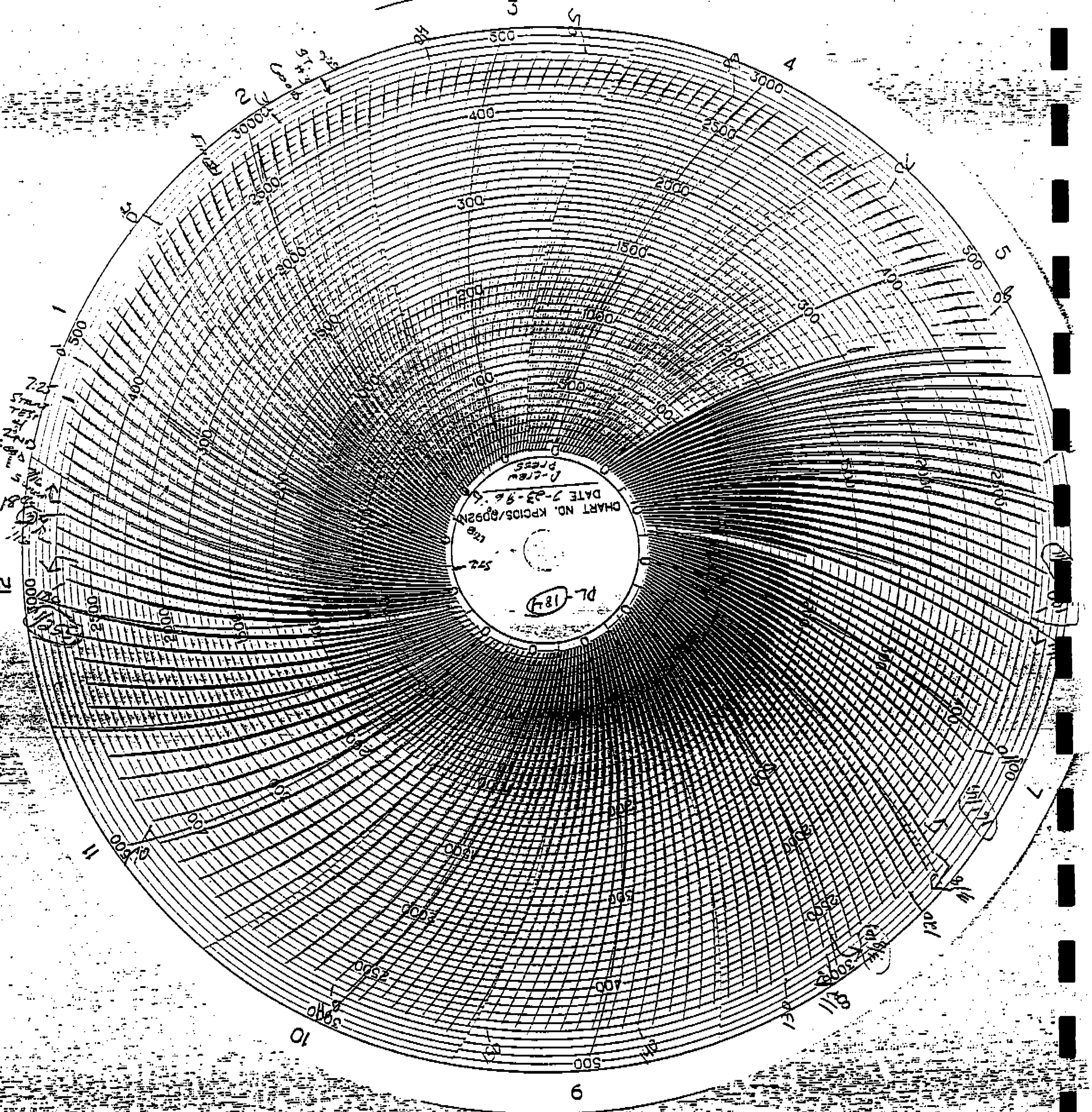
38.5 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
1,096 =average inlet temperature
44.90 =average incoming moisture percent
5.44 =average dry moisture percent

DRYER THROUGHPUT RATE
13,556 =Total pounds of fuel burned per hour in Core,Surface and Surface/Core Dryers
63,607 =lbs of finished product per hour (lbs of finshed product / hours)
77,163 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
3,348 = weight of trim per hour at 5.0% of finished product
10,208 =weight of screened fines per hour (total fuel - trim)
13.23% =resulting loss to fines as percentage of dryer throughput



SAGOLA PRESS
7/23/96
0700 - 1900

6



SAGOLA PRESS
7/23/96
1900 - 0700

7

LOUISIANA-PACIFIC CORPORATION
SAGOLA, MICHIGAN PRESS REPORT

OPERATOR Krackenberger DATE 2-23-96
SHIFT DAY CREW B

BLOW OUT ______
F.L RADIATORS ______
HYD. COOLING FANS ______
PRS COOLING FANS ______
F.C.O.S. ______
FORMER DECK ______
LOADER ______
UNLOADER ______
PRESS ______

GREASE COLUMNS ______
FLUSH BLENDER ______
BAGHOUSE PRES. ______
HYD OIL TEMP ______
INSP. PIT/RET CONVS ______
CLEAN DECKLE CHAIN ______
CLEAN BLENDERS ______
CLEAN TAIL PULLEYS ______

LN SPD	FROM	TO	THICK	PRESS LDS	FOOTAGE
93	7:00	8:00	7/16	—	—
86	8:00	8:15	7/16	—	—
83	8:15	8:45	7/16	—	—
78	8:45	1:00	7/16		
85	1:00	7:00	7/16	(188)	(505,358)

7,42

DOWNTIME

FROM	TO	M	E	O	MINS.	REASON FOR DOWN TIME
7:20	7:45	✓	✓	✓	25	sched Maint
8:00	8:02	✓			2	FCOS Plug
8:55	8:58	✓			3	" "
8:27	8:28	✓			1	Backed up
6:37	6:39				2	sawline Jam
					(33)	

M-MECHANICAL E-ELECTRICAL O-OPERATOR 20 332

TIME TO POSITION (SECONDS)

#	Sec	#	Sec	#	Sec	#	Sec
1	47	61	73	121	64	181	73
2	49	62	77	122	69	182	72
3	49	63	73	123	63	183	71
4	47	64	75	124	64	184	70
5	47	65	78	125	63	185	71
6	48	66	74	126	61	186	67
7	46	67	72	127	63	187	66
8	50	68	70	128	62	188	66
9	49	69	70	129	62	189	
10	47	70	70	130	64	190	
11	47	71	71	131	65	191	
12	50	72	71	132	65	192	
13	52	73	72	133	68	193	
14	51	74	71	134	67	194	
15	51	75	70	135	67	195	
16	52	76	71	136	68	196	
17	55	77	71	137	71	197	
18	56	78	71	138	71	198	
19	53	79	71	139	72	199	
20	52	80	72	140	73	200	
21	52	81	70	141	70	201	
22	51	82	71	142	70	202	
23	52	83	72	143	69	203	
24	52	84	72	144	69	204	
25	53	85	70	145	67	205	
26	68	86	70	146	68	206	
27	69	87	72	147	66	207	
28	70	88	69	148	67	208	
29	72	89	69	149	67	209	
30	71	90	68	150	68	210	
31	75	91	70	151	65	211	
32	75	92	68	152	63	212	
33	81	93	69	153	65	213	
34	83	94	69	154	66	214	
35	84	95	68	155	67	215	
36	80	96	66	156	67	216	
37	78	97	67	157	65	217	
38	74	98	66	158	64	218	
39	73	99	64	159	67	219	
40	71	100	66	160	67	220	
41	71	101	62	161	66	221	
42	70	102	64	162	68	222	
43	70	103	65	163	68	223	
44	69	104	66	164	69	224	
45	70	105	63	165	68	225	
46	68	106	63	166	69	226	
47	69	107	64	167	69	227	
48	70	108	63	168	68	228	
49	71	109	65	169	67	229	
50	70	110	66	170	68	230	
51	70	111	68	171	69	231	
52	74	112	68	172	68	232	
53	72	113	67	173	69	233	
54	72	114	67	174	67	234	
55	74	115	67	175	67	235	
56	76	116	65	176	68	236	
57	75	117	66	177	68	237	
58	79	118	67	178	70	238	
59	75	119	67	179	71	239	
60	73	120	65	180	72	240	

(8)

LOUISIANA-PACIFIC CORPORATION
SAGOLA, MICHIGAN PRESS REPORT

OPERATOR Levi DATE 7-23-96
SHIFT Nite CREW D

BLOW OUT		GREASE COLUMNS	
F.L RADIATORS		FLUSH BLENDER	
HYD. COOLING FANS		BAGHOUSE PRES.	
PRS COOLING FANS		HYD OIL TEMP	
F.C.O.S.		INSP. FIT/RET CONVS	
FORMER DECK		CLEAN DECKLE CHAIN	
LOADER		CLEAN BLENDERS	
UNLOADER		CLEAN TAIL PULLEYS	
PRESS			

93 - softwood 7/16
7 - Aspen 7/16

	LN SPD	FROM	TO	THICK	PRESS LDS	FOOTAGE
4.87	84	7:00	1:08	7/16	100	268,808
16.5	90	1:08	2:05	1/4	16	24577
15.0	90	2:05	2:38	3/8	10	23,040
104.8	81	2:38	6:49	1/2	55	168,956
	81	6:49		7/16	3	8064
					(184)	(493,445)

DOWNTIME

FROM	TO	M	E	O	MINS.	REASON FOR DOWN TIME
10:48	10:53				5	Dropped #8 unloader
10:55	10:57				2	unloader out of sequence
1:17	1:20				3	SAWline
6:02	6:03				1	TCF - Plugging
					(11)	

M-MECHANICAL E-ELECTRICAL O-OPERATOR

TIME TO [illegible] (SECONDS)

1	66	61	74	121	48	181	49
2	64	62	74	122	46	182	46
3	64	63	73	123	45	183	47
4	65	64	73	124	45	184	49
5	64	65	72	125	42	185	
6	65	66	70	126	44	186	
7	66	67	70	127	46	187	
8	67	68	70	128	43	188	
9	69	69	69	129	44	189	
10	72	70	68	130	49	190	
11	69	71	69	131	47	191	
12	70	72	70	132	47	192	
13	73	73	69	133	47	193	
14	70	74	71	134	51	194	
15	68	75	72	135	50	195	
16	69	76	73	136	49	196	
17	69	77	73	137	49	197	
18	68	78	75	138	47	198	
19	68	79	75	139	48	199	
20	69	80	73	140	48	200	
21	70	81	74	141	47	201	
22	71	82	73	142	46	202	
23	72	83	74	143	47	203	
24	70	84	74	144	45	204	
25	73	85	75	145	45	205	
26	78	86	75	146	47	206	
27	84	87	74	147	47	207	
28	82	88	74	148	49	208	
29	83	89	69	149	49	209	
30	80	90	69	150	50	210	
31	80	91	66	151	50	211	
32	80	92	64	152	47	212	
33	78	93	62	153	47	213	
34	73	94	58	154	46	214	
35	72	95	50	155	46	215	
36	72	96	52	156	45	216	
37	72	97	51	157	47	217	
38	73	98	51	158	47	218	
39	75	99	51	159	51	219	
40	72	100	52	160	51	220	
41	75	101	46	161	56	221	
42	74	102	46	162	53	222	
43	74	103	44	163	52	223	
44	73	104	44	164	50	224	
45	73	105	44	165	46	225	
46	75	106	45	166	46	226	
47	75	107	43	167	47	227	
48	73	108	43	168	52	228	
49	73	109	45	169	50	229	
50	74	110	42	170	50	230	
51	76	111	43	171	50	231	
52	75	112	44	172	53	232	
53	74	113	43	173	55	233	
54	72	114	44	174	55	234	
55	74	115	43	175	55	235	
56	75	116	43	176	56	236	
57	77	117	40	177	51	237	
58	74	118	49	178	52	238	
59	75	119	48	179	55	239	
60	74	120	49	180	53	240	

LOUISIANA-PACIFIC CORPORATION SAGOLA, MI

SUPERVISOR [illegible] SHIFT [illegible] CREW [illegible] DATE 7-23-96

SHIFT OPERATING REPORT

PRESS OPERATION

LINE SPEED	FROM	TO	THICKNESS	PRESS LOADS	3/8" FOOTAGE	Minutes Downtime M	E	O
83	7:00	7:00	7/16	188	505358	33		
		TOTAL		188	505358	33	-	-

Dryer Lamp Test (OK)	✓
Surface Dryer Fan Load	90
Core Dryer Fan Load	91
Surf / Core Dryer Fan Load	88
#1 Baghouse Pressure	✓
#2 Baghouse Pressure	✓
Surface Wet Bin Volume*	40
Core Wet Bin Volume*	30
Surf/Core Wet Bin Volume*	70
Surface Dry Bin Volume*	65
Core Dry Bin Volume*	58
Raidig Bin	65%

NATURAL GAS METER READINGS
(taken end of the shift)

MAIN	01268315[illegible]
PRESS RTO	5972[illegible]
DRYER RTO	1479072[illegible]
GEKA	0823986
S DRYER	
C DRYER	
S/C DRYER	

GEKA EFB	BED KV	ION KV	ION MA	EFB - P	BH - P
	10	31	71	2.3	1.5

FLAKER RUN HOURS

#1 T.L.F	#2 T.L.F

BARK % MOISTURE	37.7%	FUEL % MOISTURE	20%
		GRECONS [illegible]	[illegible]

LOG COUNT not counting [illegible]

#1 6592 #2 1588 = 8180 TOTAL

BARK FUEL COUNT: A 297 B 297

DRYER OPERATION

	Dry Fuel Usage Lbs.	Gas Usage Hrs.	Sust. Gas Usage Hrs.	Average Inlet Temp.	Running Time Mins	Ave. Wet Moisture	Ave. Dry Moisture
Surface	5926	0	/	919	720	4.6	6.4
Core	5718	15 mins	0	990	726	4.2	6.1
S/Core	5463	2.05	/	941	720	4.5	5.6

COMMENTS: 25 min [illegible] [illegible] DT [illegible] [illegible] DT

10

LOUISIANA-PACIFIC CORPORATION SAGOLA, MI

SUPERVISOR Dave DeNatz SHIFT Nights CREW D DATE 7-23-96

SHIFT OPERATING REPORT

PRESS OPERATION

LINE SPEED	FROM	TO	THICKNESS	PRESS LOADS	3/8" FOOTAGE	Minutes Downtime M	E	O
84	7:00	1:08	7/16	100	—	7		
90	1:08	2:05	1/4	16	24,577	3		
90	2:05	2:38	3/8	10	23,040			
81	2:38	6:49	1/2	55	168,956	1		
81	6:49	7:00	7/16	3	276,872			
			TOTAL	184	493,445	11		

Dryer Lamp Test (OK)	ok
Surface Dryer Fan Load	93.6
Core Dryer Fan Load	93.1
Surf / Core Dryer Fan Load	87.8
#1 Baghouse Pressure	ok
#2 Baghouse Pressure	ok
Surface Wet Bin Volume*	75
Core Wet Bin Volume*	68
Surf/Core Wet Bin Volume*	75
Surface Dry Bin Volume*	65
Core Dry Bin Volume*	75
Laidig Bin	45 %

NATURAL GAS METER READINGS (taken end of the shift)

MAIN	0127083000
PRESS RTO	59780430
DRYER RTO	14836110
GEKA	03239810
S DRYER	
C DRYER	
S/C DRYER	

GEKA EFB	BED KV	ION KV	ION MA	EFB - P	BH - P
	8.2	21	.8	3.4	1.9

FLAKER RUN HOURS

#1 T.L.F	#2 T.L.F
396	411

BARK % MOISTURE	37.6%	FUEL % MOISTURE	2.8%
		GRECONS 15	

LOG COUNT

#1 6270 #2 1567 = 7837 TOTAL

BARK FUEL COUNT: A 321 B 321

DRYER OPERATION

	Dry Fuel Usage Lbs.	Gas Usage Hrs.	Sust. Gas Usage Hrs.	Average Inlet Temp.	Running Time Mins	Ave. Wet Moisture	Ave. Dry Moisture
Surface	5839	10min.	92	837°	~~720~~ 719	40.2	5.9
Core	5421	ø	252	962°	720	40.8	5.9
S/Core	4625	3hrs 55min	56	1041°	720	41.4	6.0

COMMENTS: N.M.D.T. 11 min mise.

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DAILY PRODUCTION REPORT — LOUISIANA-PACIFIC CORPORATION — SAGOLA, MICHIGAN

DATE: JULY 23,1996 DAY: TUESDAY

SHIFT	BOARD SIZE	PRESS LOADS	NO. OF PANELS	SURFACE FOOTAGE	3/8" FOOTAGE
7AM.	7/16"	188	13,536	433,152	505,358
TO	0	0	0	0	0
7PM.	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
B	0	0	0	0	0
CREW	0	0	0	0	0
			SHIFT	TOTAL	505,358
7PM.	1/4"	16	1,152	36,864	24,577
TO	3/8"	10	720	23,040	23,040
7AM.	1/2"	55	3,960	126,720	168,956
	7/16"	103	7,416	237,312	276,872
D	0	0	0	0	0
CREW	0	0	0	0	0
			SHIFT	TOTAL	493,445
DAILY	TOTAL	372	26,784	857,088	998,803
			TOTAL	WTD	5,053,127
			TOTAL	MTD	24,901,742
			TOTAL	YTD	191,073,535

	SCHED. RUN HOURS	NET RUN HOURS	% RUN TIME	% PLANT CAP.
DAY	11.50	11.50	100.0%	134.7%
NIGHT	12.00	11.75	97.9%	126.0%
DAILY	23.50	23.25	98.9%	130.3%
WTD	115.50	113.50	98.3%	
MTD	601.75	550.00	91.4%	
YTD	4,684.00	4,414.50	94.2%	

FOREMAN	% PLANT CAP
"A" M. MESSINA	132.0%
"B" D. SPIGARELLI	139.1%
"C" F. SHOQUIST	135.0%
"D" D. DONATI	142.1%

LOG CNT.	DAILY	WTD	MTD
A CREW	0	36,215	130,597
B CREW	8,180	17,018	143,318
C CREW	0	34,332	131,563
D CREW	7,837	16,504	143,814

MTD 3/8" FOOTAGE

1/4"	202,761	1/2"	4,094,875	23/32"SE	0
3/8"	85,248	19/32"SE	988,587	23/32"H	5,966,122
7/16"	11,007,677	19/32"H	164,156	7/8"H	295,676
15/32"	2,096,640	5/8"	0	1 1/8"	0

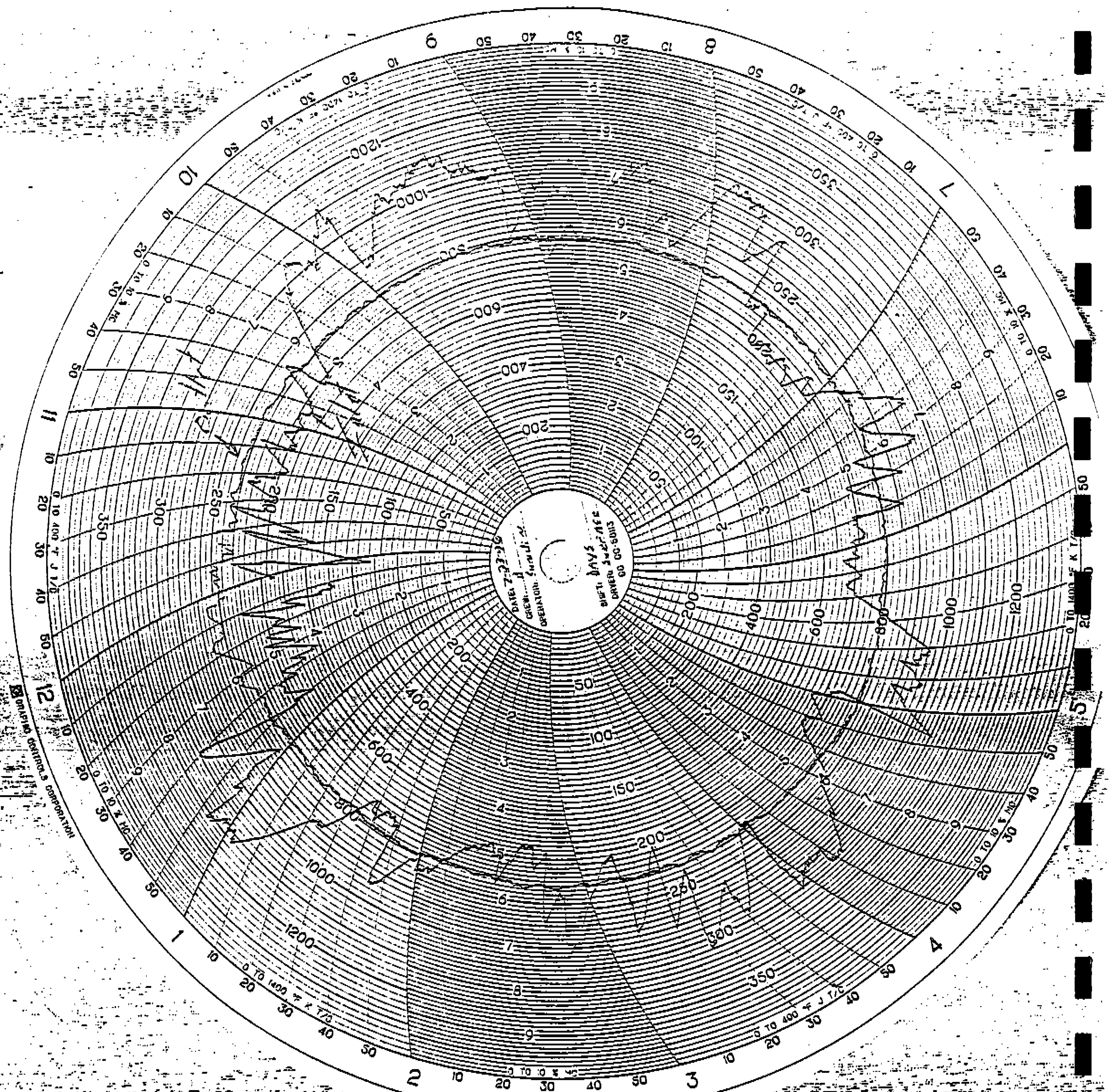
GAS USAGE (MCF)	DAY	MTD
SURFACE DRYER	0	16,865
CORE DRYER	0	0
S/C DRYER	0	0
GEKA	0	0
PRESS RTO	0	0
DRYER RTO	0	0
TOTAL	461	16,865

DOWNTIME

DAY SHIFT B-CREW 25 MIN. SCHEDULED MAINT; 8 MIN. MISC.

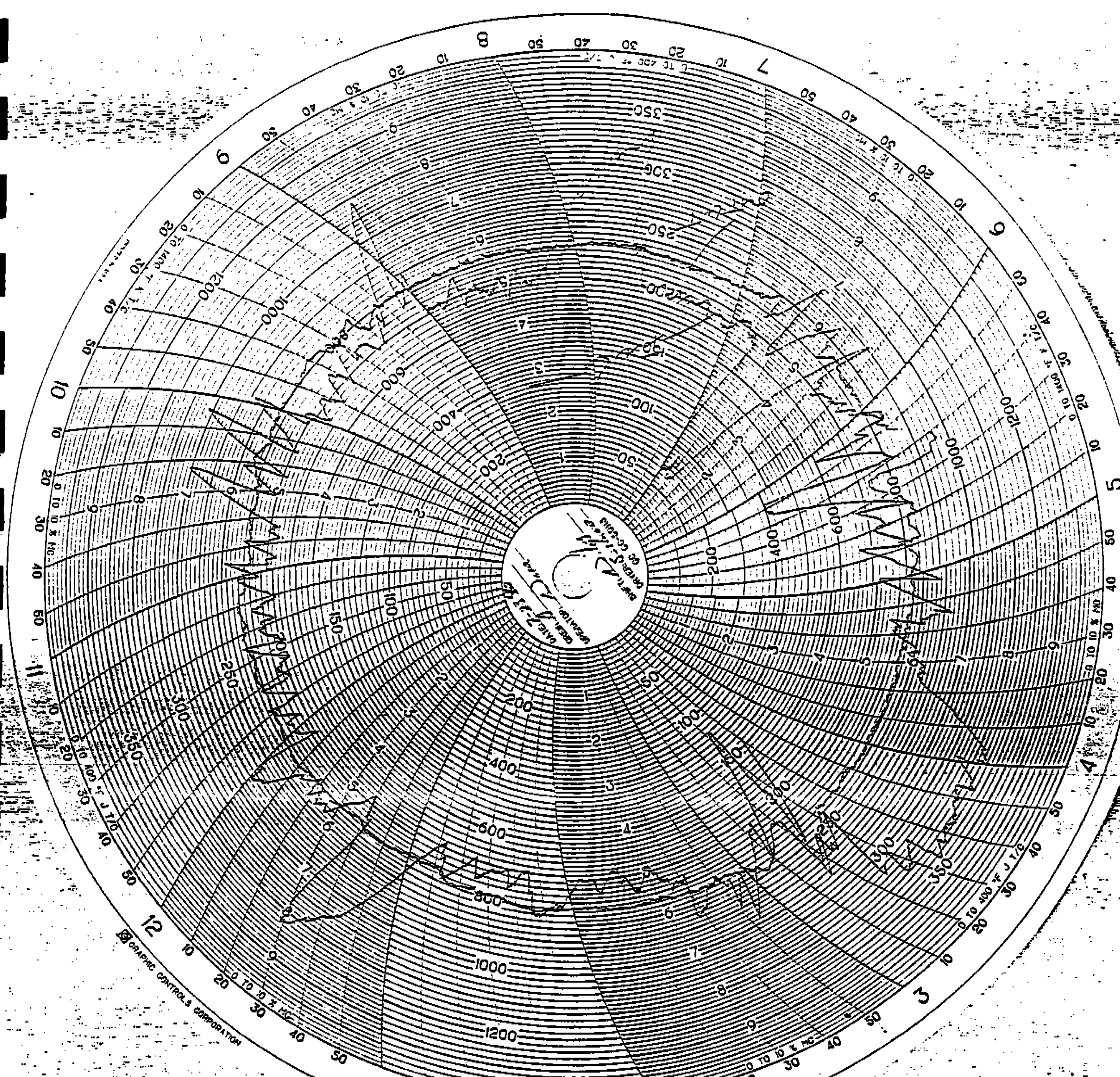
NIGHT SHIFT D-CREW 11 MIN. MISC.

2

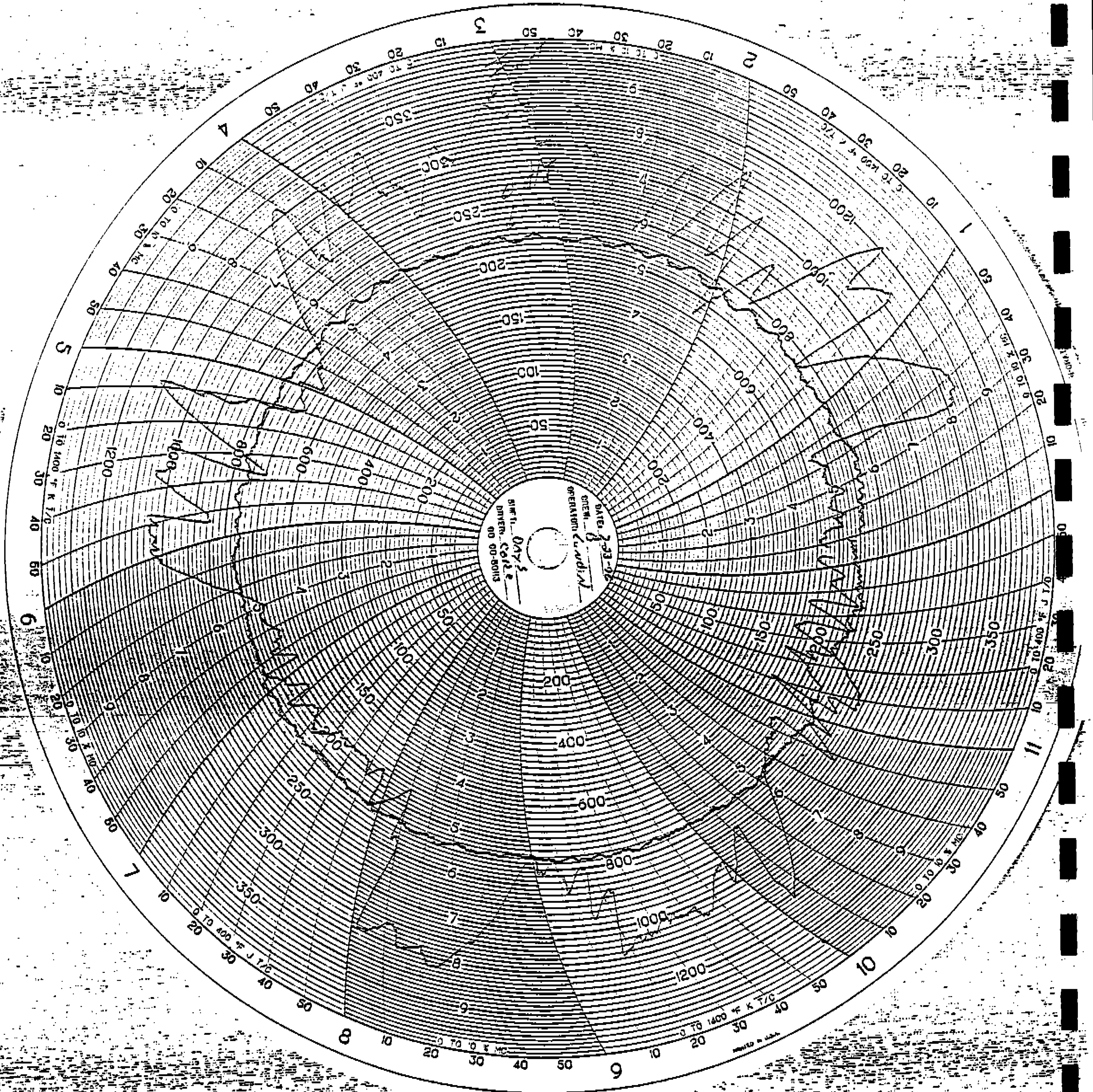


SAGOLA SURF. DRY
7/23/96
0700-1900

13

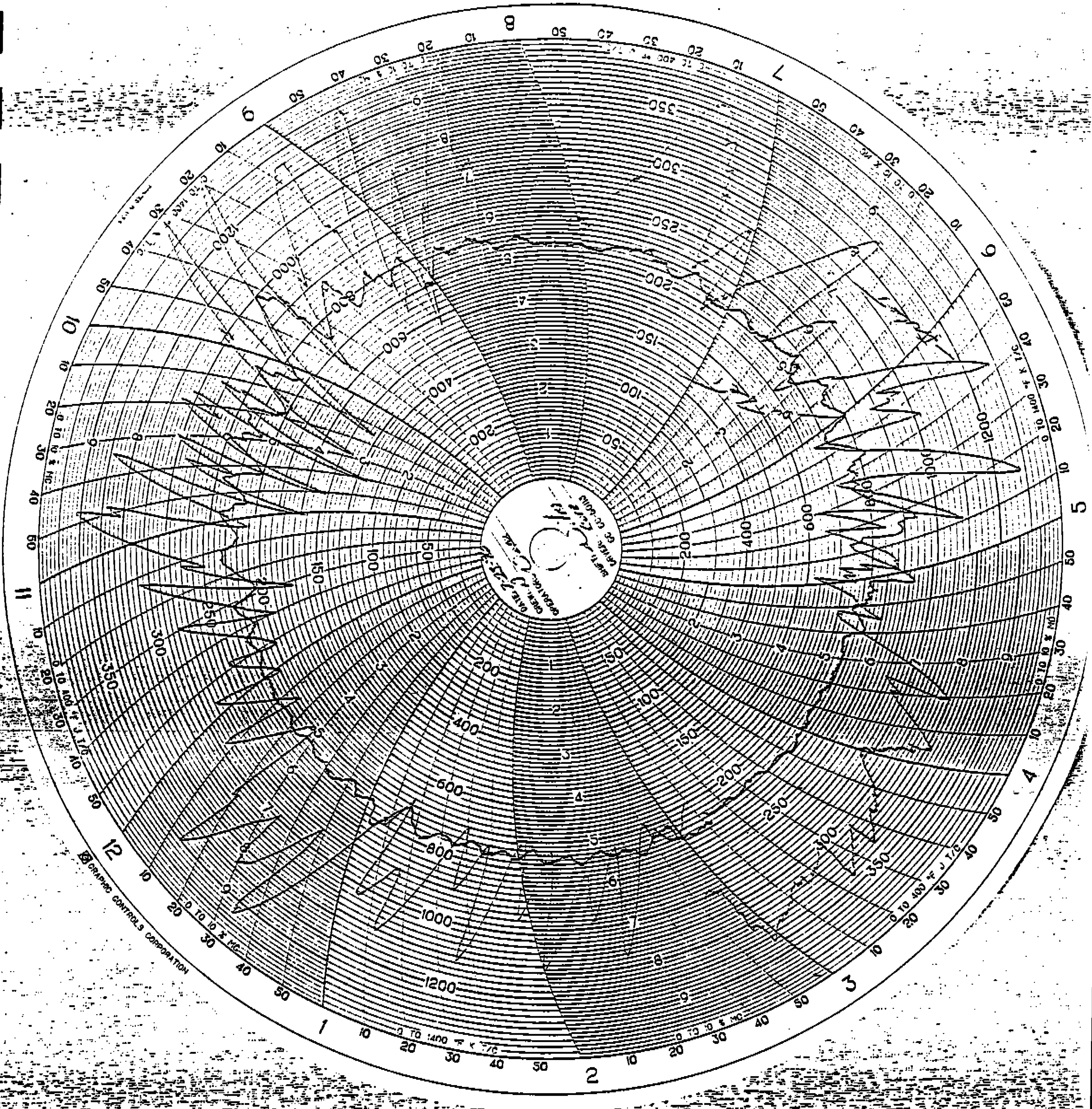


SAGOLA SURF. DRYER
7/23/96
1900 - 0700
14

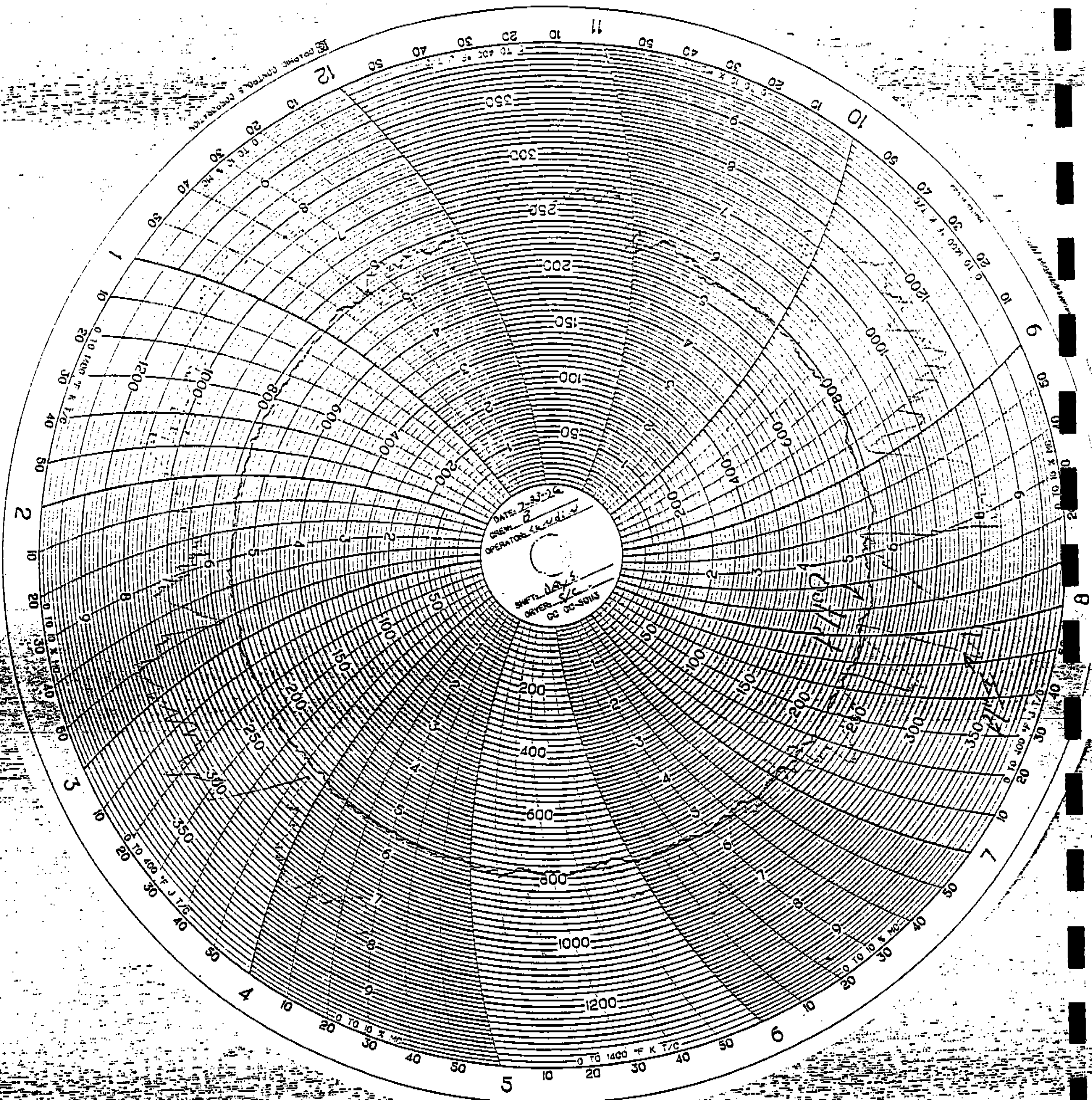


SAGOLA CORE DRYER
7/23/96
0700-1900

15



SAGOLA CORE DRYER
7/23/96
1900 - 0700
16



SAGOLA SURF/CORE
DRYER 7/23/96
0700 - 1900
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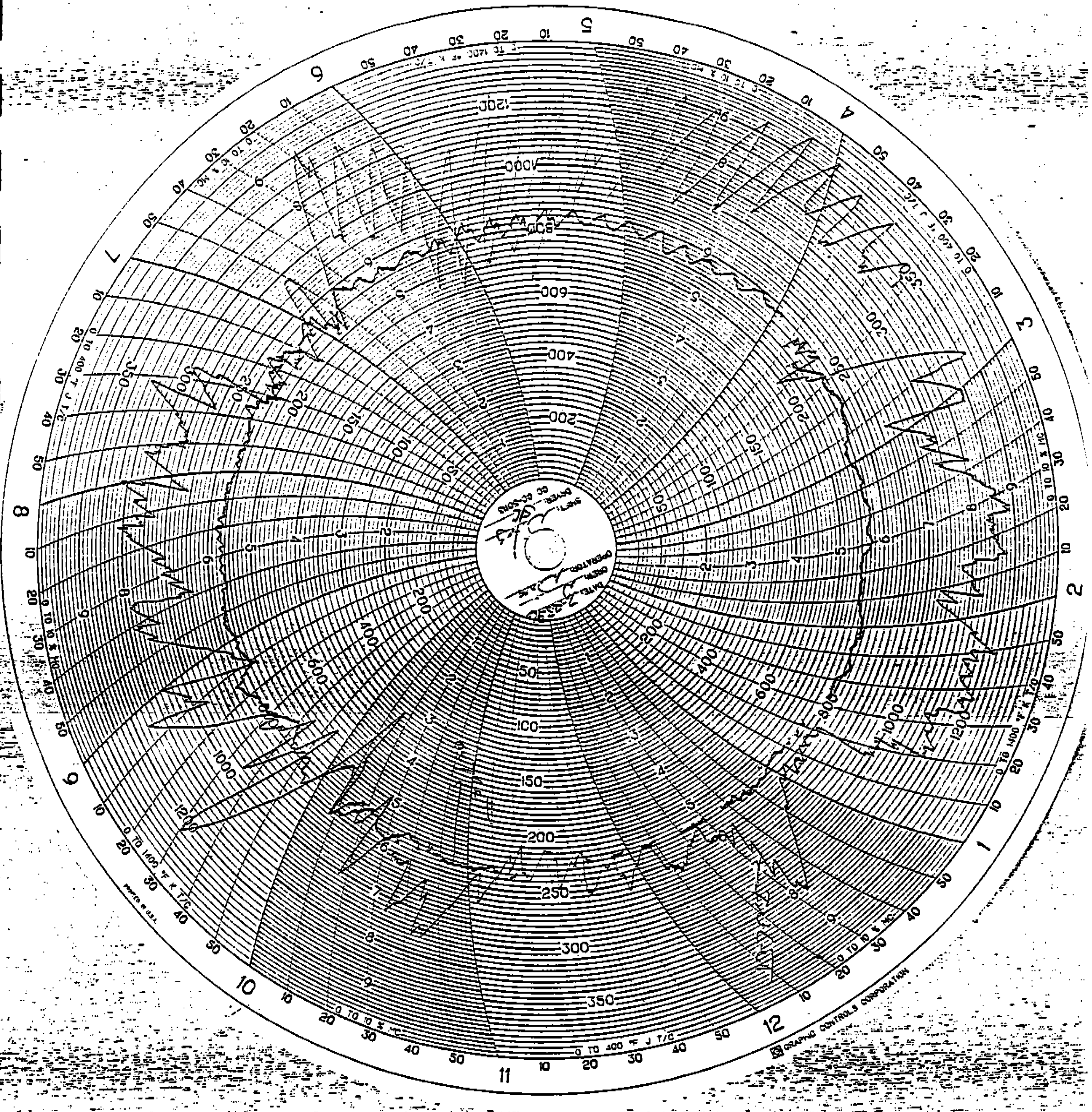

SAGOLA SURF./CORE
DRYER 7/23/96
1900-0700

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT) 7-23-96

Exch. TUBE TEMP	TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. OUT	E-TUBE OUT
		SURFACE									
211	7:10 A	MAN	61.8	612	227	134	25	55/54		8.8	13
217	7:20	"	61.7	725	239	217	25			8.0	139
216	7:30	"	69	767	240	292	50			7.3	14
217	7:40	"	73.3	720	242	377	50			6.9	14
217	7:50	"	78.6	710	240	483	75	64/60		7.3	14
218	8:00	239	80.8	697	242	568	75			7.2	146
215	8:10	238	84.1	816	238	666	75			7.7	14
211	8:20	234.8	85.2	877	236	776	75	60/60		8.4	15
211	8:30	"	87.5	1046	236	861	F			6.2 A	15
209	8:40	"	88.5	1076	233	953	F			6.8	153
210	8:50	"	89.6	893	236	1065	F			6.7	15
209	9:00	"	90.8	1089	234	1132	75	70/65	46.2	6.6	15
209	9:10	"	90.8	1128	234	1256	F			6.8	15
210	9:20	"	90.8	1072	236	1336	75			6.3	153
210	9:30	"	90.8	1027	236	1423	75			6.2	15
210	9:40		90.7	835	235	1511	50	80/70		6.0	15
208	9:50	234.5	90.8	913	237	1609	75			6.1	14
210	10:00	"	"	865	235	1682	75			6.6	150
210	10:10	"	"	990	235	1778	75			7.0	15
211	10:20	"	"	1020	235	1868	75			6.6	15
210	10:30	"	"	910	236	1959	75	78/75		6.8	15
209	10:40	"	"	954	232	2034	75			7.2	139
208	10:50	234.0	"	1075	233	2130	50			6.8	15
208	11:00	"	88.6	935	233	2222	50			7.2	15
212	11:10	"	"	762	234	2301	50			7.5	15
213	11:20	"	86.4	683	236	2381	25	F/70		7.0	148
213	11:30	"	"	673	236	2460	50			6.9	14
213	11:40	"	"	680	233	2527	50		42.0	7.6	14
213	11:50	"	"	687	232	2593	50			7.5	144
212	12:00 P	234.5	"	848	234	2670	75			8.1	152
213	12:10	235	"	808	235	2751	50			8.0	15
213	12:20	"	"	807	237	2839	75			7.8	15
214	12:30	"	"	800	238	2898	50			6.2	149
213	12:40	"	"	840	236	2972	75			6.2	150
213	12:50	"	"	729	235	3049	75	68/73		6.5	14
213	1:00	"	87.5	683	237	3123	50		47.4	6.0	14
212	1:10	"	"	669	234	3200	50			6.3	149
212	1:20	"	"	888	232	3274	75			7.9	152
212	1:30	237.5	88.6	957	235	3367	50	72/64		7.2	15
211	1:40	"	"	977	234	3460	25	—	—	6.9	15
212	1:50	"	"	717	239	3558	25		—	5.1	153
12	2:00	"	"	704	239	3616	25	65/70		5.6	15
11	2:10	236.5	90.9	718	234	3699	50			5.7	14
11	2:20	"	"	967	233	3770	50		41.8	5.9	1
210	2:30	"	"	1052	234	3871	75			5.5	152
212	2:40	234.6	"	1065	235	3947	75			6.0	15
212	2:50	"	"	783	235	4036	75			5.7	15

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT)

SURFACE										
TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. OUT	
3:00	234.6	92	980	236	4124	75	68/65		5.9	151
3:10	"	"	1078	237	4212	75			6.2	151
3:20	"	"	963	237	4295	50			5.9	150
3:30	235	"	969	235	4385	75			6.3	150
3:40	"	"	715	236	4471	50			5.9	150
3:50	"	"	993	235	4558	50	64/72		6.6	151
4:00	"	"	898	235	4636	50			5.5	148
4:10	"	"	698	235	4725	25			5.2	147
4:20	"	"	738	237	4786	25			4.7	145
4:30	"	"	647	234	4859	50			5.0	147
4:40	"	"	731	235	4922	75			5.2	149
4:50	"	"	817	234	5027	75	63/70		6.0	157
5:00	"	"	847	237	5123	75			6.0	150
5:10	"	"	760	236	5216	75			6.0	150
5:20	"	"	906	235	5285	75			5.8	152
5:30	"	93.1	1153	233	5379	75		49.6	7.0	154
5:40	233.5	"	1153	236	5466	75			6.4	152
5:50	"	"	856	235	5553	75			6.0	153
6:00	"	83.1	852	234	5648	50			5.5	149
6:10	"	72.3	731	239	5718	50	-		5.5	142
6:20	230.1	49.5	651	252	5786	25			5.8	131
6:30	"	"	678	234	5824	25	65/58		6.4	135
6:40	MAN	"	776	252	5876	25			6.5	131
6:50	"	44.4	528	265	5920	-25			6.9	127
7:00	"	65.0	673	265	57	25			5.4	132
7:10	221.1	70.1	784	221	107	50	45/57		7.2	143
7:20	252.1	91.9	850	254 *	208	50			4.6	150
7:30	247.5	94.3	846	241	320	50			4.9	150
7:40	"	"	914	246	376	75			4.6	150
7:50	"	"	714	242	484	50	48/46		6.4	148
8:00	239.5	"	760	239	541	75			6.9	147
8:10	"	"	727	241	621	50			6.3	146
8:20	"	"	726	236 *	704	75		40.2	7.0	148
8:30	"	"	826	239	787	E			7.3	149
8:40	"	"	753	242	846	75			6.9	147
8:50	237	"	718	237	945	75	45/43		6.7	146
9:00	235.2	"	693	236	1030	E			6.8	148
9:10	"	"	751	237	1107	E			5.3	148
9:20	230.4	"	937	228	1194	E			6.5	152
9:30	"	"	1160	228	1273	75	46/48		6.5	153
9:40	"	"	798	233	1362	E			6.1	149
9:50	"	"	754	229	1434	75			5.7	149
10:00	"	"	824	232	1524	50			6.0	149
10:10	"	"	427	232	1663	75	45/52		6.5	151
10:20	——									

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT)

7-23-96

Quench E-Tube IV Temp	CORE										Quench OUT Temp
	TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. OUT	
215	7:10	MAN	62.1	759	216	193	25	55/54		7.1	14
217	7:20	"	62.2	798	194	254	25			7.5	[illegible]
215	7:30	"	64.4	684	200	323	50			6.1	[illegible]
220	7:40	"	68.5	668	196	373	50			6.7	14
233	7:50	"	75.1	707	224	376	75	64/60		3.2	[illegible]
217	8:00	199	77.3	741	198	455	75			4.3	[illegible]
214	8:10	197	80.0	713	197	539	75			6.5	[illegible]
212	8:20	196	82.2	788	194	642	75	60/60		7.0	15
211	8:30	"	82.0	1154	195	723	75			4.3 A	[illegible]
211	8:40	"	83.4	871	196	806	75			6.7	[illegible]
210	8:50	"	85.0	955	195	910	F			6.5	[illegible]
209	9:00	195	85.9	1061	196	972	75	70/65	46.2	6.8	15
208	9:10	"	85.9	1032	195	1033	75			6.6	[illegible]
208	9:20	"	85.9	1112	195	1156	75			7.0	[illegible]
208	9:30	"	85.8	958	195	1235	75			—	[illegible]
207	9:40	"	85.8	870	194	1312	75	80/70		6.6	15
207	9:50	"	85.8	831	195	1395	F			6.8	[illegible]
207	10:00	"	"	881	193	1467	75			7.7	[illegible]
207	10:10	"	"	1179	192	1548	75			5.7	[illegible]
204	10:20	194	"	1153	194	1626	75			6.5	15
208	10:30	"	"	1171	194	1705	50	78/75		6.3	[illegible]
210	10:40	"	"	965	197	1779	75			5.8	[illegible]
208	10:50	"	"	664	196	1856	75			5.3	[illegible]
207	11:00	.	86.0	737	195	1925	50			4.3	147
207	11:10	193.5	84.5	679	194	1986	25			4.7	[illegible]
207	11:20	192.6	"	665	192	2049	50	F/70		6.3	[illegible]
206	11:30	"	"	695	198	2116	25			6.8	14
208	11:40	"	"	695	194	2178	50		42.0	6.4	14
206	11:50	"	"	739	193	2240	50			6.5	[illegible]
207	12:00 P	"	"	734	191	2306	50			6.9	[illegible]
206	12:10	"	"	731	192	2370	50			6.9	14
206	12:20	"	"	702	192	2445	75			6.0	14
205	12:30	"	"	696	192	2499	75			6.8	[illegible]
206	12:40	"	"	951	190	2568	50			7.2	[illegible]
209	12:50	"	"	1076	192	2646	50	68/73		7.0	15
208	1:00	"	86.0	880	192	2720	50			6.5	15
209	1:10	"	"	1036	193	2797	75			7.9	[illegible]
210	1:20	"	"	797	195	2862	75			6.7	[illegible]
208	1:30	"	87.2	1135	192	2946	50	72/64		7.3	15
209	1:40	"	"	854	193	3024	50			6.3	15
208	1:50	"	87.0	677	194	3102	75			5.0	[illegible]
207	2:00	"	"	713	194	3157	75	65/70		5.5	[illegible]
207	2:10	"	89.3	723	192	3232	75			6.0	14
207	2:20	"	"	1023	190	3296	50		41.8	7.2	[illegible]
208	2:30	"	"	977	194	3388	75			5.7	[illegible]
208	2:40	"	"	1163	194	3455	50			5.6	[illegible]
207	2:50	"	"	1210	191	3537	50			7.5	15

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT)

				CORE					
TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. OUT
300	192.6	89.3	1058	192	3616	50	68/65		6.6
3:10	"	"	1085	191	3622	75			6.5
3:20	"	"	1240	188	3763	75			6.1
3:30	"	"	1202	194	3847	75			5.0
3:40	"	"	1132	186	3927	50			5.2
3:50	"	"	1211	193	4008	25	64/72		6.3
4:00	191.5	"	1056	197	4087	50			6.5
4:10	"	"	676	191	4164	50			6.3
4:20	"	"	354	191	4222	75			5.2
4:30	"	"	938	194	4298	50			4.7
4:40	"	"	1075	188.7	4359	25			6.0
4:50	"	"	970	190	4453	50	63/70		4.9
5:00	191.0	"	765	188	4526	50			5.2
5:10	"	"	851	188	4607	75			6.6
5:20	"	"	1170	204	4676	75			6.2
5:30	"	"	1169	191	4755+	75		44.6	6.5
5:40	"	"	780	190	4825	75			6.9
5:50	"	90.1	1107	190	4906	75			6.9
6:00	"	93.3	1127	192	4991	75			5.9
6:10	"	70.5	817	193	5061	50			5.9
6:20	198.2	57.0	703	200	5144	50			5.7
6:30	"	"	756	198	5192	75	65/58		5.6
6:40	"	67.7	724	199	5255	75			6.0
6:50	198.2	75.1	658	198	6	75			5.6
7:00	"	"	772	199	77	75			5.0
7:10	192.7	84.5	732	196	145	50	45/57		5.1
7:20	195.7	89.3	910	200*	232	25			4.5
7:30	192.8	94.5	~~810~~	191	320	50			6.0
7:40	"	"	1150	193	374	75			4.8
7:50	"	"	945	195	470	50			5.5
8:00	190.4	"	763	188	518	75	48/46		5.7
8:10	"	"	778	191	592	50			5.6
8:20	"	"	729	193*	665	50		40.2	4.4
8:30	"	"	1107	192	737	75			6.0
8:40	"	"	1023	188	796	75			6.2
8:50	"	"	803	195	886	75	45/45		7.7
9:00	200.3	"	962	207	972	75			4.1
9:10	191.7	"	1109	195	1046	F			5.0
9:20	"	"	1184	197	1153	75			4.9
9:30	190.9	"	864	194	1195	F	46/48		5.4
9:40	"	"	970	189	1269	75			4.9
9:50	"	"	764	189	1331	75			5.7
10:00	"	"	731	191	1407	75			5.8
10:10	"	"	715	193	1474	50	48/52		4.9
10:20	—								

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT)

7-23-96

Quench Temp	TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. OUT	Quench Exit Temp
	SURFACE/CORE										
231	7:10P	MAN	61.5	605	263	0	20	55/54		7.6	1[illegible]
238	7:20	"	61.6	1027	252	0	25			6.9	132
244	7:30	"	68.8	960	255	0	25			6.7	125
246	7:40	"	72.9	1133	253	0	50			5.5	13[illegible]
225	7:50	"	75.2	740	245	0	50	64/60		6.4	12[illegible]
217	8:00	"	77.3	821	220	65	50			8.9	135
216	8:10	230.5	82.6	705	232	162	F			6.2	137
209	8:20	222.5	85.9	781	225	267	75	60/60		5.9	13[illegible]
207	8:30	"	87.1	1007	219	257	F			5.4A	13[illegible]
208	8:40	"	88.2	1120	220	453	75			7.5	141
211	8:50	"	89.3	1198	224	582	75			7.0	141
211	9:00	"	89.3	1159	223	657	F	70/65	40.2	6.4	14[illegible]
208	9:10	221.5	89.2	1131	220	787	50			6.7	14[illegible]
208	9:20	"	89.2	1117	222	877	50			6.7	139
209	9:30	"	89.3	970	223	976	75			6.4	130
210	9:40	"	89.2	834	224	1072	75	80/70		5.6	13[illegible]
208	9:50	"	89.3	1148	221	1165	50			6.7	14[illegible]
205	10:00	"	"	1209	221	1263	F			7.1	142
212	10:10	"	"	875	227	1345	75			3.7	135
207	10:20	221.0	"	830	220	1418	75			5.6	13[illegible]
203	10:30	"	"	1133	219	1508	75	78/75		—	14[illegible]
208	10:40	"	"	1039	225	1592	75			5.3	150
207	10:50	221.5	"	936	218	1682	75			4.8	139
210	11:00		87.1	805	224	1762	50			5.1	13[illegible]
208	11:10	221.0	84.8	820	221	1832	50			6.1	13[illegible]
206	11:20	210.0	"	901	217	1912	50	F/70		5.2	137
207	11:30	"	"	831	219	1982	75			5.1	13[illegible]
207	11:40	"	"	753	221	2044	50		42.0	4.7	135
207	11:50	"	"	719	220	2108	50	77/80		4.1	13[illegible]
207	12:00P	"	"	796	218	2181	75			5.4	134
207	12:10	"	"	717	220	2274	75			4.7	13[illegible]
207	12:20	"	"	941	217	2338	50			6.4	13[illegible]
210	12:30	"	"	868	221	2398	50			5.4	13[illegible]
207	12:40	"	"	982	218	2468	75			6.3	137
208	12:50	"	"	879	219	2544	75	68/73		6.0	13[illegible]
67	1:00	218.5	86.0	776	219	2618	50			4.6	13[illegible]
206	1:10	218	"	1148	216	2703	50			5.9	140
210	1:20	"	"	977	221	2772	50			5.9	137
210	1:30	221.1	87.2	964	221	2861	50	72/64		5.6	13[illegible]
208	1:40	221.5	83.9	1200	222	2955	75			7.2	140
212	1:50	"	84.0	1074	221	3045	75			6.0	140
97	2:00	"	"	1037	219	3104	75	65/70		6.0	140
	2:10	220.0	87.1	1028	223	3202	75			5.4	13[illegible]
"	2:20	"	"	1109	222	3272	75		41.8	6.2	14[illegible]
"	2:30	"	"	1097	222	3380	75			5.5	13[illegible]
12	2:40	"	"	1038	223	3436	75			5.3	139
12	2:50	"	"	904	224	3520	75			5.2	13[illegible]

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT)

SURFACE/CORE										
TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. OUT	
3:00	221.5	89.3	1077	219	3663	75	68/65		6.5	139
3:10	//	//	1112	219	3682	75			5.9	141
3:20	//	//	1037	221	3718	75			5.2	139
3:30	//	//	1100	221	3857	50			5.9	140
3:40	//	//	1155	221	3947	50			5.0	140
3:50	//	//	1015	222	4038	50			5.4	139
4:00	11	//	997	219	4127	50	64/72		5.5	140
4:10	//	//	947	221	4212	75			5.7	139
4:20	//	//	861	222	4275	50			4.4	139
4:30	220.5	//	970	221	4357	50			5.7	140
4:40	//	//	1026	219	4422	75			5.7	140
4:50	//	//	999	220	4529	50	63/70		4.0	141
5:00	//	//	1024	221	4620	75			5.3	140
5:10	//	//	1010	221	4712	75			5.0	140
5:20	//	//	1119	231	4785	75			5.5	143
5:30	//	//	1132	226	4872	75		49.6	5.7	144
5:40	//	//	1165	221	4962	F			6.0	143
5:50	//	//	1167	221	5066	50			6.1	142
6:00	//	82.8	1036	224	5151	50			4.7	138
6:10	220	69.9	793	222	5220	50			4.7	133
6:20	231.0	54.3	703	234	5302	50			4.9	126
6:30	//	//	750	232	5342	75	65/58		5.9	125
6:40	234.5	66.7	783	234	5409	75			5.9	129
6:50	//	74.0	753	235	25	75			4.0	133
7:00	//	//	781	233	29	75			4.3	135
7:10	221.0	83.7	807	222	162	50	45/57		6.2	137
7:20	225.7	90.4	1092	226*	273	50			5.4	141
7:30	226.2	93.9	979	226	400	50			4.1	140
7:40	//	//	1069	226	438	50	--		4.3	140
7:50	//	//	1231	218	557	F			6.8	144
8:00	224.2	//	1209	224.1	630	75	48/46		5.0	145
8:10	//	//	1228	226	725	75			5.1	145
8:20	//	//	1183	225*	819	F		40.2	5.2	143
8:30	//	//	1144	219	897	75			6.0	149
8:40	//	//	1264	221	970	75			7.3	144
8:50	225.0	//	1219	226	1096	F	45/45		5.3	144
9:00	//	//	1134	224	1183	75			4.9	142
9:10	//	//	1053	227	1263	75			4.1	140
9:20	219.7	//	900	224	1344	75			4.1	136
9:30	216.5	//	772	217	1441	F	46/48		4.4	134
9:40	//	//	818	217	1475	75			4.8	134
9:50	//	//	909	214	1540	75			5.7	137
10:00	//	//	1021	219	1630	50			5.7	138
10:10	//	//	807	220	1698	25	44/52		4.5	137
10:20	—									

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DRYER OPERATIONS REPORT — LOUISIANA-PACIFIC CORPORATION

NAME [illegible] CREW B SHIFT DAY ☒ NIGHT ☐ DATE [illegible]

TIME	WET FEED RATE %	GRAYCONS	WOOD VALVE %	B.C. Furnace F°	ABB KENT Inlet F°	ABB KENT Outlet F°	GAS % VALVE	MOISTURE METER %	MOISTURE
SURFACE									
7:50	74 7		72	1210	709	240		7.5	6.5
9:20	89		75	1220	1112	235		7.5	6.8
10:40	89 9		72	1230	1280	235		7.9	7.7
12:10	85		58	1210	575	234		7.5	6.9
1:35	87 11		68	1260	1200	237		8.4	5.6
3:05	90		76	1210	940	233		8.0	6.1
4:40	91 1		67	1230	757	232		7.7	5.6
	3			Avg.	919	235		Avg.	6.4
	5								
CORE									
7:50	74 7		70	1060	686	224	43	4.6	4.8
9:20	84		68	1010	1092	194		6.7	5.[illegible]
10:50	84 9		63	1010	1149	192		6.9	7.0
12:10	83		48	1020	683	192		6.7	6.[illegible]
1:35	85 11		57	1060	1051	196		7.9	7.[illegible]
3:05	88		60	1060	1027	193		7.3	5.6
4:40	88 1		63	1174	1171	197		6.9	6.[illegible]
	3			Avg.	950	197		Avg.	6.[illegible]
	5								
SURFACE CORE									
7:50	75 7			1020	877	221	45	6.1	5.4
9:20	87		79	910	1182	221		7.4	5.[illegible]
10:50	88 9		60	910	779	220		6.5	5.[illegible]
12:10	84		50	910	735	221		6.1	4.[illegible]
1:35	86 11		60	920	943	221		7.4	[illegible]
3:05	88		66	905	1097	221		7.4	6.[illegible]
4:40	91 1		65	910	1010	219		7.7	5.[illegible]
	3			Avg.	921	222		Avg.	[illegible]

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DRYER OPERATIONS REPORT

LOUISIANA-PACIFIC CORPORATION SAGOLA MI

NAME Vera/Gould/Emily CREW A SHIFT DAY [ ] NIGHT [✓] DATE 7-27-46

TIME	WET FEED RATE %	GRAYCONS	WOOD VALVE %	B.C. Furnace F°	ABB KENT Inlet F°	ABB KENT Outlet F°	GAS % VALVE	MOISTURE METER %	MOISTURE
SURFACE									
7:30	92	(5)	68.6	1250°	839°	231°	/	6.0	6.3
8:55	92		61.7	1225°	722°	222°	/	6.1	4.3
11:00	93	(9)	56.1	1290°	709°	224°	/	6.9	5.8
2:00	92	1	82.4	1310°	1199°	224°	/	7.4	6.1
4:35	75	(11) 1	68.4	1225°	725°	236°	/	7.9	70
				AVG.	832°	227°	→	→	5.9
		(1)							
		1							
		(3)							
		(5)							
			Graycons (3)						
CORE									
7:30	92	(5)	58.6	1100°	991°	214°	/	6.9	5.8
8:55	92		76.9	1150°	1149°	206°	/	7.6	10.1
11:00	90	(9)	55.8	1100°	842°	210°	S...	6.2	5.6
2:00	85		64.0	1005	1128°	217	/	6.1	5.8
4:35	70	(11)	61.5	1050°	698°	227°	/	6.9	6.3
				AVG.	962°	215°	→	→	5.9
		||||							
		(1) 1							
		(3)							
		1							
		(5)							
			Graycons (2)						
SURFACE CORE									
7:30	92	(2)	66.4	925°	1141°	236°	/	7.5	6.3
8:55	92	1	67.4	850°	1142°	233°	/	6.4	4.3
11:00	92	(6)	79.1	990°	1021°	236°	/	7.9	6.1
2:00	92		78.1	950°	1031°	237	/	6.0	5.8
4:35	75	(11) 11	25.4	975°	869°	238°	/	7.7	7.5
				AVG.	1041°	236°	→	→	6.0
		(1) 1							
		(3) 1							

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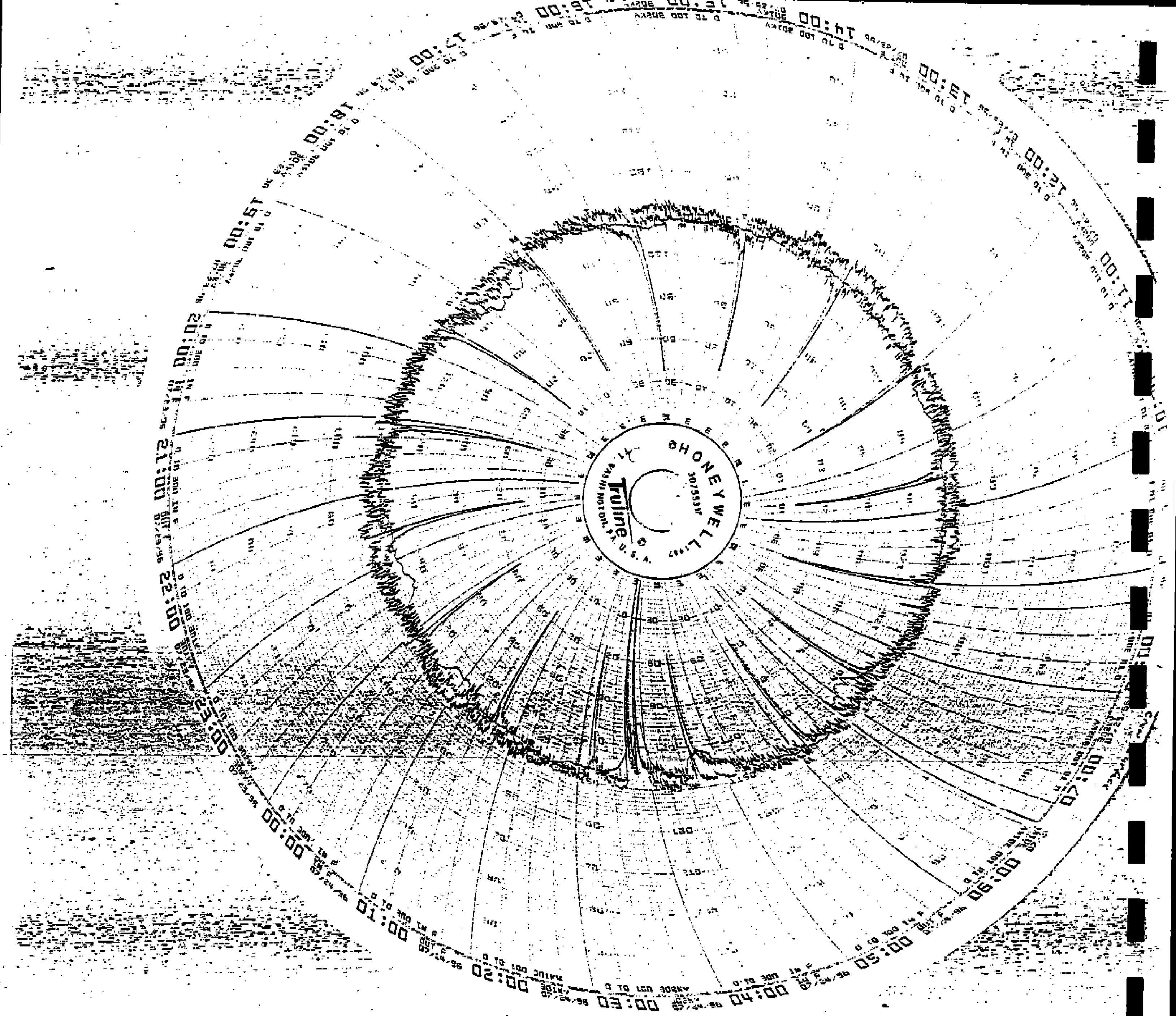

SAGOLA SURFACE
E-TUBE 7/23/96

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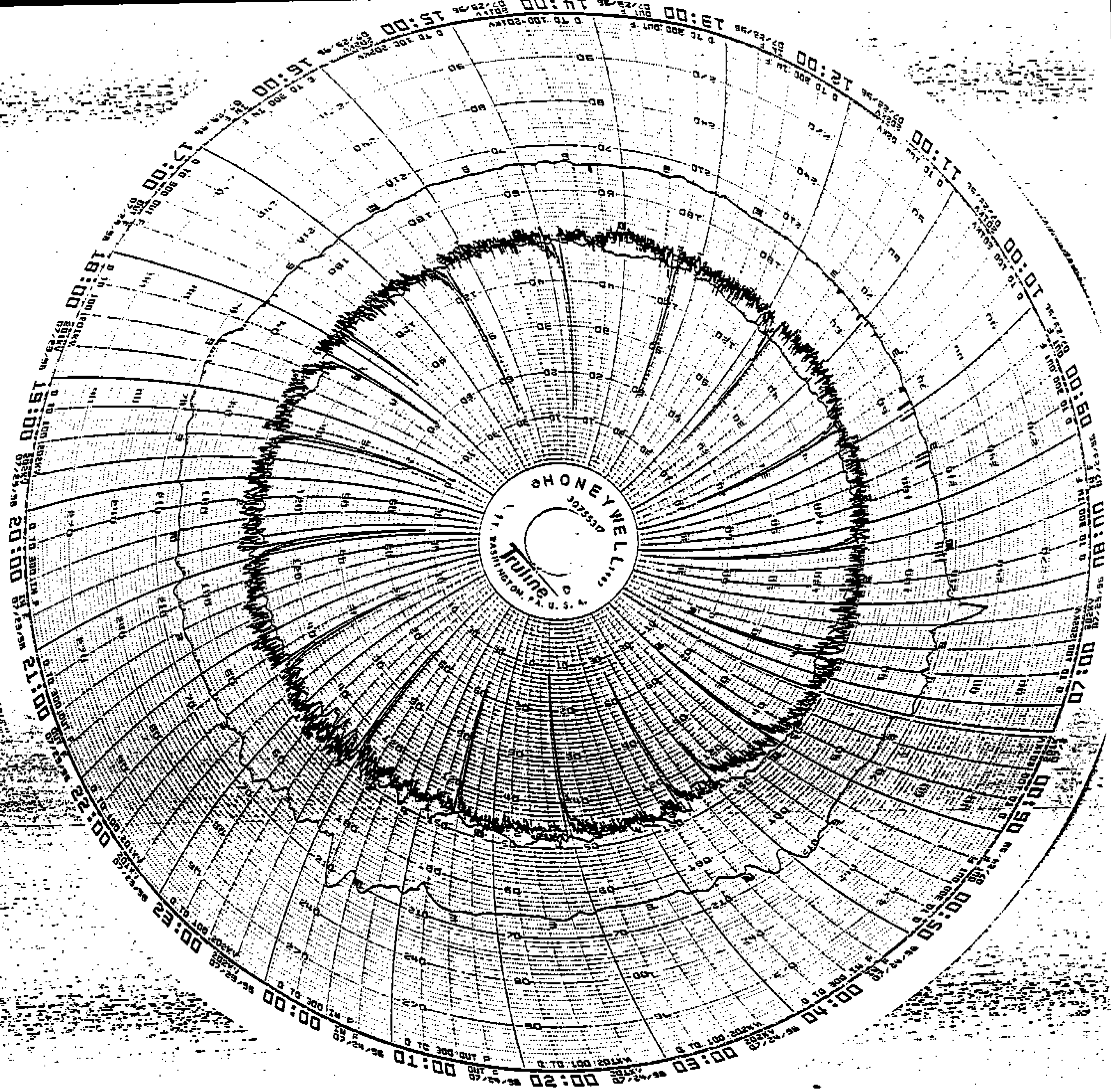

SAGOLA CORE
E-TUBE 7/23/96

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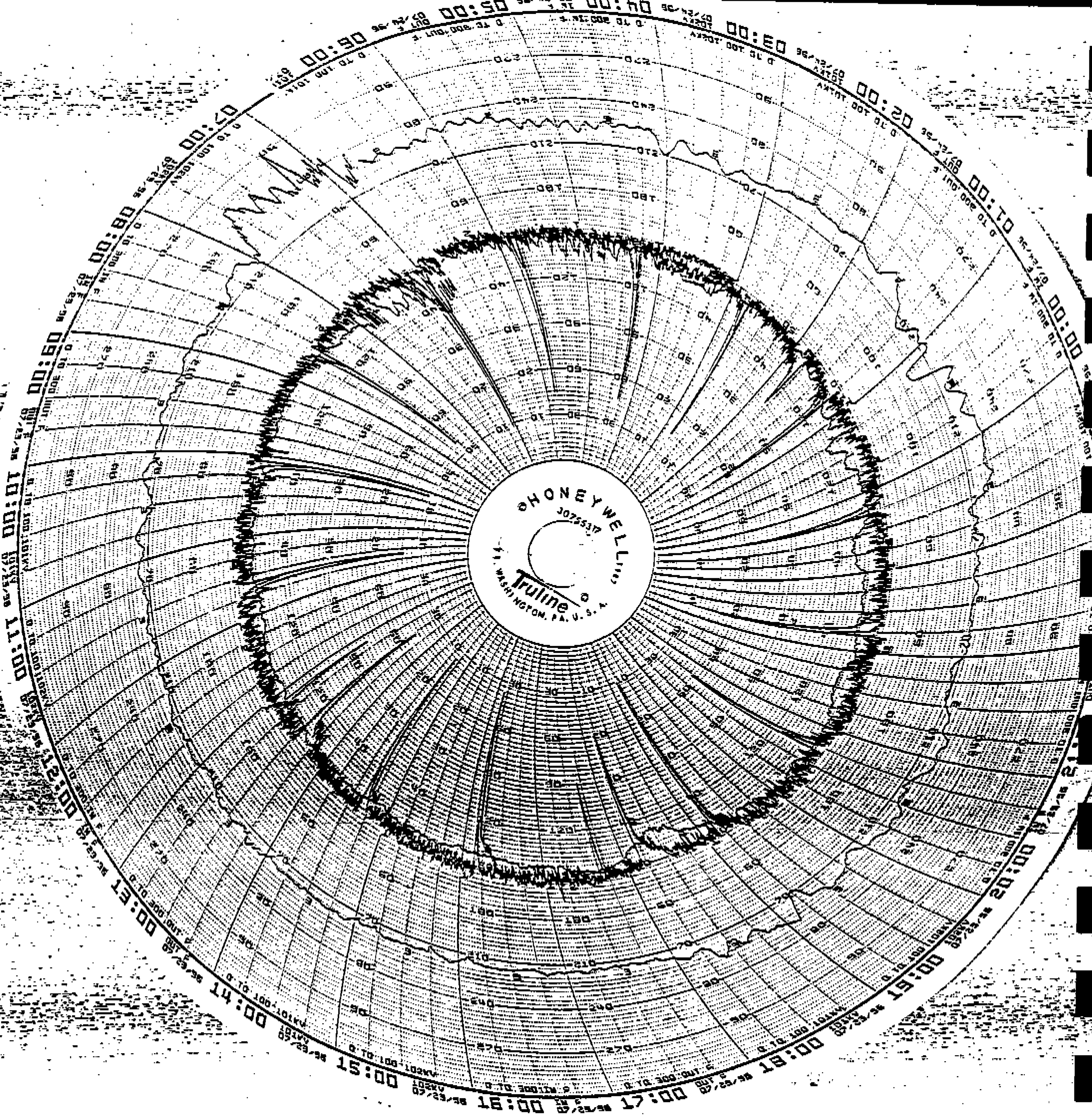

SAGOLA SURF./CORE
E-TUBE 7/23/96

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SAGOLA E-TUBE DATA SHEET

	SURFACE							
	SOUTH TR SET			NORTH TR SET			QUENCH	
TIME	KV	MA	SPARK RATE	KV	MA	SPARK RATE	INLET	OUTLET
1130	55	310	29.0	55	310	29.1		
1140	55	370	28.9	54	310	29.0		
1150	55	370	29.0	54	340	29.0		
1200	57	360	29.0	53	240	29.1		
1210	56	370	29.0	55	290	28.9		
1220	54	390	29.1	55	300	28.9		
1230	53	310	29.0	55	310	29.1		
1240	53	310	29.0	56	310	29.0		
1250	55	320	29.1	55	320	29.0		
1300	56	350	29.1	54	300	29.1		
1310	55	350	28.9	54	320	29.0		
1320	55	340	29.0	55	320	29.1		
1330	55	350	29.0	57	320	29.0		
1340	57	370	28.9	56	320	29.0		
1350	55	350	29.0	55	390	29.0		
1400	55	420	29.1	56	420	28.9		
1410	56	400	28.9	55	330	28.9		
1420	57	320	28.9	54	320	29.0		
1430	60	330	29.0	54	310	28.9		
1440	55	290	29.0	54	350	28.8		
1450	57	420	29.0	54	340	29.0		
1500	54	400	29.1	50	200	29.1		
1510	55	400	28.9	50	300	28.7		
1520	55	400	28.9	51	310	28.9		
1530	55	400	29.0	51	330	29.2		
1540	51	370	29.0	55	310	29.2		
1550	55	370	29.0	56	400	29.1		
1600	54	420	29.0	51	300	29.1		
1610	55	440	29.1	56	360	29.2		
1620	57	440	29.1	54	350	29.1		
1630	40	100	29.7	50	550	29.3		

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SAGOLA E-TUBE DATA SHEET

	SURFACE							
	SOUTH TR SET			NORTH TR SET			QUENCH	
TIME	KV	MA	SPARK RATE	KV	MA	SPARK RATE	INLET	OUTLET
1640	53	350	28.9	55	400	29.1		
1650	50	370	29.0	55	370	28.9		
1700	54	300	29.0	54	350	29.0		
1710	55	400	29.0	54	380	28.9		
1720	55	400	29.0	53	370	28.9		
1730	55	430	29.0	52	370	29.1		
1740	56	400	29.0	55	390	29.0		
1750	57	410	28.9	54	380	29.0		
FI-SL 1800	53	400	29.0	25	50	29.8		
1810	54	400	28.9	52	300	28.3		
1820	52	370	29.0	50	320	29.0		
1830	54	420	29.0	52	340	29.0		
1840	50	400	29.1	50	300	29.0		
1850	55	400	29.0	50	300	29.0		
1900	52	410	28.9	50	320	29.4		
1910	49	350	29.0	50	270	29.1		
1920	49	290	29.0	50	200	29.1		
FI-SL 1930	40	100	29.6	50	250	29.0		
1940	50	270	29.1	50	300	29.0		
1950	50	350	29.1	54	320	29.0		
2000	56	370	29.1	52	300	28.9		
2010	56	390	29.1	52	330	28.9		
2020	54	370	29.1	54	330	29.0		
2030	54	300	29.1	54	350	29.0		
2040	54	330	29.1	55	400	29.0		
2050	53	400	29.1	54	360	29.0		
2100	50	290	29.1	20	100	29.1		
2110	50	300	29.0	50	230	29.2		
2120	55	360	29.0	52	300	28.9		
2130	54	310	29.1	52	270	29.0		
2140	55	400	29.0	53	320	29.0		
2150	55	380	29.0	53	320	28.9		
2200	53	330	29.0	55	310	29.0		

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SAGOLA E-TUBE DATA SHEET

CORE								
	SOUTH TR SET			NORTH TR SET			QUENCH	
TIME	KV	MA	SPARK RATE	KV	MA	SPARK RATE	INLET	OUTLET
1130	53	300	29.1	52	290	18.4		
1140	55	300	29.0	51	295	19.6		
1150	55	300	29.1	51	295	19.0		
1200	53	300	29.0	53	250	24.3		
1210	53	300	29.1	53	260	21.8		
1220	55	300	29.2	53	300	20.5		
1230	55	300	29.0	53	250	20.2		
1240	53	330	29.1	53	260	20.7		
1250	55	380	29.1	53	260	21.6		
1300	55	400	29.0	53	280	17.8		
1310	54	400	29.0	53	280	19.4		
1320	53	350	29.2	53	280	20.9		
1330	54	400	29.0	53	290	18.8		
1340	55	400	29.2	50	290	17.0		
1350	54	390	28.9	52	300	14.6		
1400	58	450	29.0	52	300	11.6		
1410	56	430	28.9	52	310	15.7		
1420	55	350	29.1	51	300	20.5		
1430	55	470	29.0	51	310	18.6		
1440	55	490	29.0	52	320	18.0		
1450	54	470	29.0	50	300	27.3		
1500	55	400	28.9	51	300	27.0		
1510	55	400	28.9	52	290	21.4		
1520	50	300	29.1	50	260	20.4		
1530	51	440	29.1	50	290	20.1		
1540	52	500	29.0	51	300	16.5		
1550	51	450	29.0	52	300	17.1		
1600	53	460	28.9	51	300	16.2		
1610	52	450	29.0	~~50~~	310	18.8		
flush 1620	40	10	29.5	45	250	20.0		
1630	50	400	29.0	50	350	25.5		

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SAGOLA E-TUBE DATA SHEET

CORE								
	SOUTH TR SET			NORTH TR SET			QUENCH	
TIME	KV	MA	SPARK RATE	KV	MA	SPARK RATE	INLET	OUTLET
1640	51	350	29.1	52	350	21.8		
1650	50	370	29.0	50	340	20.0		
1700	54	400	29.0	50	330	20.6		
1710	55	360	28.9	50	330	19.8		
1720	54	400	29.2	50	310	25.9		
1730	51	360	29.0	50	320	22.8		
1740	50	450	29.0	50	320	21.0		
1750	54	430	29.0	50	330	22.5		
1800	55	420	29.1	50	320	22.9		
Flush 1810	25	10	29.8	25	10	20.0		
1820	54	390	28.4	50	320	27.4		
1830	53	400	29.0	50	310	24.8		
1840	55	400	29.0	50	300	23.9		
1850	50	350	29.0	50	290	22.5		
1900	50	300	29.1	52	300	24.1		
1910	54	430	28.9	52	300	23.4		
1920	49	190	29.6	49	200	26.0		
1930	52	400	28.7	51	300	23.9		
1940	50	290	28.9	51	300	21.5		
1950	51	310	28.9	51	300	21.3		
2000	52	310	29.0	51	300	21.2		
2010	54	350	29.0	51	300	24.0		
2020	55	370	29.0	51	300	20.9		
2030	55	400	29.0	51	300	22.6		
2040	54	400	28.5	51	310	22.1		
Flush 2050	45	150	29.3	20	100	22.2		
2100	54	450	28.7	51	300	27.1		
2110	54	460	29.2	51	300	24.7		
2120	53	450	29.1	51	300	23.5		
2130	55	450	29.0	51	300	16.0		
2140	56	480	29.0	50	300	14.2		
2150	54	450	29.0	52	300	16.6		
2200	56	500	29.0	52	300	17.7		

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SAGOLA E-TUBE DATA SHEET

	SURFACE/CORE								
		SOUTH TR SET			NORTH TR SET				
				SPARK			SPARK	QUENCH	
	TIME	KV	MA	RATE	KV	MA	RATE	INLET	OUTLET
Flush	1130	45	150	29.1	15	50	29.9		
	1140	50	290	29.0	49	270	29.1		
	1150	54	340	29.0	50	280	28.9		
	1200	53	350	29.1	50	290	29.1		
	1210	53	360	29.0	54	320	29.0		
	1220	50	360	29.2	54	280	29.1		
	1230	53	360	28.9	55	280	29.0		
	1240	53	350	29.0	52	300	29.1		
	1250	53	320	29.0	55	320	29.0		
	1300	55	300	29.1	54	350	29.1		
	1310	52	350	29.0	52	300	29.1		
Flush	1320	53	350	29.0	54	300	29.1		
	1330	10	10	30.0	20	10	29.8		
	1340	50	210	29.2	50	280	29.1		
	1350	51	320	28.9	55	300	28.9		
	1400	53	370	29.0	54	350	28.9		
	1410	52	340	29.0	52	290	28.9		
	1420	55	350	29.1	52	300	29.1		
	1430	54	350	29.2	54	360	29.0		
Flush	1440	50	300	29.1	48	150	29.4		
	1450	55	380	29.0	54	390	29.6		
	1500	53	320	29.1	53	280	29.0		
	1510	53	350	29.0	55	300	29.1		
	1520	54	350	29.1	55	320	29.0		
	1530	53	310	29.0	55	300	29.0		
	1540	50	350	28.9	53	300	29.0		
	1550	55	370	29.0	55	320	28.9		
	1600	55	390	29.1	55	390	29.0		
	1610	52	230	29.3	52	400	29.0		
	1620	52	310	28.4	55	370	28.8		
	1630	54	310	29.0	54	320	29.1		

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SAGOLA E-TUBE DATA SHEET

	SURFACE/CORE							
	SOUTH TR SET			NORTH TR SET			QUENCH	
TIME	KV	MA	SPARK RATE	KV	MA	SPARK RATE	INLET	OUTLET
1640	55	350	29.1	55	300	29.0		
1650	53	300	28.9	54	300	29.0		
1700	53	310	29.1	53	300	29.1		
1710	56	390	29.0	54	300	28.9		
1720	55	410	29.0	52	300	29.0		
1730	57	500	29.1	53	320	28.9		
1740	54	380	29.0	50	100	29.5		
1750	53	380	29.0	50	320	28.6		
1800	52	350	29.0	52	300	28.9		
1810	54	450	29.1	50	340	28.9		
1820	50	300	29.0	50	310	29.0		
1830	50	300	29.0	50	300	29.0		
1840	52	400	28.9	52	320	29.0		
1850	52	320	29.0	52	350	29.0		
1900	50	320	28.9	52	310	29.1		
Flush 1910	30	10	29.8	49	210	29.3		
1920	55	360	28.1	50	270	28.9		
1930	53	300	29.0	50	280	29.0		
1940	51	200	29.0	52	300	29.0		
1950	55	350	29.1	53	300	28.9		
2000	54	340	29.0	51	280	29.0		
2010	54	300	29.0	54	300	29.0		
2020	52	310	29.1	55	310	29.0		
2030	52	300	29.1	50	330	29.0		
2040	52	310	29.0	50	250	29.0		
2050	50	400	29.0	50	250	28.2		
2100	55	380	28.9	53	320	29.0		
2110	55	360	29.0	54	310	29.1		
2120	53	370	28.9	55	350	29.1		
2130	53	400	29.1	54	310	29.1		
2140	54	400	29.1	50	300	29.1		
2150	52	410	29.0	52	300	29.1		
2200	53	430	29.0	53	310	28.9		

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E-TUBE LOG SHEET

LOUISIANA-PACIFIC CORPORATION SAGOLA, MI

OPERATOR [illegible] SHIFT [illegible] CREW [illegible] DATE [illegible]

UNIT 1 S/C E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	No. 1 (N.) mA	No. 2 (S.) KV	No. 2 (S.) mA	ZYCOM QUENCH INLET deg. F	QUENCH OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Beginning & End of Shift on the Vessel: Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	50	320	48	320	211	135	[illegible]	32	8	462 261	355 487	320	320	.5	8351	786
4	[illegible]	320	50	320	228	137	15	34	5	469 195	25? 962	320	321	[illegible]	846.8	792

Recycle Water Solids % 12.8% 13.0%   Blow Off sec. 10: ______ 4: ______

Recycle Water pH 8.4 8.1

UNIT 2 CORE E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	No. 1 (N.) mA	No. 2 (S.) KV	No. 2 (S.) mA	ZYCOM QUENCH INLET deg. F	QUENCH OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Beginning & End of Shift on the Vessel: Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	45	150	55	100	208	151	19	25	6	458,592	109,911	250	250	.5		
4	52	310	50	55	206	151	19	25	6	459,138	109,914	[illegible]	250	.5		

Recycle Water Solids % 9.3% 9.7%   Blow Off sec. 10: ______ 4: ______

Recycle Water pH 8.0 7.1

UNIT 3 SURFACE E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	No. 1 (N.) mA	No. 2 (S.) KV	No. 2 (S.) mA	ZYCOM QUENCH INLET deg. F	QUENCH OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Beginning & End of Shift on the Vessel: Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	55	230	50	38	216	150	17	20	1	422,575	392,825	320	290	6		
4	55	310	50	35	226	157	19	21	2	427,521	[illegible]	320	320	6		

Recycle Water Solids % 9.6% 9.62   Blow Off sec. 10: ______ 4: ______

Recycle Water pH 8.4 8.0

	Surface	Core
DISPERSION TUBE DRAIN MAGNEHELIC: 10	6.5	
4	6.5	

BLOW OFF LINE FLOW METERS (ON TOP OF BLOW DOWN TANK)

	BEFORE	AFTER	TOTAL GALLONS BLOWN DOWN "AFTER" MINUS "BEFORE"	DRYER RUN TIME
S/C	6570	6576	6	720
CORE	137340	137741	401	720
SURFACE	162180	162331	151	720

GALLONS PER MINUTE BLOWN OFF = GALLONS BLOWN OFF / DRYER RUN TIME

S/C .008 GPM

CORE .5 GPM

SURFACE .2 GPM

	BEFORE	AFTER	TOTAL GALLONS LOST "AFTER" MINUS "BEFORE"
CORE WET BIN FLOW METER	[illegible]	[illegible]	
BLOW DOWN TANK LEVEL	47"	47"	

COMMENTS:

WETESP.XLS

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E-TUBE LOG SHEET LOUISIANA-PACIFIC CORPORATION SAGOLA, MI

OPERATOR Ncea/Enny SHIFT Nights CREW A DATE 7-23-96

UNIT 1 S/C E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	mA	No. 2 (S.) KV	mA	ZYCOM QUENCH INLET deg. F	OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	52	400	53	270	202	137	16	25	7	409192	252,905	29.0	29.0	.3	8465	792
4	52	260	51	320	216	132	20	27	7	409905	258680	28.9	29.0	.3	8486	796

Recycle Water Solids % 14.3 % 13.8 % Blow Off sec. 10: 41 4: 42

Recycle Water pH 8.3 8.3

UNIT 2 CORE E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	mA	No. 2 (S.) KV	mA	ZYCOM QUENCH INLET deg. F	OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	51	310	52	470	205	148	19	27	8	459,235	109914	17.5	29.0	.2		
4	50	220	50	210	200	150	19	27	8	459235	109914	29.0	29.1	.2		

Recycle Water Solids % 11.1 % 10.3 % Blow Off sec. 10: 42 4: 42

Recycle Water pH 6.7 7.0

UNIT 3 SURFACE E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	mA	No. 2 (S.) KV	mA	ZYCOM QUENCH INLET deg. F	OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	52	260	52	370	207	149	19	21	3	422921	262835	29.1	29.0	.3		
4	52	270	51	330	200	109	19	26	7	422989	265129	28.9	28.9	3		

Recycle Water Solids % 10.9 % 10.4 % Blow Off sec. 10: 24 4: 24

Recycle Water pH 7.7 % 7.6

DISPERSION TUBE DRAIN MAGNEHELIC:	Surface	Core
10	5	
4	5	

BLOW OFF LINE FLOW METERS (ON TOP OF BLOW DOWN TANK)

	BEFORE	AFTER	TOTAL GALLONS BLOWN DOWN "AFTER" MINUS "BEFORE")	DRYER RUN TIME
S/C	6,546	7889	1343	720
CORE	137741	138221	480	720
SURFACE	162,331	162713	382	719

GALLONS PER MINUTE BLOWN OFF = GALLONS BLOWN OFF / DRYER RUN TIME

S/C 1.9 GPM
CORE .7 GPM
SURFACE .53 GPM

	BEFORE	AFTER	TOTAL GALLONS LOST "AFTER" MINUS "BEFORE"
CORE WET BIN FLOW METER	570,260	572,160	1,900
BLOW DOWN TANK LEVEL	49'	78'	

COMMENTS:

WETESP.XLS

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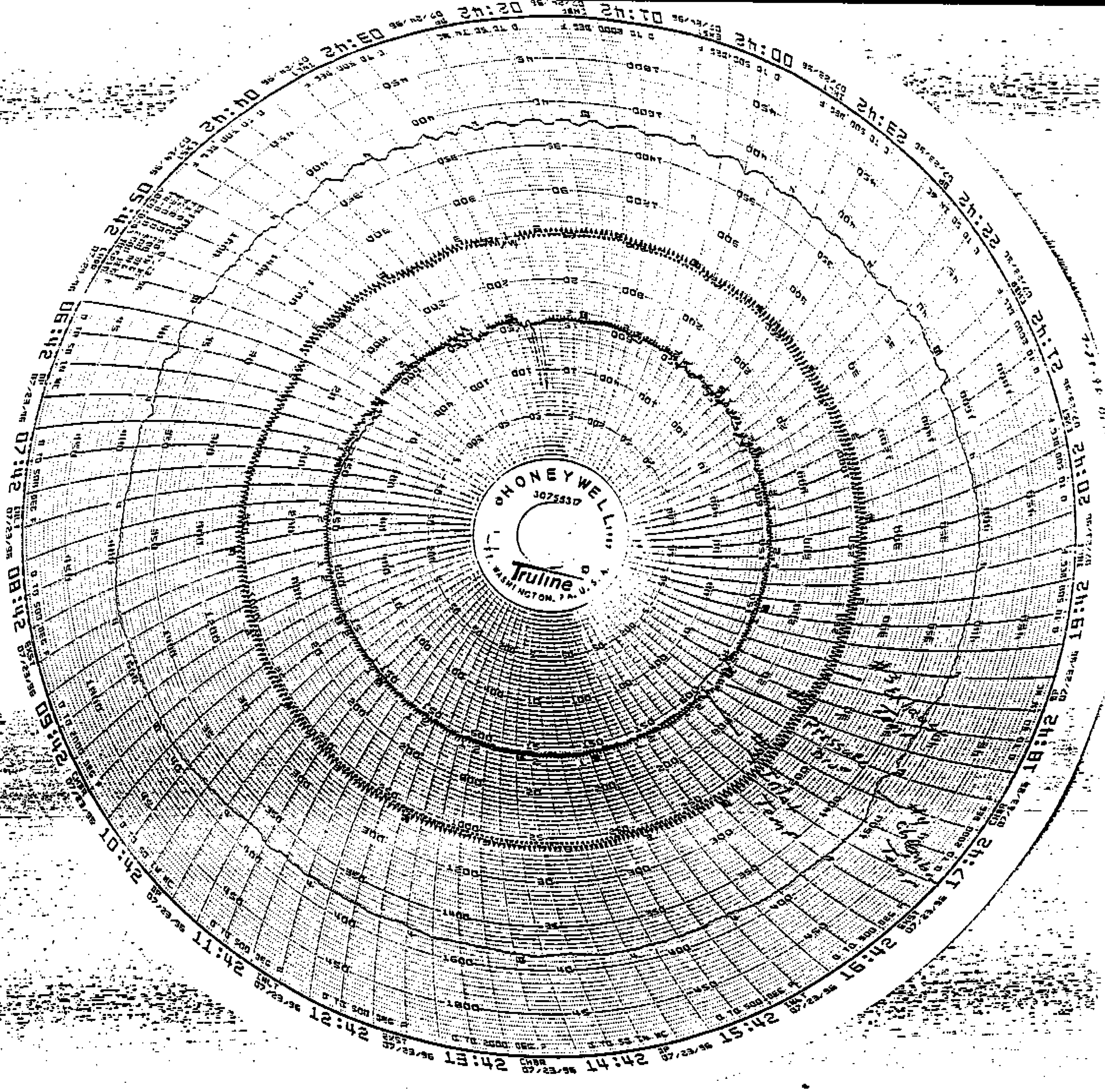

SAGOLA DRYER RTO
7/23/96

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7/23/96

SAGOLA DRYER RTO DATA SHEET

TIME	CHAMBER TEMPS.								INLET	BURNERS			COMB.	EXHAUST	PRESS	GAS
10 MINUTES	#1	#2	#3	#4	#5	#6	#7	#8	PRESS.	#1	#2	#3	TEMP.	TEMP.	DROP	USAGE
1130	383	384	358	395	410	354	388	360	152	1539	1550	1528	1516	245	15.6	869
1140	376	386	358	389	421	351	389	363	152	1536	1546	1522	1513	257	16.0	985
1150	378	387	360	389	419	351	388	364	151	1539	1532	1512	1499	254	15.6	1064
1200	382	393	352	400	412	350	394	355	152	1515	1526	1518	1498	254	15.7	5782
1210	378	390	360	390	421	351	390	366	152	1527	1540	1534	1515	256	15.7	1348
1220	385	393	353	401	411	352	395	356	153	1527	1536	1520	1499	251	15.6	2670
1230	382	389	361	392	417	353	389	367	153	1523	1533	1526	1507	260	15.9	2389
1240	384	395	352	401	411	351	395	357	154	1525	1534	1525	1501	251	15.7	3441
1250	387	392	356	399	409	353	393	361	154	1528	1535	1523	1506	258	15.7	2592
1300	387	390	359	397	409	353	391	363	153	1527	1533	1525	1506	247	15.7	3389
1310	387	391	356	399	407	352	393	360	155	1533	1536	1529	1507	256	15.9	3376
1320	380	390	360	389	417	350	390	368	155	1523	1536	1528	1509	264	15.9	1067
1330	380	391	359	389	416	350	390	369	155	1519	1532	1520	1504	256	15.7	653
1340	384	395	351	399	408	348	395	358	156	1533	1544	1529	1509	247	15.7	1069
1350	384	394	351	398	406	349	393	358	154	1539	1553	1540	1520	256	15.8	906
1400	377	397	351	392	412	345	394	361	154	1534	1545	1530	1513	263	16.0	829
1410	385	390	353	396	403	349	391	359	155	1537	1548	1527	1510	255	15.7	925
1420	376	395	354	389	413	346	392	363	156	1533	1546	1531	1515	251	15.6	953
1430	382	388	359	390	406	350	388	366	157	1547	1559	1537	1526	265	15.9	946
1440	377	396	354	390	411	345	393	362	156	1550	1562	1545	1531	263	16.0	942
1450	385	389	355	394	401	350	390	360	156	1549	1561	1540	1524	253	15.7	945
1500	385	391	353	397	400	349	391	358	155	1546	1558	1537	1521	256	15.7	948
1510	377	395	354	390	411	345	392	363	156	1542	1556	1542	1525	253	15.7	903
1520	383	389	358	392	404	350	389	365	156	1556	1568	1548	1538	261	16.1	931
1530	384	395	351	400	402	347	393	357	157	1557	1570	1548	1532	252	15.6	924
1540	385	392	355	398	401	350	391	361	157	1555	1566	1548	1534	250	15.9	975
1550	380	392	360	390	410	348	390	368	157	1557	1568	1546	1534	257	15.8	1033
1600	386	393	356	399	401	350	391	362	156	1555	1567	1549	1534	247	15.9	954
1610	385	392	356	397	401	350	391	361	154	1551	1562	1544	1529	246	15.7	852
1620	384	391	357	395	401	350	390	362	153	1550	1560	1538	1527	256	16.0	915
1630	382	391	360	395	407	349	389	367	154	1545	1557	1536	1522	248	15.7	861
1640	380	391	360	390	407	349	389	367	155	1551	1562	1540	1528	255	16.1	932
1650	381	401	350	400	405	347	396	357	155	1554	1568	1553	1537	259	16.0	890
1700	377	401	353	392	412	346	394	365	155	1560	1572	1552	1540	260	15.9	912

7/23/98

SAGOLA DRYER RTO DATA SHEET

TIME	CHAMBER TEMPS.								INLET	BURNERS			COMB.	EXHAUST	PRESS.	GAS
10 MINUTES	#1	#2	#3	#4	#5	#6	#7	#8	PRESS.	#1	#2	#3	TEMP.	TEMP.	DROP	USAGE
1710	384	398	352	402	402	349	395	359	156	1564	1576	1555	1540	248	15.7	957
1720	384	401	351	402	404	348	396	359	157	1552	1564	1550	1532	255	15.7	984
1730	387	397	357	401	403	353	392	365	159	1567	1577	1555	1542	260	16.1	961
1740	387	396	361	398	405	353	391	369	159	1569	1582	1562	1550	251	15.5	864
1750	384	406	353	403	409	349	399	362	159	1565	1578	1564	1546	261	15.9	872
1800	388	398	362	399	406	354	393	370	158	1573	1584	1564	1555	261	16.2	914
1810	388	397	362	400	405	354	392	369	153	1559	1570	1547	1540	259	16.1	1023
1820	381	400	360	393	410	350	392	370	149	1530	1540	1518	1504	254	16.2	1279
1830	378	401	356	392	411	347	393	366	145	1511	1514	1509	1487	248	16.2	9530
1840	377	399	356	391	409	347	390	368	144	1534	1534	1537	1519	251	16.0	4674
1850	384	397	352	399	398	348	390	359	146	1525	1528	1527	1506	257	16.0	3733
1900	378	397	356	390	406	347	388	368	149	1520	1536	1537	1518	260	15.4	2710
1910	376	405	349	395	405	344	394	362	152	1520	1528	1523	1501	256	15.8	1533
1920	379	399	351	404	407	346	390	368	153	1544	1556	1550	1524	255	15.8	974
1930	380	407	349	399	403	346	395	362	153	1557	1568	1556	1535	248	15.6	964
1940	381	399	358	391	404	350	388	371	155	1559	1569	1555	1573	253	15.5	1074
1950	385	403	350	400	397	349	394	361	155	1560	1572	1555	1538	249	15.3	979
2000	384	407	349	400	399	347	394	361	155	1555	1568	1556	1537	255	15.3	972
2010	379	404	356	390	406	348	390	370	154	1567	1580	1568	1553	257	15.5	985
2020	378	406	354	391	406	347	391	368	154	1522	1582	1564	1553	258	15.3	1003
2030	386	404	350	400	396	350	392	362	156	1571	1581	1565	1550	251	15.3	1024
2040	385	399	358	395	399	352	389	369	155	1582	1591	1577	1563	256	15.8	1022
2050	379	408	353	394	405	347	394	366	155	1578	1586	1568	1557	259	15.8	1023
2100	378	408	355	393	406	348	393	368	155	1581	1590	1569	1559	256	15.8	1033
2110	386	400	358	398	397	353	390	368	155	1585	1586	1567	1555	258	16.1	1031
2120	382	402	359	393	404	351	390	372	156	1568	1577	1555	1545	255	15.9	997
2130	387	402	357	401	397	354	392	366	155	1562	1571	1551	1539	257	15.9	1013
2140	382	412	351	402	403	349	398	364	154	1551	1560	1544	1529	249	15.9	1046
2150	389	405	355	404	397	353	395	364	154	1541	1549	1530	1515	255	15.5	1041
2200	381	395	352	402	404	349	398	365	154	1544	1553	1536	1521	246	15.5	1002

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RTO LOG SHEET

Wheelabrator Clean Air Systems

Huntington Energy Systems RTO

DATA SHEET

rev.3, DHS 4/1/96

LP Sagola (Dryer)

Regenerative Thermal Oxidizer

Date	7-23-96	7-23-96	Fill out data column once a shift, attach final sheet with chart recorder sheet; submit to Environmental
Time	10:00AM	4:00PM	
Burner S.P.	1540	1540	**Comments** (Note anything out of the ordinary)
Bnr #1 temp	1583	1555	
Bnr #1 out	1.5	1.1	
Bnr #2 temp	1596	1567	
Bnr #2 out	5.8	6.6	
Bnr #3 temp	1577	1545	
Bnr #3 out	6.2	6.1	
Inlet temp	155	156	
Chamber temp	1573	1537	
Exhaust temp	251	253	
RTO diff press	15.9	15.8	
#1 VFD Amps	574	573	
#1 VFD RPM	1374	1361	
#2 VFD Amps	614	621	
#2 VFD RPM	1410	1392	
P/V setpoint	1.0	1.0	
P/V out	.98	.82	
Cbr #1 B.O. temp	370	380	
Cbr #2 B.O. temp	376	393	
Cbr #3 B.O. temp	353	360	
Cbr #4 B.O. temp	380	390	
Cbr #5 B.O. temp	414	409	
Cbr #6 B.O. temp	348	349	
Cbr #7 B.O. temp	377	389	
Cbr #8 B.O. temp	357	368	
#1 Fan brg #1 temp	121	126	
#1 Fan brg #2 temp	114	120	
#2 Fan brg #1 temp	125	129	
#2 Fan brg #2 temp	110	112	
#1 Motor brg #1 temp	106	121	
#1 Motor brg #2 temp	105	91	
#2 Motor brg #1 temp	127	96	
#2 Motor brg #2 temp	100	89	
Dryer #1 RTO/ATMOS	RTO	RTO	
Dryer #2 RTO/ATMOS	RTO	RTO	
Dryer #3 RTO/ATMOS	RTO	RTO	
Chamber Prg Fan	ON	ON	
Total gas flow	966	929	
BTUE flow	0	0	

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RTO Log SHEET

Wheelabrator Clean Air Systems

Huntington Energy Systems RTO

DATA SHEET

v.3. OHS 4/1/96

LP Sagola (Dryer)

Regenerative Thermal Oxidizer

Fill out data column once a shift, attach final sheet with chart recorder sheet; submit to Environmental

			Comments (Note anything out of the ordinary)
Date	7-23-96		
Time	10:00	4:00	
Burner S.P.	1540	1540	
Chr #1 temp	1542	1548	
Chr #1 out	2.0	0.2	
Chr #2 temp	1551	1551	
Chr #2 out	5.8	4.4	
Chr #3 temp	1535	1537	
Chr #3 out	2.0	1.6	
Inlet temp	155	150	
Chamber temp	1524	1513	
Exhaust temp	249	252	
RTO diff press	15.5	15.8	
#1 VFD Amps	585	533	
#1 VFD RPM	1363	1288	
#2 VFD Amps	566	507	
#2 VFD RPM	1342	1306	
P/V setpoint	1.0	1.0	
P/V out	681	64.7	
Cbr #1 B.O. temp	382	366	
Cbr #2 B.O. temp	408	384	
Cbr #3 B.O. temp	360	333	
Cbr #4 B.O. temp	395	380	
Cbr #5 B.O. temp	409	375	
Cbr #6 B.O. temp	351	335	
Cbr #7 B.O. temp	394	380	
Cbr #8 B.O. temp	323	350	
#1 Fan brg #1 temp	121	117	
#1 Fan brg #2 temp	85	84	
#2 Fan brg #1 temp	125	112	
#2 Fan brg #2 temp	85	84	
#1 Motor brg #1 temp	113	108	
#1 Motor brg #2 temp	107	102	
#2 Motor brg #1 temp	117	111	
#2 Motor brg #2 temp	100	95	
Dryer #1 RTO/ATMOS	Rto	Rto	
Dryer #2 RTO/ATMOS	Rto	Rto	
Dryer #3 RTO/ATMOS	Rto	Rto	
Chamber Prg Fan	on	on	
Total gas flow	1013	7714	
BTUE flow	0	6055	

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Bundle Height Parameters / Weights

Board Size	Pieces / Bundle	Target Thickness	Target Bdl. Height	Target Bdl. Weight
1/4"	120	0.260	31 1/4"	3296
1/4"	150	0.260	39"	4108
3/8"	100	0.380	38"	4003
7/16"	66	0.380	28 3/4"	2932
7/16"	90	0.435	39 1/8"	3999
15/32"	82	0.485	39 3/4"	4232
1/2"	66	0.510	30 5/8"	3100
1/2"	80	0.510	40 3/4"	4134
19/32" SE	65	0.595	38 5/8"	3981
19/32" HY	55	0.610	33 1/2"	3418
5/8" SE	40	0.620	24 3/4"	2612
23/32" SE	55	0.700	38 1/2"	3850
23/32" HY	45	0.730	32 7/8"	3285
7/8" HY	38	0.890	33 7/8"	3389
1-1/8" SE	36	1.085	39"	3854
1-1/8" HY	30	1.110	33 3/8"	3286

Notes:

If the bundles heights are running plus or minus 3/8" from these figures, please notify the Quality Control Department and the Shift Forman.

If the bundles weights are plus or minus 100 pounds from these figures, please notify the Quality Control Department and the Shift Forman.

U Grade: Use normal piece count, edge seal, and 2 green stripes with the stencil on each side of the unit. Stencil the thickness on the lower right hand corner of the unit face, place tag close to bottom, and cover with plastic.

E Grade: 80 piece units thru 1/2", 50 piece units for 19/32 and 23/32, and 40 piece units for 7/8" and above. No edge seal, and 2 black stripes with the thickness logo on the lower right hand corner of the unit face.. Place tag close to the bottom, and cover with plastic.

7/23/9

Bundle Height Data

Size		Size		Size		Size		Size		Size		Size	
No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height
3	39¼												
6	39½												
9	39¼												
12	39¾												
15	39¾												
16	39¼												
40	40⅝												
45	40¾												
49	40⅝												
53	40½												
61	40¾												
57	40⅝												
63	40¼												
65	40¾												
66	40⅝												
68	39⅞												
73	40												
74	"												
75	40												
76	"												
77	40												
83	39¾												
93	40½												
97	39¾												
101	40												
109	40¼												

EPA Data

Size	Time	Pieces	Height	Weight
7/16	0716	90	39¼	4201
7/16	0800	90	"	4136
7/16	0815	90	39⅞	4177
7/16	0831	90	39¾	4226
7/16	0845	90	39¾	4191
7/16	0907	90	39¾	4128
7/16	1031	90	40⅝	4466
7/16	1052	90	40⅝	4526
7/16	1102	90	40⅝	4539
7/16	1115	90	40⅝	4597
7/16	1130	90	40⅝	4532
7/16	1200	90	40⅛	4570
7/16	1215	90	40¼	4560
7/16	1230	90	40	4541
7/16	1245	90	40¼	4510
7/16	1:00	90	39¾	4502
7/16	1:15	90	40	4467
7/16	1:30	90	40	4424
7/16	1:45	90	40	4464
7/16	2:00	90	39¾	4446
7/16	2:15	90	39⅞	4455
7/16	2:45	90	40⅛	4460
7/16	3:00	90	40¼	4533
7/16	3:15	90	39¾	4450
7/16	3:33	90	40	4153
7/16	4:00	90	40¼	4528
7/16	4:15	90	40¼	4515
7/16	4:33	90	40¼	4491
7/16	5:15	90	"	4456
	5:31	90	"	4475
	6:10	90	40	4492
		90		
		90		
		90		

43

Bundle Height Parameters w/weights

7/23/91

Board Size	Pieces / Bundle	Target Thickness	Target Bdl. Height	Target Bdl. Weight
1/4"	120	0.260	31 1/4"	3286
1/4"	150	0.260	39"	4108
3/8"	100	0.380	38"	4003
7/16"	66	0.380"	28 3/4"	2932
7/16"	90	0.435	39 1/8"	3999
15/32"	82	0.485	39 3/4"	4232
1/2"	66	0.510	30 5/8"	3100
1/2"	80	0.510	40 3/4"	4134
19/32" SE	65	0.595	38 5/8"	3981
19/32" HY	55	0.610	33 1/2"	3418
5/8" SE	40	0.620	24 3/4"	2612
23/32" SE	55	0.700	38 1/2"	3850
23/32" HY	45	0.730	32 7/8"	3285
7/8" HY	38	0.890	33 7/8"	3389
1-1/8" SE	36	1.085	39"	3854
1-1/8" HY	30	1.110	33 3/8"	3286

Notes:

If the bundles heights are running plus or minus 3/8" from these figures, please notify the Quality Control Department and the Shift Forman.

If the bundles weights are plus or minus 100 pounds from these figures, please notify the Quality Control Department and the Shift Forman.

U Grade: Use normal piece count, edge seal, and 2 green stripes with the stencil on each side of the unit. Stencil the thickness on the lower right hand corner of the unit face, place tag close to bottom, and cover with plastic.

E Grade: 80 piece units thru 1/2", 50 piece units for 19/32 and 23/32, and 40 piece units for 7/8" and above. No edge seal, and 2 black stripes with the thickness logo on the lower right hand corner of the unit face. Place tag close to the bottom, and cover with plastic.

Bundle Height Data

Size 7/16		Size 1/2		Size		Size		Size		Size		Size	
No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height
3	40	3	40 1/4										
6	40 1/4	6	✓										
9	40	9	40 3/4										
12	40 1/4	12	✓										
15	✓	15	✓										
18	✓	18											
21	40	21											
24	✓	24											
27	✓	27											
30	40 1/4	30											
33	–	33											
36	40 1/4	36											
39	✓	39	✓										
42	✓	42											
45	✓	45											
48	40	48											
51	40 1/4	51											
54	40												
57	✓												
60	✓												
63	40 1/4												
66	✓												
69													
72													
75													
78													
81													
84													
87													
90													

EPA Data

7/16

Size	Time	Pieces	Height	Weight
7/16	1917	90	40 1/4	4436
7/16	1934	90	40 3/4	4441
7/16	1947	90	40 1/4	4504
7/16	2006	90	40 1/4	4496
7/16	2026	90	40	4428
7/16	2044	90	40 1/4	4628
7/16	2109	90	40	4561
7/16	2117	90	40 1/2	4491
7/16	2138	90	40 1/4	4579
7/16	2208	90	40 3/8	4496
7/16	2224	90	40 1/4	4514
7/16	2314	90	40 1/2	4541
7/16	2400	90	40	4465
3/8	0031	100	38	4145
1/2	0346	80	40 1/4	4154
1/2	0411	80	40 3/4	4126
1/2	0514	80	40 1/2	4186

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DRYER JULY 24th, 1996
HCHO

DATA TIME	START=	17:10	END=	18:28	HOURS=	1.30
	START=	19:15	END=	20:20	HOURS=	1.08
	START=	20:40	END=	21:44	HOURS=	1.07
					TOTAL=	3.45

BOARD WEIGHTS - LBS
average weights determined by taking finished bundle weghts.

7/16"
per/peice 46.15
per/ 8' x 24' 276.93

4153.9 lb= average
bundle weight
90 piece units

PLANT PRODUCTION RATE
3.45 =hours during testing
65 =pressloads
780 =no. of 8'x24' boards produced (pressloads x 12 boards per load)
149,760 =volume produced in surface footage (pressloads x 8'x24'x12 openings)
174,725 =volume produced 3/8" basis (pressloads x 8'x24'x 12 openings x 1.1667)
216,005 =lbs of finished product (boards produced x weight of finished board)
62,610 =lbs of finished product per hour (lbs of finshed product / hours)
31.31 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

FUEL BURNING RATE ESTIMATED BY DRY FUEL INPUT

SURFACE
8 =SURFACE fuel calibration in pounds per count
1,987 =SURFACE counts during testing hours
15,896 =SURFACE lbs of fuel burned during testing
3.45 =hours during testing
4,608 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.30 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8,500 =estimated BTU content per pound of dry fuel,
39.2 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
793 =average inlet temperature
36.35 =average incoming moisture percent
6.40 =average dry moisture percent

CORE
7.96 =CORE fuel calibration in pounds per count
1,769 =CORE counts during testing hours
14,081 =CORE lbs of fuel burned during testing
3.45 =hours during testing
4,082 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.04 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8,500 =estimated BTU content per pound of dry fuel,
34.7 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
973 =average inlet temperature
24.23 =average incoming moisture percent
6.77 =average dry moisture percent

SURFACE/CORE
7.42 =SURFACE/CORE fuel calibration in pounds per count
1,900 =SURFACE/CORE counts during testing hours
14,098 =SURFACE/CORE lbs of fuel burned during testing
3.45 =hours during testing
4,086 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.04 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8,500 =estimated BTU content per pound of dry fuel,
34.7 =estimated mmbtu input per hour (lbs of dry fuel per hour x btu content)
891 =average inlet temperature
36.35 =average incoming moisture percent
5.93 =average dry moisture percent

DRYER THROUGHPUT RATE
12,775 =Total pounds of fuel burned per hour in Core,Surface and Surface/Core Dryers
62,610 =lbs of finished product per hour (lbs of finshed product / hours)
75,385 =Pounds of material produced by the dryer per hour (dry basis, assumming fuel balances)
3,295 = weight of trim per hour at 5.0% of finished product
9,480 =weight of screened fines per hour (total fuel - trim)
12.58% =resulting loss to fines as percentage of dryer throughput

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E-TUBE/RTO JULY 24th, 1996
HCHO

DATA TIME	START=	17:10	END=	18:28	HOURS=	1.30
	START=	19:15	END=	20:20	HOURS=	1.08
	START=	20:40	END=	21:44	HOURS=	1.07
					TOTAL=	3.45

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6.40 =average dry moisture percent
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7.96 =CORE fuel calibration in pounds per count
1,769 =CORE counts during testing hours
14,081 =CORE lbs of fuel burned during testing
3.45 =hours during testing
4,082 =lbs of dry fuel burned per hour during testing (pounds of dry fuel / testing hours)
2.04 =tons of dry fuel burned per hour during testing (pounds of dry fuel / 2000 lbs)
8,500 =estimated BTU content per pound of dry fuel,
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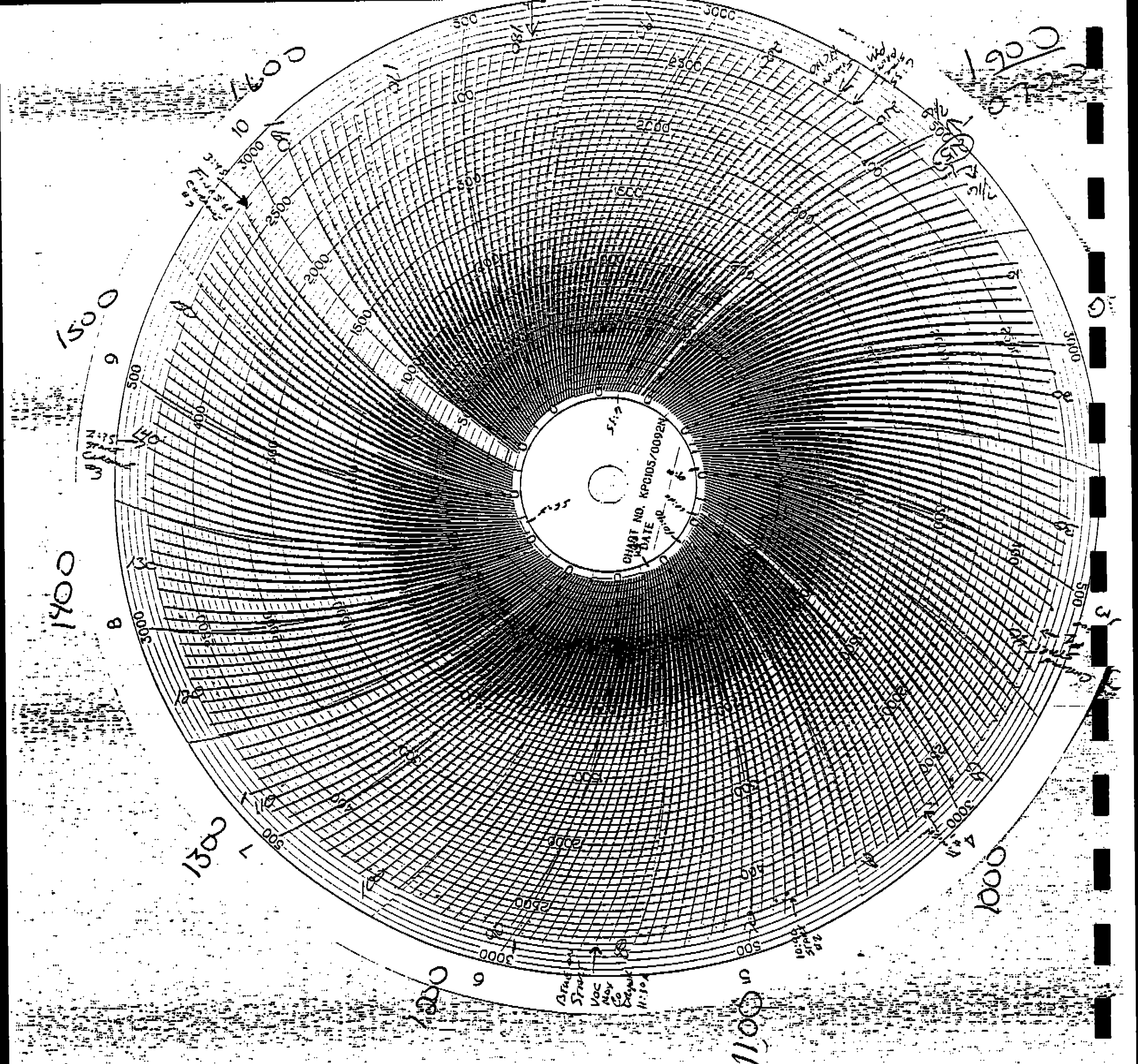

SAGOLA PRESS
7/24/96
0700-1900

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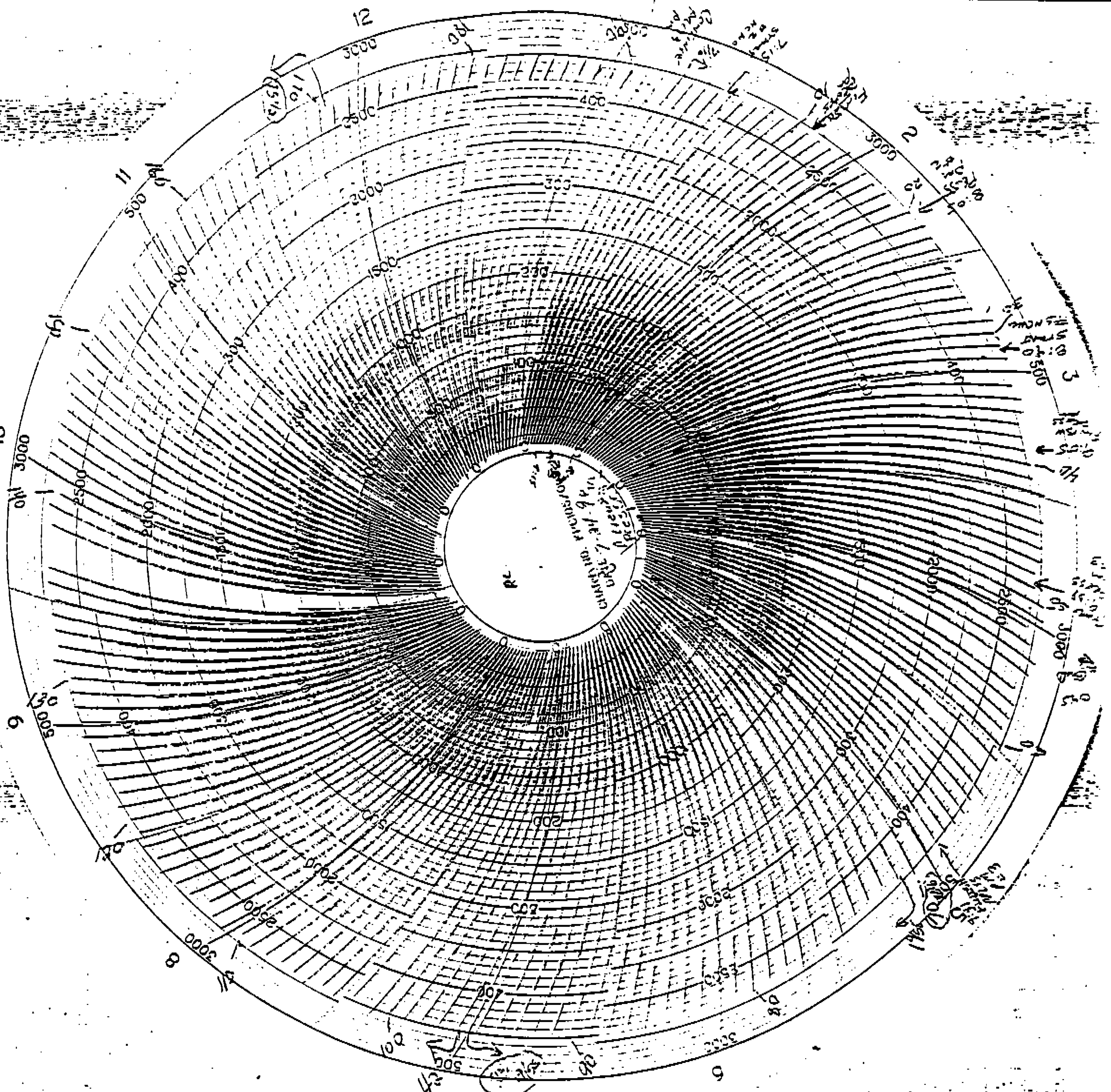

SAGOLA PRESS
7/24/96
1900 - 0700

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LOUISIANA-PACIFIC CORPORATION SAGOLA, MI

SUPERVISOR Dave S SHIFT D. G CREW B DATE 7-24-96

SHIFT OPERATING REPORT

PRESS OPERATION

LINE SPEED	FROM	TO	THICKNESS	PRESS LOADS	3/8" FOOTAGE	Minutes Downtime M	E	O
93	7:00	7:00	7/16	215	577,937	22		
			TOTAL	215	577,937	22		

Dryer Lamp Test (OK)	✓
Surface Dryer Fan Load	91
Core Dryer Fan Load	93
Surf / Core Dryer Fan Load	89
#1 Baghouse Pressure	—
#2 Baghouse Pressure	—
Surface Wet Bin Volume*	45
Core Wet Bin Volume*	40
Surf/Core Wet Bin Volume*	40
Surface Dry Bin Volume*	72
Core Dry Bin Volume*	Full
Laidig Bin	45-50%

NATURAL GAS METER READINGS
(taken end of the shift)

MAIN	0127447300
PRESS RTO	59856420
DRYER RTO	14927880
GEKA	03239810
S DRYER	
C DRYER	
S/C DRYER	

GEKA EFB	BED KV	ION KV	ION MA	EFB - P	BH - P
	10	21	1.7	3.6	1.8

FLAKER RUN HOURS

#1 T.L.F	#2 T.L.F

BARK % MOISTURE		FUEL % MOISTURE	2.89
		GRECONS 5-3	2 / 2

LOG COUNT

#1 6224 #2 4167 = 10391 TOTAL

BARK FUEL COUNT: A 252 B 252

DRYER OPERATION

	Dry Fuel Usage Lbs.	Gas Usage Hrs.	Sust. Gas Usage Hrs.	Average Inlet Temp.	Running Time Mins	Ave. Wet Moisture	Ave. Dry Moisture
Surface	6602	0	0	836	720	46.0	7.2
Core	5821	0	201	995	720	44.2	7.1
S/Core	6603	0	0	950	720	43.8	7.2

COMMENTS: Left PP Saw Plugged 15 min - Flos Plugged 5X 6 min

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LOUISIANA-PACIFIC CORPORATION SAGOLA, MI

SUPERVISOR Dave Donate SHIFT Nights CREW D DATE 7-24-96

SHIFT OPERATING REPORT

PRESS OPERATION

SPEED	FROM	TO	THICKNESS	PRESS LOADS	3/8" FOOTAGE	Minutes Downtime M	E	O
74	7:00	10:55	7/16	20	188,165	3	1	
68	10:55	12:50	19/32	25	91,198	5		
81	12:50	5:39	1/2	75	230,394	9		
81	5:39	7:00	15/32	22	63,360			
			TOTAL	192	573,117	17	1	—

Dryer Lamp Test (OK)	ok
Surface Dryer Fan Load	90.9
Core Dryer Fan Load	92.5
Surf/Core Dryer Fan Load	88.1
Baghouse Pressure	ok
Baghouse Pressure	ok
Surface Wet Bin Volume*	60
Core Wet Bin Volume*	60
Surf/Core Wet Bin Volume*	75
Surface Dry Bin Volume*	50
Core Dry Bin Volume*	58
Sludig Bin	55-60

NATURAL GAS METER READINGS
(taken end of the shift)

MAIN	012771720C
PRESS RTO	59920720
DRYER RTO	14997580
GEKA	03239810
S DRYER	
C DRYER	
S/C DRYER	

GEKA EFB	BED KV	ION KV	ION MA	EFB - P	BH - P
	9.4	21	1.6	4.1	1.9

FLAKER RUN HOURS

#1 T.L.F	#2 T.L.F
384	417

BARK % MOISTURE	36.6%	FUEL % MOISTURE	1.9%
		GRECONS	13

LOG COUNT

#1 5177 #2 7364 = 12541 TOTAL

BARK FUEL COUNT: A 232 B 232

DRYER OPERATION

	Dry Fuel Usage Lbs.	Gas Usage Hrs.	Sust. Gas Usage Hrs.	Average Inlet Temp.	Running Time Mins	Ave. Wet Moisture	Ave. Dry Moisture
Surface	6549	0	140	1100°	720	7:30 41.8 / 45.2	6.7
Core	5530	0	273	1001°	720	44.4%	5.9
S/Core	6027	0	224	971°	720	42.8%	6.3

COMMENTS: TESTED All GRECONS. Surf. Flopgate Plug 7 min Fcos Plug 4x 9 min
7 min Misc. D.T.

DAILY PRODUCTION REPORT

LOUISIANA-PACIFIC CORPORATION

SAGOLA, MICHIGAN

DATE: JULY 24.,1996

DAY: WEDNESDAY

SHIFT	BOARD SIZE	PRESS LOADS	NO. OF PANELS	SURFACE FOOTAGE	3/8" FOOTAGE
7AM.	7/16"	215	15,480	495,360	577,937
TO	0	0	0	0	0
7PM.	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
B	0	0	0	0	0
CREW	0	0	0	0	0
			SHIFT	TOTAL	577,937
7PM.	7/16"	70	5,040	161,280	188,165
TO	19/32"SE	25	1,800	57,600	91,198
7AM.	1/2"	75	5,400	172,800	230,394
	15/32"	22	1,584	50,688	63,360
D	0	0	0	0	0
CREW	0	0	0	0	0
			SHIFT	TOTAL	573,117
DAILY	TOTAL	407	29,304	937,728	1,151,054
			TOTAL	WTD	6,204,181
			TOTAL	MTD	26,052,796
			TOTAL	YTD	192,224,589

	SCHED. RUN HOURS	NET RUN HOURS	% RUN TIME	% PLANT CAP.
DAY	12.00	11.75	97.9%	147.6%
NIGHT	12.00	11.75	97.9%	146.4%
DAILY	24.00	23.50	97.9%	147.0%
WTD	139.50	137.00	98.2%	
MTD	625.75	573.50	91.7%	
YTD	4,708.00	4,438.00	94.3%	

FOREMAN % PLANT	CAP
"A" M. MESSINA	132.0%
"B" D. SPIGARELLI	140.0%
"C" F. SHOQUIST	135.0%
"D" D. DONATI	142.7%

LOG CNT.	DAILY	WTD	MTD
A CREW	0	36,215	130,597
B CREW	10,391	27,409	153,709
C CREW	0	34,332	131,563
D CREW	12,541	29,045	156,355

MTD 3/8" FOOTAGE

1/4"	202,761	1/2"	4,325,269	23/32"SE	0
3/8"	85,248	19/32"SE	1,079,785	23/32"H	5,966,122
7/16"	11,773,779	19/32"H	164,156	7/8"H	295,676
15/32"	2,160,000	5/8"	0	1 1/8"	0

GAS USAGE (MCF)	DAY	MTD
SURFACE DRYER	0	17,499
CORE DRYER	0	0
S/C DRYER	0	0
GEKA	0	0
PRESS RTO	0	0
DRYER RTO	0	0
TOTAL	634	17,499

DOWNTIME

DAY SHIFT B-CREW 15 MIN. RIP SAW PLUGGED.

NIGHT SHIFT D-CREW 18 MIN. MISC.

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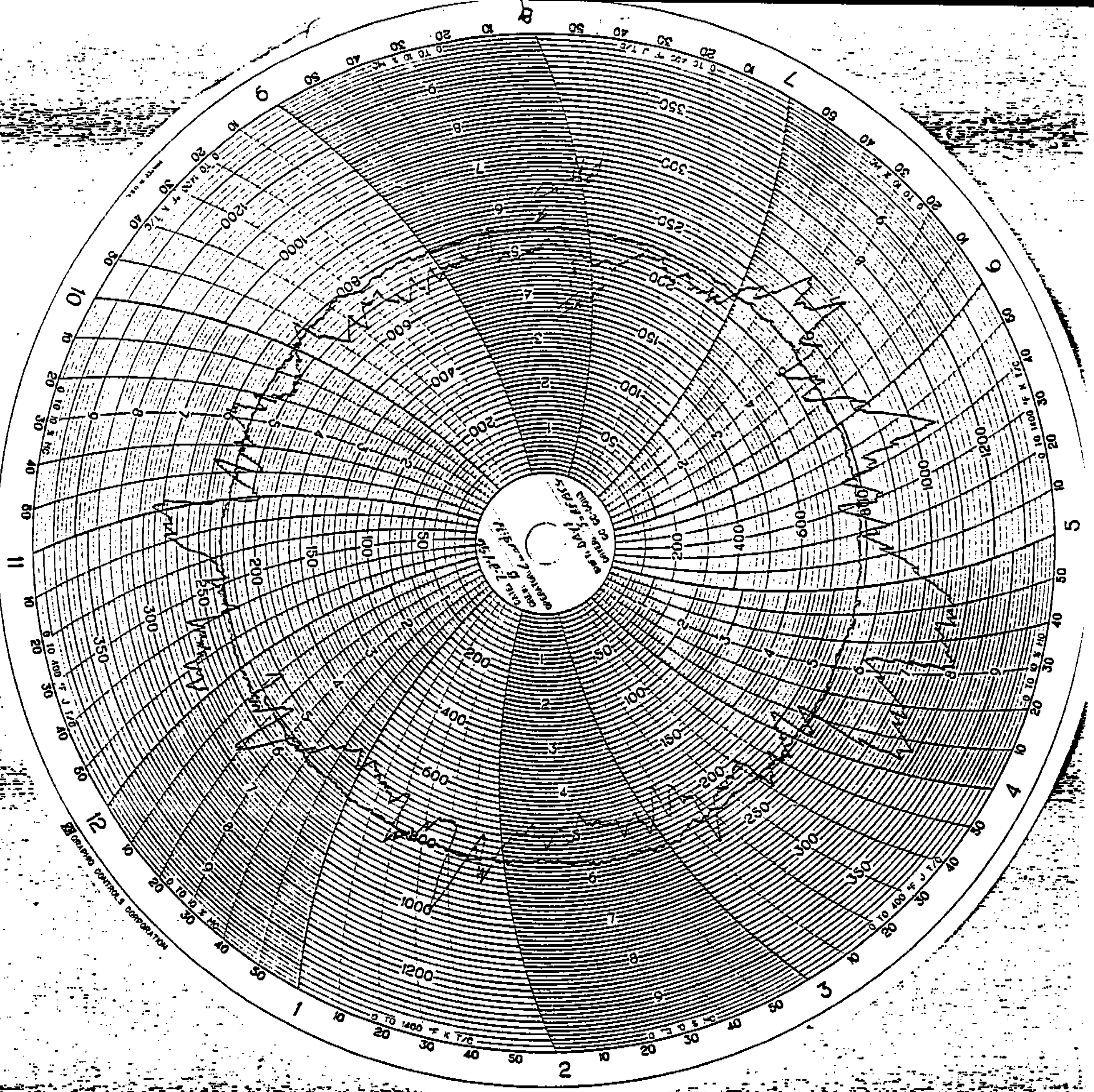

SAGOLA SURF. DRYER
7/24/96
0700 - 1900

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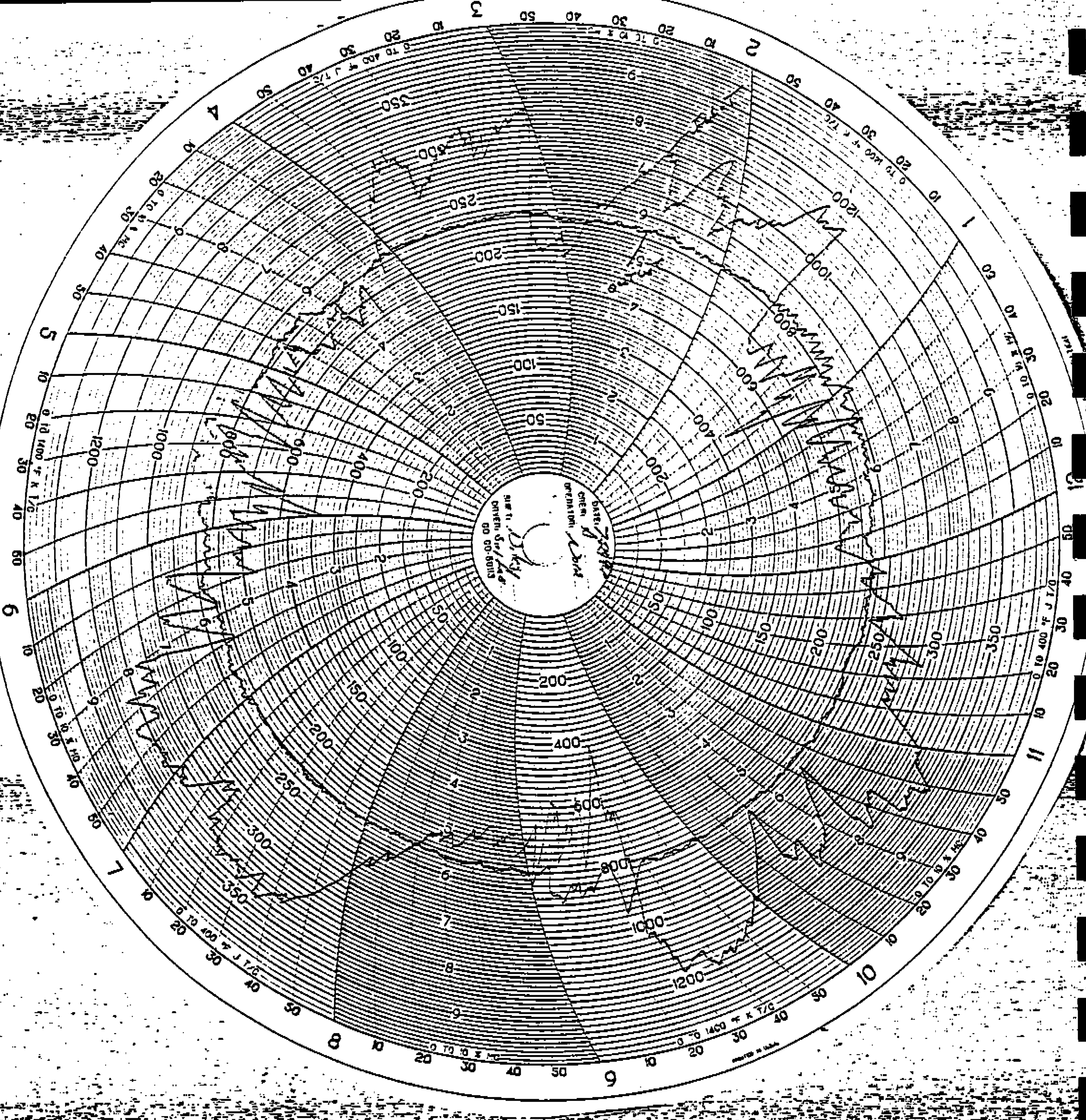

SAGOLA SURF. DRYER
7/24/96
1900-0700

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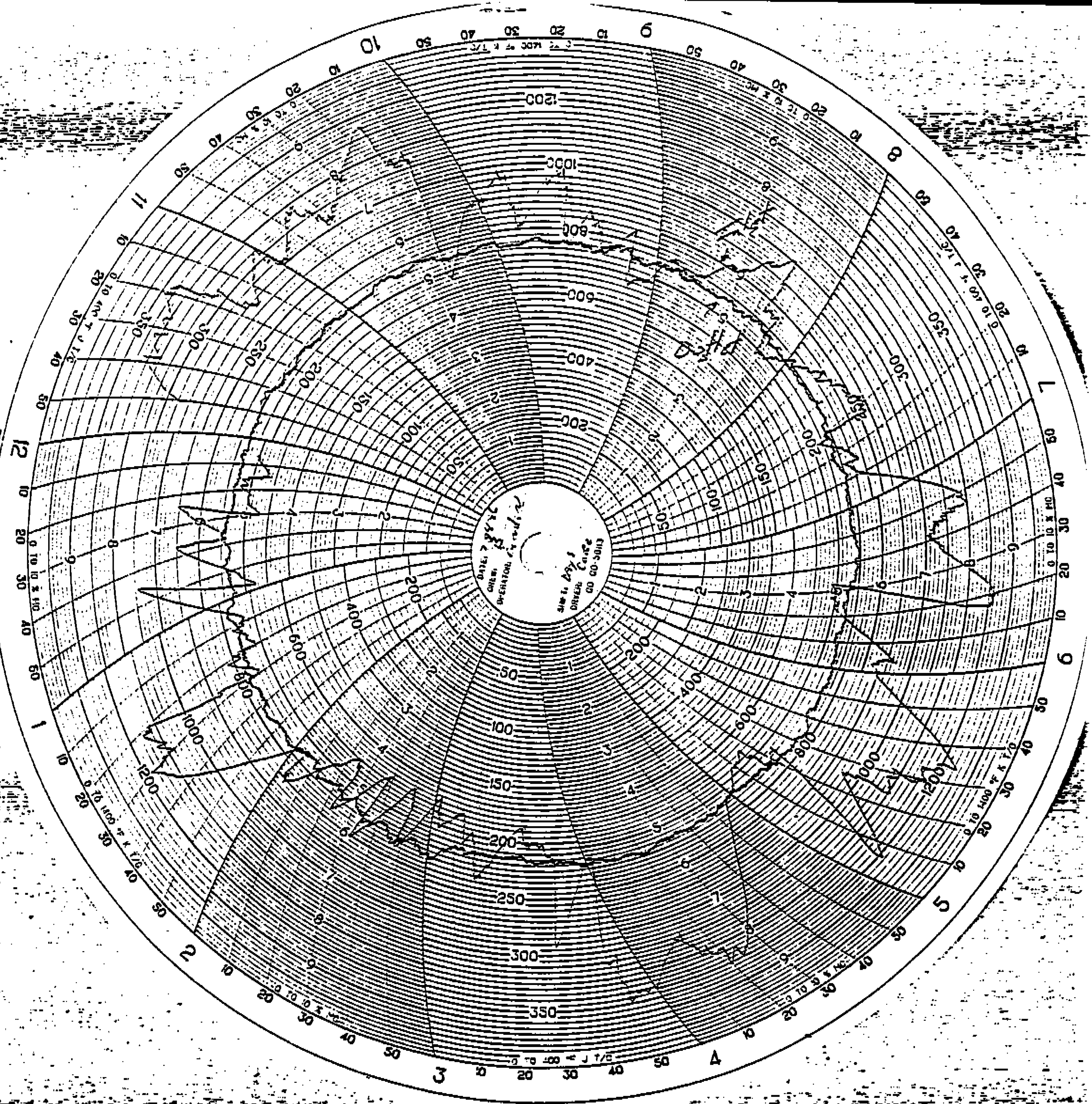

SAGOLA CORE DRYER
7/24/96
0700 - 1900

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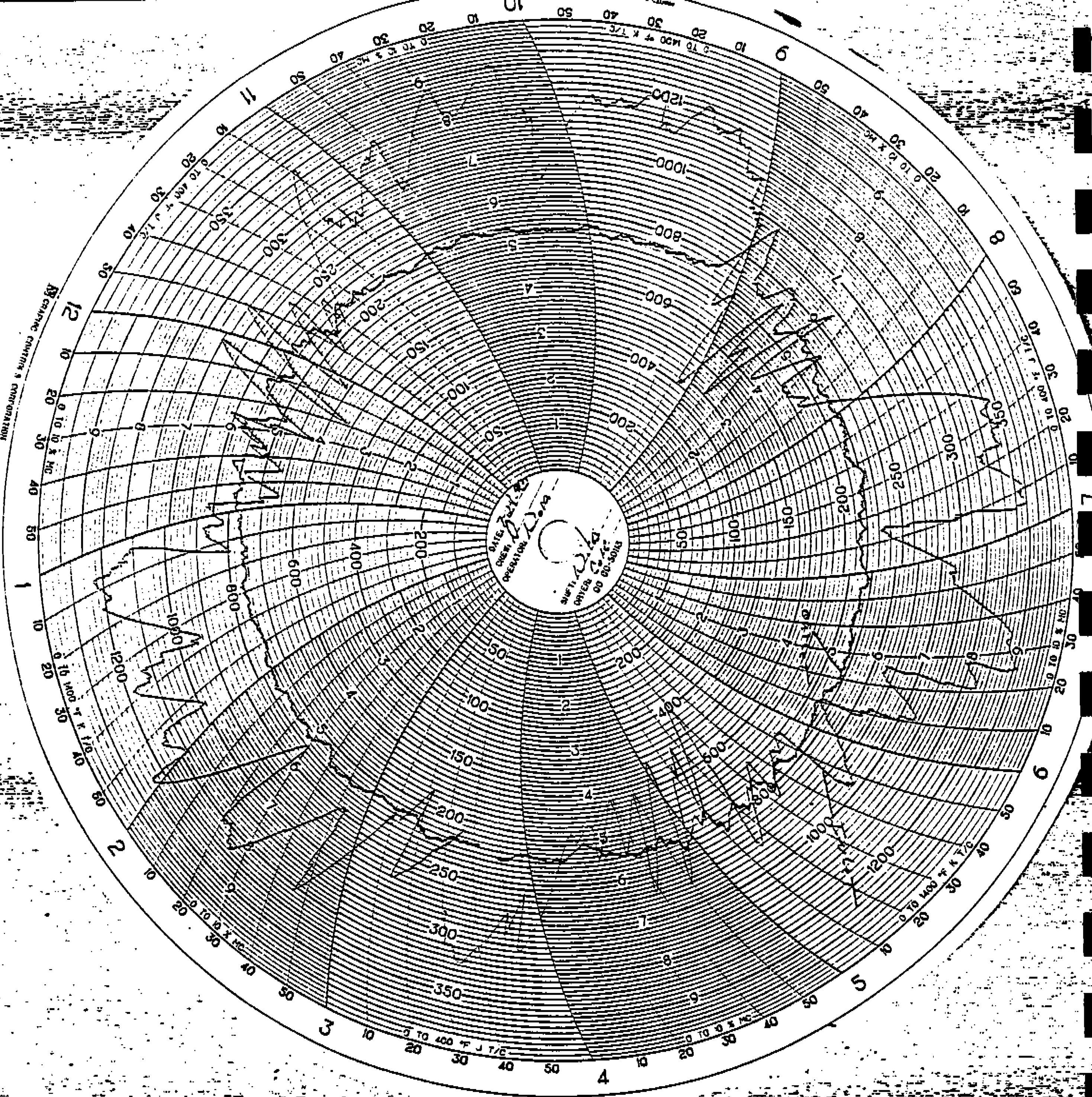

SAGOLA CORE DRYER
7/24/96
1900 - 0700

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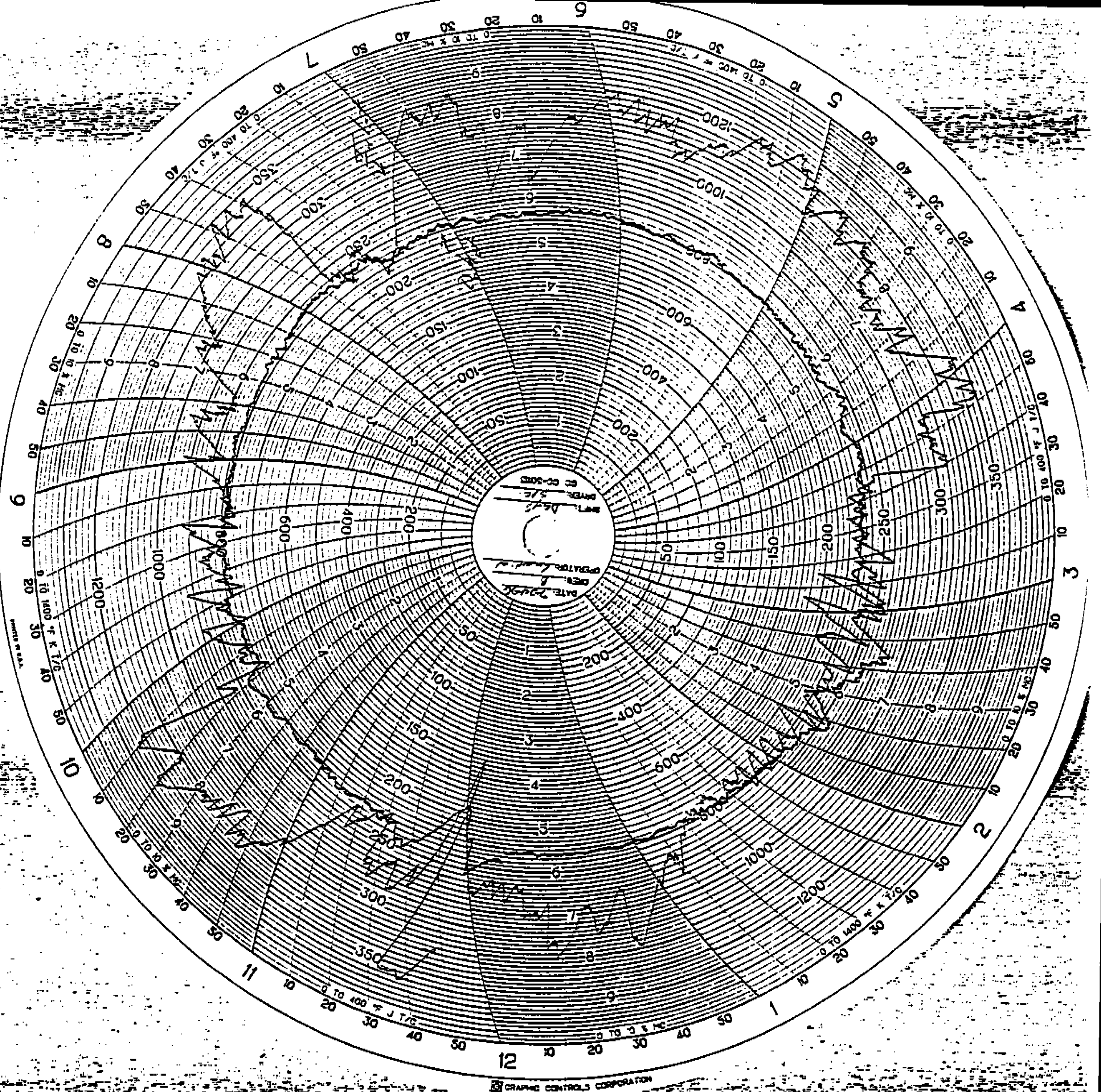
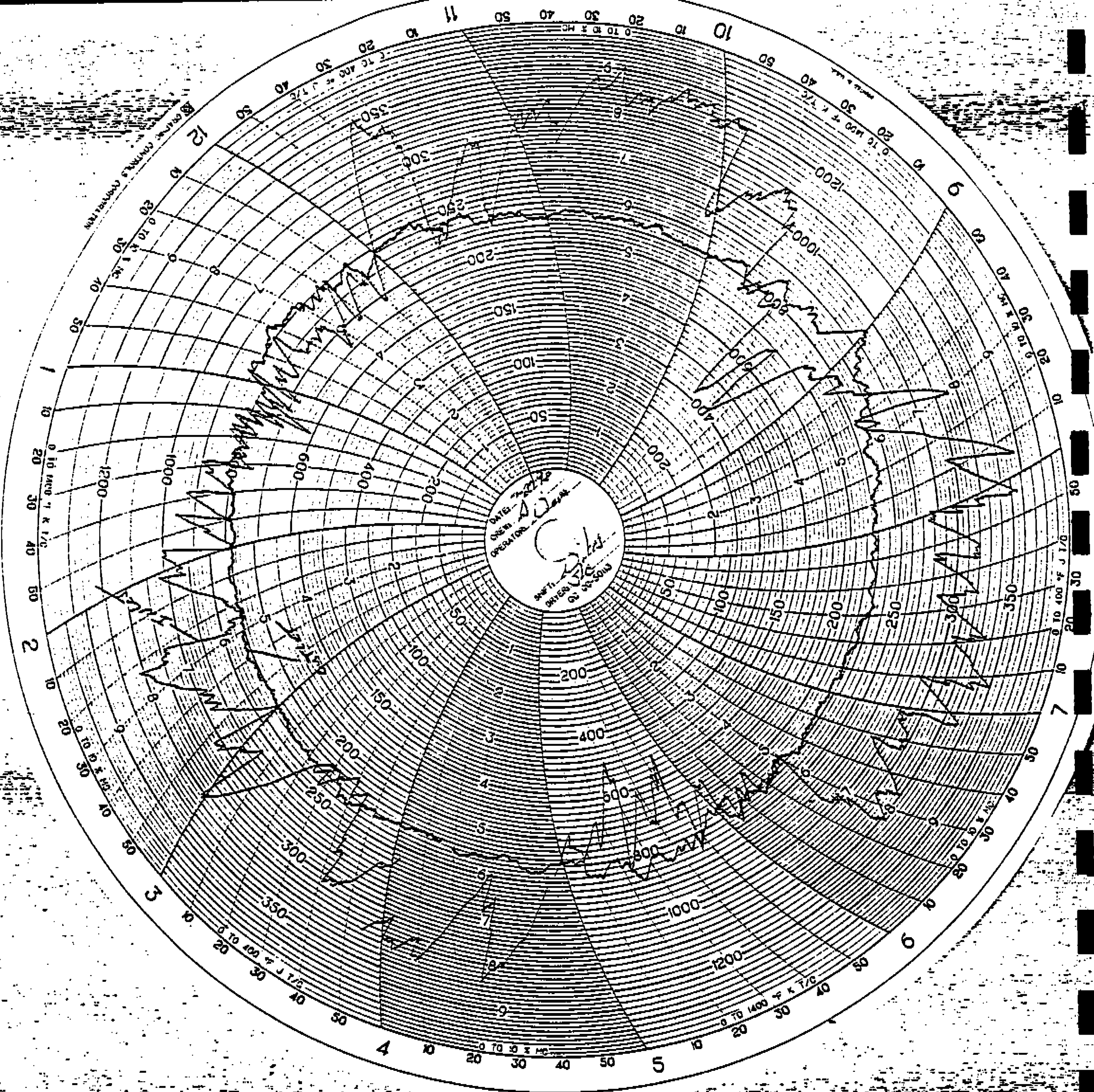


SAGOLA SURF./CORE DRYER
7/24/96
0700 - 1900
58



SAGOLA SURF./CORE DRYER
7/24/96
1900 - 0700

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT)

7-24-96

SURFACE

TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. OUT	ET. outlet
7:20	242.0	92	812	868	383	50	70-78		5.9	149
7:30	242.0	91	829	241.1	483	75	70-78		6.4	151
7:40	242.0	85	910	241.2	549	75	70-78		6.2	151
7:50	242.0	91	945	240.4	610	75	70-78		6.6	152
8:00	240	91	987	242.2	654	65	70-76		5.5	150
8:10	234.5	92	704	235.4	777	40	70-70		5.6	150
8:20	234.0	92	785	234.0	846	50	70-70		5.7	150
8:30	233.5	92	806	232.4	972	40	68-100		5.3	151
8:40	233.5	92	768	233.9	1057	40	68-90		5.7	150
8:50	233.5	92	718	234.3	1158	40	73-78	46.0	6.0	148
9:00	233.5	92	750	232.8	1252	45	74-70		5.6	149
9:10	233.5	92	816	231.1	1334	45	74-70		7.0	149
9:20	233.5	92	685	236.3	1438	40	74-70		5.3	146
9:30	233.5	92	676	236.5	1520	25	74-70		5.4	141
9:40	233.5	92	729	233.4	1587	40	74-70		6.4	144
9:50	233.5	92	663	233.9	1685	40	74-70		6.7	145
10:00	233.5	92	652	235.3	1763	40	74-70		6.5	146
10:10	233.5	92	708	231.8	1850	60	78-60	40.4	6.3	148
10:20	233.5	93	711	231.9	1955	80	78-60		6.8	149
10:30	233.5	93	704	233.5	2063	65	78-60		7.0	149
10:40	233.5	93	709	233.2	2191	75	70-65		6.4	144
10:50	233.5	93	731	233.3	2248	75	70-65		6.3	149
11:00	233.4	93	697	233.5	2330	65	70-65		7.0	148
11:10	233.5	93	678	234.0	2413	40	70-65		5.4	147
11:20	233.5	93	702	232.5	2513	40	70-65		6.5	149
11:30	233.5	93	753	232.6	2607	60	65-70	39.4	7.0	150
11:40	233.5	93	716	234.2	2702	60	65-70		6.5	149
11:50	233.5	93	733	233.6	2811	40	68-70		6.5	149
12:00	233.5	93	725	233.3	2896	40	68-70		6.8	149
12:10	233.5	93	820	232.4	2985	40	68-70		7.1	150
12:20	233.5	93	914	232.2	3108	60	68-70	34.4	7.3	159
12:30	233.5	93	826	233.4	3207	60	68-70		6.8	151
12:40	233.5	93	713	235.3	3292	65	68-70		6.3	149
12:50	233.5	93	732	233.2	3393	60	68-70		6.4	149
1:00	233.5	93	887	231.7	3496	60	68-70		6.3	152
1:10	233.5	93	991	234.5	3596	60	68-70		6.5	151
1:20	234.0	93	834	234.2	3707	60	68-70		6.3	149
1:30	234.0	93	855	234.6	3796	75	68-70		6.9	149
1:40	234.0	93	843	235.0	3903	75	68-70		6.5	150
1:50	234.0	90	966	232.6	3998	80	70-FULL		6.6	151
2:00	234	90	1115	232.9	4109	65	70-FULL	46.0	6.5	152
2:10	234	90	1150	232.9	4225	70	70-FULL		7.0	153
2:20	236	90	886	235.2	4373	80	70-FULL		6.2	150
2:30	234	90	1023	231.8	4450	90	70-FULL		7.2	152
2:40	234	87	1014	235.2	4599	F	FULL-70		7.0	151
2:50	234	87	855	237.6	4647	90	FULL-70		6.2	150
3:00	234	87	795	238.0	4737	85	FULL-70		6.0	149

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT)

7-24-96

E-Tube Inlet Temp	SURFACE TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. OUT	E-[illegible] Outlet Temp
213	3:10	234.0	87	803	234.9	4833	80	73-FULL		6.1	14[illegible]
214	3:20	234.0	87	797	235.0	4930	80	73-FULL	36.2	6.0	1[illegible]
214	3:30	233.5	88	738	234.8	5012	80	73-FULL		6.3	150
213	3:40	233.5	92	758	230.8	5096	90	73-FULL		6.6	1[illegible]
213	3:50	233.5	86	701	233.0	5180	80	73-FULL		6.4	1[illegible]
214	4:00	233.5	70	693	235.2	5256	80	73-FULL		7.1	146
218	4:10	240.0	61	725	240.7	5313	60	73-FULL		6.1	142
220	4:20	240.0	61	687	240.3	5386	60	73-FULL		6.3	1[illegible]
221	4:30	240.0	68	659	242.1	5470	80	73-FULL		5.7	1[illegible]
220	4:40	240.0	72	737	235.8	5496	80	73-FULL		5.6	14[illegible]
221	4:50	240.0	80	714	236.9	5575	80	73-FULL		6.1	144
221	5:00	240.0	83	704	238.0	5660	90	73-FULL		6.7	1[illegible]
222	5:10	242.0	84	844	241.7	5745	90	73-FULL		6.8	1[illegible]
223	5:20	242.0	86	921	244.3	5844	80	73-FULL		6.6	150
224	5:30	242.0	88	723	243.0	5932	80	73-FULL		6.3	151
223	5:40	241.0	88	833	242.4	6009	60	FULL-FULL		6.4	1[illegible]
222	5:50	242.0	88	733	240.9	6095	60	FULL-FULL		6.2	1[illegible]
220	6:00	239.5	88	678	240.1	6194	60	FULL-FULL		6.6	148
220	6:10	239.5	88	683	239.6	6264	80	FULL-FULL		6.4	148
220	6:20	239.5	88	712	238.4	6355	80	FULL-FULL		5.8	1[illegible]
219	6:30	239.5	88	794	239.4	6422	80	FULL-FULL		6.0	1[illegible]
219	6:40	237.0	89	830	236.7	6571	40	FULL-70		5.6	151
218	6:50	242.0	92	1875	241.1	133	60	FULL-70		6.3	15[illegible]
217	7:00	242.0	92	1089	240.7	182	65	FULL-70		6.5	1[illegible]
218	7:10	239.0	92	1040	242.8	190	65	78-FULL		6.3	1[illegible]
219	7:20	242.0	94	980	241.1	276	65	78-FULL	36.1	5.5	15[illegible]
220	7:30	242.0	95	30	241.7	387	40	78-FULL		5.9	15[illegible]
219	7:40	242.0	92	40	241.7	523	40	78-FULL		6.0	1[illegible]
220	7:50	242.0	91	1825	242.3	564	40	78-FULL		5.9	1[illegible]
221	8:00	242.5	94	684	243.5	675	40	FULL-72		5.5	150
221	8:10	238.4	94	680	239.5	751	65	FULL-72		6.2	15[illegible]
219	8:20	238.4	94	861	237.4	813	65	FULL-72		6.9	1[illegible]
218	8:30	240.6	94	1080	240.0	936	65	FULL-72		6.9	1[illegible]
218	8:40	241.4	94	910	240.4	1023	65	FULL-72		7.0	15[illegible]
219	8:50	242.4	94	1004	243.2	1149	80	80-FULL		6.1	1[illegible]
220	9:00	242.4	94	1230	242.9	1235	80	80-FULL	36.6	5.7	1[illegible]
219	9:10	243.0	95	1172	242.2	1348	80	FW-FW		6.3	1[illegible]
220	9:20	243.5	88	1039	246.7	1460	65	FW-FW		7.6	152
223	9:30	243.5	80	670	246.5	1546	50	FW-FW		7.2	15[illegible]
224	9:40	243.5	65	645	252.2	1630	45	FW-FW		7.4	1[illegible]
221	9:50	243.5	50	785	240.1	1710	50	FW-FW		7.3	134
218	10:00	243.5	50	584	244.4	1742	40	FW-FW	45.2	6.4	136
218	10:10	243.5	57	618	247.5	1799	40	FW-FW		6.3	1[illegible]
220	10:20	245.7	60	689	244.7	1867	40	FW-FW		6.3	1[illegible]
	10:30	245.7	60	708	245.5	1935	40	FW-FW			
	10:40										

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT)

7-24-96

CORE										
TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. OUT	ET %
7:20	199.4	82	1144	202.6	303	50	70-78		7.0	154
7:30	197.0	82	991	196.4	394	75	70-78		6.3	153
7:40	197.0	83	1102	192.3	445	75	70-78		6.4	152
7:50	197.0	83	1027	196.4	500	55	70-78		6.3	154
8:00	197	83	1139	195.4	553	60	70-76		7.0	153
8:10	197	83	1050	196.2	657	50	70-70		7.3	154
8:20	197	82	1270	196.7	749	45	70-70		6.7	154
8:30	197	82	1115	198.0	844	45	68-100		7.4	153
8:40	197	82	872	200.9	917	45	68-90		6.5	150
8:50	197	82	860	194.6	994	45	73-70	46.0	6.8	151
9:00	197	82	997	195.1	1080	45	74-70		6.7	151
9:10	197	82	871	198.2	1145	60	74-70		7.2	151
9:20	197	82	987	196.6	1240	45	74-70		6.4	151
9:30	197	82	774	195.9	1318	45	74-70		6.5	151
9:40	197	82	821	197.9	1390	45	74-70		5.8	149
9:50	196	82	854	196.4	1475	45	74-70		7.1	149
10:00	196	82	699	197.8	1541	65	74-70		7.2	148
10:10	196	82	782	195.5	1616	65	78-60	40.4	6.7	149
10:20	196.2	83	826	195.1	1708	45	78-60		6.8	151
10:30	196.5	84	952	194.7	1809	55	78-60		7.2	151
10:40	196.5	84	824	196.1	1931	70	70-65		7.0	151
10:50	197.5	84	748	199.1	1982	70	70-65		6.8	149
11:00	195.8	84	774	199.0	2063	60	70-65		6.8	147
11:10	197.5	84	807	196.4	2128	60	70-65		6.7	150
11:20	197.5	84	873	196.4	2226	40	70-65		6.6	150
11:30	197.5	84	880	199.2	2312	40	65-70	39.4	7.0	150
11:40	196.5	86	768	194.9	2396	45	65-70		7.6	150
11:50	196.5	86	891	191.7	2495	60	68-70		8.2	153
12:00	196.5	86	1106	197.8	2580	40	68-70		6.3	155
12:10	196.5	86	1030	195.9	2665	40	68-70		8.8	153
12:20	197	86	1248	197.1	2782	40	68-70	34.4	8.0	154
12:30	197	86	856	200.7	2871	65	68-70		7.9	149
12:40	197	86	730	197.6	2942	60	68-70		7.0	148
12:50	197	86	956	196.8	3032	80	68-70		7.8	150
1:00	197	86	1156	191.6	3122	70	68-70		8.3	156
1:10	198	86	1201	197.6	3215	80	68-70		8.6	154
1:20	199.5	86	1138	199.2	3315	70	68-70		7.1	152
1:30	199.5	86	1131	195.0	3396	80	68-70		7.5	155
1:40	199.6	83	733	198.9	3490	80	70-Full		7.0	150
1:50	197.0	83	702	198.1	3564	80	70-Full		6.8	147
2:00	197	83	719	193.3	3612	75	70-Full	46.0	6.6	148
2:10	195	83	986	189	3731	80	70-Full		6.4	153
2:20	195	83	1187	195	3857	75	70-Full		6.1	154
2:30	195	83	1107	195.8	3952	F	Full-70		6.8	153
2:40	196	81	1263	197.3	4056	F	Full-70		7.0	155
2:50	197.5	81	1155	202.0	4096	F	Full-70		6.3	153
3:00	197.5	81	865	201.6	4169	75	Full-70		6.5	151

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT)

7-24-96

E-Tube Inlet Temp	CORE										E-Tube Outlet Temp
	TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. OUT	
210	3:10	197.5	81	1046	198.3	4246	80	73-FULL		6.5	156
212	3:20	195.5	81	708	196.9	4324	FULL	73-FULL	36.2	6.9	148
212	3:30	195.5	82	654	198.1	4389	80	73-FULL		6.6	1[illegible]
210	3:40	195.0	86	813	193.5	4456	60	73-FULL		7.7	14[illegible]
210	3:50	195.0	80	716	194.5	4523	80	73-FULL		7.5	147
210	4:00	195.0	66	680	192.7	4588	60	73-FULL		6.7	148
214	4:10	199.6	59	671	203.3	4635	80	73-FULL		5.8	14[illegible]
215	4:20	199.6	60	662	204.0	4709	80	73-FULL		6.0	14[illegible]
215	4:30	199.6	60	769	200.1	4787	80	73-FULL		6.2	146
215	4:40	199.6	70	751	196.8	4815	90	73-FULL		6.3	142
216	4:50	199.6	81	754	193.7	4888	75	73-FULL		7.0	14[illegible]
216	5:00	197.5	83	761	195.2	4961	80	73-FULL		7.3	14[illegible]
215	5:10	199.0	84	1187	197.5	5038	65	73-FULL		7.6	153
215	5:20	199.0	78	1190	197.7	5124	80	73-FULL		6.9	153
216	5:30	199.0	78	891	198.6	5196	60	73-FULL		7.1	1[illegible]
216	5:40	199.0	80	803	200.6	5269	60	FULL-FULL		6.9	1[illegible]
214	5:50	197.0	80	783	197.4	5348	80	FULL-FULL		6.4	148
212	6:00	197.0	80	1073	199.2	5444	65	FULL-FULL		6.2	148
211	6:10	197.0	80	730	192.9	5506	80	FULL-FULL		7.4	1[illegible]
213	6:20	197.0	80	833	198.7	5594	80	FULL-FULL		6.6	14[illegible]
212	6:30	197.0	80	947	197.2	5661	60	FULL-FULL		6.4	14[illegible]
212	6:40	197.0	80	715	197.2	5730	40	FULL-FULL		6.5	147
214	6:50	197.0	81	744	196.8	5790	40	FULL-70		6.8	14[illegible]
213	7:00	197.0	87	804	196.2	103	40	FULL-70		6.4	1[illegible]
213	7:10	197.0	87	929	194.8	150	40	FULL-70		6.2	151
214	7:20	197.0	91	678	199.8	227	40	78-FULL	36.1	6.5	148
211	7:30	191.5	83	1099	192.7	322	40	78-FULL		5.8	14[illegible]
209	7:40	192.0	83	1093	191.1	441	40	78-FULL		6.1	1[illegible]
210	7:50	194.9	87	1182	196.4	498	40	78-FULL		6.7	153
208	8:00	194.9	89	995	197.9	577	65	78-FULL		6.2	15[illegible]
207	8:10	192.2	94	1219	185.4	656	65	FULL-72		8.2	1[illegible]
206	8:20	192.0	94	1157	195.4	718	65	FULL-72		6.9	15[illegible]
208	8:30	194.0	94	1083	194.2	829	65	FULL-72		7.6	154
208	8:40	194.5	94	1165	196.7	1981	70	FULL-72		6.6	15[illegible]
209	8:50	194.5	94	953	193.7	1007	80	80-FULL		6.4	1[illegible]
208	9:00	194.5	94	1238	193.3	1088	60	80-FULL	36.6	7.8	15[illegible]
208	9:10	194.5	94	1170	195.1	1192	50	FW-FW			15[illegible]
208	9:20	194.5	88	836	193.9	1282	65	FW-FW		6.4	1[illegible]
209	9:30	194.2	80	857	192.5	1360	60	FW-FW		6.3	1[illegible]
210	9:40	194.2	65	707	196.5	1441	45	FW FW		6.4	147
208	9:50	194.2	50	670	195.8	1539	50	FW-FW		7.2	143
206	10:00	194.2	50	748	198.3	1569	60	FW-FW	45.2	5.7	1[illegible]
206	10:10	194.2	58	741	189.8	1631	40	FW-FW		6.3	1[illegible]
201	10:20	194.2	60	979	188.3	1688	40	FW-FW		7.2	147
	10:30	194.2	60	728	199.4	1794	40	FW-FW			
	10:40										

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT) 7-24-96

					SURFACE/CORE					
TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. / OUT	E.T. Outlet
7:20	205.6	75	945	212.7	149	50°	70-78		6.2	135
7:30	236.6	83	791	232	1	60	70-78		6.3	134
7:40	226.5	84	832	228	960	60	70-78		5.5	136
7:50	226.5	87	1042	223.9	416	55	70-78		5.6	139
8:00	223.6	88	1159	224.5	484	60	70-70		5.5	140
8:10	222.5	89	1105	222.6	612	50	70-70		5.8	140
8:20	221.5	89	1252	219.8	757	45	70-70		6.2	140
8:30	221.5	88	1211	220.7	847	40	68-110		6.9	141
8:40	221.5	88	980	226.1	940	45	68-90		6.0	136
8:50	221.5	88	793	230.6	1030	45	73-78	46.0	6.2	129
9:00	214.1	88	871	214.5	1114	45	74-70		7.6	136
9:10	219.6	88	884	219.3	1191	60	74-70		6.9	135
9:20	222.5	88	807	225.0	1297	60	74-70		6.2	133
9:30	222.5	88	838	223.9	1388	40	74-70		6.5	135
9:40	222.5	88	846	226.6	1473	65	74-70		5.6	135
9:50	221.5	88	790	222.1	1569	45	74-70		7.0	135
10:00	221.5	88	920	221.3	1648	45	74-70		6.7	136
10:10	221.5	88	935	220.2	1738	65	78-60	40.4	7.7	137
10:20	223.0	89	846	223.8	1842	65	78-60		7.4	136
10:30	223	90	1010	223.6	1956	60	78-60		8.0	139
10:40	223.7	88	1149	222.6	2095	60	70-65		8.2	142
10:50	224.5	88	1132	226	2152	25	70-65		7.0	142
11:00	225.7	89	1226	226	2271	40	70-65		6.2	142
11:10	226.0	89	1115	229.4	2344	60	70-65		5.6	139
11:20	225.9	89	814	227.7	2449	45	70-65		6.1	135
11:30	225.9	89	861	227.7	2535	45	65-70	39.4	6.0	135
11:40	224.5	90	760	227.9	2617	60	65-70		6.2	135
11:50	224.5	90	1200	219.3	2727	40	68-70		7.6	141
12:00	225.7	90	1159	225.5	2821	40	68-70		6.2	142
12:10	225.0	90	1090	226.9	2915	40	68-70		5.1	140
12:20	224.0	90	999	223.1	3029	40	68-70	34.4	7.1	139
12:30	224.0	90	913	224.3	3127	40	68-70		7.6	139
12:40	226.0	90	1110	224.3	3219	60	68-70		7.7	141
12:50	226.5	90	1153	225.8	3332	65	68-70		6.8	141
1:00	226.5	90	1152	227.2	3442	65	68-70		7.0	141
1:10	226.5	90	1085	226.4	3542	80	68-70		7.0	140
1:20	226.5	90	1140	225.8	3649	90	68-70		7.0	143
1:30	226.5	90	1188	226.6	3762	80	68-70		6.6	143
1:40	227.0	88	1194	226.7	3887	80	68-70		6.4	142
1:50	226.0	86	1178	225.9	3988	80	70-FULL		6.9	142
2:00	226	86	1125	224.2	4090	80	70-FULL	46.0	7.0	142
2:10	226	86	1134	225.3	4199	90	70-FULL		6.2	141
2:20	227.0	86	1036	223.3	4328	80	70-FULL		6.4	139
2:30	227.0	86	1135	223.4	4428	70	70-FULL		6.7	139
2:40	225.0	84	1179	222.2	4578	F	FULL-70		6.8	142
2:50	225.0	82	1248	228.3	4634	F	FULL-70		6.1	141
3:00	228.2	82	1059	227.6	4726	80	FULL-70		7.6	141

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SAGOLA DRYER DATA
(FUEL CALIB. LB/COUNT)

7-24-96

E-Tube Inlet Temp	TIME	OUT. SET POINT	FEED RATE	INLET TEMP.	OUTLET TEMP.	FUEL COUNT	WET BIN LEVEL	DRY BIN LEVEL	MOIST. IN	MOIST. OUT	E-Tube Outlet Temp
	SURFACE/CORE										
221	3:10	227.0	82	1093	227.5	4816	80	73-FULL		6.0	1[illegible]
220	3:20	226.0	82	821	229.3	4910	80	73-FULL	36.2	5.2	135
217	3:30	225.0	83	752	225.1	4989	80	73-FULL		5.6	135
216	3:40	224.0	87	849	222.3	5070	80	73-FULL		6.2	1[illegible]
217	3:50	221.0	77	846	221.6	5149	65	73-FULL		6.2	13[illegible]
221	4:00	220.6	66	825	221.1	5221	80	73-FULL		7.6	132
214	4:10	239.3	57	709	236.2	5273	90	73-FULL		6.7	128
246	4:20	257.2	54	800	258.3	5356	80	73-FULL		5.5	12[illegible]
222	4:30	236.3	60	791	236.0	5445	65	73-FULL		5.2	1[illegible]
213	4:40	230.0	70	752	230.9	5475	65	73-FULL		7.1	130
228	4:50	243.5	80	729	243.2	5562	90	73-FULL		5.6	13[illegible]
222	5:00	229.0	81	792	229.0	5643	80	73-FULL		4.6	1[illegible]
217	5:10	223.5	83	746	225.5	5716	65	73-FULL		4.9	1[illegible]
214	5:20	222.0	87	764	221.5	5801	65	73-FULL		5.5	131
213	5:30	221.5	90	784	220.2	5876	65	73-FULL		6.5	13[illegible]
213	5:40	221.5	90	765	220.4	5953	65	73-FULL		6.8	1[illegible]
212	5:50	221.5	90	901	221.2	6041	80	FULL-FULL		6.4	1[illegible]
214	6:00	221.5	90	1130	218.7	6158	65	FULL-FULL		7.0	139
214	6:10	221.5	90	949	220.7	6240	65	FULL-FULL		6.4	1[illegible]
214	6:20	221.5	90	941	221.4	6337	40	FULL-FULL		6.7	1[illegible]
215	6:30	221.5	90	1059	223.2	6416	40	FULL-FULL		6.2	137
216	6:40	221.5	90	966	222.8	6500	60	FULL-FULL		6.9	138
215	6:50	221.5	91	908	222.9	6569	40	FULL-70		6.2	[illegible]
214	7:00	221.5	91	980	219.2	-110	40	FULL-70		6.5	1[illegible]
215	7:10	221.5	91	1067	220.7	156	40	FULL-70		6.7	134
212	7:20	221.5	93	832	225.2	250	30	78-FULL		5.7	135
218	7:30	223.8	95	754	227.1	335	40	78-FULL		5.8	1[illegible]
220	7:40	223.8	95	839	214.5	425	60	78-FULL	36.1	5.3	1[illegible]
210	7:50	223.8	91	963	224.4	440	60	78-FULL		5.4	137
216	8:00	224.5	93	1023	223.2	578	65	78-FULL		5.3	137
213	8:10	220.4	94	875	220.0	662	65	FULL-72		5.9	1[illegible]
211	8:20	220.4	94	959	219.7	721	65	FULL-72		6.0	1[illegible]
208	8:30	221.0	94	1079	221.3	837	65	FULL-72		5.1	138
212	8:40	221.0	94	822	222.9	908	70	FULL-72		4.6	136
208	8:50	220.3	94	896	217.9	1012	70	80-FULL		5.7	1[illegible]
210	9:00	220.3	94	980	218.8	1093	80	80-FULL	36.6	5.8	1[illegible]
205	9:10	220.3	95	847	218.7	1190	65	FW-FW			137
207	9:20	219.0	88	909	216.7	1277	80	FW-FW		7.3	136
203	9:30	219.0	88	870	219.0	1364	75	FW-FW		8.3	1[illegible]
212	9:40	226.0	65	771	226.5	1436	60	FW-FW		6.7	1[illegible]
205	9:50	222.8	50	784	234.0	1545	50	FW-FW		7.4	134
197	10:00	222.8	50	611	228.2	1569	40	FW-FW	45.2	7.9	133
205	10:10	222.8	57	728	210.6	1634	40	FW-FW		8.6	1[illegible]
219	10:20	232.3	60	855	234.5	1704	30	FW-FW		7.9	1[illegible]
	10:30	238.1	60	754	243.9	1766	40	FW-FW			
	10:40										

DRYER OPERATIONS REPORT

LOUISIANA-PACIFIC CORPORATION SAGOLA MI

NAME Luda CREW 6 SHIFT DAY [X] NIGHT [ ] DATE 7-24-96

TIME	WET FEED RATE %	GRAYCONS	WOOD VALVE %	B.C. Furnace F°	ABB KENT Inlet F°	ABB KENT Outlet F°	GAS % VALVE	MOISTURE METER %	MOISTURE
SURFACE									
7:46	91	7	75	1310	826	241		6.7	5.0
9:05	92		73	1310	759	234		7.4	6.2
10:10	92	9	71	1310	679	231		7.9	7.9
11:30	93	11	77	1350	752	233		8.4	8.2
1:00	93	1	78	1320	868	232		7.5	7.9
2:15	89		75	1260	1138	234		7.5	8.2
		1		Avg.	836	231		Avg.	7.2
		3							
		5							

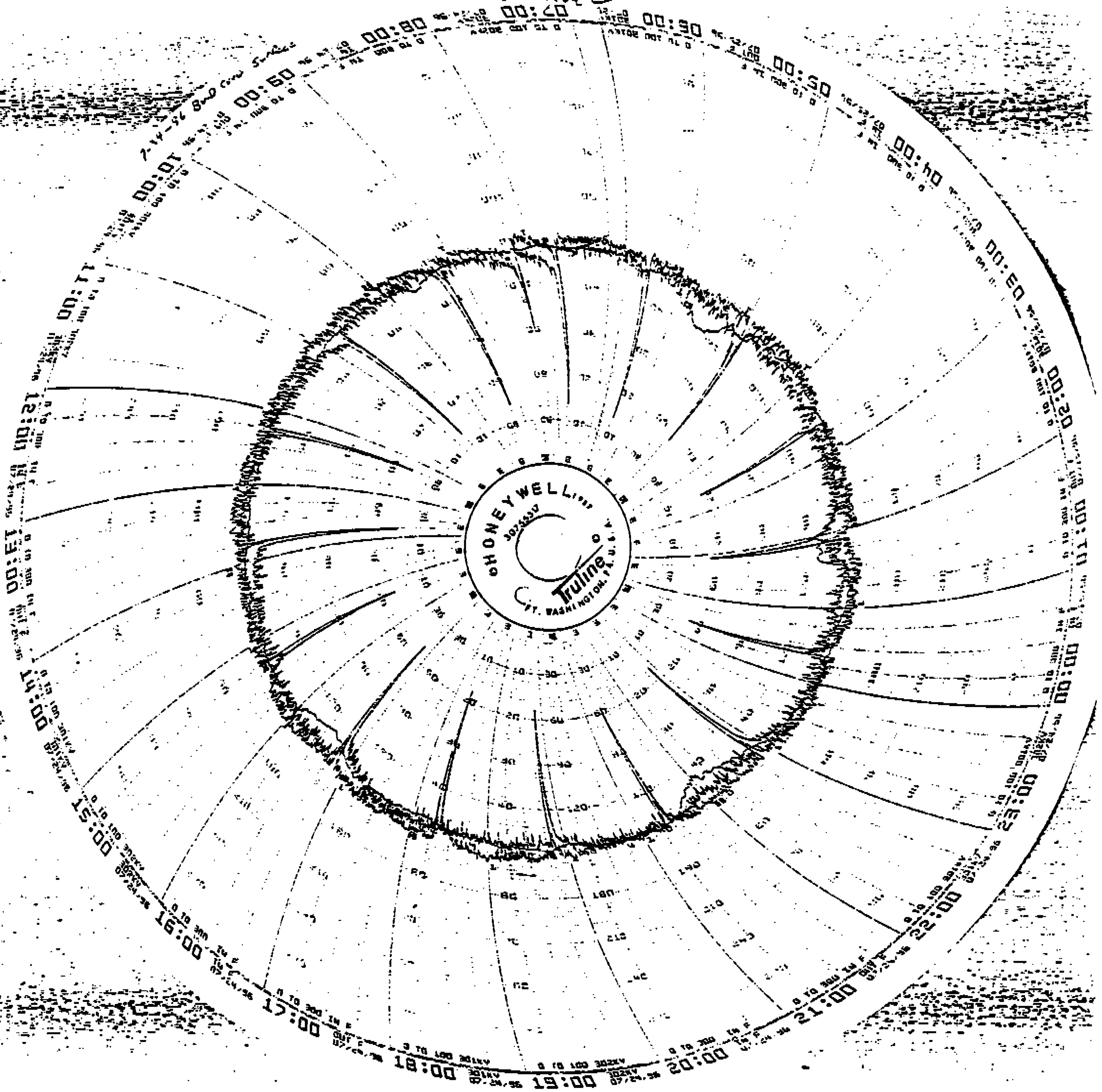
TIME	WET FEED RATE %	GRAYCONS	WOOD VALVE %	B.C. Furnace F°	ABB KENT Inlet F°	ABB KENT Outlet F°	GAS % VALVE	MOISTURE METER %	MOISTURE
CORE									
7:40	82	7	66	990	996	196		6.9	6.5
9:05	82		65	1080	981	197		6.6	6.8
10:10	82	9	62	1090	820	193		7.2	6.8
11:30	84		69	1060	858	199		7.0	6.2
1:00	86	11	78	1050	1120	191		8.5	8.9
2:15	82		76	1070	1214	192		8.0	7.4
		1		Avg.	995	195		Avg.	7.1
		3							
		5							

TIME	WET FEED RATE %	GRAYCONS	WOOD VALVE %	B.C. Furnace F°	ABB KENT Inlet F°	ABB KENT Outlet F°	GAS % VALVE	MOISTURE METER %	MOISTURE
SURFACE CORE									
7:40	84	7	76	910	842	226		6.1	5.6
9:05	88		69	940	881	221		8.6	6.6
10:10	88	9	71	970	919	221		8.3	6.6
11:30	89		68	970	818	227		7.0	6.6
1:00	90	11	80	910	1168	227		8.1	7.4
2:15	86		82	890	1073	225		7.9	6.6
		1	Avg.	Avg.	950	225		Avg.	7.6
		3							

tll DRYER OPERATIONS REPORT LOUISIANA-PACIFIC CORPORATION SAGOLA MI

NAME NORA/Finny/Gould CREW D SHIFT DAY ☐ NIGHT ☒ DATE 7-24-9

TIME	WET FEED RATE %	GRAYCONS	WOOD VALVE %	B.C. Furnace F°	ABB KENT Inlet F°	ABB KENT Outlet F°	GAS % VALVE	MOISTURE METER %	MOISTU
SURFACE									
7:30	92	⑦ —	73.4	1350	1060	225		7.3	6.1
8:50	92	—	77.3	1300	1005	227		7.2	6.6
11:45	92	⑥ —	76.0	1350	1163	228		7.6	6.3
2:00	88	—	79.6	1300	1193°	225°		8.2	7.5
4:20	93	⑪ —	82.2	1200	1139°	224°		7.6	6.8
		—		AVG.	1100°	226°	→	→	6.7
		①							
		—							
		③ —							
		—							
		⑤ —							
		TEST 111		Greeceus.	3				
CORE									
7:30	82	⑦ —	72.7	1000	996	206		5.8	6.
8:50	92	—	65.4	1000	951	208		6.4	5.2
11:45	92	⑨ —	100.8	1010	1164	209	Just	7.0	5.4
2:00	86	—	69.7	1010°	833°	210°		7.5	6.
4:20	92	⑪ 1	68.1	1075°	1063°	211°	54 57.	6.4	5.
		—		AVG.	1001°	209°	→	→	5.
		① 11							
		/							
		③ —							
		—							
		⑤ —							
		TEST 111		Greceus	2				
SURFACE CORE									
7:30	90	⑦ —	59.5	1000	782	231		7.3	6
8:50	92	—	69.5	1000	954	223		6.7	5.8
11:45	92	⑨ —	70.6	960	1105	229	Just	6.8	5.
2:00	88	—	76.7	950°	1010°	226°		6.9	6.6
4:20	93	⑪ —	74.2	975°	974°	219°		6.9	7
		—		AVG.	971°	226°	→	→	6.
		① —							
		—						(67)	
		③ —							



SAGOLA SURF. E-TUBE
7/24/96

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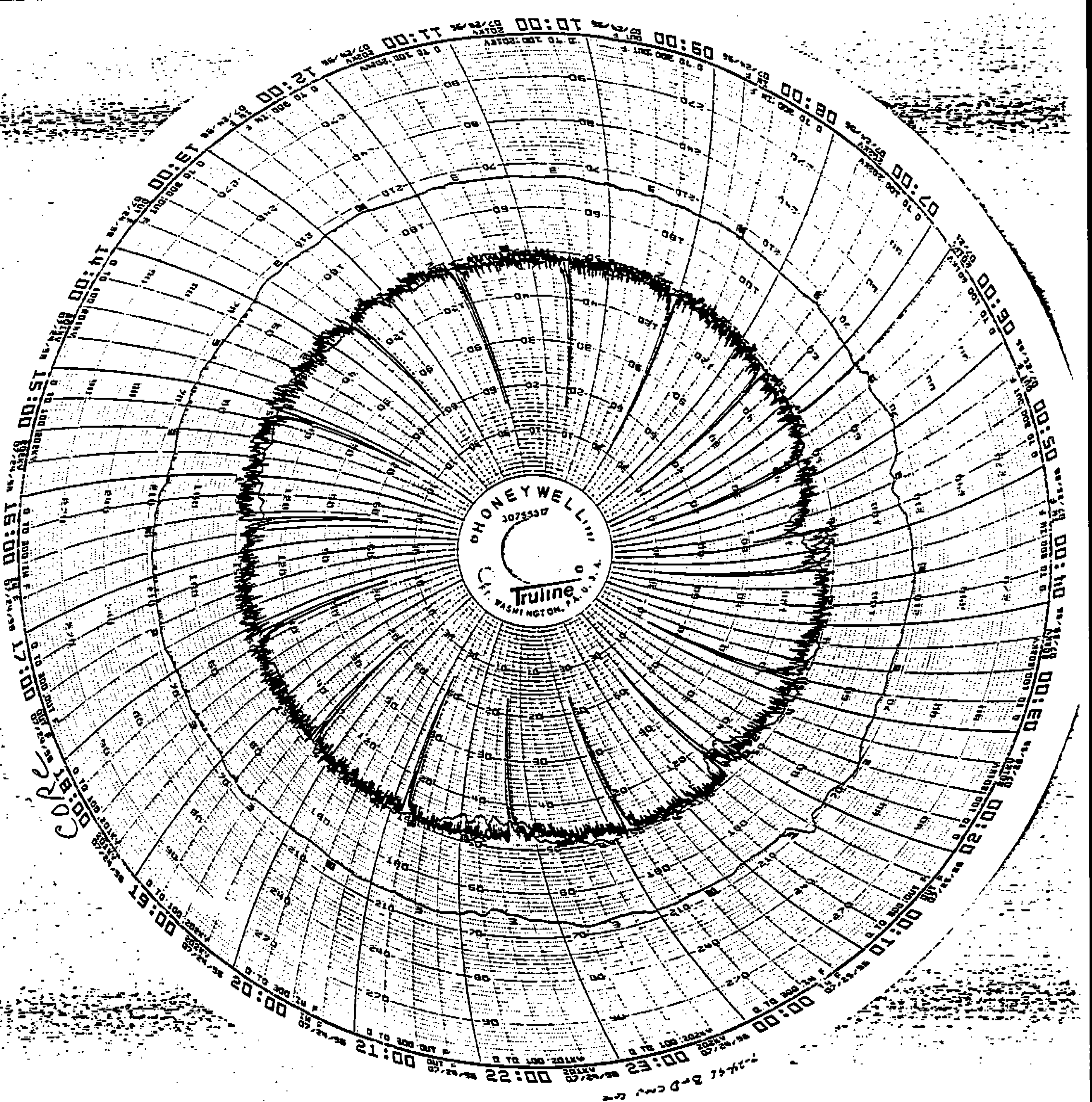

SAGOLA CORE E-TUBE
7/24/96

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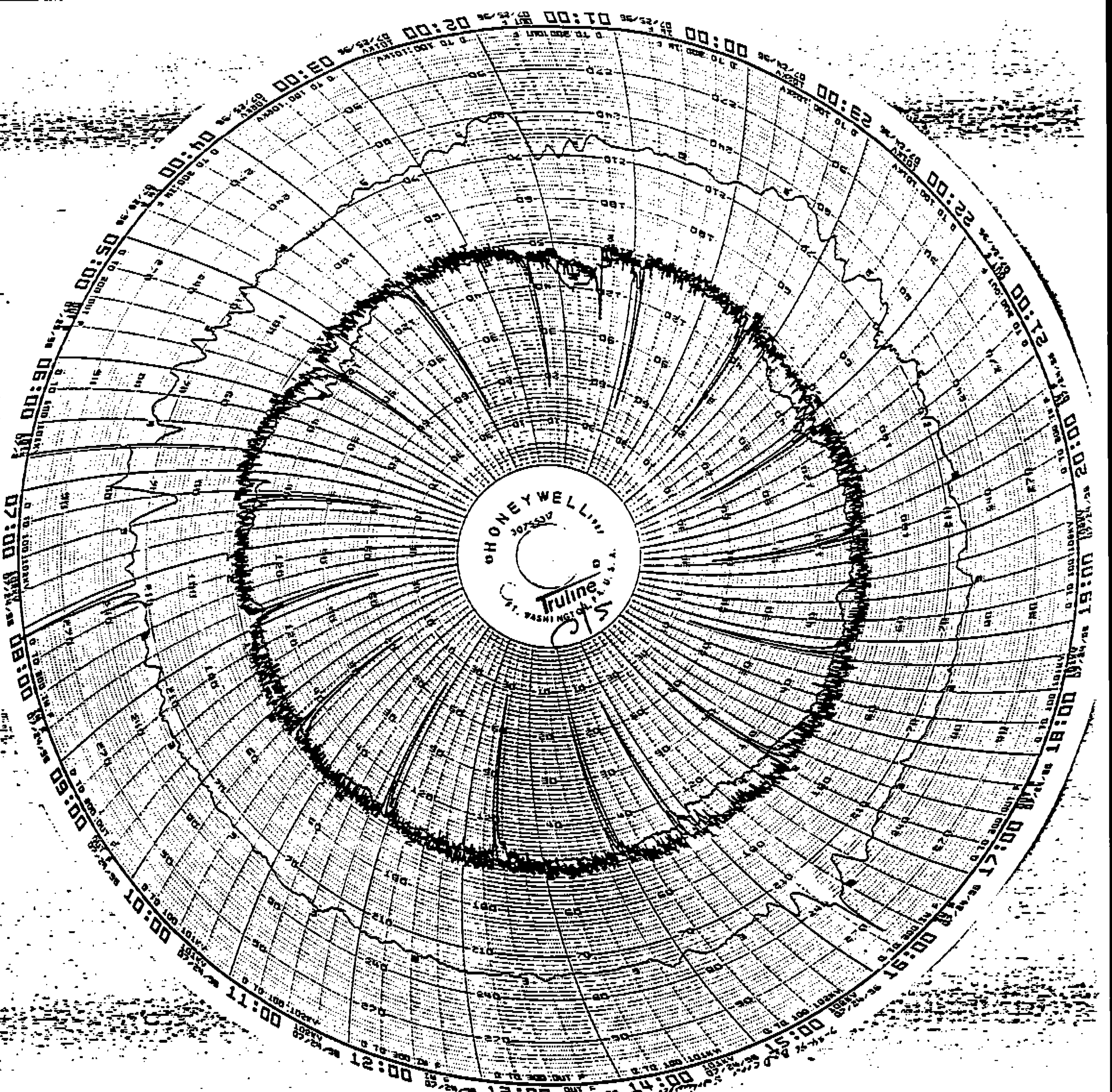

SAGOLA SURF./CORE E-TUB
7/24/96

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SAGOLA E-TUBE DATA SHEET

	SURFACE								
		SOUTH TR SET			NORTH TR SET			QUENCH	
	TIME	KV	MA	SPARK RATE	KV	MA	SPARK RATE	INLET	OUTLET
	730	52	320	29.0	51	250	29.0		
	740	45	110	29.6	48	200	29.2		
	750	50	250	28.5	51	270	28.9		
	800	50	280	28.9	52	320	29.2		
	810	54	320	29.0	54	300	28.9		
	820	51	300	29.0	50	250	29.1		
	830	52	320	28.9	51	300	29.1		
	840	50	320	29.0	52	300	29.1		
	850	55	300	29.0	55	300	29.0		
	900	54	320	28.9	52	300	29.1		
	910	53	320	28.8	52	310	29.0		
Flush	920	50	270	29.1	20	—	28		
	930	55	400	29.0	51	270	28.1		
	940	55	370	29.0	54	290	29.0		
	950	54	350	29.0	52	250	29.0		
	1000	52	280	29.0	50	280	29.1		
	1010	54	370	29.0	50	290	29.0		
	1020	53	340	28.8	50	270	28.9		
	1030	53	330	29.2	52	250	29.1		
Flush	1040	15	50	29.9	45	100	29.5		
	1050	52	340	29.1	52	280	29.0		
	1100	51	360	29.0	53	290	28.9		
	1110	52	330	28.8	53	300	29.2		
	1120	54	350	29.1	53	320	29.0		
	1130	53	320	29.0	52	310	29.1		
	1140	55	300	29.0	54	300	28.9		
	1150	54	310	28.9	53	300	29.0		
	1200	51	290	29.0	53	310	29.2		
	1210	54	300	29.0	54	300	28.9		
Flush	1220	55	350	29.1	50	250	29.1		
	1230	57	350	28.9	51	300	29.0		

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SAGOLA E-TUBE DATA SHEET

	SURFACE							
	SOUTH TR SET			NORTH TR SET			QUENCH	
TIME	KV	MA	SPARK RATE	KV	MA	SPARK RATE	INLET	OUTLET
1240	55	350	29.0	55	310	29.2		
1250	55	340	29.1	54	300	29.0		
1300	55	370	29.0	53	300	29.0		
1310	54	340	29.0	52	290	29.1		
1320	55	350	29.0	55	300	29.1		
1330	55	380	29.0	54	330	28.9		
Fcysh 1340	20	50	29.8	45	180	29.2		
1350	51	310	29.0	50	270	29.0		
1400	51	320	29.3	53	300	29.0		
1410	51	320	29.1	50	290	29.1		
1420	52	360	29.0	54	300	29.1		
1430	53	300	29.1	52	320	29.1		
1440	55	290	28.9	51	250	28.9		
1450	54	310	28.9	54	300	29.1		
1500	54	310	29.0	53	290	29.1		
1510	52	360	29.0	50	300	29.0		
1520	54	370	29.0	51	250	29.0		
1530	53	330	29.0	53	270	29.0		
1540	54	310	29.0	52	260	29.1		
1550								
1600								
1610								
1620								
1630								
1640								
1650								
1700								
1710	54	350	29.1	55	380	29.0		
1720	54	380	29.1	54	350	29.0		
1730	55	400	28.9	54	300	29.1		
1740	55	370	28.9	55	350	28.9		

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SAGOLA E-TUBE DATA SHEET

	SURFACE								
		SOUTH TR SET			NORTH TR SET			QUENCH	
	TIME	KV	MA	SPARK RATE	KV	MA	SPARK RATE	INLET	OUTLET
	1750	55	390	29.1	55	310	29.1		
	1800	54	350	29.0	54	330	29.0		
	1810	57	400	29.0	55	340	29.1		
	1820	53	330	29.1	50	280	29.3		
	1830	54	350	29.0	51	300	28.9		
	1840	54	350	29.0	53	260	29.3		
	1850	53	320	29.1	52	280	29.1		
	1900	53	300	29.1	54	300	29.1		
ST*2 ↓ 1910	1900	53	350	29.0	54	270	29.0		
20	1920	55	320	29.0	53	260	29.1		
30	1930	53	300	29.0	53	260	29.0		
40	1940	50	300	29.0	52	300	28.9		
FL. 50	1950	40	100	29.5	51	250	29.0		
	2000	53	350	28.8	53	250	29.1		
	2010	53	330	28.1	52	250	29.1		
	2020	55	340	29.0	53	300	29.1		
	2030	53	350	29.0	50	300	29.0		
	2040	55	320	29.1	50	250	29.1		
	2050	55	300	29.0	51	260	29.1		
	2100	55	300	28.9	50	280	28.9		
	2110	54	300	28.9	51	250	29.0		
FL	2120	54	300	28.9	40	50	29.4		
	2130	51	290	28.9	51	220	28.3		
	2140	51	320	29.0	51	300	29.0		
	2150								
	2200								

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SAGOLA E-TUBE DATA SHEET

	CORE							
	SOUTH TR SET			NORTH TR SET				
			SPARK			SPARK	QUENCH	
TIME	KV	MA	RATE	KV	MA	RATE	INLET	OUTLET
730	50	300	29.0	50	280	28.6		
740	50	310	29.0	50	250	27.4		
750	50	300	28.9	50	220	27.7		
800	50	320	29.2	50	250	28.2		
810	52	380	29.1	50	260	27.9		
820	55	400	29.0	50	290	28.2		
830	52	360	28.0	50	250	28.0		
840	50	360	29.2	50	220	28.2		
850	52	360	29.0	50	270	28.8		
Flush 900	45	200	29.1	40	150	29.5		
910	52	260	28.8	50	250	27.6		
920	55	370	28.9	50	270	27.1		
930	54	360	29.2	50	270	26.9		
940	55	340	29.0	50	260	26.9		
950	53	330	29.1	50	300	27.1		
1000	52	380	29.2	50	280	26.6		
1010	51	350	28.9	50	250	28.0		
1020	52	310	29.3	52	310	27.9		
Flush 1030	40	—	29.8	49	200	27.1		
1040	51	350	28.5	51	290	27.5		
1050	51	300	28.9	52	300	27.9		
1100	50	310	29.0	50	280	28.0		
1110	50	310	29.0	51	280	28.7		
1120	51	320	29.0	50	250	28.7		
1130	52	320	28.9	50	270	28.9		
1140	54	350	29.0	50	270	28.9		
1150	50	300	29.0	50	280	29.0		
Flu 1200	45	150	29.4	30	–	29.2		
1210	52	340	29.1	50	250	28.5		
1220	54	350	29.0	50	260	27.1		
1230	50	350	29.2	52	280	22.7		

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SAGOLA E-TUBE DATA SHEET

CORE								
	SOUTH TR SET			NORTH TR SET			QUENCH	
TIME	KV	MA	SPARK RATE	KV	MA	SPARK RATE	INLET	OUTLET
1240	50	270	29.1	52	270	21.8		
1250	54	380	29.0	51	280	26.1		
1300	50	300	29.2	50	260	27.8		
1310	53	350	29.1	51	280	27.1		
1320	50	360	29.1	50	270	24.9		
1330	25	100	29.9	40	200	26.3		
1340	53	370	28.6	51	290	24.9		
1350	54	400	21.9	50	300	24.9		
1400	56	390	29.1	50	300	25.6		
1410	55	380	29.0	50	300	28.1		
1420	50	300	29.0	50	250	28.0		
1430	50	290	29.0	50	260	27.3		
1440	52	270	29.0	51	270	28.3		
1450	54	340	29.0	51	300	27.5		
1500	53	330	29.1	50	270	27.7		
1510	52	350	28.9	50	280	27.3		
1520	54	350	28.9	51	250	28.7		
1530	54	370	28.8	51	300	23.3		
1540	53	390	29.2	51	290	24.5		
1550								
1600								
1610								
1620								
1630								
1640								
1650								
1700								
1710	50	300	28.9	50	210	28.5		
1720	52	380	29.0	50	250	27.9		
1730	54	450	28.8	53	300	27.2		
1740	55	460	29.1	52	300	26.3		

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SAGOLA E-TUBE DATA SHEET

CORE								
	SOUTH TR SET			NORTH TR SET				
			SPARK			SPARK	QUENCH	
TIME	KV	MA	RATE	KV	MA	RATE	INLET	OUTLET
1750	54	450	29.1	50	270	27.3		
1800	52	430	29.1	50	270	27.3		
1810	52	350	29.1	51	270	28.9		
1820	56	350	29.1	50	270	28.2		
1830	50	250	29.0	51	280	26.3		
1840	53	430	29.1	51	290	25.9		
1850	52	400	29.1	51	290	25.1		
1900	50	300	28.9	50	250	26.1		
1910	52	350	29.2	50	270	27.2		
1920	51	350	29.0	51	290	25.7		
1930	53	360	28.9	51	300	26.8		
FL 1940	45	130	29.6	49	180	27.0		
1950	51	290	28.9	50	300	27.2		
2000	54	380	29.0	50	310	26.9		
2010	52	360	29.0	50	310	26.9		
2020	52	370	29.0	52	300	27.5		
2030	55	360	29.0	50	250	27.2		
2040	51	330	29.0	51	300	26.8		
2050	53	310	29.0	51	320	27.1		
2100	50	300	29.0	50	290	27.3		
2110	51	300	29.0	50	200	28.3		
2120	52	370	29.1	51	300	26.0		
2130	54	410	29.0	51	300	24.4		
2140	52	400	29.0	51	270	26.5		
2150								
2200								

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SAGOLA E-TUBE DATA SHEET

	SURFACE/CORE							
	SOUTH TR SET			NORTH TR SET			QUENCH	
TIME	KV	MA	SPARK RATE	KV	MA	SPARK RATE	INLET	OUTLET
730	50	350	28.9	52	310	29.1		
740	52	350	29.0	50	300	29.0		
750	52	310	28.9	50	300	28.9		
800	52	310	29.1	52	300	29.1		
810	50	260	28.9	52	280	29.1		
820	50	300	29.0	50	300	28.9		
830	52	350	29.0	50	300	29.1		
840	50	310	29.0	52	300	28.2		
850	49	290	29.0	45	200	29.1		
900	50	360	28.9	50	250	28.5		
910	50	340	28.9	50	250	29.1		
920	50	290	29.0	52	300	29.1		
930	50	290	29.1	52	290	29.0		
940	50	320	29.2	53	280	29.0		
950	52	350	29.1	50	350	29.0		
1000	51	300	29.2	52	290	29.0		
1010	53	370	29.1	52	300	29.0		
Flush — 1020	25	70	29.7	40	50	29.1		
1030	50	320	28.4	54	280	29.0		
1040	53	330	29.2	52	300	29.0		
1050	53	330	29.1	53	350	29.0		
1100	54	370	29.1	51	300	29.1		
1110	54	340	29.0	50	280	29.2		
1120	51	350	29.0	52	330	29.0		
1130	51	310	29.0	50	310	29.0		
1140	50	400	28.9	52	320	29.0		
Flush — 1150	40	140	29.2	20	—	29.0		
1200	50	340	28.9	50	310	28.3		
1210	52	350	28.9	50	330	29.0		
1220	51	360	29.1	54	320	29.0		
1230	50	400	29.1	54	300	29.2		

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7/24/96

SAGOLA E-TUBE DATA SHEET

SURFACE/CORE								
	SOUTH TR SET			NORTH TR SET				
			SPARK			SPARK	QUENCH	
TIME	KV	MA	RATE	KV	MA	RATE	INLET	OUTLET
1240	51	400	29.0	50	300	29.0		
1250	51	350	29.0	53	300	29.0		
1300	55	370	29.0	53	300	29.0		
1310	51	340	29.0	52	310	29.1		
Flush — 1320	30	—	29.1	52	300	29.0		
1330	50	300	28.2	52	300	29.1		
1340	51	350	28.9	52	340	29.0		
1350	55	340	28.9	54	400	29.0		
1400	55	340	29.1	55	390	29.1		
1410	53	330	29.0	51	300	29.1		
1420	54	360	29.1	54	410	29.0		
1430	54	340	29.0	54	350	29.1		
1440	53	350	29.1	50	410	29.0		
Flush — 1450	45	180	29.4	20	10	29.9		
1500	53	300	29.0	50	280	29.0		
1510	55	460	28.9	51	310	29.0		
1520	55	470	29.0	51	330	29.0		
1530	54	550	29.0	54	350	29.0		
1540	53	550	29.2	53	310	29.1		
1550								
1600								
1610								
1620								
1630								
1640								
1650								
1700								
1710	55	450	29.0	55	370	29.1		
1720	50	400	29.1	50	250	29.1		
1730	53	450	28.9	50	300	28.9		
1740	55	450	28.9	51	300	28.9		

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7/24/91

SAGOLA E-TUBE DATA SHEET

SURFACE/CORE								
	SOUTH TR SET			NORTH TR SET				
			SPARK			SPARK	QUENCH	
TIME	KV	MA	RATE	KV	MA	RATE	INLET	OUTLET
1750	51	350	29.1	53	300	29.0		
1800	50	310	28.9	55	300	29.0		
1810	52	410	29.1	51	350	29.1		
1820	53	300	29.0	55	360	29.1		
1830	54	370	29.1	55	400	29.0		
1840	53	320	29.0	54	370	29.1		
1850	53	310	29.1	53	360	29.0		
1900	52	330	29.0	51	320	28.9		
1910	53	360	28.9	51	300	28.9		
1920	55	380	29.1	52	400	28.9		
1930	53	370	292	52	350	29.0		
1940	54	350	29.0	52	430	29.0		
1950	51	300	28.9	51	350	28.9		
2000	51	340	29.0	53	300	29.0		
2010	51	320	29.1	52	310	28.9		
2020	52	350	29.0	40	20	29.4		
2030	53	350	29.0	50	300	29.0		
2040	55	380	29.0	50	250	28.9		
2050	54	370	29.0	51	300	29.0		
2100	54	450	29.0	53	310	29.0		
2110	54	470	29.1	52	300	29.1		
2120	55	400	29.1	52	330	29.2		
2130	55	400	29.0	54	370	29.0		
2140	53	410	28.9	52	350	29.1		
2150								
2200								

FL.

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LOUISIANA-PACIFIC CORPORATION SAGOLA, MI

ERATOR *Lucdia Harper* SHIFT *Day* CREW *B* DATE *7-24-96*

UNIT 1 S/C E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	No. 1 (N.) mA	No. 2 (S.) KV	No. 2 (S.) mA	ZYCOM QUENCH INLET deg. F	QUENCH OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	52	220	50	320	213	155	18	24	6	409905	253620	29.0	29.1	.5	8486	796
4	52	350	50	300	225	131	16	25	8	409415	257344	29.0	29.0	.5	8521	803

Beginning & End of Shift on the Vessel

ecycle Water Solids % *9.36* *8.9%*

ecycle Water pH *7.9* *8.4*

Blow Off sec. 10: ______ 4: ______

UNIT 2 CORE E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	No. 1 (N.) mA	No. 2 (S.) KV	No. 2 (S.) mA	ZYCOM QUENCH INLET deg. F	QUENCH OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	50	280	50	320	207	150	19	27	7	459235	109914	26.8	27.0	.5		
4	50	180	48	200	216	148	19	26	7	[illegible]	[illegible]	25.4	22.0	.5		

Beginning & End of Shift on the Vessel

ecycle Water Solids % *8.7%* *9.9%*

ecycle Water pH *7.3* *6.6*

Blow Off sec. 10: ______ 4: ______

UNIT 3 SURFACE E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	No. 1 (N.) mA	No. 2 (S.) KV	No. 2 (S.) mA	ZYCOM QUENCH INLET deg. F	QUENCH OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	52	280	52	320	212	147	19	21	1	422559	245129	22.0	22.1	.5		
4	52	280	50	250	221	144	19	22	7	[illegible]	275129	22.9	22.5	.6		

Beginning & End of Shift on the Vessel

ecycle Water Solids % *6.9%* *9.1%*

ecycle Water pH *8.6* *7.8*

Blow Off sec. 10: ______ 4: ______

ISPERSION TUBE DRAIN MAGNEHELIC:

	Surface	Core
10	5.5	
4	5.5	

BLOW OFF LINE FLOW METERS (ON TOP OF BLOW DOWN TANK)

	BEFORE	AFTER	TOTAL GALLONS BLOWN DOWN "AFTER" MINUS "BEFORE"	DRYER RUN TIME
S/C	7889	9377	1488	720
CORE	138221	138938	717	720
SURFACE	162713	162713	0	720

GALLONS PER MINUTE BLOWN OFF = GALLONS BLOWN OFF / DRYER RUN TIME

S/C *2.0* GPM

CORE *.99* GPM

SURFACE *-0-* GPM

	BEFORE	AFTER	TOTAL GALLONS LOST "AFTER" MINUS "BEFORE"
CORE WET BIN FLOW METER	572,160	574360	2200
BLOW DOWN TANK LEVEL	78"	103"	

COMMENTS:

(80)

WETESP.XLS

LOUISIANA-PACIFIC CORPORATION SAGOLA, MI

OPERATOR Noro / Fenny SHIFT N CREW D DATE 7-24-06

UNIT 1 S/C E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	No. 1 (N.) mA	No. 2 (S.) KV	No. 2 (S.) mA	ZYCOM QUENCH INLET deg. F	QUENCH OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	51	270	51	300	177	123	18	25	7	409415	253345	29.1	28.8	.3	8521	80.3
4	51	300	54	270	201	119	20	26	6	409410	259340	29.0	29.1	.3	8548	807

Recycle Water Solids % 11.9 % 11.1 % Blow Off sec. 10: 43 4: 43

Recycle Water pH 8.1 8.2

UNIT 2 CORE E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	No. 1 (N.) mA	No. 2 (S.) KV	No. 2 (S.) mA	ZYCOM QUENCH INLET deg. F	QUENCH OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	50	320	50	330	206	138	9	27	18	456,278	110,341	26.2	29.1	.2		
4	51	250	50	320	212	138	2	26	24	459270	110750	26.4	29.0	.2		

Recycle Water Solids % 6.9 % 9.6 % Blow Off sec. 10: 32 4: 32

Recycle Water pH 6.6 6.8

UNIT 3 SURFACE E-TUBE:

Time	T/R CONTROL PANEL DIGITAL TRANSFORMER/RECTIFIERS No. 1 (N.) kv	No. 1 (N.) mA	No. 2 (S.) KV	No. 2 (S.) mA	ZYCOM QUENCH INLET deg. F	QUENCH OUTLET deg. F	INLET PSI in H2O	OUTLET PSI in H2O	Δ P	Flush Water total gal.	Make-up Water total gal.	Spark Rate N.	Spark Rate S.	Mesh Pad Δ	Caustic Meter	Defoamer Meter
10	51	260	51	330	218	133	19	23	4	423018	295129	29.1	29.1	.3		
4	51	260	53	290	228	137	19	22	3	423010	245120	29.0	28.9	.3		

Recycle Water Solids % 10.8 % 11.3 % Blow Off sec. 10: 24 4: 24

Recycle Water pH 7.4 7.0 8

DISPERSION TUBE DRAIN MAGNEHELIC:	Surface	Core
	10 5	10
	4 5	4

BLOW OFF LINE FLOW METERS (ON TOP OF BLOW DOWN TANK)

	BEFORE	AFTER	TOTAL GALLONS BLOWN DOWN "AFTER" MINUS "BEFORE"	DRYER RUN TIME
S/C	9377	9367	~~5~~ (-10)	720
CORE	138,938	139144	206	720
SURFACE	162713	162713	0	720

GALLONS PER MINUTE BLOWN OFF = GALLONS BLOWN OFF / DRYER RUN TIME

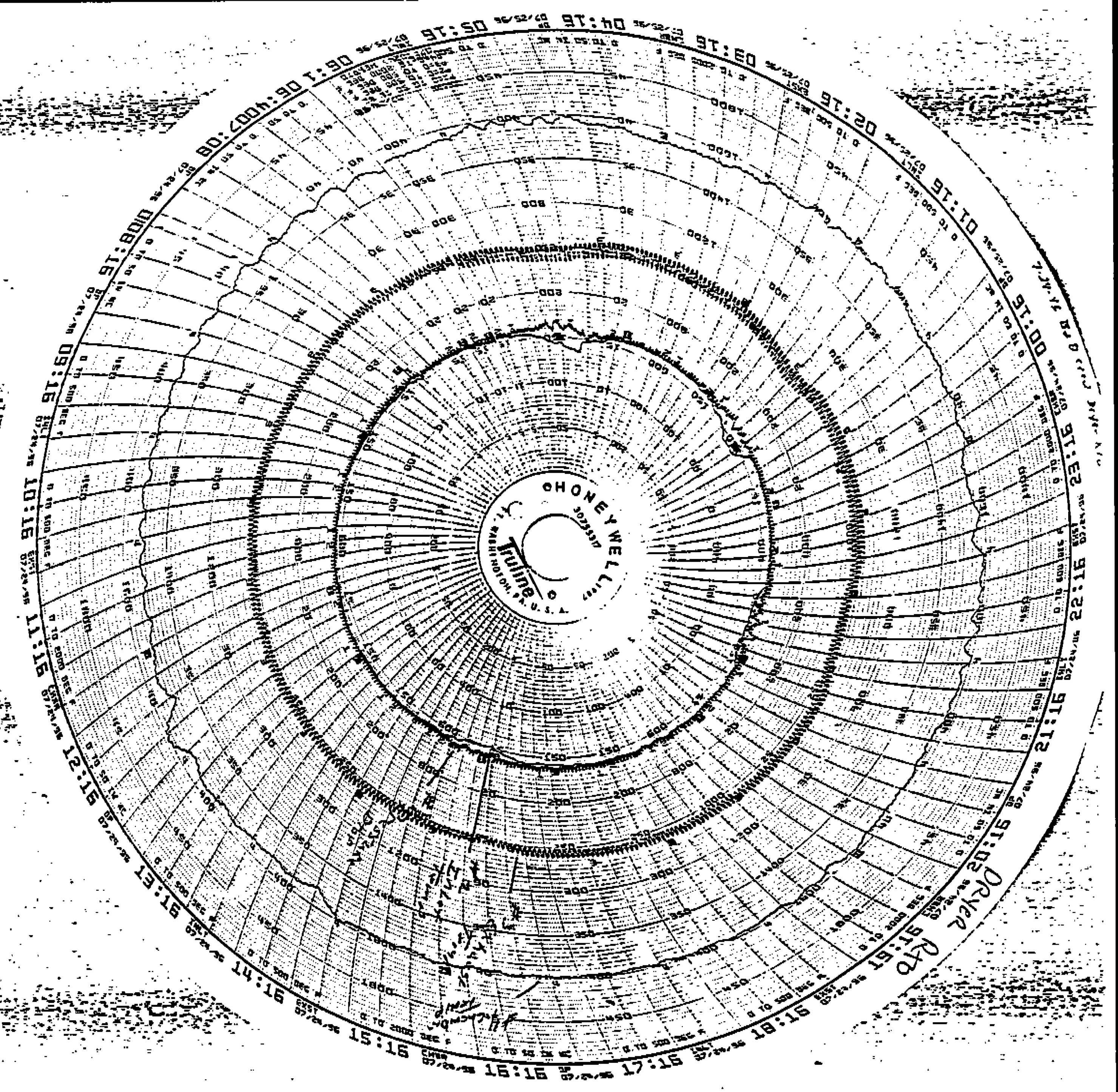
S/C — GPM
CORE .29 GPM
SURFACE — GPM

	BEFORE	AFTER	TOTAL GALLONS LOST "AFTER" MINUS "BEFORE"
CORE WET BIN FLOW METER	574,360	576000	1640
BLOW DOWN TANK LEVEL	103"	127"	

COMMENTS: Removed the guts from surface Blowoff meter.

(81)

WETESP.XLS



JAGOLA DRYER RTO
7/24/96
0700-0700

(82)

7/24/96

SAGOLA DRYER RTO DATA SHEET

TIME	CHAMBER TEMPS.								INLET PRESS.	BURNERS			COMB.	EXHAUST	PRESS.	GAS
10 MINUTES	#1	#2	#3	#4	#5	#6	#7	#8		#1	#2	#3	TEMP.	TEMP.	DROP	USAGE
1850	372	373	336	382	378	339	382	345	154	1542	1541	1536	1583	249	16.0	10,984
1900	372	376	340	373	387	337	380	352	155	1536	1540	1544	1580	260	16.5	11,520
1910	372	374	336	382	377	339	381	346	156	1541	1541	1541	1577	255	15.9	9,238
1920	371	369	345	374	381	340	376	355	154	1531	1534	1538	1570	261	16.1	10,884
1930	371	377	336	381	380	337	383	346	154	1550	1545	1544	1585	255	16.0	9,749
1940	368	373	344	372	385	338	377	355	154	1534	1539	1542	1573	258	15.9	9,210
1950	367	378	339	375	385	336	381	351	155	1545	1547	1547	1578	254	16.2	7,617
2000	374	369	344	377	378	341	376	353	154	1530	1531	1535	1553	258	16.4	11,030
2010	372	378	336	382	378	337	382	345	155	1546	1545	1543	1579	248	16.0	7984
2020	370	379	337	380	381	336	382	348	155	1541	1541	1539	1570	250	16.0	7147
2030	367	378	340	374	384	337	379	353	155	1538	1541	1524	1565	255	15.9	7624
2040	373	378	336	382	377	337	381	346	155	1543	1537	1537	1559	248	15.8	8609
2050	369	379	337	380	380	336	381	348	156	1540	1537	1536	1561	248	15.8	8292
2100	370	379	337	378	382	336	380	349	156	1543	1541	1538	1566	250	16.0	8606
2110	375	371	345	376	379	341	375	355	155	1538	1538	1535	1558	252	15.9	7263
2120	377	376	339	384	374	339	378	347	155	1540	1539	1537	1553	252	16.0	6424
2130	368	379	339	377	383	336	378	351	154	1532	1534	1538	1557	262	16.2	10050
2140	374	378	335	384	376	336	380	345	150	1543	1541	1537	1573	246	15.7	10866
2150																
2200																

SAGOLA DRYER RTO DATA SHEET

TIME	CHAMBER TEMPS.								INLET	BURNERS			COMB.	EXHAUST	PRESS.	GAS
10 MINUTES	#1	#2	#3	#4	#5	#6	#7	#8	PRESS.	#1	#2	#3	TEMP.	TEMP.	DROP	USAGE
7:30	373	370	339	381	369	341	379	349	153	1529	1541	1533	1506	242	15.8	4893/3358
740	369	368	342	376	373	340	377	354	153	1547	1550	1544	1525	243	15.6	9539/766
750	365	371	341	373	377	338	378	355	154	1532	1546	1539	1521	252	15.7	4521/336
800	364	377	335	377	378	335	382	350	154	1518	1525	1517	1496	246	15.9	9042/5401
810	364	374	338	375	379	337	380	353	154	1536	1542	1532	1515	250	15.9	9080/7524
820	363	375	338	373	379	336	380	352	149	1518	1525	1514	1499	249	15.9	12700/8267
830	363	375	338	374	379	336	380	352	152	1544	1552	1538	1518	249	16.2	6,966/5893
840	371	369	340	380	370	341	378	349	151	1525	1530	1519	1496	250	16.3	12,683/7997
850	369	374	332	383	369	337	383	343	150	1529	1540	1534	1506	243	15.7	7061/5835
900	371	368	335	381	368	339	382	345	151	1540	1540	1532	1508	246	15.9	12360/8890
910	368	372	331	382	369	336	383	342	151	1533	1544	1536	1510	244	15.8	6300/5015
920	370	370	332	382	368	337	382	342	151	1536	1540	1536	1514	247	15.7	11658/8546
930	362	371	336	372	377	334	380	348	151	1527	1538	1528	1505	247	16.0	7312/5648
940	366	365	339	371	373	337	377	351	150	1537	1541	1533	1518	256	16.0	11,672/92
950	363	372	332	376	375	334	382	344	151	1524	1535	1530	1505	242	15.8	8404/6450
1000	367	370	331	380	371	335	382	341	151	1535	1536	1527	1505	239	15.6	11628/8272
1010	363	367	339	370	378	336	378	350	152	1521	1533	1528	1510	255	15.6	8454/621
1020	362	373	333	375	377	334	383	344	152	1536	1541	1536	1515	244	15.6	11064/8338
1030	364	373	332	378	375	334	384	342	152	1525	1533	1522	1500	258	15.7	6070/4179
1040	362	369	339	370	381	336	379	350	152	1551	1552	1543	1525	248	15.8	10804/9042
1050	369	366	337	378	372	339	380	346	153	1534	1537	1526	1507	242	15.5	11838/7589
1100	368	370	332	380	372	337	383	342	153	1540	1548	1541	1524	243	15.7	9760/7926
1110	369	367	336	379	372	338	381	344	152	1524	1530	1517	1496	249	16.0	9930/627
1120	369	370	333	381	372	336	383	342	152	1538	1544	1540	1518	248	15.7	11,719/92
1130	361	370	338	371	382	334	382	349	153	1527	1540	1532	1512	248	15.6	5549/49
1140	362	367	340	371	381	336	379	351	152	1539	1542	1534	1518	248	15.7	13,062/93
1150	369	366	337	378	374	338	380	346	155	1538	1547	1534	1515	249	15.6	6897/5688
1200	364	373	333	378	379	334	385	344	155	1524	1533	1526	1506	257	16.0	12685/8407
1210	367	365	342	375	385	335	379	352	154	1540	1547	1538	1518	260	16.2	1157/7724
1220	362	370	341	372	385	336	380	352	155	1560	1555	1539	1537	254	15.9	12856/9644
1230	369	369	337	381	374	338	382	344	153	1557	1566	1553	1535	249	15.8	7735/6412
1240	363	375	335	379	380	334	385	345	154	1515	1512	1503	1492	243	15.8	13420
1250	362	372	341	373	386	336	382	352	154	1537	1539	1529	1571	251	16.0	20000
1300	371	371	339	383	377	340	383	347	156	1560	1556	1548	1591	251	15.9	11,745

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7/24/96

SAGOLA DRYER RTO DATA SHEET

TIME 10 MINUTES	CHAMBER TEMPS. #1	#2	#3	#4	#5	#6	#7	#8	INLET PRESS.	BURNERS #1	#2	#3	COMB. TEMP.	EXHAUST TEMP.	PRESS. DROP	GAS USAGE
1310	364	378	339	381	385	336	388	349	155	1536	1537	1543	1538	245	15.9	5513
1320	364	376	343	377	388	338	386	353	155	1537	1534	1539	1548	254	16.2	10474
1330	368	371	347	376	386	341	383	355	156	1548	1546	1546	1565	251	16.2	8101
1340	368	371	346	377	385	340	383	355	154	1535	1539	1540	1550	262	16.2	6389
1350	372	371	342	383	379	341	384	348	154	1546	1542	1541	1552	252	16.0	7726
1400	371	370	344	381	380	341	383	350	154	1541	1544	1544	1548	252	16.1	5002
1410	372	370	343	381	379	341	384	350	155	1542	1539	1536	1535	254	16.0	6685
1420	364	377	342	376	389	337	386	352	155	1536	1539	1539	1536	252	15.9	5378
1430	372	370	346	379	381	342	382	352	156	1545	1545	1547	1549	256	16.3	6111
1440	371	370	346	379	383	343	382	354	156	1542	1546	1545	1546	263	16.3	4145
1450	372	371	346	381	381	343	383	353	155	1531	1533	1528	1523	258	16.2	5877
1500	372	370	345	381	381	342	383	352	154	1537	1533	1536	1561	255	16.2	16,117
1510	371	377	338	386	382	338	388	347	153	1543	1549	1547	1592	258	16.4	14,356
1520	370	377	338	385	382	339	388	346	153	1541	1540	1543	1577	254	15.7	13,457
1530	365	374	345	375	389	339	384	355	152	1557	1538	1540	1581	256	16.2	14148
1540	373	373	340	384	379	340	384	348	153	1583	1540	1535	1587	252	16.0	14,350
1550																
1600																
1610																
1620																
1630																
1640																
1650																
1700																
1710	369	373	336	381	377	338	382	344	153	1545	1543	1538	1590	250	16.1	12,805
1720	368	367	345	373	382	340	377	355	153	1536	1541	1547	1590	264	16.5	12,500
1730	365	372	343	371	386	338	379	353	153	1536	1539	1542	1585	255	16.0	13,430
1740	364	372	343	372	386	338	379	354	153	1539	1542	1544	1589	255	16.0	12,900
1750	369	368	345	373	382	341	377	354	154	1535	1540	1543	1586	263	16.5	12,279
1800	364	376	339	375	386	337	382	349	155	1542	1538	1536	1580	252	16.0	12,899
1810	372	369	344	376	379	342	378	352	154	1531	1536	1539	1578	258	16.3	12,132
1820	369	369	345	373	383	341	377	355	154	1538	1541	1545	1588	262	16.3	12,124
1830	370	377	336	381	381	345	381	356	155	1545	1542	1539	1584	248	16.0	10,646
1840	367	377	337	379	383	337	384	347	154	1543	1538	1537	1575	249	16.0	11,149

C. HROM.

4CHO

Wheelabrator Clean Air Systems

Huntington Energy Systems RTO

ATA SHEET

ev.3, DHS 4/1/96

LP Sagola (Dryer)

Regenerative Thermal Oxidizer

ate	7-24-96	7-24-96	Fill out data column once a shift, attach final sheet with chart recorder sheet; submit to Environmental
ime	10:00 A.M	4:00 PM	**Comments**
urner S.P.	1540	1540	(Note anything out of the ordinary)
r #1 temp	1524	1537	
Bnr #1 out	12.7	49.4	
r #2 temp	1535	1540	
nr #2 out	7.1	40.1	
nr #3 temp	1526	1544	
r #3 out	8.1	60.8	
nlet temp	151	150	
hamber temp	1504	1583	
xhaust temp	245	251	
RTO diff press	15.7	16.0	
VFD Amps	555	562	
#1 VFD RPM	1319	1322	
2 VFD Amps	592	635	
2 VFD RPM	1360	1366	
E/V setpoint	1.0	1.0	
/V out	.83	.82	
Cbr #1 B.O. temp	370	367	
br #2 B.O. temp	369	372	
br #3 B.O. temp	338	335	
Cbr #4 B.O. temp	376	380	
br #5 B.O. temp	371	377	
Cbr #6 B.O. temp	339	336	
br #7 B.O. temp	377	381	
br #8 B.O. temp	348	343	
#1 Fan brg #1 temp	119	123	
1 Fan brg #2 temp	112	117	
#2 Fan brg #1 temp	120	125	
#2 Fan brg #2 temp	105	106	
#1 Motor brg #1 temp	131	133	
#1 Motor brg #2 temp	90	99	
#2 Motor brg #1 temp	98	101	
#2 Motor brg #2 temp	94	91	
Dryer #1 RTO/ATMOS	RTO	RTO	
Dryer #2 RTO/ATMOS	RTO	RTO	
Dryer #3 RTO/ATMOS	RTO	RTO	
Chamber Prg Fan	ON	ON	
Total gas flow	11005	12496	
BTUH flow	7217	0	

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Wheelabrator Clean Air Systems

Huntington Energy Systems RTO

DATA SHEET

rev.3, OHS 4/1/96

LP Sagola (Dryer)

Regenerative Thermal Oxidizer

Fill out data column once a shift, attach final sheet with chart recorder sheet; submit to Environmental

Comments

(Note anything out of the ordinary)

Date	2-24-96	
Time	1000	400
Burner S.P.	1540	1540
Bnr #1 temp	1544	1545
Bnr #1 out	35.7	25.8
Bnr #2 temp	1542	1540
Bnr #2 out	35.5	13.4
Bnr #3 temp	1539	1538
Bnr #3 out	53.8	31.6
Inlet temp	148	154
Chamber temp	1575	1545
Exhaust temp	253	261
RTO diff press	15.7	16.3
#1 VFD Amps	615	591
#1 VFD RPM	1361	1322
#2 VFD Amps	616	590
#2 VFD RPM	1352	1381
P/V setpoint	1.0	1.0
P/V out	65.5	65.3
Cbr #1 B.O. temp	368	373
Cbr #2 B.O. temp	379	377
Cbr #3 B.O. temp	337	301
Cbr #4 B.O. temp	378	372
Cbr #5 B.O. temp	380	398
Cbr #6 B.O. temp	335	344
Cbr #7 B.O. temp	379	379
Cbr #8 B.O. temp	348	366
#1 Fan brg #1 temp	122	109
#1 Fan brg #2 temp	83	78
#2 Fan brg #1 temp	97	91
#2 Fan brg #2 temp	85	84
#1 Motor brg #1 temp	116	114
#1 Motor brg #2 temp	110	108
#2 Motor brg #1 temp	119	113
#2 Motor brg #2 temp	102	97
Dryer #1 RTO/ATMOS	Rto	Rto
Dryer #2 RTO/ATMOS	Rto	Rto
Dryer #3 RTO/ATMOS	Rto	Rto
Chamber Prg Fan	ON	ON
Total gas flow	11463	4692
BTUF flow	[illegible]	[illegible]

87

Bundle Height Parameters w/ WEIGHTS

7/24/96

Board Size	Pieces / Bundle	Target Thickness	Target Bdl. Height	Target Bdl. Weight
1/4"	120	0.260	31 1/4"	3286
1/4"	150	0.260	39"	4108
3/8"	100	0.380	38"	4003
7/16"	66	0.380"	28 3/4"	2932
7/16"	90	0.435	39 1/8"	3999
15/32"	82	0.485	39 3/4"	4232
1/2"	66	0.510	30 5/8"	3100
1/2"	80	0.510	40 3/4"	4134
19/32" SE	65	0.595	38 5/8"	3981
19/32" HY	55	0.610	33 1/2"	3418
5/8" SE	40	0.620	24 3/4"	2612
23/32" SE	55	0.700	38 1/2"	3850
23/32" HY	45	0.730	32 7/8"	3285
7/8" HY	38	0.890	33 7/8"	3389
1-1/8" SE	36	1.085	39"	3854
1-1/8" HY	30	1.110	33 3/8"	3286

Notes:

If the bundles heights are running plus or minus 3/8" from these figures, please notify the Quality Control Department and the Shift Forman.

If the bundles weights are plus or minus 100 pounds from these figures, please notify the Quality Control Department and the Shift Forman.

U Grade: Use normal piece count, edge seal, and 2 green stripes with the stencil on each side of the unit. Stencil the thickness on the lower right hand corner of the unit face, place tag close to bottom, and cover with plastic.

E Grade: 80 piece units thru 1/2", 60 piece units for 19/32 and 23/32, and 40 piece units for 7/8" and above. No edge seal, and 2 black stripes with the thickness logo on the lower right hand corner of the unit face. Place tag close to the bottom, and cover with plastic.

Bundle Height Data

Size 7/16		Size 7/16		Size		Size		Size		Size		Size	
No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height
5	39½	37	39¼										
9	39¼	43	39½										
12	39⅛	48	39½										
[illegible]	39¼	52	39										
18	39¼	155	39¼										
21	39¼	160	39⅛										
22	39⅛	162	39⅛										
25	[illegible]	167	39½										
[illegible]	39⅛												
36	39¼												
[illegible]	39¼												
42	39⅛												
43	39¼												
46	"												
49	39												
52	39												
56	39¼												
60	39½												
[illegible]	39⅛												
80	[illegible]												
[illegible]	39¼												
[illegible]	[illegible]												
[illegible]	[illegible]												
[illegible]	39¼												
[illegible]	39¼												
[illegible]	39⅛												
[illegible]	[illegible]												
[illegible]	[illegible]												
175	1/2												
127	39½												
[illegible]	[illegible]												
13	[illegible]												
13	[illegible]												
[illegible]	[illegible]												

Size	Time	Pieces	Height	Weight
7/16	1615	90	39½	4150
	1630		39⅜	4110
	1645			4092
	1700			4098
	1715		39⅜	4157
	1730		39⅛	4150
	1745		39	4124
	1800		40	4138
	1815		39⅛	4138
	1830		39⅜	4172
	1845		39½	4170
	1900		39¼	4145

EPA Data

Size	Time	Pieces	Height	Weight
7/16	07:00	90	39½	4340
7/16	07:15	90	[illegible]	4253
7/16	07:30	90	39⅛	4350
7/16	07:45	90	39⅜	4400
7/16	08:00	90	39⅜	4137
7/16	08:15	90	39¼	4130
7/16	08:30	90	39¼	4230
7/16	08:45	90	39½	4332
7/16	09:00	90	39⅜	4342
7/16	09:15	90	39½	4442
7/16	09:30	90	39¼	4320
7/16	09:45	90	39¼	4145
7/16	10:00	90	39	4201
7/16	10:15	90	39	4188
7/16	10:30	90	39½	4284
7/16	10:45	90	39¼	4237
7/16	11:00	90	38¾	4180
7/16	11:15	90	38½	4192
7/16	11:30	90	39⅛	4165
7/16	11:45	90	39¼	4107
7/16	12:00	90	39⅛	4086
7/16	1215	90	39½	4128
7/16	1230	90	39¼	4028
7/16	1245	90	39½	4140
7/16	1300	90	39⅜	4156
7/16	1315	90	"	4138
7/16	1330	90	39⅜	[illegible]
7/16	1400	90	39¼	4170
7/16	1415	90	[illegible]	4137
7/16	1430	90	39¼	4143
7/16	1445	90	39¼	4097
7/16	1500	90	"	4040
7/16	1515	90	39½	4075
7/16	1530	90	39¼	4092
7/16	1545	90	39¼	4120
[illegible]	1600	90		4065

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Bundle Height Parameters w/ WEIGHTS

7/24/9

Size	Pieces / Bundle	Target Thickness	Target Bdl. Height	Target Bdl. Weight
1/4"	120	0.260	31 1/4"	3286
1/4"	150	0.260	39"	4108
3/8"	100	0.380	38"	4003
7/16"	66	0.380	29 3/4"	2932
7/16"	90	0.435	39 1/8"	3999
15/32"	82	0.485	39 3/4"	4232
1/2"	66	0.510	30 5/8"	3100
1/2"	80	0.510	40 3/4"	4134
19/32" SE	65	0.595	38 5/8"	3981
19/32" HY	55	0.610	33 1/2"	3418
5/8" SE	40	0.620	24 3/4"	2612
23/32" SE	55	0.700	38 1/2"	3850
23/32" HY	45	0.730	32 7/8"	3285
7/8" HY	38	0.890	33 7/8"	3389
1-1/8" SE	36	1.085	39"	3854
1-1/8" HY	30	1.110	33 3/8"	3286

Notes:

If the bundles heights are running plus or minus 3/8" from these figures, please notify the Quality Control Department and the Shift Forman.

If the bundles weights are plus or minus 100 pounds from these figures, please notify the Quality Control Department and the Shift Forman.

U Grade: Use normal piece count, edge seal, and 2 green stripes with the stencil on each side of the unit. Stencil the thickness on the lower right hand corner of the unit face, place tag close to bottom, and cover with plastic.

E Grade: 80 piece units thru 1/2", 50 piece units for 19/32 and 23/32, and 40 piece units for 7/8" and above. No edge seal, and 2 black stripes with the thickness logo on the lower right hand corner of the unit face. Place tag close to the bottom, and cover with plastic.

Bundle Height Data

Size		Size		Size		Size		Size		Size		Size	
No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height

EPA Data

Size	Time	Pieces	Height	Weight
7/16	700	90		4044
	715	90		4150
	730	90		4167
	745	90		4188
	800	90		4201
	815	66	28 3/4	3011
	830	66	29	3012
	845	66	28 3/4	3016
	900	66	28 3/4	3009
	915	66	29	3008
	930	66	28 3/4	3001
	945	66	29	3017
	1000	66	28 1/2	2977
	1015	66	28 3/4	2980
	1030	66	28 5/8	2989
	1045	66	28 5/8	2976
	1100	66	29	3016
	1115	66	28 1/2	3024
	1430	66	28 5/8	3017

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PRESS JULY 24th 1996
PM

DATA TIME	START=	18:35	END=	19:36	HOURS=	1.02
	START=	20:05	END=	21:08	HOURS=	1.05
	START=	21:37	END=	22:37	HOURS=	1.00
					TOTAL=	3.07

BOARD WEIGHTS - LBS
average weights determined by taking finished bundle weghts.

7/16"
per/peice 46.15
per/ 8' x 24' 276.93

4153.9 lb= average bundle weight 90 piece units

PLANT PRODUCTION RATE

3.07 =hours during testing 3.3 min/press load
56 =pressloads
672 =no. of 8'x24' boards produced (pressloads x 12 boards per load)
129,024 =volume produced in surface footage (pressloads x 8'x24'x12 openings)
150,532 =volume produced 3/8" basis (pressloads x 8'x24'x 12 openings x 1.1667) 47.03 MSF 3/8 /hr
186,096 =lbs of finished product (boards produced x weight of finished board)
60,684 =lbs of finished product per hour (lbs of finshed product / hours)
30.34 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb) 39.56 lb/ft3

RESIN USAGE TAKEN FROM TOTALIZERS

TIME	MDI	PHENOL	WAX
18:35-19:36	788	1,495	691
20:05-21:08	814	1,543	712
21:37-22:37	775	1,470	678
AVERAGE	792.33	1,502.67	693.67

60,684 =average lbs. per hour finished product produced during testing
792.33 =average lbs. per hour of MDI resin used during testing
1.31% = MDI resin used as % of finished product

1,502.67 =average lbs. per hour of phenolic resin (100% solids) used during testing
2.48% =Phenolic resin used as % of finished product

693.67 =average lbs. per hour of wax (100% solids) used during testing
1.14% =wax used as % of finished product

info copied to summary page

30.34 =Plant Production rate in Tons per hour
792.33 =MDI resin usage in pounds per hour
1.31% =MDI resin usage as % of finished product
1,502.67 =Liquid phenolic resin usage in pounds per hour (100% solids)
2.48% =Liquid phenolic resin usage as % of finished product (100% solids)
693.67 =Wax usage in pounds per hour
1.14% =Wax usage as % of finished product

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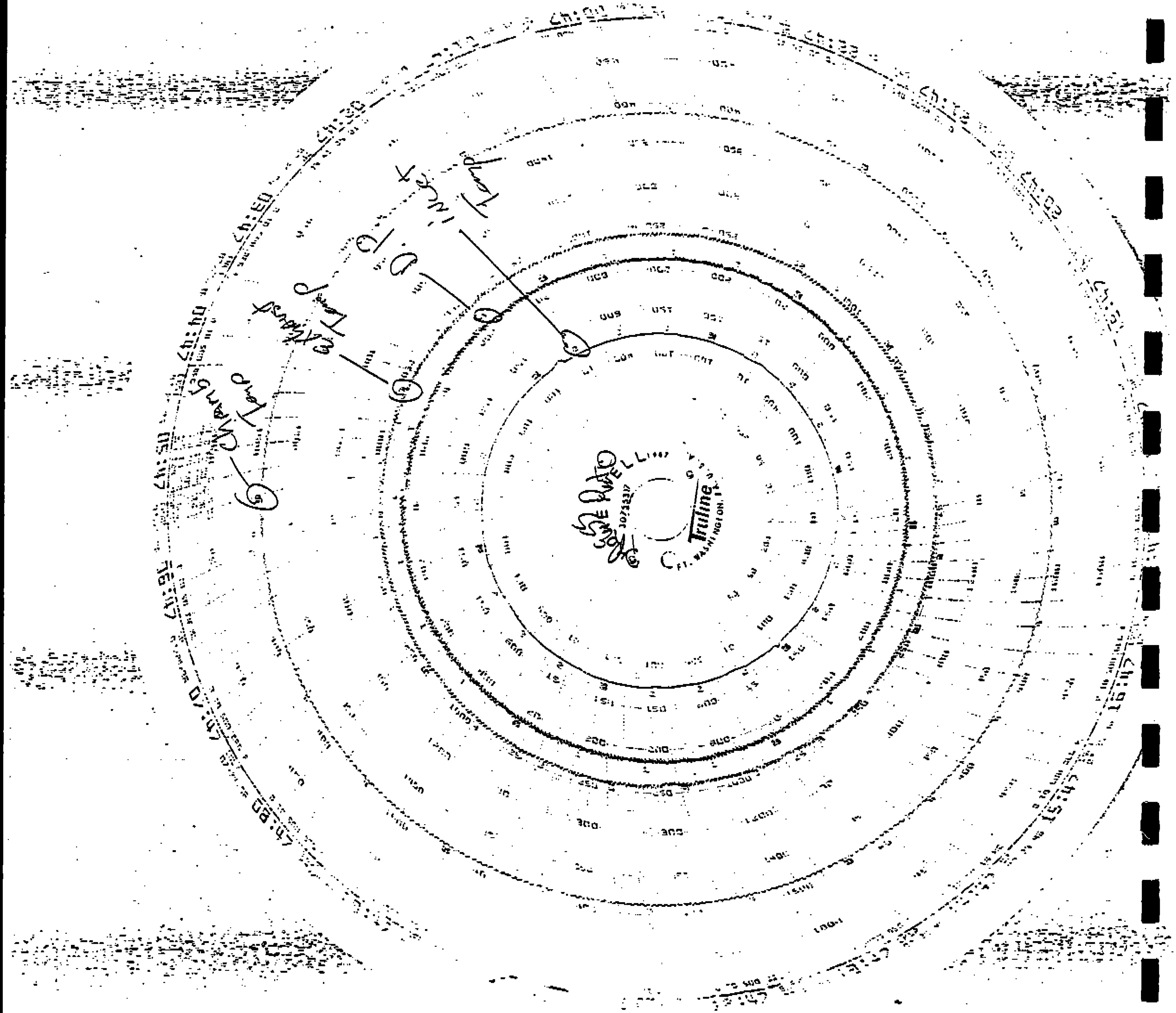

SAGOLA PRESS RTO
7/24/96

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7/24/96

18:__ start 19:36 END — #2 20:0_ start 21:06 End — #3 21:3_ START 22:4_

SAGOLA PRESS RTO DATA SHEET

No DECIMAL.

TIME 10 MINUTES	#1	#2	#3	#4	#5	INLET PRESS.	BURNERS #1	BURNERS #2	COMB. TEMP.	EXHAUST TEMP.	PRESS. DROP	GAS USAGE
18:30	435	381	396	403	373	124	1543	1540	1542	240	21.4	598568.10
18:40	428	377	398	410	372	124	1544	1536	1546	246	21.1	598578.70
18:50	433	381	397	404	371	125	1541	1532	1543	244	21.1	598586.00
19:00	428	373	398	414	374	125	1543	1539	1545	241	21.0	598595.90
19:10	427	375	399	413	372	125	1533	1543	1545	240	21.3	598606.30
19:20	432	372	396	413	374	125	1539	1542	1543	241	21.1	598615.80
19:30	430	374	397	413	373	125	1537	1546	1544	242	20.9	598625.60
19:40	436	378	396	407	373	125	1537	1550	1540	244	21.0	5986350
19:50	437	375	396	408	374	125	1541	1548	1549	240	21.2	59864520
20:00	432	381	399	407	374	126	1541	1532	1538	242	21.3	59865400
20:10	431	381	399	406	372	125	1541	1534	1538	242	21.2	59866450
20:20	438	379	396	404	373	124	1537	1543	1538	242	20.9	59867330
20:30	436	374	396	409	372	124	1538	1532	1537	241	21.2	59868200
20:40	436	376	396	409	372	123	1538	1550	1546	239	21.1	59869420
20:50	429	376	397	408	371	123	1538	1546	1546	239	21.2	59870440
21:00	431	373	395	411	372	122	1536	1551	1547	239	21.0	59871280
21:10	429	379	397	404	370	122	1538	1538	1544	239	21.1	59872160
21:20	434	377	395	402	371	121	1538	1531	1539	240	21.1	59873240
21:30	427	373	395	410	372	121	1537	1552	1547	238	21.1	~~5987~~ 59874110
21:40	428	373	395	408	371	121	1534	1550	1544	238	21.1	59874670
21:50	432	370	393	408	372	121	1537	1547	1538	240	21.4	59876390
22:00	433	372	393	405	372	122	1540	1533	1537	240	20.9	59877100
22:10	433	374	393	404	371	121	1542	1532	1540	239	21.1	59877900
22:20	432	375	394	402	371	121	1538	1531	1540	239	21.2	59879050
22:30	427	376	396	403	371	121	1545	1535	1544	239	21.2	59880000
22:40												
22:50												
23:00												
23:10												
23:20												
23:30												
23:40												
23:50												
24:00												

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RTO LOG SHEET

Wheelabrator Clean Air Systems

Huntington Energy Systems RTO
LP Sagola Data Sheet
Rev 0, DHS 3/5/95

Press

Crew / Name	B	MATT
Date	7-24-96	7-24-96
Time	10:00	16:00
Gas Meter reading	598060	598423
Burner S.P.	1540	1540
Bnr #1 temp	1542	1540
Bnr #1 out	32.8	30.8
Bnr #2 temp	1532	1549
Bnr #2 out	41.3	32.8
Inlet temp	121	124
Chamber temp	1543	1546
Exhaust temp	240	239
RTO D.P.	21.2	20.9
Chm Pur Fan Amp	25	68
Main Fan Amps	25	22
BTUE on/off	ON	ON
P/V setpoint	3.62	3.62
P/V out	65.2	68.8
Cbr #1 B.O. temp	426	428
Cbr #2 B.O. temp	376	377
Cbr #3 B.O. temp	393	395
Cbr #4 B.O. temp	401	413
Cbr #5 B.O. temp	368	371
Brg next to mtr	95	97
Brg opp mtr	96	93
Mtr brg #1	113	116
Mtr brg #2	93	95

LINE OPERATORS

READINGS MUST BE TAKEN TWICE A SHIFT — DAYS - 10:00 AND 16:00; NIGHTS -22:00 AND 04:00

24 HR. CHARTS MUST BE CHANGED OUT EVERY DAY @ 07:00

NOTE: INCONSISTENT AND UNUSUAL READINGS MUST BE ADDRESSED IN THE COMMENTS SECTION !

COMMENTS:

RTO LOG SHEET

Wheelabrator Clean Air Systems

Huntington Energy Systems RTO
LP Sagola Data Sheet
Rev 0, DHS 3/5/96

Press

Crew / Name	[illegible]	[illegible]
Date	7-24-96	
Time	11:00	4:00
Gas Meter reading	598709	599099
Burner S.P.	1540	1540
Bnr #1 temp	1539	1542
Bnr #1 out	32.7	33.6
Bnr #2 temp	1545	1533
Bnr #2 out	38.6	39.3
Inlet temp	126	118
Chamber temp	1542	1532
Exhaust temp	232	235
RTO D.P.	21.3	21.1
Chm Pur Fan Amp	78	70
Main Fan Amps	80	75
BTUE on/off	ON	ON
P/V setpoint	362	362
P/V out	67.7	62.2
Cbr #1 B.O. temp	427	430
Cbr #2 B.O. temp	372	368
Cbr #3 B.O. temp	403	389
Cbr #4 B.O. temp	411	406
Cbr #5 B.O. temp	386	371
Brg next to mtr	100	88
Brg opp mtr	97	77
Mtr brg #1	118	105
Mtr brg #2	103	84

LINE OPERATORS

READINGS MUST BE TAKEN TWICE A SHIFT — DAYS - 10:00 AND 16:00; NIGHTS -22:00 AND 04:00

24 HR. CHARTS MUST BE CHANGED OUT EVERY DAY @ 07:00

NOTE: INCONSISTENT AND UNUSUAL READINGS MUST BE ADDRESSED IN THE COMMENTS SECTION !

COMMENTS:

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RAW MATERIAL USAGE Variable Data

** Please make recording every half hour **

DATE	TIME	THICK	LINE SPEED	SURFACE DRY-BIN %	CORE DRY-BIN %	SUFACE RESIN POT-SET	SUFACE RESIN GPM	SURCACE WAX	CORE RESIN POT-SET	CORE RESIN GPM	CORE WAX
7-24	8:00	7/16	93	70	70	825	4.13	852	683	1238	817
DAY	8:25	7/16	93	68	F	825	4.12	852	683	1240	817
	8:40	7/16	93	73	78	825	4.12	852	683	1245	817
	9:00	7/16	93	74	70	825	4.12	852	683	1249	817
	10:00	7/16	93	78	60	825	4.11	852	683	1238	817
	10:40	7/16	93	70	65	825	4.13	852	683	1.238	817
	11:25	7/16	93	65	70	825	4.12	852	683	1238	817
	11:40	7/16	93	68	70	825	4.11	852	683	1238	817
	1:00	7/16	93	70	65	825	4.12	852	683	1.238	817
	1:25	7/16	93	68	70	825	4.13	852	683	1.249	817
	1:45	7/16	93	70	F	825	4.13	852	683	1.249	817
	2:30	7/16	93	80	75	825	4.13	852	683	1.238	817
	3:05	7/16	93	73	F	828	4.13	852	683	1.238	817
	4:30	7/16	94	F	F	839	4.17	861	686	1248	826
	5:40	7/16	94	F	F	839	4.16	861	686	1.249	826
	6:35	7/16	94	F	F	839	4.16	861	686	1.249	826
NITES	7:13	7/16	94	78	FW	839	4.16	861	686	1.249	826
	8:00	7/16	94	FW	72	839	4.16	861	686	1.249	826
	8:30	7/16	94	80	FW	739	4.16	861	686	1.249	826
	9:10	7/16	94	FW	FW	839	4.16	861	686	1.249	826
	9:30	7/16	94	F	F	839	4.16	861	686	1.249	876
	10:30	7/16	94	FW	80	839	4.16	861	686	1.249	826
	11:10	19/32	68	68	71	917	4.57	853	677	1.238	817
	11:50	19/32	68	70	70	917	4.57	853	677	1.238	817
	12:00	19/32	68	65	F	917	4.57	853	677	1.238	817
	12:50	1/2	81	70	FW						
	1:30	1/2	81	F	F	885	4.41	857	649	1.188	[illegible]
	2:50	1/2	81	60	68						
	3:35	1/2	81	80	67						
	4:15	1/2	81	80	73						
	4:35	1/2	81	78	FW						
	5:15	1/2	81	FW	FW						

- PHENOL 5.89 LBS = gallon
- MDI 10.34 LBS = gallon

LOUISIANA-PACIFIC
Sagola, Michigan

96

PRESS JULY 25th 1996
HCHO

DATA TIME	START=	09:37	END=	10:39	HOURS=	1.03
	START=	12:35	END=	13:36	HOURS=	1.02
	START=	14:10	END=	15:12	HOURS=	1.03
					TOTAL=	3.08

BOARD WEIGHTS - LBS
average weights determined by taking finished bundle weghts.

7/16"
per/peice 49.81
per/ 8' x 24' 298.85

4482.8 lb= average bundle weight
90 piece units

PLANT PRODUCTION RATE

3.8 min\pressload

3.08 =hours during testing
49 =pressloads
588 =no. of 8'x24' boards produced (pressloads x 12 boards per load)
112,896 =volume produced in surface footage (pressloads x 8'x24'x12 openings)
131,716 =volume produced 3/8" basis (pressloads x 8'x24'x 12 openings x 1.1667)
175,726 =lbs of finished product (boards produced x weight of finished board)
56,992 =lbs of finished product per hour (lbs of finshed product / hours)
28.50 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

1.1667 - conversion from 7/16 to 3/8

42.69 lb/ft 3
42.76 MSC 3/8

RESIN USAGE TAKEN FROM TOTALIZERS

TIME	MDI	PHENOL	WAX
09:37-10:39	819	1,775	700
12:35-13:36	872	1,743	689
14:10-15:12	819	1,767	700
AVERAGE	836.67	1,761.67	696.33

56,992 =average lbs. per hour finished product produced during testing
836.67 =average lbs. per hour of MDI resin used during testing
1.47% = MDI resin used as % of finished product

1,761.67 =average lbs. per hour of phenolic resin (100% solids) used during testing
3.09% =Phenolic resin used as % of finished product

696.33 =average lbs. per hour of wax (100% solids) used during testing
1.22% =wax used as % of finished product

info copied to summary page

28.50 =Plant Production rate in Tons per hour
836.67 =MDI resin usage in pounds per hour
1.47% =MDI resin usage as % of finished product
1,761.67 =Liquid phenolic resin usage in pounds per hour (100% solids)
3.09% =Liquid phenolic resin usage as % of finished product (100% solids)
696.33 =Wax usage in pounds per hour
1.22% =Wax usage as % of finished product

PRESS JULY 25th 1996
MDI,PHENOL,VOC,NOX,CO

DATA TIME						
	START=	16:20	END=	17:20	HOURS=	1.00
	START=	18:00	END=	19:00	HOURS=	1.00
	START=	19:35	END=	20:35	HOURS=	1.00
					TOTAL=	3.00

BOARD WEIGHTS - LBS
average weights determined by taking finished bundle weghts.

7/16"
per/peice 49.81
per/ 8' x 24' 298.85

4482.8 lb= average bundle weight 90 piece units

3.5 min/ pressload

PLANT PRODUCTION RATE
3.00 =hours during testing
51 =pressloads
612 =no. of 8'x24' boards produced (pressloads x 12 boards per load)
117,504 =volume produced in surface footage (pressloads x 8'x24'x12 openings)
137,092 =volume produced 3/8" basis (pressloads x 8'x24'x 12 openings x 1.1667) 45.70 MSF/hr 3/8
182,898 =lbs of finished product (boards produced x weight of finished board)
60,966 =lbs of finished product per hour (lbs of finshed product / hours)
30.48 =tons of finished product per hour (lbs of finshed product per hour / 2000 lb)

RESIN USAGE TAKEN FROM TOTALIZERS

TIME	MDI	PHENOL	WAX
16:20-17:20	793	1,707	677
18:00-19:00	793	1,703	677
19:35-20:35	793	1,709	677
AVERAGE	793.00	1,706.33	677.00

60,966 =average lbs. per hour finished product produced during testing
793.00 =average lbs. per hour of MDI resin used during testing
1.30% = MDI resin used as % of finished product

1,706.33 =average lbs. per hour of phenolic resin (100% solids) used during testing
2.80% =Phenolic resin used as % of finished product

677.00 =average lbs. per hour of wax (100% solids) used during testing
1.11% =wax used as % of finished product

info copied to summary page

30.48 =Plant Production rate in Tons per hour
793.00 =MDI resin usage in pounds per hour
1.30% =MDI resin usage as % of finished product
1,706.33 =Liquid phenolic resin usage in pounds per hour (100% solids)
2.80% =Liquid phenolic resin usage as % of finished product (100% solids)
677.00 =Wax usage in pounds per hour
1.11% =Wax usage as % of finished product

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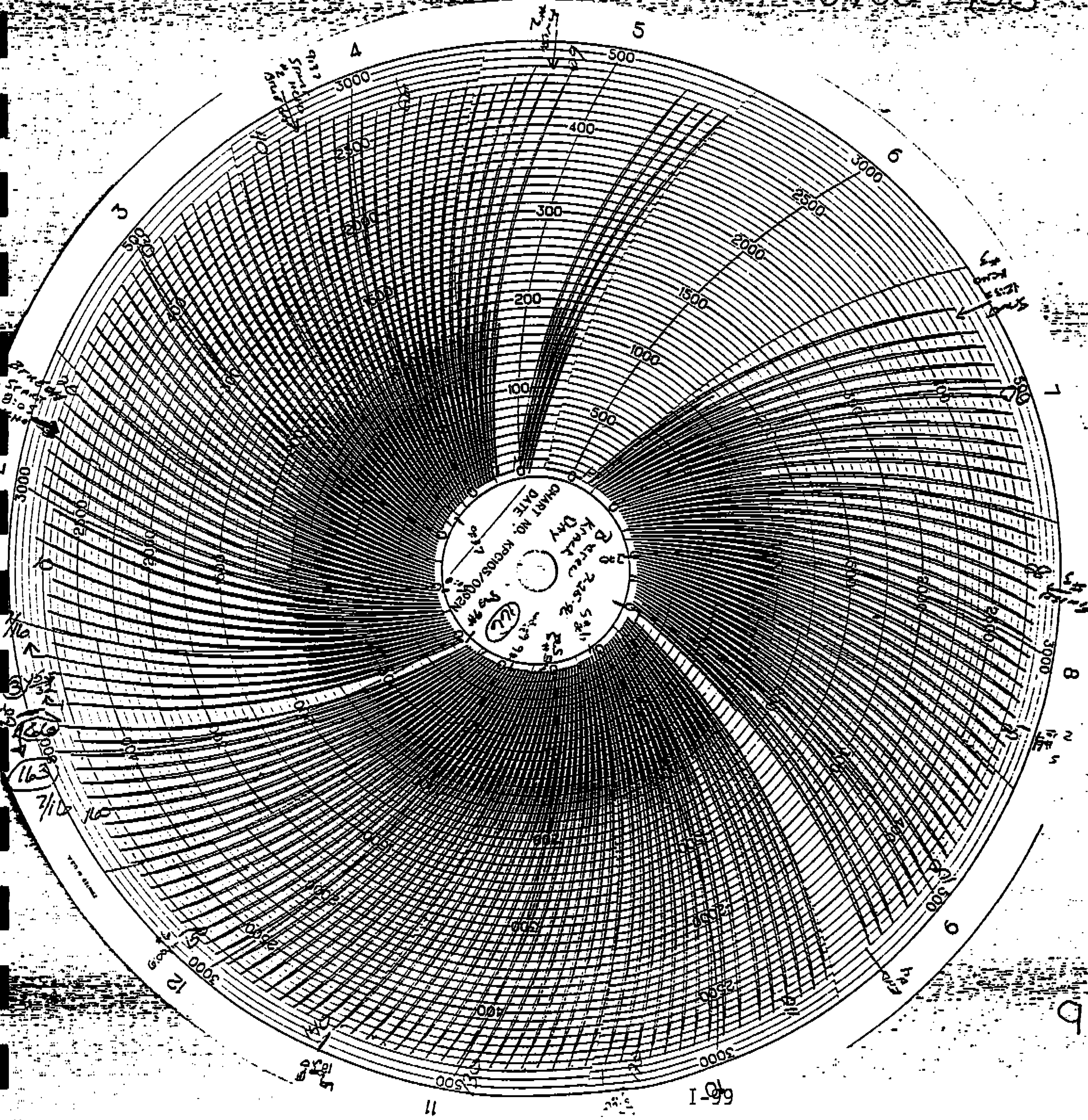
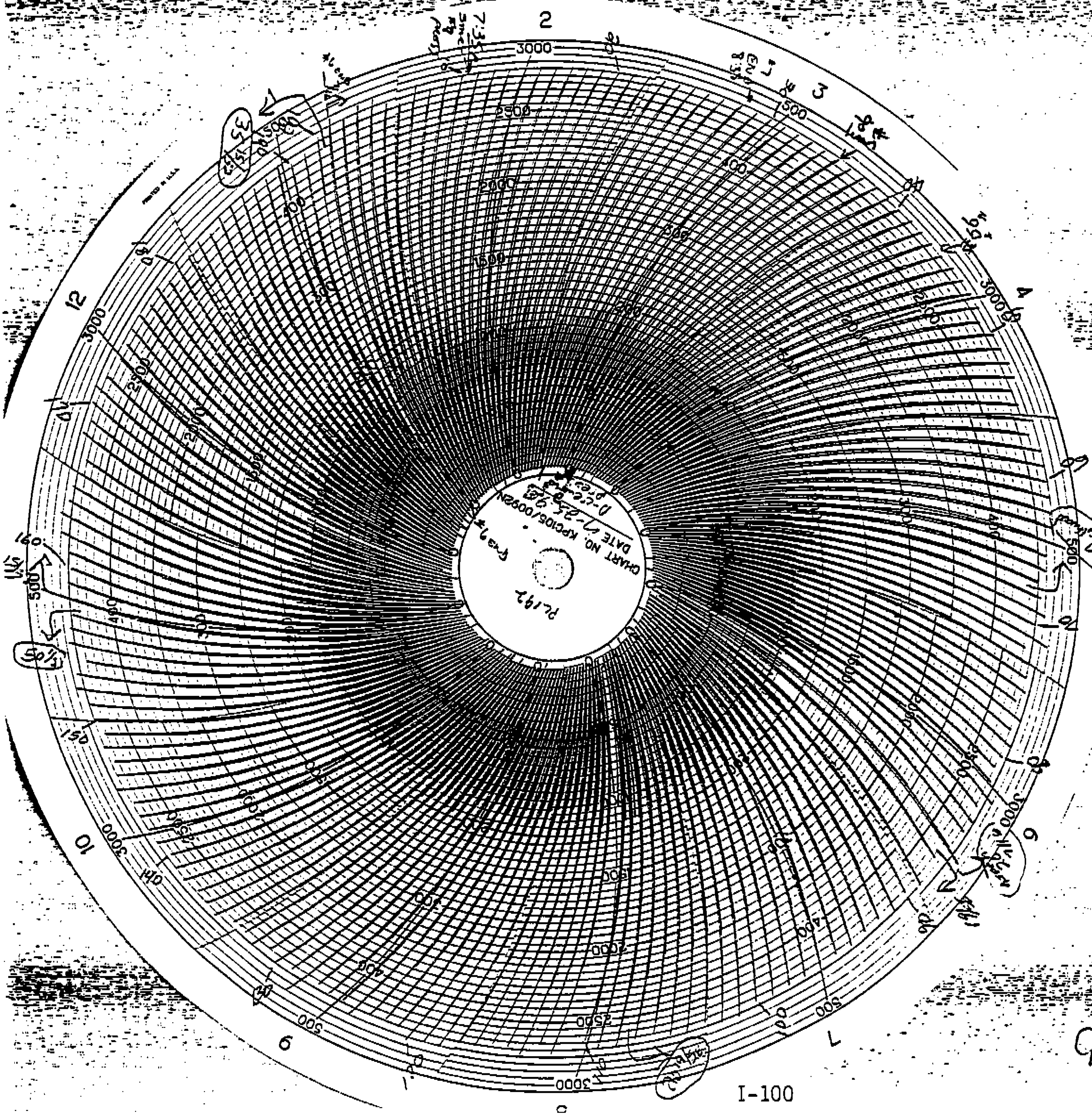
LOUISIANA-PACIFIC
Sagola, Michigan

PRESS
7/25/96
0700-1900



LOUISIANA-PACIFIC
Sagola, Michigan

PRESS
7/25/96
1900-0700



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LOUISIANA-PACIFIC CORPORATION
SAGOLA, MICHIGAN PRESS REPORT

OPERATOR Krackenberger DATE 2-25-96
SHIFT Day CREW B

BLOW OUT	
F.L. RADIATORS	
HYD. COOLING FANS	
PRS COOLING FANS	
F.C.O.S.	
FORMER DECK	
LOADER	
UNLOADER	
PRESS	

GREASE COLUMNS	
FLUSH BLENDER	
BAGHOUSE PRES.	
HYD OIL TEMP	
INSP. FIT/RET CONVS	
CLEAN DECKLE CHAIN	
CLEAN BLENDERS	
CLEAN TAIL PULLEYS	

LN SPD	FROM	TO	THICK	PRESS LDS	FOOTAGE
81	7:00	7:10	45/32	3	8640
85	7:10	2:00	7/16	163	438157
				166	446,797

DOWNTIME

FROM	TO	M	E	O	MINS.	REASON FOR DOWN TIME
10:45	11:10	✓	✓	✓	25	sched maint
11:20	12:25		✓		65	Lost Sur - All spinner Heads (changed #5)
1:10	1:12		✓		2	storage conv stoped
3:00	3:01			✓	1	Backed up (Prox)
3:14	3:20		✓		6	Storage conv stoped
3:41	3:42		✓		1	changed Prox on storage conv
420	4:21		✓		1	Didn't make Limit #/in Press

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TIME TO POSITION (SECONDS)

1	55	61	68	121	78	181	
2	54	62	68	122	78	182	
3	53	63	65	123	76	183	
4	45	64	67	124	74	184	
5	47	65	67	125	73	185	
6	49	66	72	126	73	186	
7	52	67	73	127	73	187	
8	55	68	72	128	73	188	
9	52	69	76	129	74	189	
10	56	70	77	130	72	190	
11	55	71	79	131	76	191	
12	57	72	81	132	73	192	
13	57	73	82	133	73	193	
14	72	74	79	134	74	194	
15	71	75	74	135	73	195	
16	68	76	75	136	74	196	
17	70	77	73	137	74	197	
18	71	78	70	138	74	198	
19	70	79	72	139	72	199	
20	70	80	77	140	73	200	
21	69	81	71	141	75	201	
22	69	82	72	142	75	202	
23	68	83	72	143	74	203	
24	70	84	74	144	75	204	
25	69	85	82	145	76	205	
26	69	86	84	146	76	206	
27	70	87	82	147	75	207	
28	70	88	82	148	75	208	
29	68	89	84	149	72	209	
30	65	90	79	150	72	210	
31	64	91	78	151	72	211	
32	62	92	78	152	71	212	
33	63	93	78	153	69	213	
34	61	94	73	154	71	214	
35	64	95	74	155	72	215	
36	64	96	77	156	69	216	
37	63	97	76	157	68	217	
38	63	98	77	158	69	218	
39	63	99	80	159	71	219	
40	64	100	81	160	69	220	
41	62	101	82	161	69	221	
42	63	102	85	162	69	222	
43	63	103	84	163	69	223	
44	63	104	84	164	67	224	
45	62	105	82	165	66	225	
46	62	106	81	166	64	226	
47	58	107	75	167		227	
48	52	108	82	168		228	
49	59	109	74	169		229	
50	57	110	75	170		230	
51	58	111	79	171		231	
52	60	112	78	172		232	
53	61	113	80	173		233	
54	60	114	79	174		234	
55	60	115	78	175		235	
56	62	116	76	176		236	
57	64	117	76	177		237	
58	64	118	78	178		238	
59	64	119	78	179		239	
60	74	120	79	180		240	

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LOUISIANA-PACIFIC CORPORATION
SAGOLA, MICHIGAN PRESS REPORT

OPERATOR *Levi* DATE *7-25-96*
SHIFT *Nites* CREW *D*

BLOW OUT		GREASE COLUMNS	
F.L. RADIATORS		FLUSH BLENDER	
HYD. COOLING FANS		BAGHOUSE PRES.	
PPS COOLING FANS		HYD OIL TEMP	
F.C.O.S.		INSP. FIT/RET CONVS	
FORMER DECK		CLEAN DECKLE CHAIN	
LOADER		CLEAN BLENDERS	
UNLOADER		CLEAN TAIL PULLEYS	
PRESS			

	LN SPD	FROM	TO	THICK	PRESS LDS	FOOTAGE
softwood	84	7:00	11:00	7/16	67	
aspen	94	11:00	12:08	7/16	20	233,863
	68	12:08	1:40	19/32	20	72,958
	82	1:40	4:47	1/2	50	153,596
	82	4:47	7:00	15/32	35	100,800
					(192)	(561,217)

DOWNTIME

FROM	TO	M	E	O	MINS.	REASON FOR DOWN TIME
12:08	12:11				3	R1 #3 loader limit stuck
1:50	1:54				4	sawline - stacker Jam
5:21	5:22				1	dropped H.B in loader FI #1 NO #
5:41	5:42				1	" "
					(9)	

TIME TO POSITION (SECONDS)

End TEST

1	64	61	66	121	52	181	55
2	64	62	65	122	54	182	55
3	64	63	64	123	52	183	55
4	63	64	66	124	52	184	55
5	61	65	62	125	53	185	55
6	65	66	60	126	53	186	56
7	64	67	58	127	52	187	54
8	66	68	54	128	50	188	54
9	69	69	44	129	50	189	55
10	69	70	44	130	48	190	54
New TEST 11	69	71	43	131	49	191	52
12	69	72	44	132	48	192	54
13	69	73	44	133	46	193	
14	71	74	46	134	48	194	
15	67	75	45	135	46	195	
16	68	76	43	136	47	196	
17	69	77	42	137	46	197	
18	68	78	43	138	47	198	
19	68	79	42	139	48	199	
20	71	80	42	140	49.	200	
21	70	81	42	141	49	201	
22	69	82	41	142	52	202	
23	70	83	42	143	51	203	
24	70	84	43	144	51	204	
25	69	85	44	145	51	205	
26	69	86	42	146	51	206	
27	68	87	[illegible]	147	51	207	
End TEST 28	70	88	57	148	49	208	
29	71	89	54	149	50	209	
30	69	90	54	150	47	210	
31	69	91	54	151	47	211	
32	69	92	57	152	47	212	
33	69	93	55	153	48	213	
34	69	94	58	154	48	214	
35	70	95	57	155	44	215	
new test 36	68	96	52	156	47	216	
37	71	97	49	157	48	217	
38	69	98	53	158	55	218	
39	69	99	55	159	54	219	
40	68	100	55	160	35	220	
41	69	101	56	161	56	221	
42	70	102	55	162	55	222	
43	69	103	55	163	56	223	
End Test 44	68	104	55	164	54	224	
45	69	105	59	165	54	225	
46	68	106	57	166	56	226	
47	67	107	57	167	54	227	
48	66	108	54	168	56	228	
49	67	109	54	169	54	229	
50	63	110	52	170	54	230	
51	66	111	50	171	57	231	
52	68	112	49	172	58	232	
53	67	113	46	173	59	233	
54	65	114	48	174	55	234	
55	65	115	47	175	55	235	
56	67	116	47	176	56	236	
57	66	117	49	177	57	237	
58	65	118	50	178	60	238	
59	67	119	49	179	57	239	
60	67	120	51	180	56	240	

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M-MECHANICAL E-ELECTRICAL O-OPERATOR

LOUISIANA-PACIFIC CORPORATION SAGOLA, MI

[SU]PERVISOR Dave S. SHIFT Day? CREW B DATE 7-25-96

[SH]IFT OPERATING REPORT

PRESS OPERATION

[LIN]E SPEED	FROM	TO	THICKNESS	PRESS LOADS	3/8" FOOTAGE	Minutes Downtime M	E	O
81	7:00	7:40	15/32	3	8640			
85	7:40	7:00	7/16	163	438,157	25	75	1
			TOTAL	166	446,797	25	75	1

Dryer Lamp Test (OK)	—
[S]urface Dryer Fan Load	92
[C]ore Dryer Fan Load	92
Surf / Core Dryer Fan Load	89
#1 Baghouse Pressure	—
#2 Baghouse Pressure	—
Surface Wet Bin Volume*	90
[C]ore Wet Bin Volume*	90
[S]urf/Core Wet Bin Volume*	F
[Surf]ace Dry Bin Volume*	75
[C]ore Dry Bin Volume*	Full
[Sch]aidig Bin	408

NATURAL GAS METER READINGS
(taken end of the shift)

MAIN	0280 7160
PRESS RTO	5998 3190
DRYER RTO	1504 1150
GEKA	0324 1860
S DRYER	
C DRYER	
S/C DRYER	

GEKA EFB	BED KV	ION KV	ION MA	EFB - P	BH - P
	13	20	21	3.2	2.0

FLAKER RUN HOURS

#1 T.L.F	#2 T.L.F

BARK % MOISTURE	39.82	FUEL % MOISTURE	2.26
		GRECONS 5-1	C-2 1/2 2

LOG COUNT

#1 6,487 #2 7,429 = 13,916 TOTAL

BARK FUEL COUNT: A 261 B 264

DRYER OPERATION

	Dry Fuel Usage Lbs.	Gas Usage Hrs.	Sust. Gas Usage Hrs.	Average Inlet Temp.	Running Time Mins	Ave. Wet Moisture	Ave. Dry Moisture
Surface	4637	0	123	746	691	48.8	6.6
Core	3022	4:20	5	705	720	46.2	6.9
S/Core	4873	0	29	740	720	44.8	6.1

[COM]MENTS: 45 min Hitachi Supt Blender Burned out 65 min; 25 min Sched Maint

Maint/Mill D.T.

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LOUISIANA-PACIFIC CORPORATION SAGOLA, MI

SUPERVISOR Dale Donati SHIFT Night CREW D DATE 7-25-96

SHIFT OPERATING REPORT

PRESS OPERATION

LINE SPEED	FROM	TO	THICKNESS	PRESS LOADS	3/8" FOOTAGE	Minutes Downtime M	E	O
84	7:00	11:00	7/16	67	—			
94	11:00	12:08	7/16	20	233,863			
68	12:08	1:49	19/32	20	72,958	3		
82	1:49	4:47	1/2	50	153,596	4		
82	4:47	7:00	15/32	35	100,800	2		
			TOTAL	192	561,217	9	—	—

Dryer Lamp Test (OK)	OK
Surface Dryer Fan Load	91.1
Core Dryer Fan Load	95.2
Surf / Core Dryer Fan Load	90.4
#1 Baghouse Pressure	OK
#2 Baghouse Pressure	OK
Surface Wet Bin Volume*	78
Core Wet Bin Volume*	74
Surf/Core Wet Bin Volume*	50
Surface Dry Bin Volume*	40
Core Dry Bin Volume*	30
Laidig Bin	Full

NATURAL GAS METER READINGS
(taken end of the shift)

MAIN	012830440D
PRESS RTO	60044380
DRYER RTO	151003460
GEKA	03241860
S DRYER	
C DRYER	
S/C DRYER	

GEKA EFB	BED KV	ION KV	ION MA	EFB - P	BH - P
	9.0	20	2.2	3.5	2.0

FLAKER RUN HOURS

#1 T.L.F	#2 T.L.F

BARK % MOISTURE	36.8	FUEL % MOISTURE	2.2
		GRECONS	20

LOG COUNT

#1 4561 #2 7166 = 11727 TOTAL

BARK FUEL COUNT: A 256 B 256

DRYER OPERATION

	Dry Fuel Usage Lbs.	Gas Usage Hrs.	Sust. Gas Usage Hrs.	Average Inlet Temp.	Running Time Mins	Ave. Wet Moisture	Ave. Dry Moisture
Surface	6180	Ø	0	774	720	40.2	6.0
Core	5524	Ø	132	886	720	44.4	5.5
S/Core	6293	Ø	35	1022	720	46.8	6.0

COMMENTS: 9 min DT 9 min Misc

LOUISIANA-PACIFIC CORPORATION [redacted]OLA, [redacted]HIG[redacted]

DAILY PRODUCTION REPORT

DATE: JULY 25.,1996 DAY: THURSDAY

SHIFT	BOARD SIZE	PRESS LOADS	NO. OF PANELS	SURFACE FOOTAGE	3/8" FOOTAGE
7AM.	15/32"	3	216	6,912	8,640
TO	7/16"	163	11,736	375,552	438,157
7PM.	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
B	0	0	0	0	0
CREW	0	0	0	0	0
			SHIFT	TOTAL	446,797
7PM.	7/16"	87	6,264	200,448	233,863
TO	19/32"SE	20	1,440	46,080	72,958
7AM.	1/2"	50	3,600	115,200	153,596
	15/32"	35	2,520	80,640	100,800
D	0	0	0	0	0
CREW	0	0	0	0	0
			SHIFT	TOTAL	561,217
DAILY	TOTAL	358	25,776	824,832	1,008,014
			TOTAL	WTD	7,212,195
			TOTAL	MTD	27,060,810
			TOTAL	YTD	193,232,603

	SCHED. RUN HOURS	NET RUN HOURS	% RUN TIME	% PLANT CAP.
DAY	11.50	10.25	89.1%	119.1%
NIGHT	12.00	11.75	97.9%	143.4%
DAILY	23.50	22.00	93.6%	131.5%
WTD	163.00	159.00	97.5%	
MTD	649.25	595.50	91.7%	
YTD	4,731.50	4,460.00	94.3%	

FOREMAN % PLANT	CAP
"A" M. MESSINA	132.0%
"B" D. SPIGARELLI	139.6%
"C" F. SHOQUIST	135.0%
"D" D. DONATI	142.9%

LOG CNT.	DAILY	WTD	MTD
A CREW	0	36,215	130,597
B CREW	13,916	41,325	167,625
C CREW	0	34,332	131,563
D CREW	11,727	40,772	168,082

MTD 3/8" FOOTAGE

1/4"	202,761	1/2"	4,478,865	23/32"SE	0
3/8"	85,248	19/32"SE	1,152,743	23/32"H	5,966,122
7/16"	12,445,799	19/32"H	164,156	7/8"H	295,676
15/32"	2,269,440	5/8"	0	1 1/8"	0

GAS USAGE (MCF)	DAY	MTD
SURFACE DRYER	0	18,086
CORE DRYER	0	0
S/C DRYER	0	0
GEKA	0	0
PRESS RTO	0	0
DRYER RTO	0	0
TOTAL	587	18,086

DOWNTIME

DAY SHIFT B-CREW 25 MIN. SCHEDULED MAINT:. 65 MIN. SPINNER SURFACE BLENDER BURNED OUT:. 11 MIN. MISC. DOWNTIME.

NIGHT SHIFT D-CREW 9 MIN. MISC.

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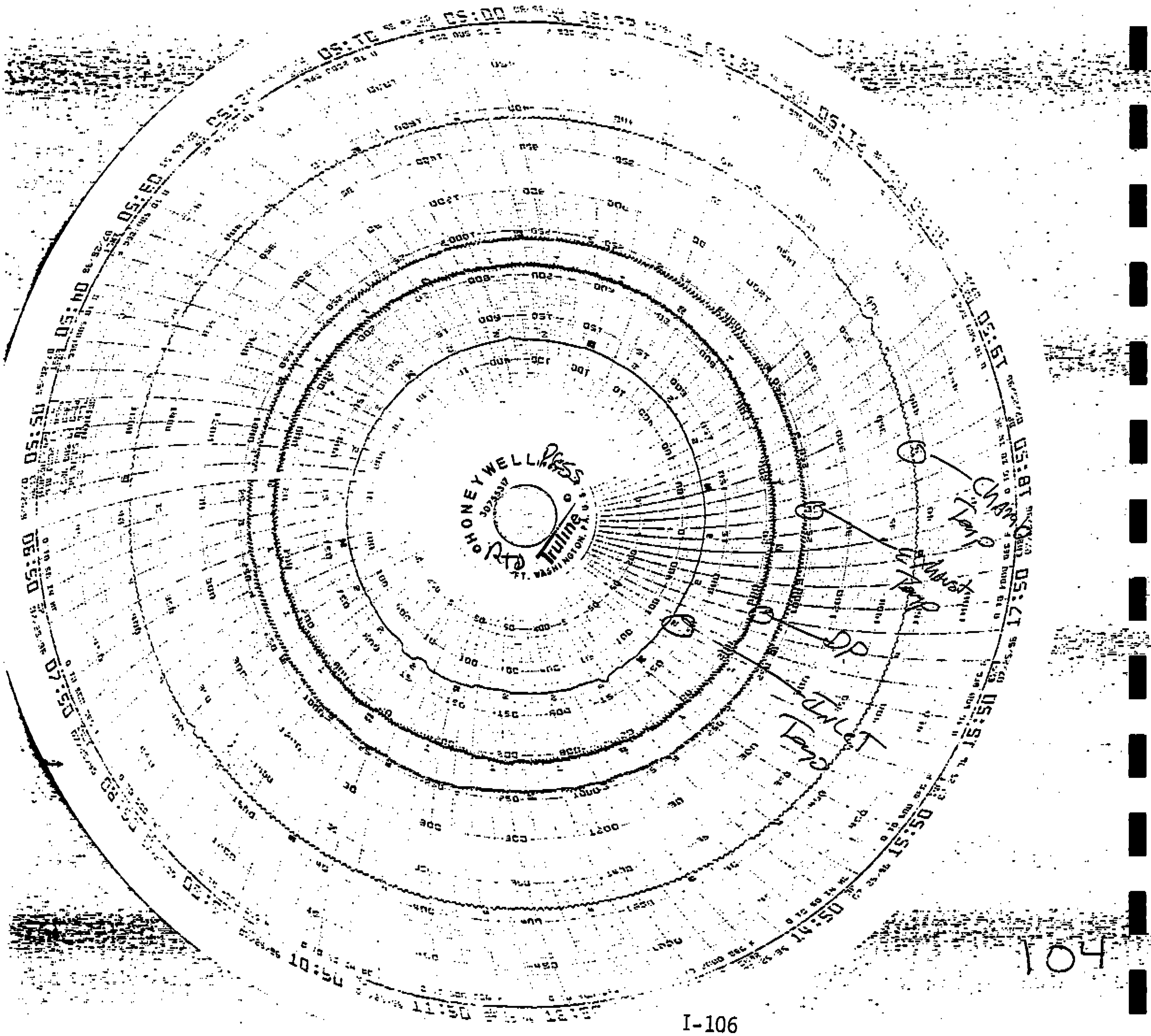
LOUISIANA-PACIFIC
Sagola, Michigan

PRESS RTO
7/25/96

PRESSRTO



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7/25/96

SAGOLA PRESS RTO DATA SHEET

TIME 10 MINUTES	#1	#2	#3	#4	#5	INLET TEMP	BURNERS #1	BURNERS #2	COMB. TEMP.	EXHAUST TEMP.	PRESS DROP	GAS USAGE	
1:50	427	376	401	403	365	124	1522	1515	1522	240	20.7	9624.1	1:45
2:00	429	375	400	401	365	124	1521	1514	1521	243	20.6		
2:10	430	368	398	407	367	124	1519	1517	1526	240	20.8		
2:20	436	372	396	401	368	124	1520	1529	1519	240	20.2	9647.3	2:15
2:30	435	371	396	403	369	125	1514	1527	1517	239	20.3		
2:40	431	376	399	400	367	124	1519	1507	1516	236	20.7		
2:50	428	376	400	402	367	123	1521	1510	1521	237	20.8	9670.4	2:45
3:00	426	376	402	404	366	125	1525	1513	1527	240	20.6		
3:10	425	374	401	407	367	124	1522	1515	1525	243	20.6		
3:20	433	372	400	408	369	131	1513	1531	1534	241	20.5	9693.2	3:15
3:30	436	378	399	402	369	125	1516	1517	1514	243	20.7		
3:40	433	379	401	402	368	123	1518	1516	1519	238	20.7		
3:50	427	378	402	405	367	123	1523	1514	1523	240	20.6	9717.2	3:45
4:00	429	377	400	401	366	123	1518	1508	1517	238	20.6		
4:10	430	369	399	408	369	123	1521	1524	1531	238	20.6		
4:20	434	369	396	407	370	123	1515	1533	1525	235	20.7	9740.0	4:15
4:30	435	370	397	405	369	123	1513	1532	1521	236	20.6		
4:40	435	373	398	404	368	123	1516	1529	1519	237	20.4		
4:50	427	376	402	403	365	123	1524	1514	1524	239	20.7	9762.7	4:45
5:00	426	373	401	406	365	122	1520	1514	1525	241	20.6		
5:10	427	374	402	406	365	123	1520	1517	1524	241	20.7		
5:20	434	373	400	405	366	123	1512	1530	1523	237	20.6	9785.3	5:15
5:30	436	380	400	397	364	123	1518	1515	1514	238	21.0		
5:40	431	380	401	398	363	122	1519	1510	1518	235	20.9		
5:50	430	371	399	406	365	121	1520	1524	1528	238	20.7	9807.7	5:45
6:00	430	373	399	404	365	122	1521	1515	1522	242	20.8		
6:10	430	372	398	406	366	123	1522	1519	1524	241	20.8		
6:20	438	373	396	402	367	124	1515	1528	1519	236	20.7	9829.6	6:15
6:30	433	394	400	400	366	124	1521	1511	1521	238	20.9		
6:40	440	376	396	401	369	124	1521	1527	1518	240	20.3		
6:50	445	379	398	400	368	124	1522	1510	1519	239	20.8	9852.2	6:45
7:00	438	370	396	407	371	124	1513	1531	1521	237	20.7		
7:10	434	369	397	410	372	124	1514	1528	1527	238	20.7		
7:20	437	371	396	406	372	124	1517	1531	1522	238	20.7	9874.6	7:15
7:30	435	376	397	402	371	124	1521	1511	1518	240	20.7		
7:40	430	376	399	405	371	124	1521	1510	1520	239	20.9		

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7/25/96

SAGOLA PRESS RTO DATA SHEET

TIME 10 MINUTES	#1	#2	#3	#4	#5	INLET TEMP	BURNERS #1	BURNERS #2	COMB TEMP.	EXHAUST TEMP.	PRESS DROP	GAS USAGE	
7:50	428	374	400	407	373	124	1519	1513	1522	242	20.7	9897.3	7:45
8:00	429	368	400	413	374	124	1517	1528	1528	238	20.5		
8:10	429	368	400	413	374	123	1519	1527	1529	237	20.6		
8:20	431	369	399	412	374	123	1514	1529	1528	238	20.7	9919.6	8:15
8:30	433	376	399	404	371	122	1517	1510	1515	240	20.8		
8:40	434	373	399	406	370	124	1518	1529	1520	238	20.8		
8:50	429	380	402	403	367	123	1521	1514	1523	238	21.0	9942.8	8:45
9:00	431	373	399	409	369	124	1518	1525	1529	239	20.5		
9:10	436	375	399	405	368	124	1524	1532	1528	239	20.7		
9:20	438	380	397	400	367	124	1527	1529	1527	241	20.3	9966.0	9:15
9:30	432	382	398	400	365	123	1524	1518	1526	237	20.9		

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Wheelabrator Clean Air Systems

Huntington Energy Systems RTO
LP Sagola Data Sheet
Rev 0, DHS 3/6/95

Press

Crew / Name	B	MATT
Date	7-25-96	7-25-96
Time	10:00	16:00
Gas Meter reading	594431	597225
Burner S.P.	1520	1519
Bnr #1 temp	1523	1514
Bnr #1 out	39.1	37.7
Bnr #2 temp	1524	1526
Bnr #2 out	37.0	36.5
Inlet temp	621	623
Chamber temp	1528	1527
Exhaust temp	238	238
RTO D.P.	21.0	20.4
Chm Pur Fan Amp	78	78
Main Fan Amps	75	72
BTUE on/off	OFF	OFF
P/V setpoint	3.62	3.62
P/V out	61.7	63.9
Cbr #1 B.O. temp	427	427
Cbr #2 B.O. temp	377	375
Cbr #3 B.O. temp	399	401
Cbr #4 B.O. temp	407	405
Cbr #5 B.O. temp	372	367
Brg next to mtr	92	97
Brg opp mtr	83	86
Mtr brg #1	108	116
Mtr brg #2	88	95

LINE OPERATORS

READINGS MUST BE TAKEN TWICE A SHIFT

DAYS - 10:00 AND 16:00
NIGHTS -22:00 AND 04:00

24 HR. CHARTS MUST BE CHANGED OUT EVERY DAY @ 07:00

NOTE: INCONSISTENT AND UNUSUAL READINGS MUST BE ADDRESSED IN THE COMMENTS SECTION !

COMMENTS:

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Wheelabrator Clean Air Systems

Huntington Energy Systems RTO
L.P. Sagola Data Sheet
Rev.0, DHS 3/5/96

Press

Crew / Name	E [illegible]	
Date	7-23-96	
Time	9:55	4:05
Gas Meter reading	594996	600332
Burner S.P.	1540	1540
Bnr #1 temp	1538	1541
Bnr #1 out	25.0	33.6
Bnr #2 temp	1536	1531
Bnr #2 out	34.8	40.6
Inlet temp	123	117
Chamber temp	1542	1536
Exhaust temp	243	235
RTO D.P.	20.9	21.1
Chm Pur Fan Amp	78	80
Main Fan Amps	75	75
BTUE on/off	on	on
P/V setpoint	3.62	362
P/V out	63.3	69.2
Cbr #1 B.O. temp	436	432
Cbr #2 B.O. temp	382	377
Cbr #3 B.O. temp	395	388
Cbr #4 B.O. temp	397	400
Cbr #5 B.O. temp	366	370
Brg next to mtr	91	56
Brg opp mtr	53	76
Mtr brg #1	109	100
Mtr brg #2	88	80

LINE OPERATORS

READINGS MUST BE TAKEN TWICE A SHIFT   DAYS - 10:00 AND 16:00
NIGHTS -22:00 AND 04:00

24 HR. CHARTS MUST BE CHANGED OUT EVERY DAY @ 07:00

NOTE: INCONSISTENT AND UNUSUAL READINGS MUST BE ADDRESSED IN THE COMMENTS SECTION !

COMMENTS:

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7/25/96

Bundle Height Parameters w/ weights

Board Size	Pieces / Bundle	Target Thickness	Target Bdl. Height	Target Bd. Weight
1/4"	120	0.280	31 1/4"	3296
1/4"	150	0.280	39"	4108
3/8"	100	0.380	38"	4003
7/16"	66	0.380"	28 3/4"	2932
7/16"	90	0.435	39 1/8"	3999
15/32"	82	0.485	39 3/4"	4232
1/2"	66	0.510	30 5/8"	3100
1/2"	80	0.510	40 3/4"	4134
19/32" SE	65	0.595	38 5/8"	3981
19/32" HY	55	0.610	33 1/2"	3418
5/8" SE	40	0.620	24 3/4"	2612
23/32" SE	55	0.700	38 1/2"	3850
23/32" HY	45	0.730	32 7/8"	3285
7/8" HY	38	0.860	33 7/8"	3389
1-1/8" SE	36	1.085	39"	3854
1-1/8" HY	30	1.110	33 3/8"	3288

Notes:

If the bundles heights are running plus or minus 3/8" from these figures, please notify the Quality Control Department and the Shift Forman.

If the bundles weights are plus or minus 100 pounds from these figures, please notify the Quality Control Department and the Shift Forman.

U Grade: Use normal piece count, edge seal, and 2 green stripes with the stencil on each side of the unit. Stencil the thickness on the lower right hand corner of the unit face, place tag close to bottom, and cover with plastic.

E Grade: 80 piece units thru 1/2", 50 piece units for 19/32 and 23/32, and 40 piece units for 7/8" and above. No edge seal, and 2 black stripes with the thickness logo on the lower right hand corner of the unit face. Place tag close to the bottom, and cover with plastic.

Bundle Height Data

Size 15/32		Size 7/16		Size		Size		Size		Size		Size	
No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height
2	39 3/4	3	38 1/2										
4	40 1/8	5	39										
		8	39 1/4										
		9	40 1/4										
		11	40 1/4										
		15	[illegible]										
		21	40										
		22	40 1/2										
		24	40 1/4										
		31	40 1/4										
		34	39 1/4										
		49	39 1/4										
		56	40 1/2										
		61	40 1/2										
		71	40 1/4										
		83	[illegible]										
		85	41										
		95	40 1/4										

Size	Time	Pieces	Height	Weight
7/16	1615	90	41	4587
	1630		40 1/4	4547
	1645		40 3/8	4538
	1700		40 1/4	4540
	1715		40 1/4	4565
	1730		40 1/2	4553
	1745		"	4562
	1800		40 1/2	4567
	1815		40 1/4	4550
	1830		40 1/2	4511
	1845		40 1/2	4529
	1900		40 1/4	4452

EPA Data

Size	Time	Pieces	Height	Weight
15/32	07:00	82	40	4301
15/32	07:15	82	40	4291
7/16	07:30	90	38 3/4	4128
7/16	07:45	90	39	4229
7/16	08:00	90	39 1/2	428[illegible]
7/16	8:15	90	40 1/2	45[illegible]
7/16	08:30	90	40 1/4	4522
7/16	08:45	90	40 1/4	4477
7/16	09:00	90	40 1/4	4505
7/16	09:15	90	40 1/2	4370
	0930		40	4417
	0945		40 1/4	4429
	1000		39 1/4	[illegible] 4406
	10:15		39 3/4	4389
	10:30		"	4457
	10:45		40 1/4	44[illegible]
	11:00		40 1/4	44[illegible]
	11:15		40 1/2	4451
	11:30		41 1/4	4432
Down Time				
	1245		39 3/4	4459
	1300		39 1/2	4597
	1315		39 1/4	4530
	1330		40 1/2	4545
	1345		39 1/2	4493
	1400		40 1/2	4577
	1415		40 1/2	4589
	1430		40 1/4	44[illegible]
	1445		40 1/4	4471
	1500		40 1/4	44[illegible]
	1515		40 3/4	4524
	1530		"	4565
	1545		40 1/4	4511
	1600		40 1/2	4583

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7/25/96

Bundle Height Parameters w/weights

Board Size	Pieces / Bundle	Target Thickness	Target Bdl. Height	Target Bdl. Weight
1/4"	120	0.260	31 1/4"	3286
1/4"	150	0.260	39"	4108
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7/16"	66	0.380	28 3/4"	2932
7/16"	90	0.435	39 1/8"	3999
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1/2"	66	0.510	30 5/8"	3100
1/2"	80	0.510	40 3/4"	4134
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19/32" HY	55	0.610	33 1/2"	3418
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23/32" SE	55	0.700	38 1/2"	3850
23/32" HY	45	0.730	32 7/8"	3285
7/8" HY	38	0.890	33 7/8"	3389
1-1/8" SE	36	1.085	39"	3854
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E Grade: 80 piece units thru 1/2", 50 piece units for 19/32 and 23/32, and 40 piece units for 7/8" and above. No edge seal, and 2 black stripes with the thickness logo on the lower right hand corner of the unit face. Place tag close to the bottom, and cover with plastic.

Bundle Height Data

Size 7/16		Size		Size		Size		Size		Size		Size	
No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height	No.	Height
3	40												
6	40 1/4												
9	40												
12	/												
15	39 3/4												
18	/												
21	40												
24	39 3/4												
27	40												
30	–												
33	40 1/4												
36	39 3/4												
39	–												
42													
45													
48													
51													
54													
57													
60													
63													
66													
69													
72													

EPA Data

Size	Time	Pieces	Height	Weight
7/16	1914	90	40	4431
7/16	1922	90	39 3/4	4404
7/16	1941	90	40	4513
7/16	1954	90	39 1/2	4461
7/16	2000	90	39 3/4	4475
7/16	2018	90	40	4487
7/16	2038	90	40	4500
7/16	2052	90	39 3/4	4466
7/16	2109	90	40	4491
7/16	2124	90	40 1/4	4454
7/16	2138	90	39 3/4	4438
7/16				

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Variable Data

** Please make recording every half hour **

DATE	TIME	THICK	LINE SPEED	SURFACE DRY-BIN %	CORE DRY-BIN %	SUFACE RESIN POT-SET	SUFACE RESIN GPM	SURCACE WAX	CORE RESIN POT-SET	CORE RESIN GPM	CORE WAX
25	8:05	7/16	85	48	65	999	4.87	948	702	1.268	743
	8:40	7/16	85	43	55	999	4.87	948	702	1.268	743
	9:15	7/16	85	43	45	999	4.86	948	202	1.228	743
	9:45	7/16	85	40	35	999	4.87	948	202	1.228	743
	10:20	7/16	84	42	25	999	4.85	948	702	1278	743
	11:10	7/16		55	50	999	4.85	948	702	1289	783
	11:40	7/16		64	63	~~999~~	~~4.85~~	~~948~~	~~702~~	~~1382~~	~~783~~
	1:10	7/16		F	77	999	4.85	948	752	1382	283
	205	7/16	82	F	F	999	4.84	948	702	1228	743
	3:00	7/16	84	F	F	999	4.84	948	702	1228	743
	4:45	7/16	84	70	F	999	4.84	948	202	1228	743
	5:00	7/16	84	78	F	999	4.82	948	702	1278	743
	5:35	7/16	84	F	70	999	4.72	948	702	1268	743
	6:50	7/16	84	70	F	999	4.83	948	702	1278	743
Tes	7:20	7/16	84	FW	FW	999	4.84	948	702	1.278	743
	8:30	7/16	84	FW	FW	999	4.85	948	702	1.278	743
	9:30	7/16	84	65	70	999	4.85	948	702	1.278	743
	11:10	7/16	94	70	70						
	11:55	7/16	94	73	72						
	1:00	19/32	68	FW	80						
	1:25	19/32	68	FW	FW						
	2:00	1/2	82	FW	FW						
	3:00	1/2	82	70	67						
	4:00	1/2	82	70	65						
	4:30	1/2	82	68	68						
	5:30	15/32	81	FW	74						
	6:45	15/32	81	78	74						
7-26	7:15	15/32	81	68	70						
	7:30	15/32	81	63	65						
	7:15	15/32	81	60	61						
	8:50	15/32	81	46	50	914	4.56	256	707	1293	820
	9:25	15/32	81	40	40						

LOUISIANA-PACIFIC
Sagola, Michigan

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APPENDIX J

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, 1995). 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-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. The sampling module also houses the impinger case and a Drierite filled column. The sampling module is connected by means of an umbilical cord to the control module. The control module 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 are collected as follows: The sample gas is drawn through the sampling probe isokinetically and passed through a 4-inch diameter Gelman Type A/E glass fiber filter where particulates are removed. The sample gas is then passed through an ice-cooled impinger train and a desiccant-packed column which absorbs remaining moisture. The sample gas then passes through a vacuum pump followed by a dry test gas meter. The gas meter integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gasmeter provides real time 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 test point maintaining isokinetic sampling conditions. Nomographs are used for rapid determination of the sampling rate.

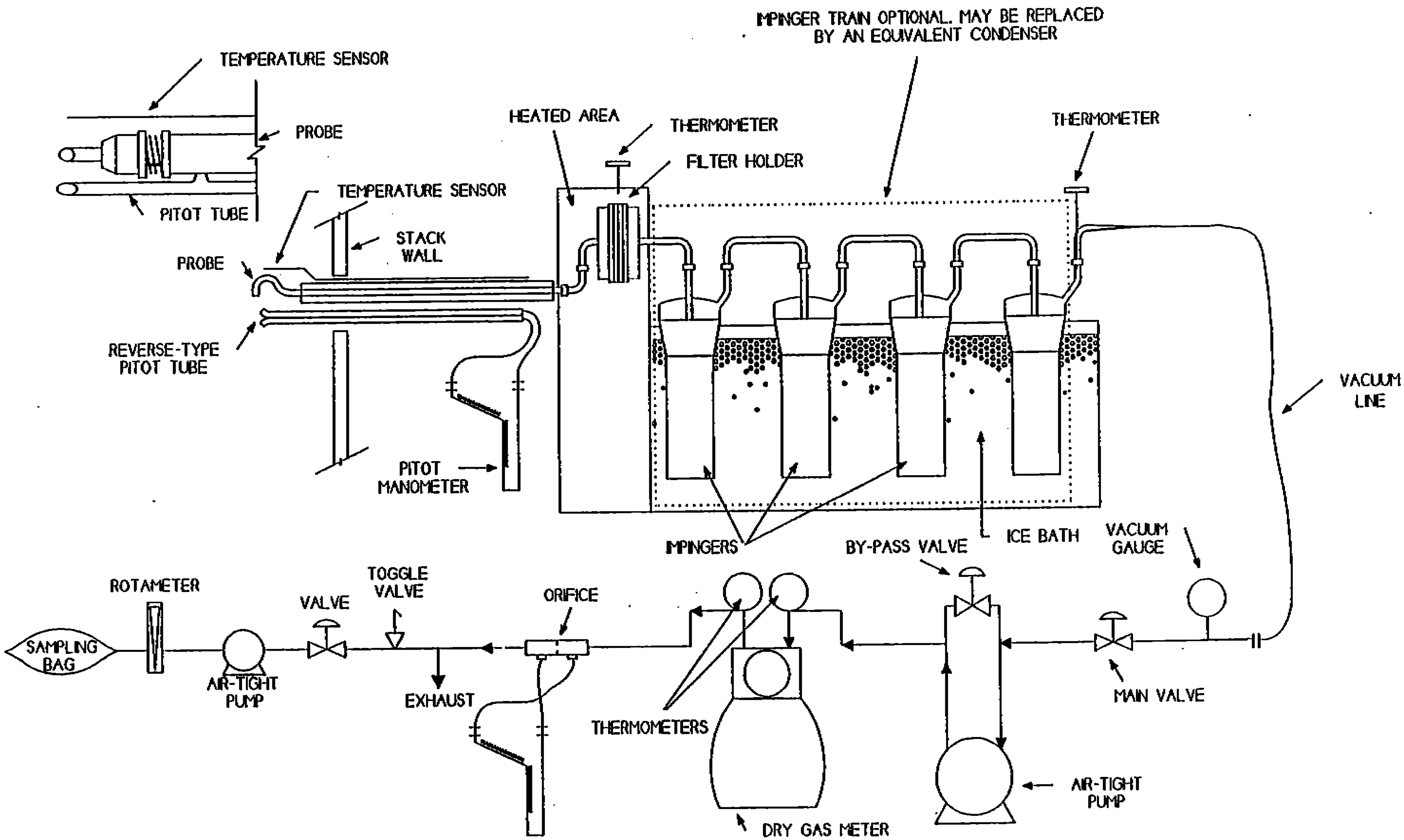
Particulate Loading and Emission Rates

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).

Interpoll Laboratories
(612) 786-6020

PARTICULATE SAMPLING TRAIN



PARTRAN2

Method 3A——Determination of Oxygen and Carbon Dioxide Concentrations in Emissions From Stationary Sources (Instrumental Analyzer Procedure)

1. Applicability and Principle

1.1 **Applicability.** This method is applicable to the determination of oxygen (O_2) and carbon dioxide (CO_2) concentrations in emissions from stationary sources only when specified within the regulations.

1.2 **Principle.** A sample is continuously extracted from the effluent stream: a portion of the sample stream is conveyed to an instrumental analyzer(s) for determination of O_2 and CO_2 concentration(s). 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, except that the span of the monitoring system shall be selected such that the average O_2 or CO_2 concentration is not less than 20 percent of the span.

3. Definitions

3.1 **Measurement System.** The total equipment required for the determination of the O_2 or CO_2 concentration. The measurement system consists of the same major subsystems as defined in Method 6C, Sections 3.1.1, 3.1.2, and 3.1.3.

3.2 Span, Calibration Gas, Analyzer Calibration Error, Sampling System Bias, Zero Drift, Calibration Drift, Response Time, and Calibration Curve. Same as Method 6C, Sections 3.2 through 3.8, and 3.10.

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 O_2 or CO_2 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.** A leak-free probe, of sufficient length to traverse the sample points.

5.1.2 **Sample Line.** Tubing, to transport the sample gas from the probe to the moisture removal system. A heated sample line is not required for systems that measure the O_2 or CO_2 concentration on a dry basis, or transport dry gases.

5.1.3 Sample Transport Line, Calibration Value Assembly, Moisture Removal System, Particulate Filter, Sample Pump, Sample Flow Rate Control, Sample Gas Manifold, and Data Recorder. Same as Method 6C, Sections 5.1.3 through 5.1.9, and 5.1.11, except that the requirements to use stainless steel, Teflon, and nonreactive glass filters do not apply.

5.1.4 **Gas Analyzer.** An analyzer to determine continuously the O_2 or CO_2 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. The requirements for measuring and controlling the analyzer flow rate are not applicable if data are presented that demonstrate the analyzer is insensitive to flow variations over the range encountered during the test.

5.2 **Calibration Gases.** The calibration gases for CO_2 analyzers shall be CO_2 in N_2 or CO_2 in air. Alternatively, CO_2/SO_2, O_2/SO_2, or $O_2/CO_2/SO_2$ gas mixtures in N_2 may be used. Three calibration gases, as specified Section 5.3.1 through 5.3.3 of Method 6C, shall be used. For O_2 monitors that cannot analyze zero gas, a calibration gas concentration equivalent to less than 10 percent of the span may be used in place of zero gas.

6. Measurement System Performance Test Procedures

Perform the following procedures before measurement of emissions (Section 7).

6.1 **Calibration Concentration Verification.** Follow Section 6.1 of Method 6C, except if calibration gas analysis is required, use Method 3 and change the acceptance criteria for agreement among Method 3 results to 5 percent (or 0.2 percent by volume, 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 type of gas detector). Conduct the interference response in accordance with Section 5.4 of Method 20.

6.3 Measurement System Preparation, Analyzer Calibration Error, and Sampling System Bias Check. Follow Sections 6.2 through 6.4 of Method 6C.

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 3.

7.2 **Sample Collection.** Position the sampling probe at the first measurement point, and begin sampling at the same rate as used during the sampling system bias check. Maintain constant rate sampling (i.e., ± 10 percent) during the entire run. The sampling time per run shall be the same as for tests conducted using Method 3 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. Quality Control Procedures

The following quality control procedures are recommended when the results of this method are used for an emission rate correction factor, or excess air determination. The tester should select one of the following options for validating measurement results:

8.1 If both O_2 and CO_2 are measured using Method 3A, the procedures described in Section 4.4 of Method 3 should be followed to validate the O_2 and CO_2 measurement results.

8.2 If only O_2 is measured using Method 3A, measurements of the sample stream CO_2 concentration should be obtained at the sample by-pass vent discharge using an Orsat or Fyrite analyzer, or equivalent. Duplicate samples should be obtained concurrent with at least one run. Average the duplicate Orsat or Fyrite analysis results for each run. Use the average CO_2 values for comparison with the O_2 measurements in accordance with the procedures described in Section 4.4 of Method 3.

8.3 If only CO_2 is measured using Method 3A, concurrent measurements of the sample stream CO_2 concentration should be obtained using an Orsat or Fyrite analyzer as described in Section 8.2. For each run, differences greater than 0.5 percent between the Method 3A results and the average of the duplicate Fyrite analysis should be investigated.

9. Emission Calculation

For all CO_2 analyzers, and for O_2 analyzers that can be calibrated with zero gas, follow Section 8 of Method 6C, except express all concentrations as percent, rather than ppm.

For O_2 analyzers that use a low-level calibration gas in place of a zero gas, calculate the effluent gas concentration using Equation 3A-1.

$$C_{gas} = \frac{C_{ma} - C_{oa}}{C_m - C_o} - (\overline{C} - C_m) + C_{ma} \quad Eq.\ 3A-1$$

Where:

C_{gas} = Effluent gas concentration, dry basis, percent.
C_{ma} = Actual concentration of the upscale calibration gas, percent.
C_{oa} = Actual concentration of the low-level calibration gas, percent.
C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, percent.
C_o = Average of initial and final system calibration bias check responses for the low-level gas, percent.

$\overline{C}$ = Average gas concentration indicated by the gas analyzer, dry basis, percent.

10. Bibliography

Same as bibliography of Method 6C.

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

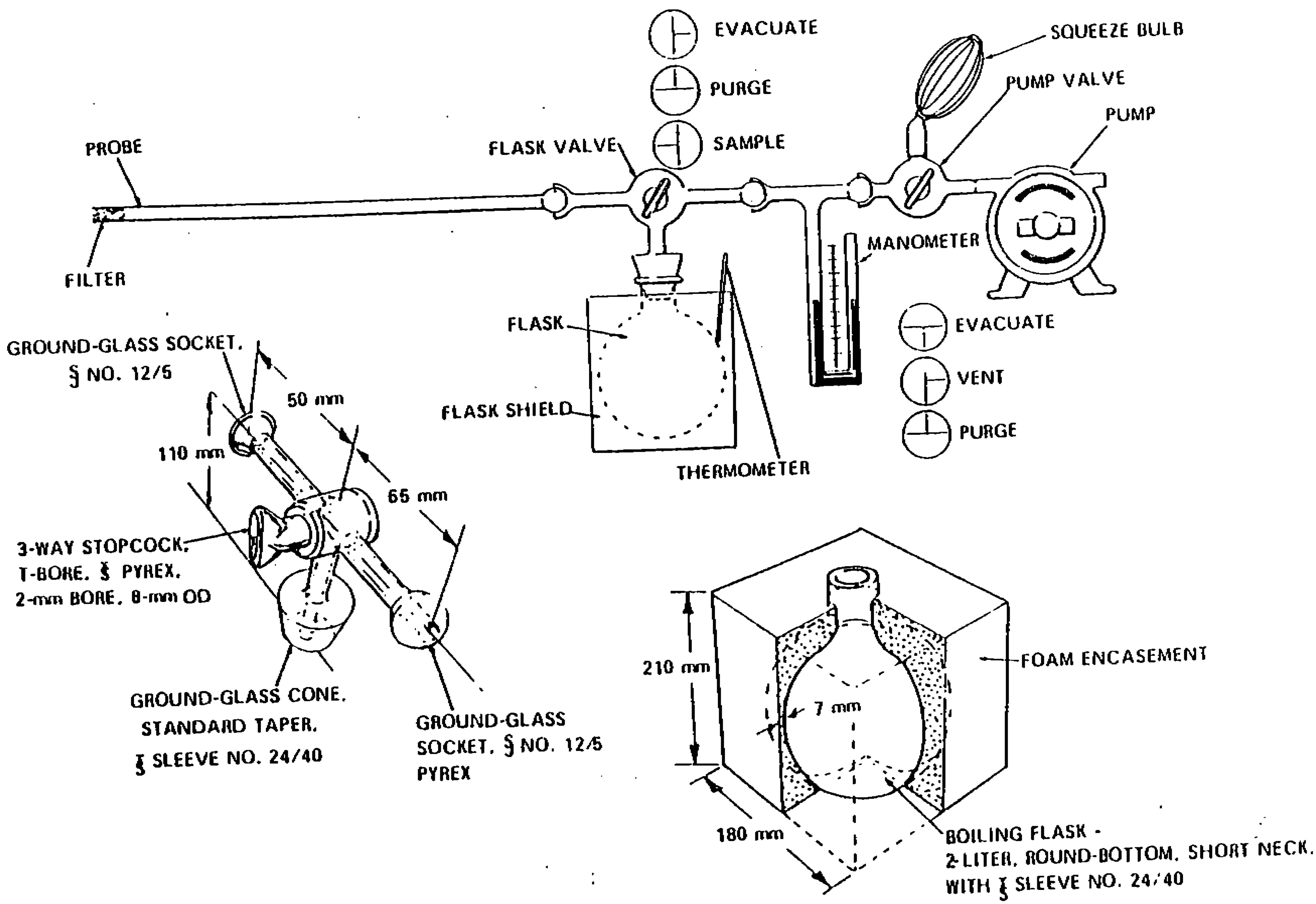
Gas compositions were determined as per Method 3 by Orsat analysis of an integrated gas sample collected from the stack during the oxides of nitrogen determinations. Standard commercially prepared solutions were used in the Orsat analyzer (sat. KOH for carbon dioxide and reduced methylene blue for oxygen).

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.

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 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).

5.2.6 **Flexible Bag.** Tedlar, or equivalent, with a capacity of 60 to 90 liters (2 to 3 ft^3). 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.

|_See_CFR_paper_publication_for_illustration_18A

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.

|_See_CFR_paper_publication_for_illustration_19A

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.

CCO stack = CCO NDIR(1-Fco2)   Eq. 10-1

Where:

CCO stack = Concentration of CO in stack, PPM by volume (dry basis).
CCO NDIR = Concentration of CO measured by NDIR analyzer, PPM by volume (dry basis).
FCO 2 = Volume fraction of CO_2 in sample, i.e., percent CO_2 from Orsat analysis divided by 100.

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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

Agenda

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.

Accuracy——The degree of agreement between a measured value and the true value; usually expressed as ± percent of full scale.
Time to 90 percent response——The time interval from a step change in the input concentration at the instrument inlet to a reading of 90 percent of the ultimate recorded concentration.
Rise Time (90 percent)——The interval between initial response time and time to 90 percent response after a step increase in the inlet concentration.
Fall Time (90 percent)——The interval between initial response time and time to 90 percent response after a step decrease in the inlet concentration.
Zero Drift——The change in instrument output over a stated time period, usually 24 hours, of unadjusted continuous operation when the input concentration is zero; usually expressed as percent full scale.
Span Drift——The change in instrument output over a stated time period, usually 24 hours, of unadjusted continuous operation when the input concentration is a stated upscale value; usually expressed as percent full scale.
Precision——The degree of agreement between repeated measurements of the same concentration, expressed as the average deviation of the single results from the mean.
Noise——Spontaneous deviations from a mean output not caused by input concentration changes.
Linearity——The maximum deviation between an actual instrument reading and the reading predicted by a straight line drawn between upper and lower calibration points.

Method 10A—Determination of Carbon Monoxide Emissions in Certifying Continuous Emission Monitoring Systems at Petroleum Refineries

1. Applicability and Principle

1.1 **Applicability.** This method applies to the measurement of carbon monoxide (CO) at petroleum refineries. This method serves as the reference method in the relative accuracy test for nondispersive infrared (NDIR) CO continuous emission monitoring systems (CEMS's) that are required to be installed in petroleum refineries on fluid catalytic cracking unit catalyst regenerators [40 CFR Part 60.105(a)(2)].

1.2 **Principle.** An integrated gas sample is extracted from the stack, passed through an alkaline permanganate solution to remove sulfur and nitrogen oxides, and collected in a Tedlar bag. The CO concentration in the sample is measured spectrophotometrically using the reaction of CO with p-sulfaminobenzoic acid.

1.3. **Range and Sensitivity.**

1.3.1 **Range.** Approximately 3 to 1800 PPM CO. Samples having concentrations below 400 PPM are analyzed at 425 nm, and samples having concentrations above 400 PPM are analyzed at 600 nm.

1.3.2 **Sensitivity.** The detection limit is 3 PPM based on three times the standard deviation of the mean reagent blank values.

Method 25A-Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

1. Applicability and Principle

1.1 **Applicability.** This method applies to the measurement of total gaseous organic concentration of vapors consisting primarily of alkanes, alkenes, and/or arenes (aromatic hydrocarbons). The concentration is expressed in terms of propane (or other appropriate organic calibration gas) or in terms of carbon.

1.2 **Principle.** A gas sample is extracted from the source through a heated sample line, if necessary, and glass fiber filter to a flame ionization analyzer (FIA). Results are reported as volume concentration equivalents of the calibration gas or as carbon equivalents.

2. Definitions

2.1 **Measurement Systems.** The total equipment required for the determination of the gas concentration. The system consists of the following major subsystems:

2.1.1 **Sample Interface.** That portion of the system that is used for one or more of the following: sample acquisition, sample transportation, sample conditioning, or protection of the analyzer from the effects of the stack effluent.

2.1.2 **Organic Analyzer.** That portion of the system that senses organic concentration and generates an output proportional to the gas concentration.

2.2 **Span Value.** The upper limit of a gas concentration measurement range that is specified for affected source categories in the applicable part of the regulations. The span value is established in the applicable regulation and is usually 1.5 to 2.5 times the applicable emission limit. If no span value is provided, use a span value equivalent to 1.5 to 2.5 times the expected concentration. For convenience, the span value should correspond to 100 percent of the recorder scale.

2.3 **Calibration Gas.** A known concentration of a gas in an appropriate diluent gas.

2.4 **Zero Drift.** The difference in the measurement system response to a zero level calibration gas before and after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

2.5 **Calibration drift.** The difference in the measurement system response to a midlevel calibration gas before and after a stated period of operation during which no unscheduled maintenance, repair or adjustment took place.

2.6 **Response Time.** The time interval from a step change in pollutant concentration at the inlet to the emission measurement system to the time at which 95 percent of the corresponding final value is reached as displayed on the recorder.

2.7 **Calibration Error.** The difference between the gas concentration indicated by the measurement system and the known concentration of the calibration gas.

3. Apparatus

A schematic of an acceptable measurement system is shown in Figure 25A-1. The essential components of the measurement system are described below:

3.1 **Organic Concentration Analyzer.** A flame ionization analyzer (FIA) capable of meeting or exceeding the specifications in this method.

3.2 **Sample Probe.** Stainless steel, or equivalent, three-hole rake type. Sample holes shall be 4 mm in diameter or smaller and located at 16.7, 50, and 83.3 percent of the equivalent stack diameter. Alternatively, a single opening probe may be used so that a gas sample is collected from the centrally located 10 percent area of the stack cross-section.

3.3 **Sample Line.** Stainless steel or Teflon * tubing to transport the sample gas to the analyzer. The sample line should be heated, if necessary, to prevent condensation in the line.

3.4 **Calibration Valve Assembly.** A three way valve assembly to direct the zero and calibration gases to the analyzers is recommended. Other methods, such as quick-connect lines, to route calibration gas to the analyzers are applicable.

3.5 **Particulate Filter.** An in-stack or an out-of-stack glass fiber filter is recommended if exhaust gas particulate loading is significant. An out-of-stack filter should be heated to prevent any condensation.

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* Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

3.6 **Recorder.** A strip-chart recorder, analog computer, or digital recorder for recording measurement data. The minimum data recording requirement is one measurement value per minute, Note: This method is often applied in highly explosive areas. Caution and care should be exercised in choice of equipment and installation.

4. Calibration and Other Gases.

Gases used for calibrations, fuel, and combustion air (if required) are contained in compressed gas cylinders. Preparation of calibration gases shall be done according to the procedure in Protocol No. 1, listed in Citation 2 of Bibliography. Additionally, the manufacturer of the cylinder should provide a recommended shelf life for each calibration gas cylinder over which the concentration does not change more than ±2 percent from the certified value. For calibration gas values not generally available (i.e., organics between 1 and 10 percent by volume), alternative methods for preparing calibration gas mixtures, such as dilution systems, may be used with prior approval of the Administrator.

Calibration gases usually consist of propane in air or nitrogen and are determined in terms of the span value. Organic compounds other than propane can be used following the above guidelines and making the appropriate corrections for response factor.

4.1 **Fuel.** A 40 percent H_2/60 percent N_2 gas mixture is recommended to avoid an oxygen synergism effect that reportedly occurs when oxygen concentration varies significantly from a mean value.

4.2 **Zero Gas.** High purity air with less than 0.1 parts per million by volume (PPMv) of organic material (propane or carbon equivalent) or less than 0.1 percent of the span value, whichever is greater.

4.3 **Low-level Calibration Gas.** An organic calibration gas with a concentration equivalent to 25 to 35 percent of the applicable span value.

4.4 **Mid-level Calibration Gas.** An organic calibration gas with a concentration equivalent to 45 to 55 percent of the applicable span value.

4.5 **High-level Calibration Gas.** An organic calibration gas with a concentration equivalent to 80 to 90 percent of the applicable span value.

5. Measurement System Performance Specifications

5.1 **Zero Drift.** Less than ±3 percent of the span value.

5.2 **Calibration Drift.** Less than ±3 percent of span value.

5.3 **Calibration Error.** Less than ±5 percent of the calibration gas value.

6. Pretest Preparations

6.1 **Selection of Sampling Site.** The location of the sampling site is generally specified by the applicable regulation or purpose of the test; i.e., exhaust stack, inlet line, etc. The sample port shall be located at least 1.5 meters or 2 equivalent diameters upstream of the gas discharge to the atmosphere.

6.2 **Location of Sample Probe.** Install the sample probe so that the probe is centrally located in the stack, pipe, or duct and is sealed tightly at the stack port connection.

6.3 **Measurement System Preparation.** Prior to the emission test, assemble the measurement system following the manufacturer's written instructions in preparing the sample interface and the organic analyzer. Make the system operable.

FIA equipment can be calibrated for almost any range of total organics concentrations. For high concentrations of organics (>1.0 percent by volume as propane) modifications to most commonly available analyzers are necessary. One accepted method of equipment modification is to decrease the size of the sample to the analyzer through the use of a smaller diameter sample capillary. Direct and continuous measurement of organic concentration is a necessary consideration when determining any modification design.

6.4 **Calibration Error Test.** Immediately prior to the test series, (within 2 hours of the start of the test) introduce zero gas and high-level calibration gas at the calibration valve assembly. Adjust the analyzer output to the appropriate levels, if necessary. Calculate the predicted response for the low-level and mid-level gases based on a linear response line between the zero and high-level responses. Then introduce low-level and mid-level calibration gases successively to the measurement system. Record the analyzer responses for low-level and mid-level calibration gases and determine the differences between the measurement system responses and the predicted responses. These differences must be less than 5 percent of the respective calibration gas value. If not, the measurement system is not acceptable and must be replaced or repaired prior to testing. No adjustments to the measurement system shall be conducted after the calibration and before the drift check (Section 7.3). If adjustments are necessary before the completion of the test series, perform the drift checks prior to the required adjustments and repeat the calibration following the adjustments. If multiple electronic ranges are to be used, each additional range must be checked with a mid-level calibration gas to verify the multiplication factor.

6.5 **Response Time Test.** Introduce Zero gas into the measurement system at the calibration valve assembly. When the system output has stabilized, switch quickly to the high-level calibration gas. Record the time from the concentration change to the measurement system response equivalent to 95 percent of the step change. Repeat the test three times and average the results.

7. Emission Measurement Test Procedure

7.1 **Organic Measurement.** Begin sampling at the start of the test period, recording time and any required process information as appropriate. In particular, note on the recording chart periods of process interruption or cyclic operation.

7.2 **Drift Determination.** Immediately following the completion of the test period and hourly during the test period, reintroduce the zero and mid-level calibration gases, one at a time, to the measurement system at the calibration valve assembly. (Make no adjustments to the measurement system until after both the zero and calibration drift checks are made.) Record the analyzer response. If the drift values exceed the specified limits, invalidate the test results preceding the check and repeat the test following corrections to the measurement system. Alternatively, recalibrate the test measurement system as in Section 6.4 and report the results using both sets of calibration data (i.e., data determined prior to the test period and data determined following the test period).

8. Organic Concentration calculations

Determine the average organic concentration in terms of PPMv as propane or other calibration gas. The average shall be determined by the integration of the output recording over the period specified in the applicable regulation. If results are required in terms of PPMv as carbon, adjust measured concentrations using Equation 25A-1.

$$C_c = K\, C_{meas} \qquad \text{Eq. 25A-1}$$

Where:

C_c = Organic concentration as carbon, PPMv.
C_{meas} = Organic concentration as measured, PPMv.
K = Carbon equivalent correction factor.
K=2 for ethane.
K=3 for propane.
K=4 for butane.
K=Appropriate response factor for other organic calibration gases.

9. Bibliography

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3. Gasoline Vapor Emission Laboratory Evaluation-Part 2. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Research Triangle Park, NC. EMB Report No. 75-GAS-6. August 1975.

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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 6.4×10^{-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 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 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 <u>Leak-Check Procedures</u>:

6.5.1 <u>Pre-test Leak Check</u>:

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.

<u>NOTE</u>: 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 <u>not</u> 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 <u>Leak Checks During Sampling Runs</u>:

6.5.2.1 If, during the sampling run, a component change (i.e., impinger) becomes 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 <u>Preparation</u>:

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 curing 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:

Max $FORM_i$ Mass =

$$[(WF) (FORM_i\ conc) (100 - \%DRE)] / 100$$

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.

$$[LDL_{FORM} \times 10] / [FORM_{i\ conc}] = V_{tbc}$$

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 Sampling: See EPA Manual 600/4-77-027b for Method 5 quality control.

11.2 Analysis: 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 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, 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 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 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.

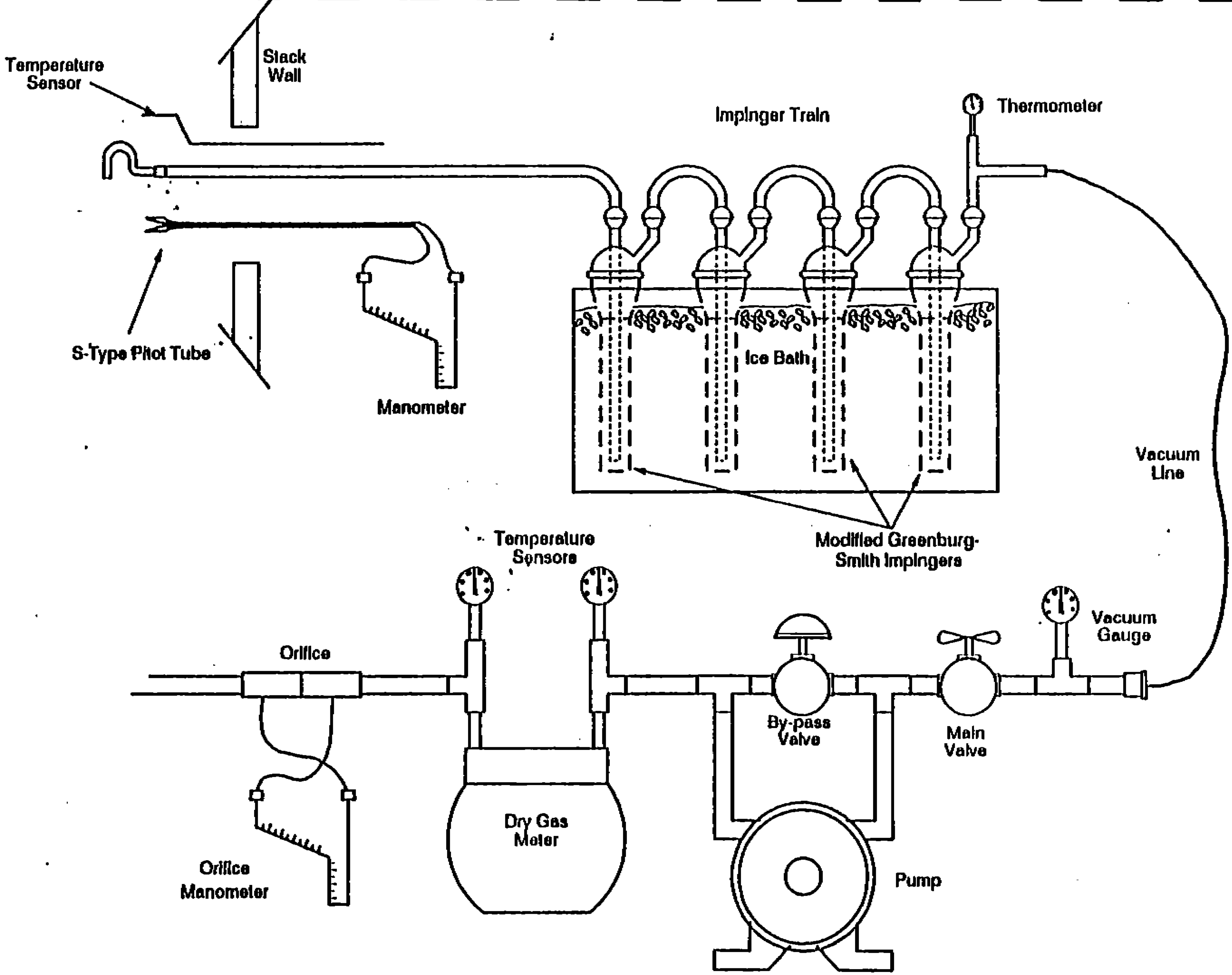
12.0 METHOD PERFORMANCE

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

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 Heating 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: Inlet °C(°F)	Gas Sample Temp. at Dry Gas Meter: Outlet °C(°F)	Filter Holder Temperature °C(°F)	Temperature of Gas Leaving Last Impinger °C(°F)
Total							Avg.	Avg.		
Average										

3-04346R

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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FIELD TEST OF A GENERIC METHOD FOR SAMPLING AND ANALYSIS OF ISOCYANATES

Interim Report
(Work Assignment 55)

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DISCLAIMER

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EXECUTIVE SUMMARY

Isocyanates are used extensively in the production of polyurethane materials such as flexible foam, enamel wire coatings, paint formulations and in binders for the pressed board industry. Because of their widespread use and known adverse physiological effects, several isocyanates have been listed in Title III of the Clean Air Act Amendments of 1990. The isocyanates of interest are: 2,4-toluene diisocyanate (TDI), methylene diphenyl diisocyanate (MDI), 1,6-hexamethylene diisocyanate (HDI) and methyl isocyanate (MI). Previously, no validated sampling and analytical methodology for these compounds relative to stationary sources existed.

The field validation study presented in this report is a culmination of laboratory investigations, performed under previous work assignments, which were designed to develop and evaluate a viable approach for the determination of isocyanate emissions from stationary sources. After the successful completion of the laboratory studies, the sampling and analysis approach was formulated and a field validation test was initiated. At the direction of the EPA, TDI was selected as the primary analyte.

The test site selected was a flexible foam manufacturing facility in High Point, North Carolina, which used TDI in the manufacturing process. The approximate level of TDI in the emission stream was determined by the analysis of samples collected during a presurvey. A sampling scheme was then designed to ensure the collection of sufficient samples to yield statistically valid data. Following the EPA Method 301 protocol, quadruplicate trains (QUAD) were operated simultaneously with four co-located probes. Two of the trains were spiked with TDI and two were unspiked. Samples from eight QUAD runs (minimum of six valid runs required by Method 301) were returned to the laboratory and analyzed according to the analytical procedure developed in laboratory studies. These data were statistically evaluated following Method 301 protocol to determine the performance of the method relative to bias and precision. These results are summarized in the following table. The precision for both the spiked and unspiked trains was less than 5% RSD, which is well within the precision criteria (% RSD <50)

Method Validation Statistical Summary

Precision[a]	
% RSD for Spiked Samples % RSD for Unspiked Samples	3.55[b] 4.72[b]
Accuracy[a]	
Bias: Significant? Correction Factor	-295 μg No 1.0[c]
Recovery[a]	
Amount Spiked (as TDI) Average Percent Recovered	7828 μg 95

[a]Results are based on the average of seven QUAD runs (14 spiked trains and 14 unspiked trains). TDI was present in the stack emissions and was therefore collected as background in the unspiked trains as well as in the spiked trains.

[b]EPA Method 301 requires the precision to be <50% RSD for the method to be acceptable.

[c]EPA Method 301 requires the calculated Correction Factor to be between 0.7 and 1.3 for the method to be acceptable.

for an acceptable method as tested. Using the data from all eight runs, the bias was found to be significant at the 95% level of confidence thus requiring the use of a correction factor of 1.053. Using the data from only seven runs (eliminating run number eight due to a questionable leak check for one of the trains) the bias was not significant and therefore did not require the calculation of a correction factor. In either case, the method was well within the bias acceptance criteria (correction factor between 0.7 and 1.3) for an acceptable method as tested.

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1.0 INTRODUCTION

Sampling and analytical methods for a particular analyte or group of analytes can be evaluated and validated by demonstrating their performance in field tests, thereby establishing the precision and bias of the methods experimentally. Few methods have been fully validated for sampling and analyzing the organic compounds listed in Title III of the Clean Air Act Amendments of 1990. For some analytes, methods have been validated for sample analysis, but not for sample collection. Full validation for both sampling and analytical methods, for both field and laboratory operations, is available for fewer than 10 percent of the analytes listed in Title III of the Clean Air Act Amendments at any source category. Field validation may be performed by side-by-side comparison of a candidate method to a validated method to establish comparable performance for the same analytes in the same matrix (same source category). Another procedure for validation of a method is to spike known quantities of analytes into the collection apparatus in the field so that the precision and bias of the method can be demonstrated from sample collection through analysis.

EPA, under the authority of Title III of the Clean Air Act Amendments (CAAA) of 1990, requires the identification and validation of sampling and analytical methods for the isocyanate compounds which are listed among the 189 hazardous air pollutants identified in Title III. These isocyanate compounds are listed in Table 1-1. Development of sampling and analytical methods for these four compounds was accomplished under Work Assignments 11, 21, and 40 on EPA Contract No. 68-D1-0010. At the direction of EPA, initial efforts were directed to the measurement of 2,4-toluene diisocyanate (TDI) emissions.

The objective of this work assignment was to validate the isocyanate sampling and analytical test method through field testing at an operating stationary source. The method was validated by collecting flue gas samples for the analysis of 2,4-TDI, and evaluating the data for bias and precision. EPA Method 301, "Field Validation of Pollutant Measurement Methods from Various Waste Media," was used as

Table 1-1

Isocyanates Listed in the Clean Air Act Amendments of 1990

Hexamethylene-1,6-diisocyanate (HDI)
2,4-Toluene diisocyanate (TDI)[a]
Methylene diphenyl diiocyanate (MDI)
Methyl isocyanate (MI)

[a]The 2,6 TDI isomer may also be present but is not listed in the CAAA.

a model for the validation protocol. Analyte spiking was used with quadruplicate sampling trains to generate the required data. The field validation was performed at an industrial facility which manufactures flexible foam products. Only two of the quadruplicate trains were spiked for each run. The two unspiked trains were used to establish the background level of target compound in the stack gas.

The sampling method utilizes a Method 5-type sampling train, which operates with a solution of 1-(2-pyridyl) piperazine and toluene in the impingers. Stack gas is extracted from the source through a heated probe and drawn through the impingers. TDI present in the stack gas reacts with the piperazine to form an isocyanate derivative. The quantity of isocyanate is determined by solvent exchange of the toluene solution with acetonitrile followed by high pressure liquid chromatographic (HPLC) analysis.

This report discusses the details of the field validation study. Section 2.0, Conclusions and Recommendations, summarizes the results and provides recommendations for future work. Sections 3.0 and 4.0 provide details of the sampling and analysis procedures respectively. Section 5.0 is a detailed discussion of the procedures, calculations and quality control.

2.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results presented in Section 6.0 of this report, the following conclusions can be made concerning the validity of the method as tested under the conditions described in this report:

- The calculated values for precision (%RSD) for both the spiked and unspiked trains, 3.55 and 4.72 respectively, are both well within the acceptance criteria of less than 50% RSD found in Section 6.3 of the EPA Method 301. Therefore, the method as tested at the source category described meets the precision requirements;

- The method bias, at the concentration levels tested, was found to be significantly different from zero at the 95% level of confidence when the data from all eight runs (minimum of six runs required) were used in the calculations. A correction factor of 1.053 would be required if all eight runs are included in the bias calculation. Good technical reasons exist for excluding one of eight QUAD runs. If this run is eliminated, no bias correction is required. In either case the correction factor is well within the acceptance criteria of 0.7 to 1.3 found in Section 1.2 of the EPA Method 301. Therefore, the method as tested at the source category described meets the bias and correction factor requirements; and

- The method as tested is sufficiently robust to allow testing at sources similar to the source tested in this study where the stack gas moisture is less than 1% by volume, the stack temperature is less than 30 degrees C and the presence of other compounds that may interfere with the analysis are minimal.

Recommendations for future testing and validation of the method for the sampling and analysis of isocyanates include the following:

- Identify a source for testing that has more than one isocyanate present in the stack gas;

- Spike as many of the four CAAA target isocyanates as possible into the train before sampling in order to gain as much information as possible from the field test; and

- Design the condenser between the first and second impinger of the train to more efficiently reduce the loss of toluene from the first impinger and minimize compound breakthrough due entrained aerosols.

3.0 FIELD TEST

The objective of this program was to perform a field test to establish the bias and precision of a sampling and analytical method for isocyanate compounds listed in Title III of the Clean Air Act Amendments of 1990. The method evaluation in this test series resulted from extensive literature reviews, industry consultation and laboratory development. To achieve the test objective, an industrial source with known emissions of TDI was selected as a field test site. Factors in the site selection were easy access, ample space for the quadruple sampling trains and proximity to Radian's office and laboratory in Research Triangle Park, North Carolina.

3.1 Site Description

The field validation test was performed at a flexible foam production plant located in High Point, North Carolina. In the manufacturing process starting materials (TDI, water, a polyether resin, methylene chloride, an amine catalyst, and coloring additives) are blended and continuously fed onto a conveyer belt. The TDI reacts with water and releases CO_2, which causes foaming in the resin material. Dichloromethane (DCM) can be added as a supplemental "blowing" or foaming agent. The heat from the reaction of TDI and water causes the DCM to vaporize, resulting in increased foaming. The density of the foam is controlled by the amount of TDI, water and DCM added. The foaming action continues as the material proceeds down the conveyer belt. Finished product is then allowed to cure and degas for 24 to 48 hours.

3.2 Sampling Location

Figure 3-1 presents a schematic view of the sampling location. Three induced draft (ID) fans are used to exhaust TDI and DCM vapors from the production process through three separate uninsulated sheet metal ducts that extend through the roof. Two of the ducts are connected by a 30-foot horizontal duct, 34 inches in diameter, which then extends vertically to a height of 25 feet above the roof top. A 6 inch

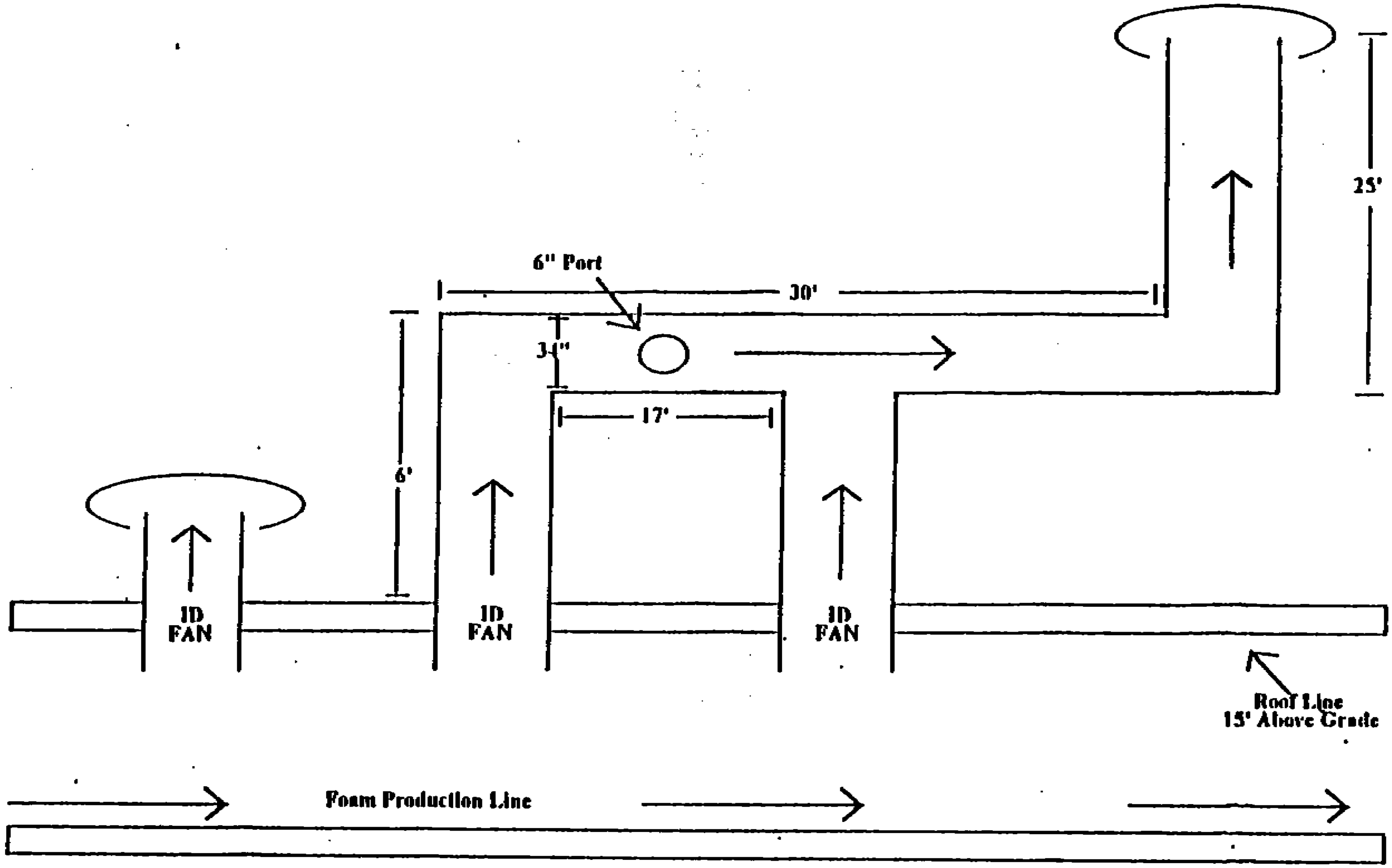


Figure 3-1. Sample Location

diameter sampling port is located in the horizontal duct midway between vertical ducts number 2 and 3, approximately 5 feet above the roof level. The roof level is approximately 15 feet above the ground.

A recovery trailer was located on the ground immediately in front of the sampling area, allowing easy communication between the sampling crew and recovery area. Two-way radio communication between the facility production personnel and the sampling crew allowed coordination between production startup and the start of each sampling run.

3.3 Test Schedule

The recovery trailer and test equipment were mobilized on Saturday, February 20, 1993. Equipment setup took place Saturday afternoon and Sunday, and testing began Monday morning.

The sampling schedule is shown in Table 3-1. Eight runs were completed, which included two extra runs above the required minimum of six.

3.4 Sample Collection

3.4.1 Quad Probe

Sampling was performed by withdrawing stack gas from a single port in the stack through a quad probe, then directing the sampled gas simultaneously to four independently operated sampling trains. The quad probe contains four similar heated sampling probes that were inserted into the stack as one unit, as shown in Figure 3-2. The front end of the quad probe was positioned in the center of the stack and remained

Table 3-1

Test Schedule

Run	Date	Start Time	Stop Time
1	2-22-93	1215	1300
2	2-22-93	1330	1410
3	2-23-93	0945	1085
4	2-23-93	1335	1415
5	2-24-93	1010	1110
6	2-24-93	1335	1420
7	2-25-93	1215	1255
8	2-25-93	1315	1355

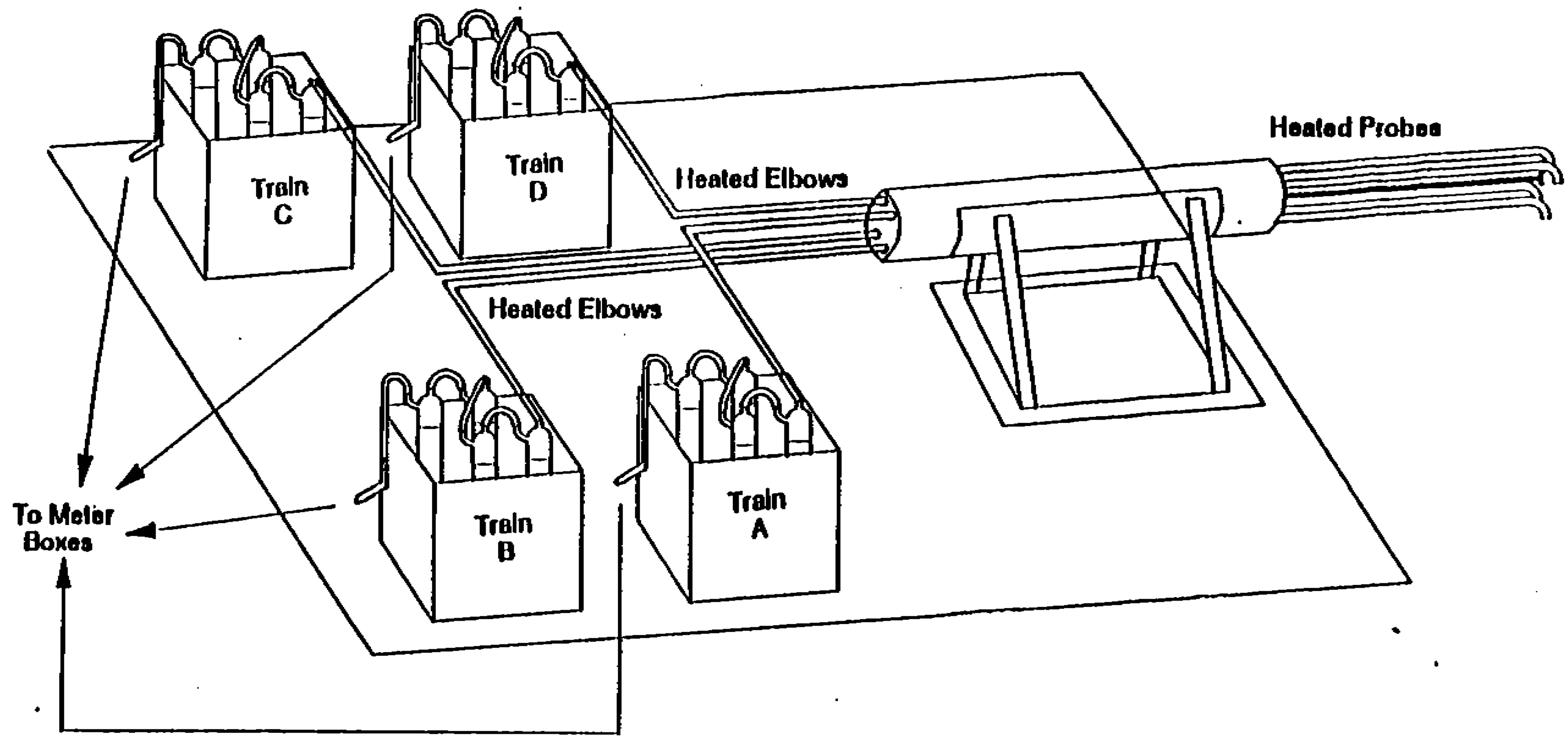


Figure 3-2. Schematic of Quad Train Setup

in that location during each test. The stack was not traversed nor were stack gas velocity measurements made, because determination of the true concentration and emission rate of the target compound in the stack gas was not required to meet the objectives of this program.

Method 301 of 40 CFR Part 63 describes field validation procedures and details the criteria for the quadruple sampling probe tip arrangement. This method requires the inside edge of sampling probe tips to be situated in a 6.0 cm x 6.0 cm square area. The area encompassed by the probe tip arrangement should occupy less than 5% of the stack cross-sectional area. The cross-sectional area of the probe tip arrangement used in this test was 5.8 square inches as measured from the probe/nozzle centerlines. This area is less than 1% of the stack cross-sectional area of 908 square inches, which satisfies the Method 301 criterion.

3.4.2 Quad-Train Assembly

Four independent sampling trains made up the quad-train assembly. Although four meter boxes were required, the velocity head (ΔP) was determined using only one set of pitot tubes. The sampling trains were identified as Train A, B, C, and D. Two of the four trains were spiked before each run. The spiking compound was added to the first impinger of these trains in the field for bias determination. The sampling train test matrix is given in Table 3-2.

3.5 Sampling Preparation

3.5.1 Glassware Preparation

All glassware used for sampling was thoroughly cleaned prior to use. This included the probe, impingers, all sample bottles and all utensils used during sample recovery. All glassware was washed with hot soapy water, rinsed with hot tap water, rinsed with distilled water and baked in a oven at 300 °C for four hours. The glassware

Table 3-2

Sampling Train Test Matrix

	Train Designation	
Run #	Spiked	Unspiked
1	A, B	C, D
2	C, D	A, B
3	A, B	C, D
4	C, D	A, B
5	A, B	C, D
6	C, D	A, B
7	A, B	C, D
8	C, D	A, B

was then triple-rinsed with HPLC grade acetonitrile, followed by triple-rinsing with HPLC grade toluene. Open ends of glassware were covered with aluminum foil to minimize potential contamination during transportation and set-up.

3.5.2 Preparation of Impinger Absorbing Solution

Historical data available from the host test site facility and data resulting from the collection of preliminary samples by Radian indicated that the concentration of TDI in the process exhaust was 1 ppm or less, depending on the density of foam being produced on any given day. At this concentration, a 30 cubic foot sample size would result in the collection of approximately 7 mg of TDI. Using the reaction stoichiometry of two moles of 1,2-PP per mole of TDI, the piperazine in toluene solution was then prepared at a concentration level three times the calculated minimum needed, or 133 μg/mL. This would provide a total of approximately 40 mg of 1,2-PP in 300 mL of impinger solution in the first impinger available for reaction with TDI. At this concentration, approximately 22 mg of TDI could be collected in the first impinger before the reagent was exhausted. This solution was prepared in the laboratory just prior to use in the field, and was used within 10 days of preparation.

3.5.3 Preparation of TDI Spiking Solution

The TDI spiking solution was prepared at a concentration of 1.5 mg of the derivatized TDI per 1 mL of acetonitrile. Fifteen mL of this spiking solution was spiked into the first impinger of two of the four trains prior to each QUAD run. This spiking scheme resulted in a total spike amount of derivatized TDI of 22.5 mg, which is equivalent to 7.83 mg of underivatized TDI. This is an amount equivalent to the amount of TDI expected to be collected in the train from the stack gas based on presurvey samples. Therefore, the amount present in the two spiked trains was designed to be at least twice the amount present in the two unspiked trains.

3.5.4 Sampling Equipment Preparation

Final sampling train preparations included calibration and leak checking of all the train equipment, including meter boxes, thermocouples, nozzles, pitot tubes, and umbilicals. Reference calibration procedures were followed when available, and the results were properly documented and archived. If a referenced calibration technique for a particular piece of apparatus was not available, then a state-of-the-art technique was used. A discussion of the techniques used to calibrate this equipment is presented below.

S-Type Pitot Tube Calibration

The EPA has specified guidelines concerning the construction and geometry of an acceptable S-Type pitot tube. If the specified design and construction guidelines are met, a pitot tube coefficient of 0.84 can be used. Information pertaining to the design and construction of the Type-S pitot tube is presented in detail in Section 4.1.1 of EPA Document 600/4-77027b. Only S-Type pitot tubes meeting the required EPA specifications were used. Pitot tubes were inspected and documented as meeting EPA specifications prior to field sampling.

Sampling Nozzle Calibration

Glass nozzles were used for sampling. All nozzles were thoroughly cleaned, visually inspected for damage , and calibrated according to the procedure outlined in Section 4.4.2 of EPA Document 600/4-77-027b.

Dry Gas Meter Calibration

Dry gas meters (DGMs) were used in the sample trains to measure the sample volume and sampling rate. All DGMs were calibrated to document the volume correction factor prior to the departure of the equipment to the field. Post-test calibration checks were performed after the equipment was returned to Radian's laboratory. Pre- and post-test calibrations agreed to within 5 percent.

Prior to calibration, a positive pressure leak check of the system was performed using the procedure outlined in Section 4.3.2 of EPA Document 600/4-77-23b. The system was placed under approximately 10 inches of water pressure and an oil manometer was used to determine if the pressure decreased over a one-minute period.

After the sampling console was assembled and leak checked, the pump was allowed to run for 15 minutes to allow the pump and DGM to warm up. The valve was then adjusted to obtain the desired flow rate. For the pre-test calibrations, data were collected at the orifice manometer settings (ΔH) of 0.5, 1.0, 1.5, 2.0, 3.0, and 4.0 inches of water. Gas volumes of 5 ft^3 were used for the two lower orifice settings, and volumes of 10 ft^3 were used for the higher settings. The individual gas meter correction factors (γi) were calculated for each orifice setting and averaged. The method requires that each of the individual correction factors fall within $\pm 2\%$ of the average correction factor or the meter must be cleaned, adjusted, and recalibrated. In addition, Radian requires that the average correction factor be 1.00 $\pm$ 1 percent. For the post-test calibration, the meter was calibrated three times at the average orifice setting and vacuum which were used during the actual test.

Dry gas meter calibrations were performed at Radian's laboratory using an American® wet test meter as an intermediate standard. The intermediate standard is calibrated every six months against the EPA spirometer at EPA's Emission Measurement Laboratory in Research Triangle Park (RTP), North Carolina.

3.5.5 Sampling Operations

Vent gas samples were collected isokinetically from a single sampling point located in the center of the duct. Preliminary information about the stack gas velocity useful in selecting nozzle size and calculating the K-factor was obtained during the pre-site survey. Prior to testing, a leak check of pitot lines was performed according to EPA Method 2. Oxygen (O_2) and carbon dioxide (CO_2) concentrations were ambient levels as determined by EPA Method 3. The stack gas moisture data was measured by the host facility as the relative humidity.

Preparation of Sampling Train

The four sampling trains for each QUAD run were charged and assembled in the recovery trailer. The impinger buckets were marked as Train A, B, C, or D. Tared impingers were used. Approximately 300 mL of the absorbing reagent was transferred to the first impinger and 200 mL to the second impinger. The first impinger of each train was of a Greenburg-Smith design and all remaining impingers were of the modified Greenburg-Smith design. The third impinger was empty, 200 to 300 g of silica gel was placed in the fourth impinger and 400 g of charcoal was placed in the fifth impinger. A water jacketed condenser was placed between the outlet of the first impinger and the inlet to the second impinger to promote cooling and minimize evaporative loses of toluene from the first impinger. Fifteen (15) mL of the spiking solution was pipetted into the first impinger of Trains A and B. Openings were covered with Teflon® film or aluminum foil after the assembly of the trains.

Final assembly of the sampling trains occurred at the sampling location. The complete train configuration is shown in Figure 3-3. Thermocouples were attached to measure the stack temperature and probe outlet and impinger outlet temperatures. Crushed ice was added to each impinger bucket, and the probe heaters were turned on and allowed to stabilize at 120° ± 12°C (248° ± 25°F).

The isocyanate trains were leak checked before and after each sampling run, as required in EPA Method 5. To leak check the assembled train, the nozzle end was capped off and the sampling train evacuated to a vacuum of 15 inches of Hg. After the system was evacuated and the pump isolated from the train, the volume of gas flowing through the system was timed for 60 seconds. The leak rate is required to be

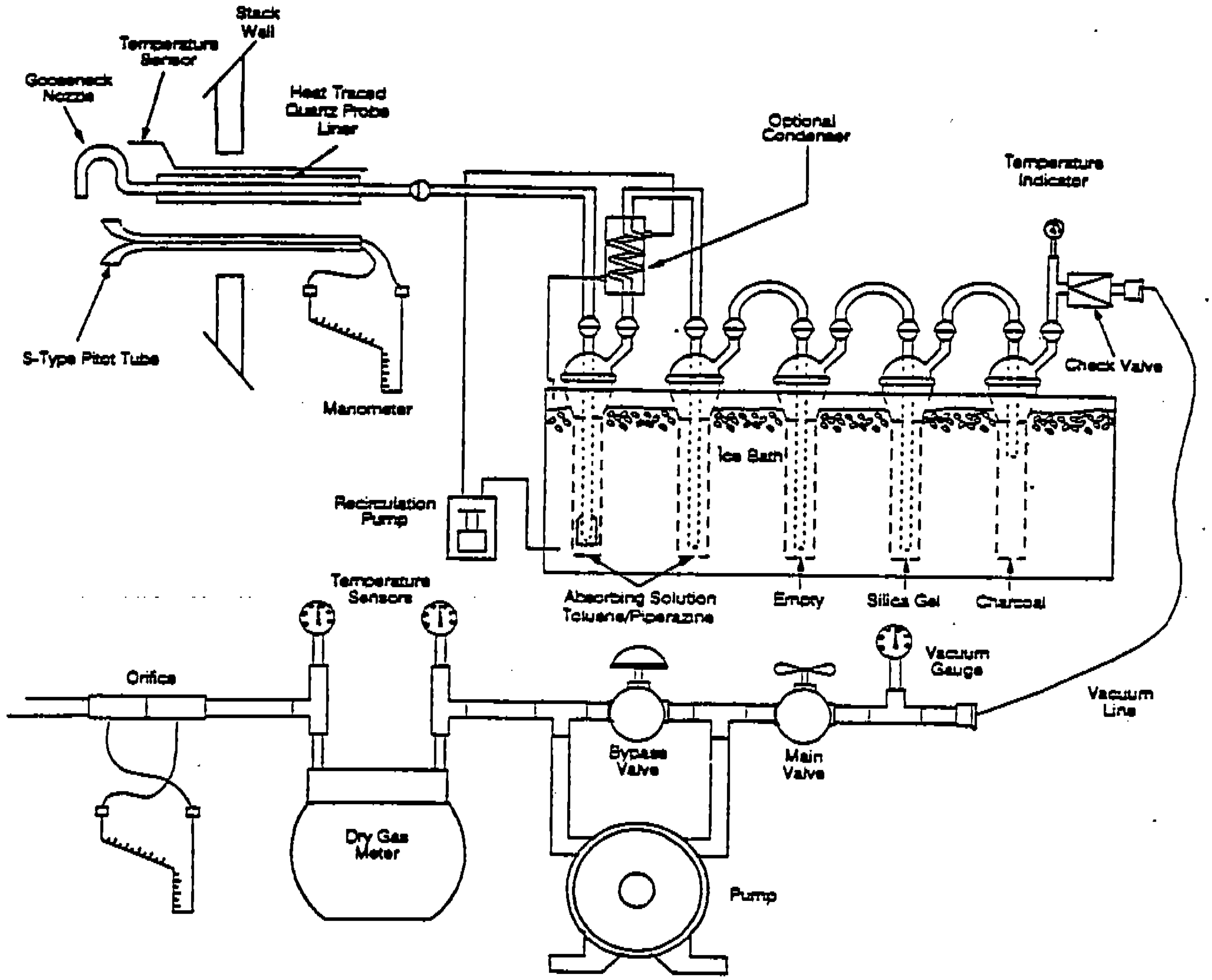


Figure 3-3. Sampling Train for Isocyanate

less than 0.02 acfm or 4% of the average sampling rate, whichever is less. After the leak rate was determined, the cap was slowly removed from the nozzle end until the vacuum in the train returned to atmospheric pressure and then the pump was turned off.

The leak rates and sampling start and stop times were recorded on the sampling task log. Also, any other events that occur during sampling were recorded on the task log (such as pitot cleaning, thermocouple malfunctions, heater malfunctions, and any other unusual occurrences). A nominal sample size of 30 cubic feet was collected in all sampling train. This was accomplished by sampling at a flowrate of 0.5 cubic feet per minute for 60 minutes. The sample volumes for each train by QUAD run are presented in Table 3-3.

3.5.6 Sample Recovery

The sample bottles containing the probe and nozzle washings and the impinger portion of the sampling trains were moved to the recovery trailer.

Each impinger was carefully removed from the impinger bucket, the outside was wiped dry, and the final impinger weight was determined and recorded to calculate stack moisture. The isocyanate sample was then collected in the following two fractions:

- First impinger contents, toluene rinses from the nozzle/probe liner and toluene/acetonitrile rinses of the first impinger and connecting glassware; and
- Contents and toluene/acetonitrile rinses from the second and third impingers and the condenser.

Recovery procedures are detailed in this section. All recovery bottles were wide mouth amber glass with Teflon® lined lids.

Table 3-3.

Quad Train Sample Volumes

Date	Run Number	Train A Vm @ 68° (ft^3)	Train B Vm @ 68° (ft^3)	Train C Vm @ 68° (ft^3)	Train D Vm @ 68° (ft^3)
2/22/93	1	33.42	33.89	33.02	33.04
2/22/93	2	29.07	29.65	28.67	28.40
2/23/93	3	34.24	35.15	33.75	33.01
2/23/93	4	30.60	31.17	30.35	29.54
2/24/93	5	34.14	34.70	34.46	32.59
2/24/93	6	35.10	35.17	34.49	33.78
2/25/93	7	31.11	31.94	30.14	29.91
2/25/93	8	30.89	29.73	30.49	31.95

Container 1 - Probe and First Impinger Contents

The contents and rinses of each of the first impingers and first impinger connectors were combined with the corresponding probe/nozzle washing solution. The entire contents of the first impinger were recovered as a single sample, even if two phases were present. The first impinger and connecting tubing were rinsed three times with 15 mL aliquots of toluene. A final rinse of the impinger with acetonitrile was also necessary to remove any water left on the impinger wall and to recover any remaining derivatized TDI.

Container 2 - Second and Third Impinger Contents/Condenser Rinse

The contents and toluene/acetonitrile rinses of the second and third impingers and the condenser of each train were collected in the same manner used for the first impinger described above. The contents of these impingers were analyzed separately from the contents collected in the first impinger to check for breakthrough; therefore, care was taken to avoid physical carryover from the first impinger to the second. The contents of the fourth and fifth impingers were weighed as previously described and then discarded.

Field Blanks

Four field blanks were prepared and recovered during the test, one on each day of testing. The four field blanks were prepared using Trains A, B, C, and D from the two sets of glassware used during the testing. A sampling train was assembled in the staging area, taken to the sampling location, and leak-checked. The probe of the blank train was heated during the generation of the field blank, but no gas sample was passed through the sampling train. The sampling train for the field blank was recovered with the same procedure described for authentic source samples..

Reagent Blank(s)

Aliquots of each lot of toluene, acetonitrile and absorbing reagent were collected daily to be analyzed as reagent blanks.

Sample Storage and Shipping

Sample containers were checked to ensure that complete labels had been affixed. The labels identified Trains A, B, C, or D, as appropriate. Teflon® lids were tightened and secured with Teflon® tape. The sample bottles were stored in a cooler packed with ice and were returned to Radian's laboratory in these coolers at the end of the field test.

3.6 Quality Control

The following quality control measures were implemented during the field testing phase of this program:

- All dry gas meters were calibrated. Calibration procedures were followed for the pitot tube/probe assembly and all thermocouple readout devices.
- Temperatures of the sampling train were maintained at the specified setting (120± 12°C) during each sampling run at levels prescribed in the test plan.
- Sampling trains were leak-checked both prior to and after sampling.
- All glassware was washed and oven-baked following appropriate method protocol, given in the test plan.
- All recovery solvents were HPLC grade and an aliquot of each was collected daily as reagent blanks.
- One field blank was collected for every two sampling runs.

- Chain of Custody forms and log books were filled in at the completion of each day of sampling.

4.0 ANALYTICAL PROCEDURES

4.1 Sample Preparation

The samples were received in the laboratory in screw-capped glass bottles with Teflon®-lined caps, sealed with Teflon® tape and stored in coolers packed with ice. Samples were logged into the laboratory sample tracking system and stored in a secure, refrigerated (4°C) sample storage area prior to analysis. Samples were prepared for analysis within 30 days of collection and analyzed within 30 days of preparation.

All labware was washed with detergent and water and rinsed with hot tap water, rinsed with deionized water, baked at 300°C, rinsed with acetonitrile and toluene prior to use. Solvents used were HPLC grade or equivalent.

Each of the two recovered samples from each train was transferred along with rinses to separate 500 mL round bottom flasks and then evaporated to dryness under vacuum in a 65°C water bath. Each round-bottom flask was then rinsed three times with separate two (2) mL aliquots of acetonitrile (ACN) and the rinses transferred to a 10-mL volumetric flask. The sample was then brought to volume with ACN and transferred to a 15-mL vial and sealed with a Teflon®-lined lid. The vial was stored in a refrigerated sample storage area at 4°C until analysis.

4.2 Chromatographic Analyses

The procedures for the HPLC analyses of the samples are described in the following sections.

4.2.1 Standard Preparation

A 300 μg/mL stock solution of TDI piperazine urea derivative was prepared by dissolving 7.5 mg of the purified crystals of the derivatized TDI in 25 mL of

ACN. [The derivatized TDI was previously prepared by adding 1 g of the neat TDI to a solution of 1-(2-pyridyl) piperazine in ACN, evaporating to dryness and recrystallizing the urea derivative three times from ACN.] Working standards for the calibration curve were made from this stock at six concentration levels in ACN ranging from 0 to 50 μg/mL. This concentration range covered the amount of TDI expected to be collected at the host facility. This stock solution was also used to prepare the field spiking solution. A check standard was prepared from a separately prepared stock solution. This check standard fell in the middle of the calibration curve.

4.2.2 Analysis

HPLC System

The HPLC system operating parameters for analysis of standards and samples were as follows:

Instrument:	RAININ HPXL Delivery System Waters 710B WISP autosampler
Data System:	Nelson 2600 (1 volt)
Column:	Zorbax ODS (4.6 mm ID x 25 cm)
Mobile Phase:	Acetonitrile/0.1M Ammonium Acetate Buffer
Gradient:	25:75 ACN/0.1 m ammonium acetate buffer, pH 6.2, hold 2 minutes, then to 60:40 by 19.5 minutes.
Detector:	RAININ Dynamax Dual-Wavelength, Ultraviolet at 254 nm
Flow Rate:	2 mL/min
Injector Volume:	50 μL
Retention Time:	2,4-TDI, 10.2 min.; 2,6-TDI 8.5 min.

Instrument Calibration

Calibration standards were prepared at seven levels as described in Section 4.2.1. Each calibration standard was injected in duplicate. Linear regression analysis of peak area response versus concentrations of TDI was used to prepare a calibration curve. Linearity of the calibration curve was confirmed by visual inspection and verified by a correlation coefficient of 0.9995. After an initial calibration curve was obtained, the calibration check standard described in Section 4.2.1 was analyzed. This standard was injected after every 3 samples, and was used for daily calibration. This check standard consistently agreed to within 10% of the true value.

All samples were analyzed in triplicate on the HPLC. An acetonitrile blank was analyzed once per day to ensure that the system was not contaminated. A check standard was analyzed prior to sample analysis, after every 3 samples, and at the end of the sample analysis each day.

4.3 Qualitative Identification

Analytes were identified by retention time. The retention time for 2,4-TDI was 10.2 min and 8.5 min for 2,6-TDI. Figures 4-1 and 4-2 show chromatograms from the analysis of first impinger contents from QUAD run number 4 for the unspiked and spiked trains respectively. As seen in the chromatograms, the TDI peaks are well separated from the peak for unreacted 1-2 PP. The peak at 17.5 min. was not identified.

4.4 Calculations

4.4.1 Calculation of the Amount of Isocyanate Collected

A least squares linear regression analysis of the calibration data was used to calculate a correlation coefficient, slope, and intercept. Concentration was used as the independent or X-variable and response was used as the dependent or Y-variable.

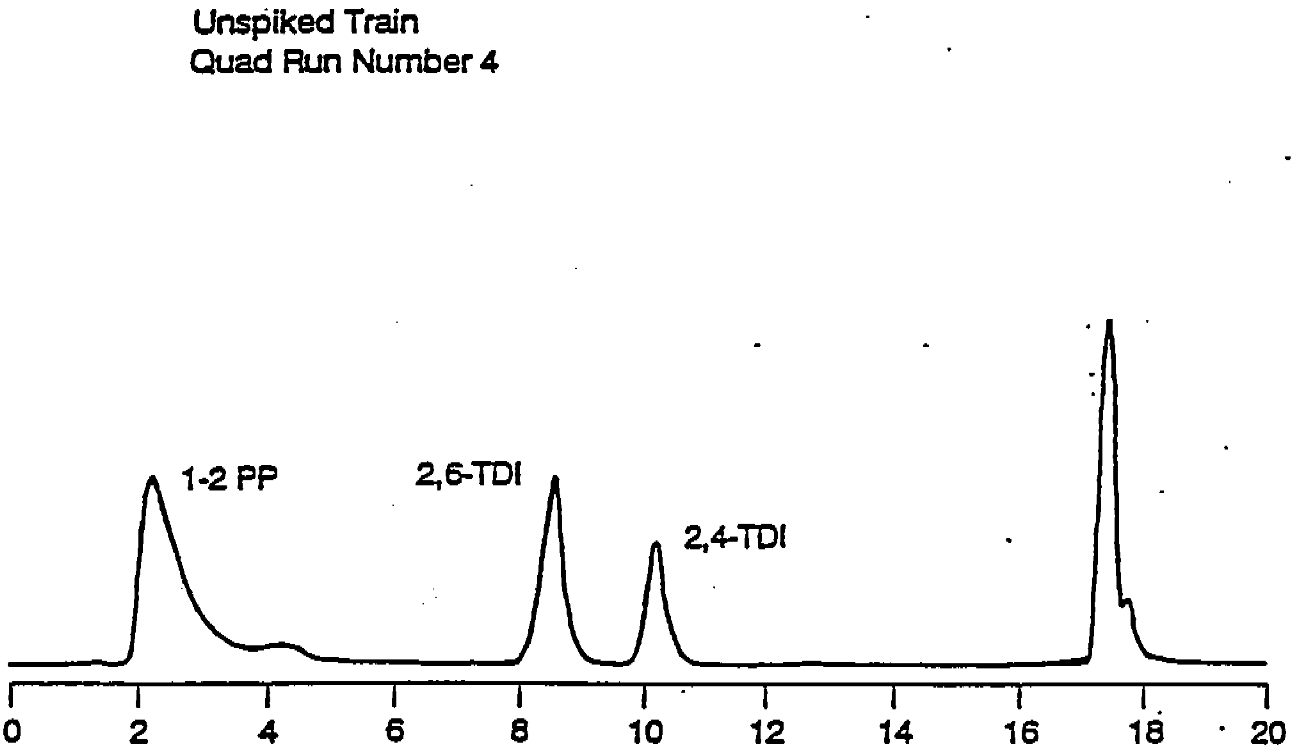


Figure 4-1. Chromatogram of Unspiked Train

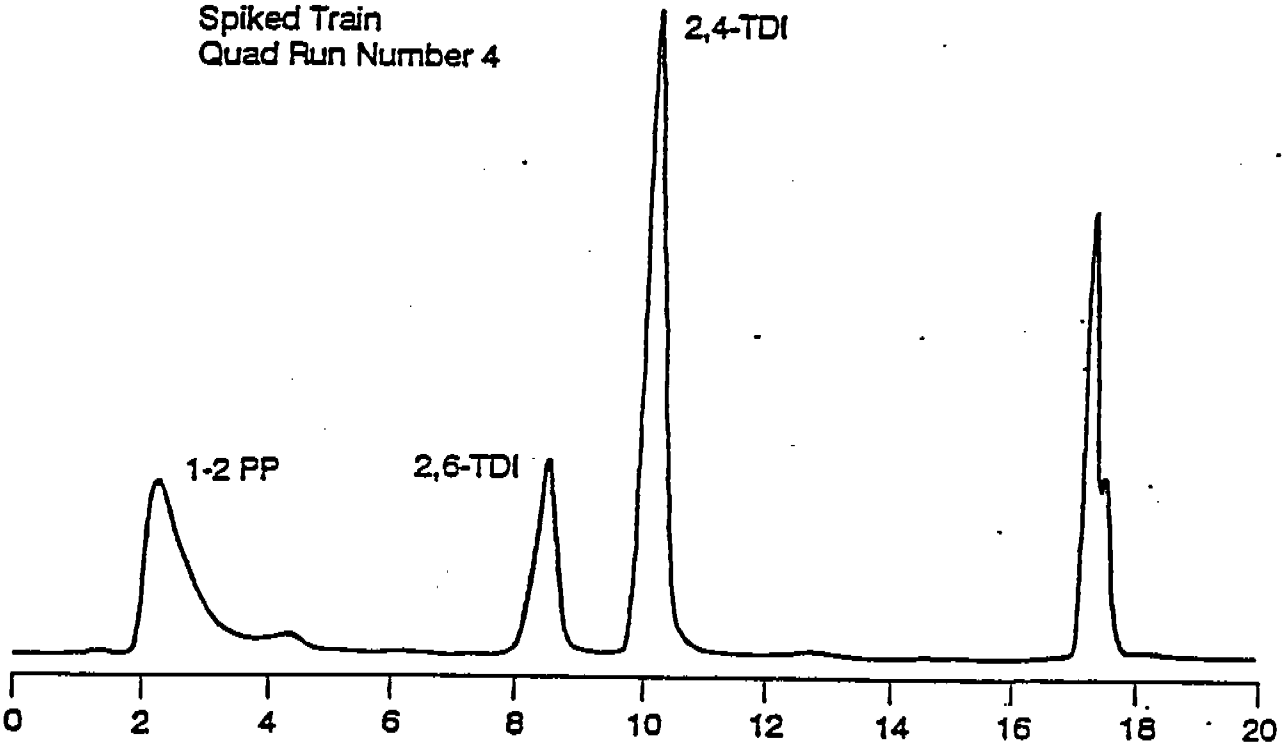


Figure 4-2. Chromatogram of Spiked Train

The concentration of isocyanate (as the derivative) in the concentrated samples was then calculated as follows:

$$\text{Concentration} = \frac{\text{(Sample Response - Intercept)}}{\text{Slope}} \qquad 4\text{-}1$$

The total amount (μg) collected in a sample was then calculated by multiplying the concentration (μg/mL) times the final volume (10 mL) of ACN used to redissolve the concentrated sample.

$$\text{Amount TDI derivative} = \text{Concentration } (\mu g/mL) \times \text{Final Volume (10 mL)} \qquad 4\text{-}2$$

The equivalent amount of TDI required to generate this much derivative was calculated by multiplying the ratio of the molecular weights of TDI (174) and the TDI derivative (501) times the amount of TDI derivative (determined by using equation 4-2).

The total amount of 2,4-TDI (underivatized) collected in the unspiked and spiked trains is given in Table 4-1 and Table 4-2 respectively.

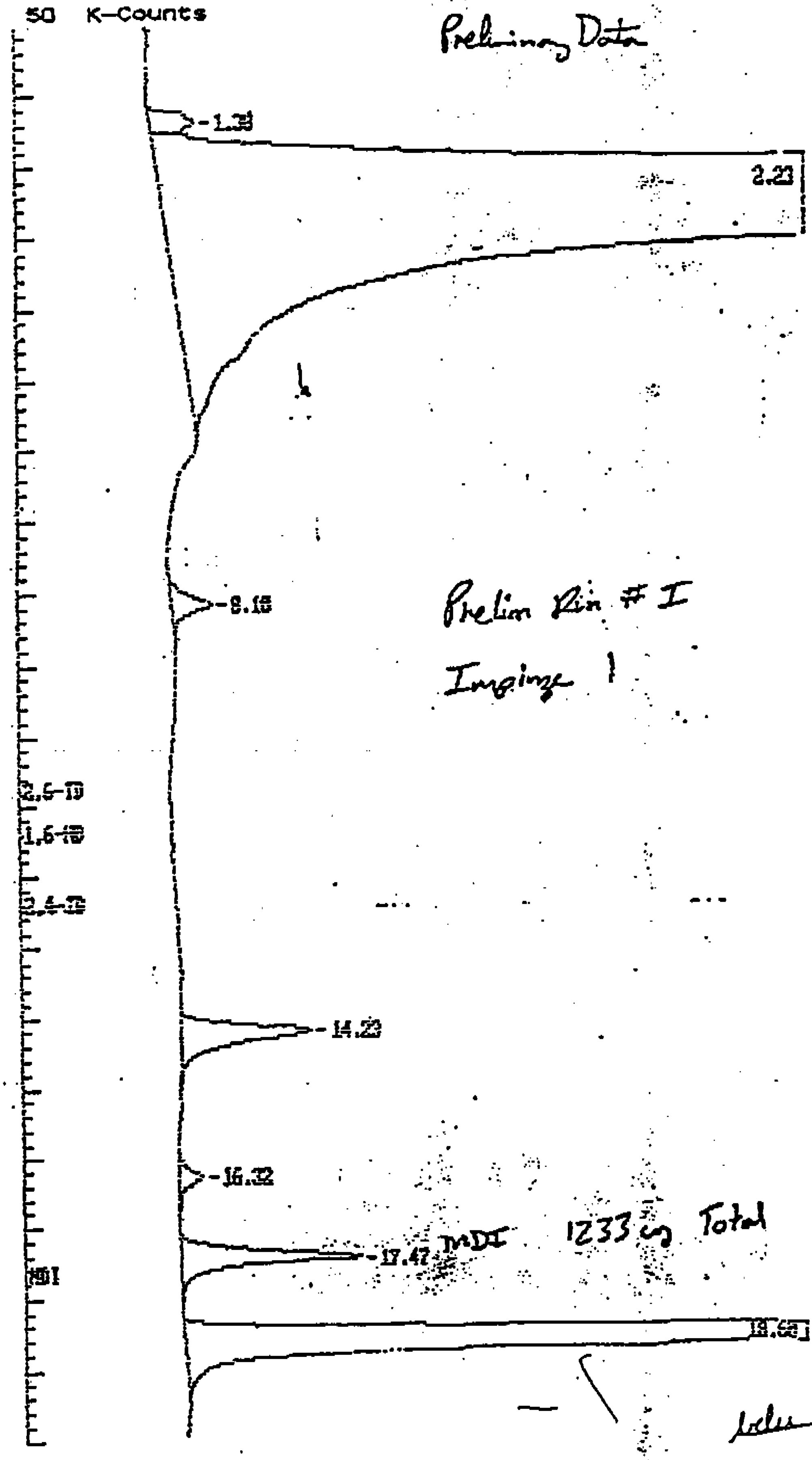
4.4.2 Normalization of the Amount of Isocyanate Collected

In order to simplify the comparison of the analytical results of the four trains in each QUAD run for subsequent calculations of bias and precision, the test plan called for the collected of 30 ft^3 of sample in each train. Due to operational variabilities inherent to each train, accurate but slightly differing sample volumes resulted as shown in Table 3-3. Therefore, it was necessary to normalize the data presented in Tables 4-1 and 4-2 to a common sample volume. The sample volume to which all data were normalized was selected to be 35.31 ft^3 which is equivalent to $1m^3$. The following stepwise calculations were used to normalize the data. The data from QUAD run number 1 are used as an example.

SENT BY:

Data File = E:\S3253F6.PTS Printed on 09-10-1993 at 12:29:41
Start time: 0.00 min. Stop time: 20.00 min. Offset: 0 cts
Full Range: 50 K-Counts

Preliminary Data



Prelim Run # I

Impinger 1

MDI 1233 cts Total

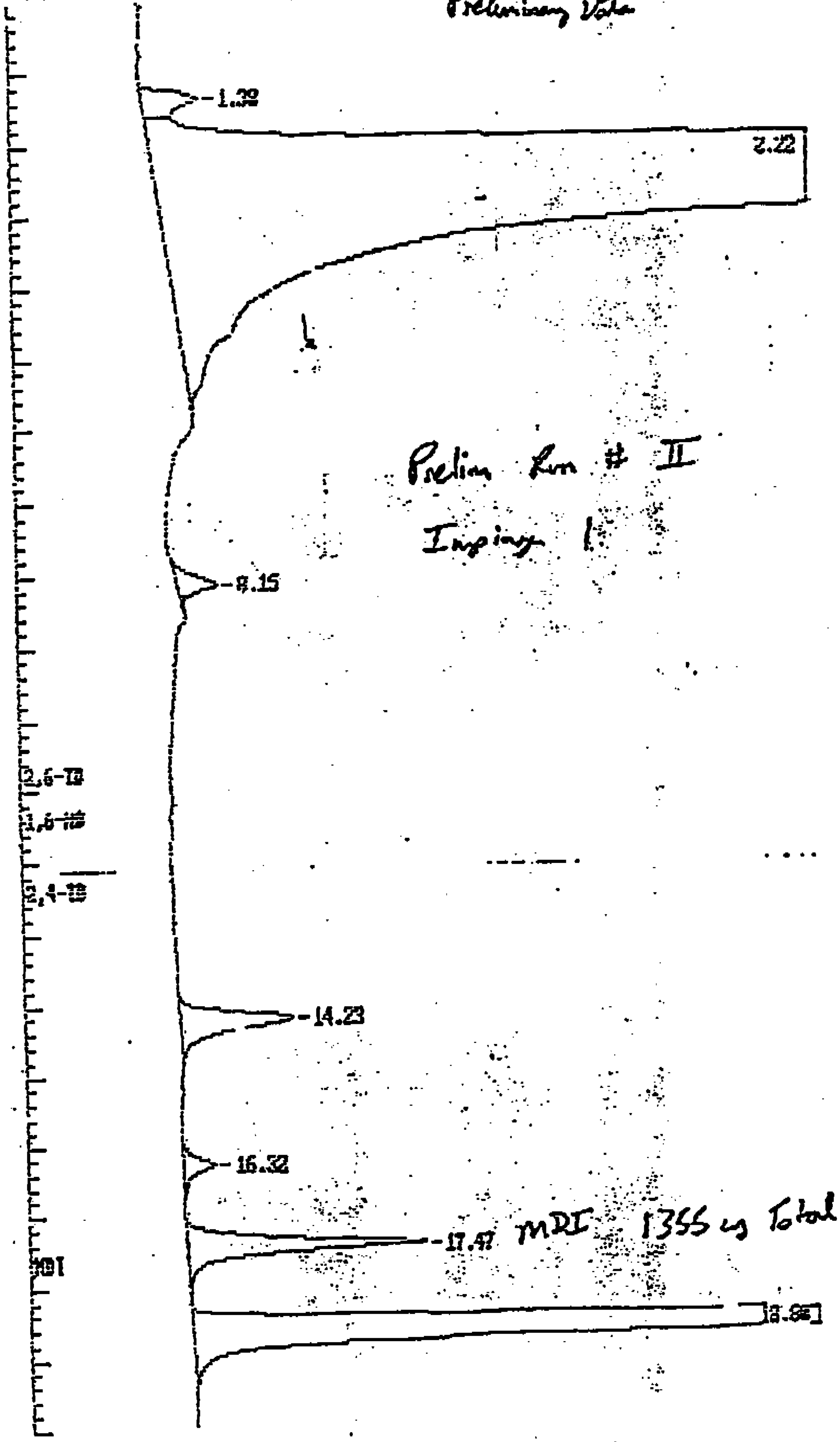
Rxn is check 10

J=82

SENT BY:

Areas, times, and heights stored in: E:\S3253F7.ATB
Data File = E:\S3253F7.PTS Printed on 09-10-1993 at 13:01:05
Start time: 0.00 min. Stop time: 20.00 min. Offset: 0 cts
Full Range: 50 K-Counts

Preliminary Data



Data File = E:\S3256F7.PTS Printed on 09-13-1993 at 14:43:58
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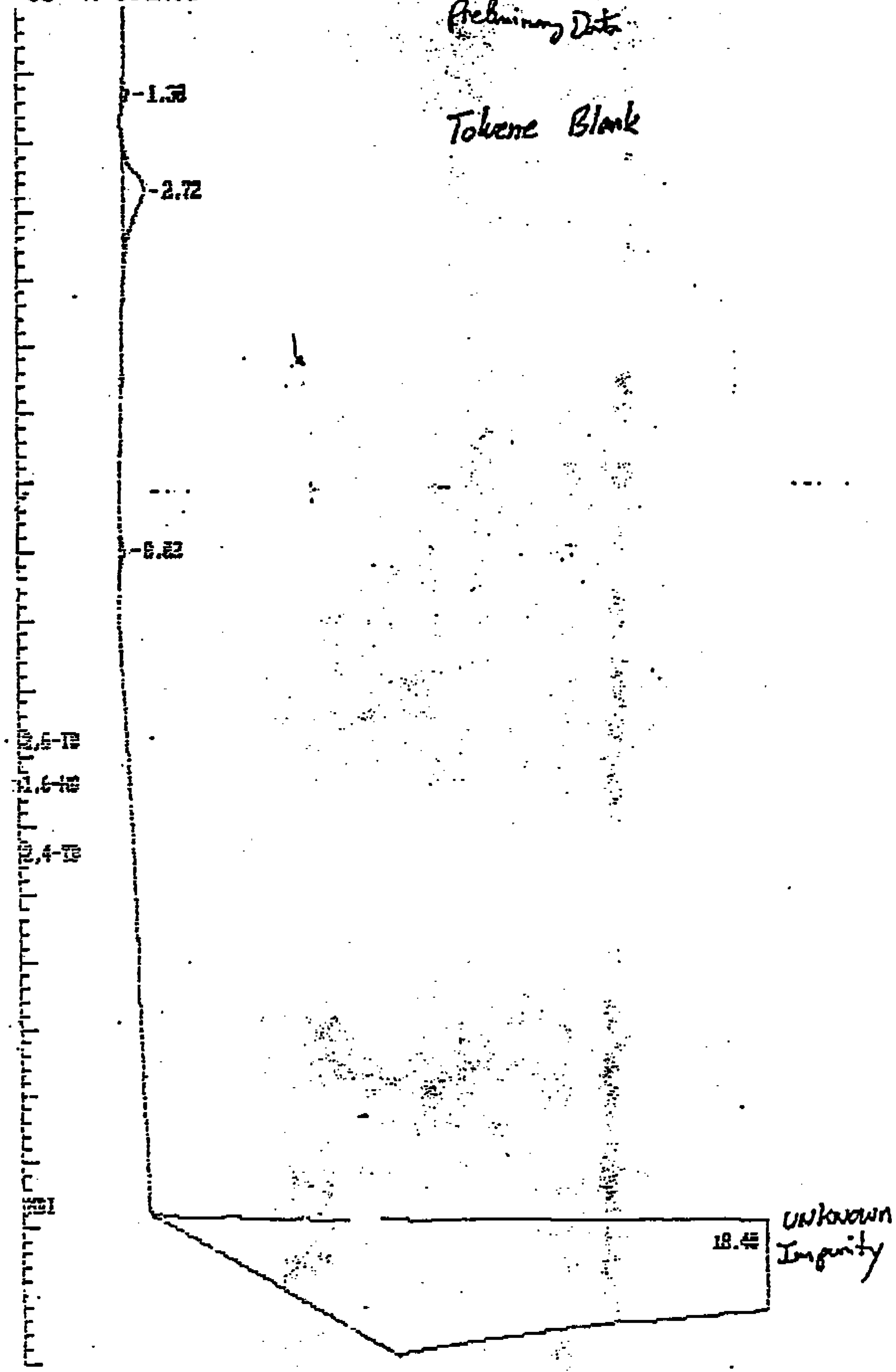
Full Range: 50 K-Counts



SENT BY:

Data File: ...

Start time: 0.00 min. Stop time: 20.00 min. Offset: 0 cts

Full Range: 50 K-Counts

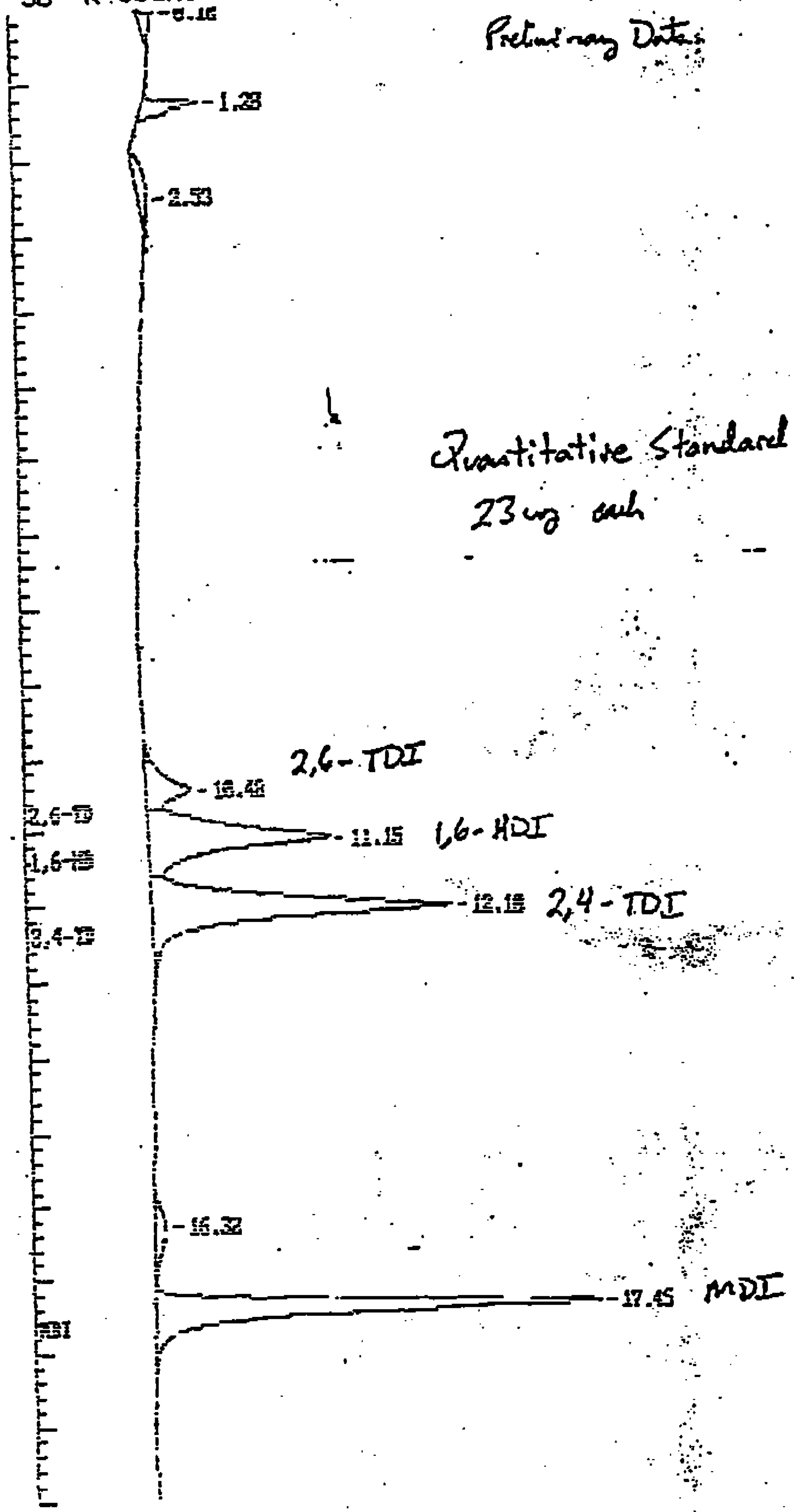


Table 4-1

2,4-TDI Detected in Unspiked Trains, μg

Train[1]	QUAD Run No.											
	1			2			3			4		
	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total
A	--	--	--	5114	61	5175	--	--	--	1832	16	1848
B	--	--	--	5224	40	5264	--	--	--	1864	24	1888
C	4409[2]	18	4427	--	--	--	3281	32	3313	--	--	--
D	4416	85	4501	--	--	--	2928	33	2960	--	--	--

[1]The unspiked trains alternated from run to run, C and D then A and B.
[2]All values are in micrograms of underivatized TDI.

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Table 4-1 (Continued)

Train[1]	QUAD Run No.											
	5			6			7			8		
	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total
A	--	--	--	7880	105	7993	--	--	--	3521	53	3574
B	--	--	--	7488	89	7577	--	--	--	3805	50	3855
C	4810	17	4827	--	--	--	2160	23	2183	--	--	--
D	5054	42	5096	--	--	--	2180	36	2216	--	--	--

[1]The unspiked trains alternated from run to run, C and D then A and B.
[2]All values are in micrograms of underivatized TDI.

Table 4-2

2,4-TDI Detected in Spiked Trains, μg

Train[1]	QUAD Run No.											
	1			2			3			4		
	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total
A	11943[2]	64	12007	--	--	--	11488	36	11524	--	--	--
B	11301	28	11329	--	--	--	12024	38	12062	--	--	--
C	--	--	--	12045	35	12080	--	--	--	9329	58	9387
D	--	--	--	12454	49	12503	--	--	--	9429	26	9455

[1]The spiked trains alternated from run to run, A and B then C and D.
[2]All values are in micrograms of underivatized TDI.

Table 4-2 (Continued)

Train[1]	QUAD Run No.											
	5			6			7			8		
	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total	Imp 1	Imp 2	Total
A	12014	45	12059	--	--	--	10094	46	10140	--	--	--
B	12588	37	12625	--	--	--	9003	40	9043	--	--	--
C	--	--	--	15201	88	15289	--	--	--	10561	45	10606
D	--	--	--	15173	96	15269	--	--	--	10315	44	10359

[1]The spiked trains alternated from run to run, A and B then C and D.
[2]All values are in micrograms of underivatized TDI.

Step 1 Normalize unspiked Trains C and D first impinger amounts (μg) to the sample volume collected (cubic feet) in spiked Train A;

$$\text{Train C} \quad \frac{33.42\ ft^3}{33.02\ ft^3} X\ 4409\ \mu g = 4462\ \mu g \qquad \text{4-3A}$$

$$\text{Train D} \quad \frac{33.42\ ft^3}{33.04\ ft^3} X\ 4416\ \mu g = 4467\ \mu g \qquad \text{4-3B}$$

Step 2 Average the normalized, unspiked train amounts from step 1 above. Assuming the collection efficiency of all trains to be the same, this value would also be the amount of TDI that would be collected by Train A due to sampling the stack gas;

$$\frac{4462\ \mu g + 4467 \mu g}{2} = 4465\ \mu g \qquad \text{4-4}$$

Step 3 Subtract the average value (step 2) from the uncorrected amount (sampled amount plus spike) for spiked Train A, first impinger, to get recovered spike amount;

$$11943\ \mu g - 4465\ \mu g = 7478\ \mu g \qquad \text{4-5}$$

Step 4 Normalize the amount collected in spiked Train A, first impinger to 35.31 ft^3 using the sample volume for Train A and the value obtained in step 2;

$$\frac{35.31\ ft^3}{33.42\ ft^3} X\ 4465\ \mu g = 4718\ \mu g \qquad \text{4-6}$$

Step 5 Normalize the amount collected in the second impinger of spiked Train A to 35.31 ft^3 using the sample volume for Train A and the amount determined by HPLC;

$$\frac{35.31\ ft^3}{33.42\ ft^3} X\ 63.9\ \mu g = 67.5\ \mu g \qquad 4\text{-}7$$

Step 6 Sum the values determined from steps 3, 4 and 5 to get the total amount of TDI found in spiked Train A, normalized to 35.31 ft^3;

$$7478\ \mu g + 4718\ \mu g + 67.5 \mu g = 12264\ \mu g \qquad 4\text{-}8$$

Steps 1-6 can be repeated for similar calculations for spiked Train B. The total amount of TDI collected in each of the unspiked trains can be determined by first normalizing the amounts found in the two impingers of each train to $1m^3$ and then summing the two values. The raw and normalized data for all analysis results are presented in Appendix A. The resulting normalized values are summarized in Tables 4-3 and 4-4.

4.5 Quality Control

Quality control procedures that were implemented for this program include:

- Adhering to applicable sampling and analysis protocols;
- Collecting and analyzing field blanks, trip blanks, reagent blanks, and laboratory blanks;
- Tracking samples from collection to analysis;
- Calibrating all analytical equipment prior to use:
- Maintaining accurate and complete written documentation;
- If any changes were made to the analytical system (i.e., column changed, column maintenance), a calibration check was performed to verify the validity of the calibration curve. If the calibration check did not meet acceptance criteria, the analytical system was recalibrated.

Table 4-3

Normalized Amount of 2,4-TDI Detected in Unspiked Trains, µg

Train[1]	QUAD Run No.							
	1	2	3	4	5	6	7	8
A	--	6287	--	2132	--	8042	--	4086
B	--	6270	--	2139	--	7608	--	4579
C	4735[2]	--	3466	--	4947	--	2557	--
D	4811	--	3166	--	5522	--	2616	--

[1]The unspiked trains alternated from run to run, C and D then A and B.
[2]All values are in micrograms of underivatized TDI, normalized to a sample volume of 35.31 ft^3 ($1m^3$).

Table 4-4

Normalized Amount of 2,4-TDI Detected in Spiked Trains, μg

Train[1]	QUAD Run No.							
	1	2	3	4	5	6	7	8
A	12264[2]	--	11625	--	12233	--	10450	--
B	11520	--	12078	--	12717	--	9290	--
C	--	13258	--	9694	--	15471	--	11197
D	--	13733	--	9805	--	15610	--	10947

[1]The spiked trains alternated from run to run, A and B then C and D.
[2]All values are in micrograms of underivatized TDI, normalized to a sample volume of 35.31 ft^3 ($1m^3$).

- Analysis of field spiked QC samples; and
- Analysis of check standards every 3 samples.

5.0 RESULTS AND DISCUSSION

This section presents the results of the eight sampling runs relative to the criteria for method precision and bias. Fractional results are also presented to show the amount of isocyanate breakthrough occurring in the impinger train. All sample fractions were prepared and analyzed for toluene diisocyanate at Radian's Research Triangle Park laboratory.

5.1 Bias and Precision

Table 5-1 is a summary table which presents the results of the statistical evaluation of the test data following the EPA Method 301 criteria showing the method precision and bias for 2-4 TDI. Method 301 requires valid data from a minimum of six QUAD runs. Table 5-1 presents data from all eight runs. Precision is shown as the percent relative standard deviation of the measured amounts of TDI in the samples. Results for precision of both the spiked and unspiked samples were less than 5 percent RSD, which is well within the limits of acceptable precision (upper limit of 50%) given in EPA Method 301.

Using the data from all eight QUAD runs, method bias was measured at -395 micrograms. This value was determined to be statistically significant at the 95% confidence level, using the t statistic calculated for the analytical data. A correction factor of 1.053 was calculated for use with the method to compensate for the bias should the method be used to measure TDI emissions from similar sources.

Using the data from only seven QUAD runs (eliminating run 8 because this run had the lowest average % recovery and the final leak check for one of the trains was questionable), the method bias was -295 micrograms. This bias was not statistically significant and therefore no correction factor was calculated. In either case, the criteria for an acceptable method were met (i.e., a correction factor between 0.7 and 1.3).

Table 5-1

Summary of Method 301 Statistical Calculations

Parameter	Spiked Trains		Unspiked Trains	
	7 Runs	8 Runs	7 Runs	8 Runs
Spiked Amount[1]	7828	7828	–	–
RSD, %	3.6	3.4	4.7	5.2
Average Bias[1]	-295	-395	–	–
Bias Significant?	No	Yes	–	–
Correction Factor	1.0	1.053	–	–

[1]Values are presented as μg of underivatized TDI

5.2 Breakthrough and Recovery

This section presents details of the breakthrough and recovery results for the field samples, as well as recovery information for the spiked compound (2,4-TDI).

5.2.1 Breakthrough

Tables 4-1 and 4-2 provide a summary of the combined total mass of 2,4-TDI collected in the probe/first impinger and second/third impinger samples for the unspiked and spiked trains, respectively. These totals are used as a basis for calculating breakthrough of the TDI from the first impinger to the second impinger. The mass of compound found in the probe/first impinger fraction and in the second impinger fraction were each divided by the total mass of TDI for that train and then multiplied by 100 to yield the percent of the total TDI found in the separate train sections. The results are presented in Table 5-2 and 5-3 for the spiked and unspiked trains respectively.

The average breakthrough for the spiked trains was 1.5% and for the unspiked trains 1.1%. More than 98% of the TDI was collected in the first impinger under the sampling conditions used in this study.

The amount of the toluene contained in the first impingers of each of the trains was reduced by approximately 25% (by weight) during the sampling run due to evaporation. The second impingers showed, on the average, a net gain of approximately 5%. The remainder was collected in the silica gel and the charcoal, both of which showed net weight gains. The total weight gained in the train components following the first impinger more than compensate for loses from the first impinger, probably due to the collection of a small amount of moisture. The loss of toluene from the first impinger was minimized by keeping the impingers in an ice bath and placing a water cooled condenser between the outlet of the first impinger and the inlet of the second impinger.

Table 5-2

Distribution of 2,4-TDI Within the Spiked Trains

Train[1]	Impinger No.	QUAD Run No.							
		1	2	3	4	5	6	7	8
A	1	98.5[2]	--	99.0	--	99.0	--	98.0	--
	2	1.5	--	1.0	--	1.0	--	2.0	--
B	1	99.2	--	99.1	--	99.2	--	97.0	--
	2	0.8	--	0.9	--	0.8	--	3.0	--
C	1	--	99.2	--	96.4	--	98.8	--	98.4
	2	--	0.8	--	3.6	--	1.2	--	1.6
D	1	--	99.0	--	98.5	--	98.7	--	98.4
	2	--	1.0	--	1.5	--	1.3	--	1.6
Average/ % RSD	1	98.5/0.81							
	2	1.5/54.4							

[1]Spiked Trains alternate from run to run, A and B, then C and D.
[2]Values are a percentage of the total amount of 2-4 TDI determined to be in each train.

Table 5-3

Distribution of 2,4-TDI Within the Unspiked Trains

Train[1]	Impinger No.	QUAD Run No.							
		1	2	3	4	5	6	7	8
A	1	--	98.8	--	99.1	--	98.7	--	98.5
	2	--	1.2	--	0.9	--	1.3	--	1.5
B	1	--	99.2	--	98.8	--	98.8	--	98.7
	2	--	0.8	--	1.2	--	1.2	--	1.3
C	1	99.6[2]	--	99.0	--	99.6	--	99.0	--
	2	0.4	--	1.0	--	0.4	--	1.0	--
D	1	99.1	--	98.9	--	99.2	--	98.4	--
	2	1.9	--	1.1	--	0.8	--	1.6	--
Average/ % RSD	1	98.9/0.41							
	2	1.1/37.1							

[1]Unspiked Trains alternate from run to run, C and D, then A and B.
[2]Values are a percentage of the total amount of 2,4-TDI determined to be in each train.

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5.2.2 Recovery

One of the objectives of this test program was to obtain bias and precision data to validate the proposed test method for isocyanates. Samples from two of the four trains of each quad assembly were spiked with TDI before each sampling run. The estimation of method bias is based on the percentage of the TDI spikes recovered. Analytical results used for this calculation are the averages of the triplicate analysis results for each spiked sample. A summary of the spiked TDI recovery percentages is presented in Table 5-4.

The percent recovery was calculated for each spiked train for each run following the calculation procedures outlined in steps 1-3 of Section 5.0. The value obtained at step 3, the amount of spike recovered, is divided by the actual amount of TDI spiked, 7827 μg, multiplied by 100. An average recovery was determined by averaging the 16 individual run recoveries.

The recovery for TDI ranged between 83 and 112 percent and averaged 95 percent with a %RSD of 8.2.

5.3 Quality Assurance/Quality Control

As a part of the testing for Work Assignment No. 55, Radian designed and implemented a quality assurance/quality control (QA/QC) effort tailored to meet the specific needs of this project. The testing was conducted in accordance with QA/QC procedures described in the Quality Assurance Project Plan (QAPP). The results of the QA/QC effort demonstrate that the data are reliable and meet project objectives for completeness and representativeness. The data met the QA objectives for precision and accuracy and there are no data quality issues that effect conclusions regarding the objectives of this project.

Table 5-4

Percent Recovery of the Spiked 2,4-TDI

Train[1]	QUAD Run No.							
	1	2	3	4	5	6	7	8
A	96[2]	--	106	--	89	--	100	--
B	86	--	112	--	96	--	86	--
C	--	89	--	97	--	98	--	88
D	--	95	--	98	--	99	--	83
Average	95							
% RSD	8.2							

[1]Spiked Trains alternated from run to run, A and B, then C and D.
[2]Values are a percentage based upon a spiked amount of 7827.8 μg as 2,4-TDI.

The primary objectives of the QA/QC effort were to control, assess, and document data quality. In order to accomplish these objectives, the QA/QC approach consisted of the following key elements:

- Definition of data quality objectives that reflect the overall technical objectives of the project;
- Design of a sampling, analytical, QA/QC, and data analysis system to meet these objectives; and
- Initiation of corrective action when measurement system performance did not meet the specifications.

These elements include the use of selected standard sampling and analytical procedures as components of the overall approach in addition to, specified calibration requirements, QC checks, data reduction and validation procedures, and sample tracking.

A summary of analysis results for QA/QC samples, which includes measures of precision and accuracy and limitations in the use of these data is presented in this section.

5.3.1 Overview of Data Quality

The QAPjP established specific QA objectives for precision (15% RSD), accuracy (±30%), and completeness (100%) for the determination of TDI emissions. The statistical results presented in Table 5-1 and the % recovery values given in Table 5-4 show that the objectives were met. The data quality acceptance criteria and the experimental results are summarized in Table 5-5. Results for spike/spike duplicates and triplicate analyses were compared with the criteria. In all cases the criteria were met. Other data quality indicators for each type of analysis are also presented throughout the remainder of Section 5.3.

There are no cases where data quality issues impair the study's conclusions with respect to the validity of the sampling and analytical test method procedures. With

Table 5-5

Data Quality Acceptance Criteria and Results

Parameter	Criteria	Results
TDI Spike Recovery	70 - 130%	83 - 112%
TDI Analysis Results QUAD Train, % RSD	15%	5%
Individual DGM Correction Factor Agreement	±2% of Avg	<2%
Analytical Balance	≤0.1 g of Class S Weights	<0.1 g
HPLC Linearity Correlation Coeff.	>0.995	0.9995
HPLC Retention Time Variation	±15%	±10%
HPLC Calibration Check	±10% of Curve	±9%
HPLC System Blank	<0.1% Analyte level	<0.1%
HPLC Replicate Analyses	±10% of 1st injection	±2%
HPLC Method Spikes	±20% of theoretical	±5%

exception of a limited number of samples, the quality of measurement data generated for the test parameters fully meets the data quality objectives outlined in the QAPjP.

5.3.2 Sampling Quality Control

Quality control activities associated with the field sampling are described in the QAPjP. These activities include adherence to accepted reference method protocols, use of standardized data recording sheets, equipment calibration, and collection of field blanks.

Stack sampling QC data, including sampling rates, sample volume collected, maximum recorded leak rate, and maximum allowable leak rate, are summarized in Table 5-6 for each run. All of the data quality indicators are within acceptable limits, with the exception of a slightly high leak rate value for Train C Run 8. However, this train was leak checked at a vacuum of 7 inches of mercury which was almost twice that achieved during sampling and the leak would therefore have very little, if any, effect on the data. The leak rate criterion is <4% of the average sampling rate or 0.02 dscf, whichever is less.

5.3.3 Sample Storage and Holding Time

Sample hold times specified in the QAPP were met for all samples. All samples were prepared within 30 days of collection and analyzed within 30 days of preparation.

5.3.4 Analytical Quality Control

Results for method spikes, field spikes, field blanks, reagent blanks and method blanks are summarized in Table 5-7. These samples served the dual purpose of controlling and assessing measurement data quality, and providing the basis for precision and accuracy estimates. The QC acceptance criteria for each of these types of samples

Table 5-6

Sampling Train Leak Summary

Run Number	Std. Metered Volume (dscf)	Average Sampling Rate (dscfm)	Maximum Leak Check (dscf@ in Hg)	4% Sample Rate (dscfm)	Acceptable[a] Leak Rate?
1A	33.42	0.743	0.010 @ 10	0.030	Yes
1B	33.89	0.753	0.010 @ 15	0.030	Yes
1C	33.02	0.734	0.010 @ 8	0.029	Yes
1D	33.04	0.734	0.020 @ 10	0.029	Yes
2A	29.07	0.727	0.016 @ 8	0.029	Yes
2B	29.65	0.741	0.009 @ 8	0.030	Yes
2C	28.67	0.717	0.010 @ 7	0.029	Yes
2D	28.40	0.710	0.010 @ 8	0.028	Yes
3A	34.24	0.571	0.012 @ 10	0.023	Yes
3B	35.15	0.586	0.010 @ 8	0.023	Yes
3C	33.75	0.563	0.009 @ 8	0.023	Yes
3D	33.01	0.550	0.020 @ 5	0.022	Yes
4A	30.60	0.765	0.012 @ 8	0.031	Yes
4B	31.17	0.779	0.012 @ 7	0.031	Yes
4C	30.35	0.759	0.008 @ 7	0.030	Yes
4D	29.54	0.739	0.015 @ 10	0.030	Yes
5A	34.14	0.569	0.014 @ 10	0.023	Yes
5B	34.70	0.578	0.012 @ 8	0.023	Yes
5C	34.46	0.574	0.012 @ 8	0.023	Yes
5D	32.59	0.543	0.016 @ 7	0.022	Yes
6A	35.10	0.780	0.007 @ 7	0.031	Yes
6B	35.17	0.782	0.010 @ 8	0.031	Yes
6C	34.49	0.766	0.008 @ 7	0.031	Yes
6D	33.78	0.751	0.008 @ 10	0.030	Yes
7A	31.11	0.778	0.015 @ 9	0.031	Yes
7B	31.94	0.799	0.011 @ 8	0.032	Yes
7C	30.14	0.754	0.009 @ 7	0.030	Yes
7D	29.91	0.748	0.014 @ 10	0.030	Yes
8A	30.89	0.772	0.009 @ 10	0.031	Yes
8B	29.73	0.743	0.011 @ 8	0.030	Yes
8C	30.49	0.762	0.021 @ 7	0.030	No
8D	31.95	0.799	0.018 @ 8	0.032	Yes

[a]The maximum acceptable leak rate is the lesser of 0.020 dscfm or 4% of the average sampling rate.

Table 5-7

Summary of Analytical Quality Control Results

Sample ID	Total Detected µg	Theoretical µg	Percent Error %
Field Blank A	2.5	NA[4]	NA
Field Blank B	8.3	NA	NA
Field Blank C	6.4	NA	NA
Field Spike 1	7570	7828	96.7
Field Spike 2	7686	7828	98.2
Method Spike 1	8120	7828	104
Method Spike 2	7838	7828	100
Method Spike 3	7890	7828	101
Method Spike 4	7945	7828	101
Toluene Reagent Blank[1]	0.5	NA	NA
ACN Reagent Blank[2]	0.4	NA	NA
Method Blank[3]	10.2	NA	NA

[1]Average of four, ranging from 0.1 to 1.2 µg
[2]Average of four, ranging from 0.1 to 0.8 µg
[3]Average of three, ranging from 0.3 to 20.7 µg
[4]NA, Not Applicable

were met as shown in Table 5-5. Field blanks were collected by assembling a sampling train as if to collect a sample, transporting to the sampling location, leak checking and returning the train to the onsite laboratory for recovery. Field spikes and method spikes were prepared by spiking approximately 300 mL of the toluene 1,2-PP solution with 15 mL of the field spiking solution. Method and reagent blanks were prepared by evaporating approximately 300 mL of solvent to dryness and dissolving any residue with 10 mL of ACN. All spikes and blanks met the data acceptance criteria listed in Table 5-5.

No blank contamination problems were identified during the analysis of field and laboratory blanks and no blank corrections were performed for the reported data. All blank analysis data are presented along with other QC and field sample results in Appendix A.

APPENDIX A

Analytical Data for Samples, Blanks, Spikes and Quality Control Samples

Sample Name	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample ug	Avg Amt Sample ug	Volume Sampled Cu Ft	Sampling Factor	Adjusted Avg ug	Total Train ug	Amount Spiked ug	Spike Recovery %	Train ID
ISO-SCF-32293-4	1263013	5.90	5.40641	9%										
ISO-SCF-32293-4	1253783	5.86	5.40641	8%										
ISO-SCF-32293-4	1249399	5.84	5.40641	8%										
ARL-1	1277072	5.97			2000	11931.6	11942.9	33.42	1.05669	12196.0	12263.5	7827.81	95.69%	1-A-1
ARL-1	1276918	5.97			2000	11930.1								
ARL-1	1280852	5.98			2000	11966.8								
ARL-2	135291	0.64			100	64.1	63.9	33.42	1.05669	67.5				1-A-2
ARL-2	135913	0.64			100	64.4								
ARL-2	133152	0.63			100	63.1								
ARL-3	1196354	5.59			2000	11178.7	11300.8	33.89	1.04204	11491.1	11520.1	7827.81	86.19%	1-B-1
ARL-3	1214532	5.67			2000	11348.3								
ARL-3	1217429	5.69			2000	11375.3								
ARL-4	59159	0.29			100	28.6	27.8	33.89	1.04204	29.0				1-B-2
ARL-4	57134	0.28			100	27.7								
ARL-4	56201	0.27			100	27.2								
ISO-SCF-32293-4	1255771	5.87	5.40641	9%										
ISO-SCF-32293-4	1251918	5.85	5.40641	8%										
ISO-SCF-32293-4	1242330	5.80	5.40641	7%										
ARL-5	471546	2.21			2000	4418.4	4409.3	33.02	1.06949	4715.7	4735.0			1-C-1
ARL-5	470785	2.21			2000	4411.3								
ARL-5	469380	2.20			2000	4398.2								
ARL-6	35898	0.18			100	17.8	18.1	33.02	1.06949	19.3				1-C-2
ARL-6	37029	0.18			100	18.3								
ARL-6	36906	0.18			100	18.2								
ARL-7	469526	2.20			2000	4399.5	4416.1	33.04	1.06885	4720.1	4811.1			1-D-1
ARL-7	461467	2.16			2000	4324.4								
ARL-7	482909	2.26			2000	4524.4								
ARL-8	180144	0.85			100	85.0	85.1	33.04	1.06885	90.9				1-D-2
ARL-8	179633	0.85			100	84.8								
ARL-8	181047	0.85			100	85.4								
ISO-SCF-32293-4	1238919	5.79	5.40641	7%										
ISO-SCF-32293-4	1245039	5.82	5.40641	8%										
ISO-SCF-32293-4	1235673	5.77	5.40641	7%										

Sample Name	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample ug	Avg Amt Sample ug	Volume Sampled Cu Ft	Sampling Factor	Adjusted Avg ug	Total Train ug	Amount Spiked ug	Spike Recovery %	Train ID
ARL-9	544346	2.55			2000	5097.4	5114.2	29.07	1.21481	6212.9	6287.4			2-A-1
ARL-9	548157	2.57			2000	5132.9								
ARL-9	545954	2.56			2000	5112.4								
ARL-10	130306	0.62			100	61.8	61.4	29.07	1.21481	74.6				2-A-2
ARL-10	130940	0.62			100	62.1								
ARL-10	127140	0.60			100	60.3								
ARL-11	567669	2.66			2000	5314.9	5224.4	29.65	1.19105	6222.5	6269.9			2-B-1
ARL-11	563460	2.64			2000	5275.7								
ARL-11	542754	2.54			2000	5082.6								
ARL-12	83414	0.40			100	39.9	39.8	29.65	1.19105	47.4				2-B-2
ARL-12	83620	0.40			100	40.0								
ARL-12	82237	0.39			100	39.4								
ISO-SCF-32293-4	1220899	5.70	5.40641	6%	1	5.7								
ISO-SCF-32293-4	1232005	5.76	5.40641	6%	1	5.8								
ISO-SCF-32293-4	1230936	5.75	5.40641	6%	1	5.8								
ARL-13	1287864	6.02			2000	12032.2	12045.3	28.67	1.23176	13215.1	13258.2	7827.81	89.16%	2-C-1
ARL-13	1288870	6.02			2000	12041.6								
ARL-13	1291043	6.03			2000	12061.9								
ARL-14	71522	0.34			100	34.4	35.0	28.67	1.23176	43.1				2-C-2
ARL-14	73423	0.35			100	35.3								
ARL-14	73513	0.35			100	35.3								
ARL-15	1335291	6.24			2000	12474.6	12454.1	28.40	1.24347	13671.5	13732.6	7827.81	95.22%	2-D-1
ARL-15	1334709	6.23			2000	12469.2								
ARL-15	1329284	6.21			2000	12418.6								
ARL-16	103190	0.49			100	49.1	49.1	28.40	1.24347	61.1				2-D-2
ARL-16	103848	0.49			100	49.4								
ARL-16	102349	0.49			100	48.7								
ISO-SCF-32293-4	1246426	5.82	5.40641	8%	1	5.8								
ISO-SCF-32293-4	1237852	5.78	5.40641	7%	1	5.8								
ISO-SCF-32293-4	1239959	5.79	5.40641	7%	1	5.8								

Sample Name	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample ug	Avg Amt Sample ug	Volume Sampled Cu Ft	Sampling Factor	Adjusted Avg ug	Total Train ug	Amount Spiked ug	Spike Recovery %	Train ID
ARL-17	1229990	5.75			2000	11492.4	11487.9	34.24	1.03139	11587.8	11624.8	7827.81	106.14%	3-A-1
ARL-17	1214060	5.67			2000	11343.9								
ARL-17	1244450	5.81			2000	11627.3								
ARL-18	75825	0.36			100	36.4	35.9	34.24	1.03139	37.0				3-A-2
ARL-18	74917	0.36			100	36.0								
ARL-18	73672	0.35			100	35.4								
ARL-19	1282836	5.99			2000	11985.3	12024.4	35.15	1.00468	12039.7	12077.7	7827.81	111.93%	3-B-1
ARL-19	1289518	6.02			2000	12047.7								
ARL-19	1288725	6.02			2000	12040.3								
ARL-20	79007	0.38			100	37.9	37.8	35.15	1.00468	38.0				3-B-2
ARL-20	78713	0.38			100	37.7								
ARL-20	79021	0.38			100	37.9								
ISO-SCF-32293-4	1263449	5.90	5.40641	9%	1	5.9								
ISO-SCF-32293-4	1253499	5.86	5.40641	8%	1	5.9								
ISO-SCF-32293-4	1260480	5.89	5.40641	9%	1	5.9								
ARL-21	351376	1.65			2000	3297.6	3281.0	33.75	1.04636	3433.1	3466.4			3-C-1
ARL-21	343323	1.61			2000	3222.4								
ARL-21	354099	1.66			2000	3323.0								
ARL-22	65492	0.32			100	31.6	31.8	33.75	1.04636	33.3				3-C-2
ARL-22	66002	0.32			100	31.8								
ARL-22	66603	0.32			100	32.1								
ARL-23	319713	1.50			2000	3002.2	2927.6	33.01	1.06982	3132.0	3165.7			3-D-1
ARL-23	310818	1.46			2000	2919.3								
ARL-23	304609	1.43			2000	2861.4								
ARL-24	65115	0.31			100	31.4	31.5	33.01	1.06982	33.7				3-D-2
ARL-24	66054	0.32			100	31.8								
ARL-24	64767	0.31			100	31.2								
ISO-SCF-32293-4	1223529	5.72	5.40641	6%	1	5.7								
ISO-SCF-32293-4	1220297	5.70	5.40641	5%	1	5.7								
ISO-SCF-32293-4	1183133	5.70	5.40641	5%										

Sample Name	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample ug	Avg Amt Sample ug	Volume Sampled Cu Ft	Sampling Factor	Adjusted Avg ug	Total Train ug	Amount Spiked ug	Spike Recovery %	Train ID
ARL-25	198810	0.94			2000	1874.6	1831.7	30.60	1.15407	2113.9	2132.1			4-A-1
ARL-25	195931	0.92			2000	1847.7								
ARL-25	187888	0.89			2000	1772.7								
ARL-26	33336	0.17			100	16.6	15.8	30.60	1.15407	18.3				4-A-2
ARL-26	32875	0.16			100	16.3								
ARL-26	29079	0.15			100	14.6								
ARL-27	200805	0.95			2000	1893.2	1864.2	31.17	1.13297	2112.1	2138.7			4-B-1
ARL-27	200538	0.95			2000	1890.7								
ARL-27	191767	0.90			2000	1808.9								
ARL-28	48281	0.24			100	23.5	23.5	31.17	1.13297	26.6				4-B-2
ARL-28	49506	0.24			100	24.1								
ARL-28	46705	0.23			100	22.8								
ISO-SCF-32293-4	1202635	5.62	5.40641	4%	1	5.6								
ISO-SCF-32293-4	1219147	5.70	5.40641	5%	1	5.7								
ARL-29	1001159	4.68			2000	9358.1	9329.4	30.35	1.16358	9626.4	9693.9	7827.81	96.56%	4-C-1
ARL-29	987039	4.61			2000	9226.4								
ARL-29	1006035	4.70			2000	9403.6								
ARL-30	124507	0.59			100	59.1	58.0	30.35	1.16358	67.5				4-C-2
ARL-30	122754	0.58			100	58.3								
ARL-30	119182	0.57			100	56.6								
ARL-31	1004933	4.70			2000	9393.3	9428.7	29.54	1.19549	9774.2	9804.7	7827.81	97.97%	4-D-1
ARL-31	1018359	4.76			2000	9518.5								
ARL-31	1002870	4.69			2000	9374.1								
ARL-32	53598	0.26			100	26.0	25.5	29.54	1.19549	30.5				4-D-2
ARL-32	53113	0.26			100	25.8								
ARL-32	50832	0.25			100	24.7								
ISO-SCF-32293-4	1200453	5.61	5.40641	4%	1	5.6								
ISO-SCF-32293-4	1204115	5.63	5.40641	4%	1	5.6								
ISO-SCF-32293-4	1189454	5.56	5.40641	3%	1	5.6								

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Sample Name	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample ug	Avg Amt Sample ug	Volume Sampled Cu Ft	Sampling Factor	Adjusted Avg ug	Total Train ug	Amount Spiked ug	Spike Recovery %	Train ID
ARL-33	1309769	6.12			2000	12236.5	12014.2	34.14	1.03441	12187.3	12233.3	7827.81	89.41%	5-A-1
ARL-33	1323802	6.18			2000	12367.4								
ARL-33	1224229	5.72			2000	11438.7								
ARL-34	103486	0.49			100	49.3	44.5	34.14	1.03441	46.1				5-B-1
ARL-34	103836	0.49			100	49.4								
ARL-34	72585	0.35			100	34.9								
ARL-35	1369996	6.40			2000	12798.3	12588.1	34.70	1.01771	12678.6	12716.7	7827.81	95.59%	5-B-1
ARL-35	1382908	6.46			2000	12918.7								
ARL-35	1289467	6.02			2000	12047.2								
ARL-36	84360	0.40			100	40.4	37.4	34.70	1.01771	38.0				5-B-2
ARL-36	85164	0.41			100	40.7								
ARL-36	64462	0.31			100	31.1								
ISO-SCF-32293-4	1198549	5.60	5.40641	4%	1	5.6								
ISO-SCF-32293-4	1178529	5.51	5.40641	2%	1	5.5								
ARL-37	511915	2.40			2000	4794.9	4809.8	34.46	1.02480	4929.1	4946.9			5-C-1
ARL-37	520667	2.44			2000	4876.5								
ARL-37	507945	2.38			2000	4757.9								
ARL-38	38452	0.18			100	18.0	17.4	34.46	1.02480	17.8				5-C-2
ARL-38	36462	0.18			100	18.0								
ARL-38	32321	0.16			100	16.1								
ARL-39	532851	2.50			2000	4990.2	5054.0	32.59	1.08360	5476.5	5521.9			5-D-1
ARL-39	544154	2.55			2000	5095.6								
ARL-39	542068	2.54			2000	5076.1								
ARL-40	90692	0.43			100	43.3	41.9	32.59	1.08360	45.4				5-D-2
ARL-40	82975	0.40			100	39.7								
ARL-40	89246	0.43			100	42.6								
ISO-SCF-32293-4	1187611	5.55	5.40641	3%	1	5.5								
ISO-SCF-32293-4	1199484	5.60	5.40641	4%	1	5.6								
ISO-SCF-32293-4	1183133	5.53	5.40641	2%	1	5.5								

Sample Name	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample ug	Avg Amt Sample ug	Volume Sampled Cu Ft	Sampling Factor	Adjusted Avg ug	Total Train ug	Amount Spiked ug	Spike Recovery %	Train ID
ARL-41	861252	4.03			2000	8053.2	7887.9	35.10	1.00612	7936.1	8041.6			6-A-1
ARL-41	860232	4.02			2000	8043.7								
ARL-41	809094	3.78			2000	7566.7								
ARL-42	227095	1.07			100	106.9	104.8	35.10	1.00612	105.4				6-A-2
ARL-42	228142	1.07			100	107.4								
ARL-42	212430	1.00			100	100.1								
ARL-43	815730	3.81			2000	7628.6	7488.0	35.17	1.00411	7518.8	7607.6			6-B-1
ARL-43	825689	3.86			2000	7721.5								
ARL-43	760533	3.56			2000	7113.8								
ARL-44	193894	0.91			100	91.4	88.5	35.17	1.00411	88.8				6-B-2
ARL-44	197908	0.93			100	93.3								
ARL-44	170746	0.81			100	80.6								
ISO-SCF-32293-4	1189088	5.56	5.40641	3%	1	5.6								
ISO-SCF-32293-4	1190921	5.56	5.40641	3%	1	5.6								
ARL-45	1656820	7.74			2000	15473.5	15201.1	34.49	1.02391	15381.5	15471.2	7827.81	97.69%	6-C-1
ARL-45	1652121	7.71			2000	15429.7								
ARL-45	1573883	7.35			2000	14700.0								
ARL-46	187832	0.89			100	88.6	87.6	34.49	1.02391	89.7				6-C-2
ARL-46	195647	0.92			100	92.3								
ARL-46	173379	0.82			100	81.9								
ARL-47	1649873	7.70			2000	15408.7	15173.2	33.78	1.04543	15509.0	15609.8	7827.81	99.46%	6-D-1
ARL-47	1634325	7.63			2000	15263.7								
ARL-47	1589678	7.42			2000	14847.3								
ARL-48	220417	1.04			100	103.8	96.3	33.78	1.04543	100.7				6-D-2
ARL-48	206802	0.97			100	97.5								
ARL-48	186023	0.88			100	87.8								
ISO-SCF-32293-4	1205054	5.63	5.40641	4%	1	5.6								
ISO-SCF-32293-4	1195876	5.59	5.40641	3%	1	5.6								
ISO-SCF-32293-4	1183664	5.53	5.40641	2%	1	5.5								

Sample Name	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample ug	Avg Amt Sample ug	Volume Sampled Cu Ft	Sampling Factor	Adjusted Avg ug	Total Train ug	Amount Spiked ug	Spike Recovery %	Train ID
ARL-49	1081312	5.05			2000	10105.7	10094.4	31.11	1.13515	10398.3	10450.0	7827.81	100.45%	7-A-1
ARL-49	1074952	5.02			2000	10016.4								
ARL-49	1084020	5.07			2000	10131.0								
ARL-50	98427	0.47			100	46.9	45.6	31.11	1.13515	51.8				7-A-2
ARL-50	96270	0.46			100	45.9								
ARL-50	92145	0.44			100	44.0								
ARL-51	963252	4.50			2000	9001.6	9002.6	31.94	1.10566	9246.5	9290.2	7827.81	85.63%	7-B-1
ARL-51	970463	4.54			2000	9071.8								
ARL-51	955412	4.47			2000	8931.4								
ARL-52	83965	0.40			100	40.2	39.5	31.94	1.10566	43.6				7-B-2
ARL-52	83998	0.40			100	40.2								
ARL-52	79455	0.38			100	38.1								
ISO-SCF-32293-4	1194001	5.58	5.40641	3%	1	5.6								
ISO-SCF-32293-4	1201282	5.61	5.40641	4%	1	5.6								
ARL-53	230346	1.08			2000	2168.7	2159.8	30.14	1.17169	2530.6	2557.9			7-C-1
ARL-53	232911	1.10			2000	2192.6								
ARL-53	224911	1.06			2000	2118.0								
ARL-54	49290	0.24			100	24.0	23.3	30.14	1.17169	27.3				7-C-2
ARL-54	49749	0.24			100	24.2								
ARL-54	44499	0.22			100	21.8								
ARL-55	237247	1.12			2000	2233.1	2180.2	29.91	1.18070	2574.2	2616.4			7-D-1
ARL-55	228829	1.08			2000	2154.5								
ARL-55	228660	1.08			2000	2153.0								
ARL-56	75486	0.36			100	36.2	35.8	29.91	1.18070	42.3				7-D-2
ARL-56	75034	0.36			100	36.0								
ARL-58	73273	0.35			100	35.2								
ISO-SCF-32293-4	1201622	5.61	5.40641	4%	1	5.6								
ISO-SCF-32293-4	1192039	5.57	5.40641	3%	1	5.6								
ISO-SCF-32293-4	1184281	5.53	5.40641	2%	1	5.5								

Sample Name	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample ug	Avg Amt Sample ug	Volume Sampled Cu Ft	Sampling Factor	Adjusted Avg ug	Total Train ug	Amount Spiked ug	Spike Recovery %	Train ID
ARL-57	374801	1.76			2000	3516.0	(3520.7	30.89	1.14324	4025.0	4086.0			8-A-1
ARL-57	377410	1.77			2000	3540.4								
ARL-57	373681	1.75			2000	3505.6								
ARL-58	111353	0.53			100	52.9	53.4	30.89	1.14324	61.0				8-A-2
ARL-58	112493	0.53			100	53.5								
ARL-58	113066	0.54			100	53.7								
ARL-59	406883	1.91			2000	3815.3	3805.4	29.73	1.18785	4520.2	4579.2			8-B-1
ARL-59	401924	1.88			2000	3769.0								
ARL-59	408657	1.92			2000	3811.8								
ARL-60	105005	0.50			100	50.0	49.7	29.73	1.18785	59.0				8-B-2
ARL-60	104950	0.50			100	50.0								
ARL-60	102971	0.49			100	49.0								
ISO-SCF-32293-4	1197542	5.59	5.40641	3%	1	5.6								
ISO-SCF-32293-4	1200068	5.61	5.40641	4%	1	5.6								
ISO-SCF-32293-4	1190471	5.56	5.40641	3%	1	5.6								
ARL-61	1137017	5.31			2000	10625.3	10561.2	30.49	1.15824	11144.9	11197.4	7827.81	88.46%	8-C-1
ARL-61	1120589	5.24			2000	10471.9								
ARL-61	1132853	5.29			2000	10586.4								
ARL-62	94647	0.45			100	45.2	45.3	30.49	1.15824	52.5				8-C-2
ARL-62	95991	0.46			100	45.8								
ARL-62	94335	0.45			100	45.0								
ARL-63	1108755	5.18			2000	10361.7	10314.5	31.95	1.10531	10721.6	10770.2	7827.81	83.01%	8-D-1
ARL-63	1096270	5.12			2000	10245.2								
ARL-63	1106072	5.17			2000	10336.7								
ARL-64	92259	0.44			100	44.0	44.0	31.95	1.10531	48.6				8-D-2
ARL-64	92558	0.44			100	44.2								
ARL-64	91687	0.44			100	43.8								
ISO-SCF-32293-4	1186551	5.54	5.40641	3%	1	5.5								
ISO-SCF-32293-4	1187157	5.55	5.40641	3%	1	5.5								
ISO-SCF-32293-4	1196473	5.59	5.40641	3%	1	5.6								

Sample Name	FILE	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample	Avg Amt Sample	Amount Spiked	Spike Recovery	Train ID
ISO-SCF-32293-4	S3083F4	1263013	5.90	5.41	9%	1	5.9	5.9			QC
ISO-SCF-32293-4	S3083F5	1253783	5.86	5.41	8%	1	5.9				
ISO-SCF-32293-4	S3083F6	1249399	5.84	5.41	8%	1	5.8				
ARL-81	S3083F19	30452	0.15			10	1.5	1.6			FBA
ARL-81	S3083F20	31446	0.16			10	1.6				
ARL-81	S3083F21	33523	0.17			10	1.7				
ARL-104	S3083F22	809699	3.79			2000	7572.4	7569.9	7827.81	97%	FS-1
ARL-104	S3083F23	808659	3.78			2000	7562.7				
ARL-104	S3083F24	809952	3.79			2000	7574.7				
ISO-SCF-32293-4	S3083F25	1255771	5.87	5.41	9%	1	5.9	5.8			QC
ISO-SCF-32293-4	S3083F26	1251918	5.85	5.41	8%	1	5.8				
ISO-SCF-32293-4	S3083F27	1242330	5.80	5.41	7%	1	5.8				
ARL-82	S3083F40	16055	0.08			10	0.8	0.9			FBA
ARL-82	S3083F41	16597	0.09			10	0.9				
ARL-82	S3083F42	16113	0.09			10	0.9				
ARL-105	S3083F43	832058	3.89			2000	7780.9	7686.3	7827.81	98%	FS-2
ARL-105	S3083F44	822507	3.85			2000	7691.8				
ARL-105	S3083F45	811167	3.79			2000	7586.1				
ISO-SCF-32293-4	S3083F46	1238919	5.79	5.41	7%	1	5.8	5.8			QC
ISO-SCF-32293-4	S3083F47	1245039	5.82	5.41	8%	1	5.8				
ISO-SCF-32293-4	S3083F48	1235673	5.77	5.41	7%	1	5.8				
ARL-83	S3084F13	163746	0.77			10	7.7	7.7			FBB
ARL-83	S3084F14	162706	0.77			10	7.7				
ARL-83	S3084F15	164806	0.78			10	7.8				
ARL-106	S3084F16	869707	4.07			2000	8132.1	8120.1	7827.81	104%	MS-1
ARL-106	S3084F17	867360	4.06			2000	8110.2				
ARL-106	S3084F18	868206	4.06			2000	8118.1				
ISO-SCF-32293-4	S3084F19	1220899	5.70	5.41	6%	1	5.7	5.7			QC
ISO-SCF-32293-4	S3084F20	1232005	5.76	5.41	6%	1	5.8				
ISO-SCF-32293-4	S3084F21	1230936	5.75	5.41	6%	1	5.8				
ARL-84	S3084F34	33054	0.16			10	1.6	1.6			FBB
ARL-84	S3084F35	32381	0.16			10	1.6				
ARL-84	S3084F36	32300	0.16			10	1.6				

Sample Name	FILE	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample	Avg Amt Sample	Amount Spiked	Spike Recovery	Train ID
ARL-107	S3084F37	829745	3.88			2000	7759.3	7837.5	7827.81	100%	MS-2
ARL-107	S3084F38	838117	3.92			2000	7837.4				
ARL-107	S3084F39	846508	3.96			2000	7915.7				
ISO-SCF-32293-4	S3084F40	1246426	5.82	5.41	8%	1	5.8	5.8			QC
ISO-SCF-32293-4	S3084F41	1237852	5.78	5.41	7%	1	5.8				
ISO-SCF-32293-4	S3084F42	1239959	5.79	5.41	7%	1	5.8				
ARL-85	S3085F19	75475	0.36			10	3.6	3.6			FBC
ARL-85	S3085F20	75608	0.36			10	3.6				
ARL-85	S3085F21	72681	0.35			10	3.5				
ARL-108	S3085F22	847084	3.96			2000	7921.1	7890.2	7827.81	101%	MS-3
ARL-108	S3085F23	836897	3.91			2000	7826.0				
ARL-108	S3085F24	847337	3.96			2000	7923.4				
ISO-SCF-32293-4	S3085F25	1263449	5.90	5.41	9%	1	5.9	5.9			QC
ISO-SCF-32293-4	S3085F26	1253499	5.86	5.41	8%	1	5.9				
ISO-SCF-32293-4	S3085F27	1260480	5.89	5.41	9%	1	5.9				
ARL-86	S3085F40	59577	0.29			10	2.9	2.8			FBC
ARL-86	S3085F41	56343	0.27			10	2.7				
ARL-86	S3085F42	59626	0.29			10	2.9				
ARL-109	S3085F43	851309	3.98			2000	7960.5	7944.8	7827.81	101%	MS-4
ARL-109	S3085F44	850793	3.98			2000	7955.6				
ARL-109	S3085F45	846800	3.96			2000	7918.4				
ISO-SCF-32293-4	S3085F46	1245663	5.82	5.41	8%	1	5.8	4.0			QC
ISO-SCF-32293-4	S3085F47	0	0.01	5.41	-100%	1	0.0				
ISO-SCF-32293-4	S3085F48	1296988	6.06	5.41	12%	1	6.1				
ISO-SCF-32293-4	S3098F1	1158548	5.41	5.41	0%	1	5.4				
ARL-89	S3098F2	0	0.01			10	0.1	0.1			T-RB1
ARL-89	S3098F3	0	0.01			10	0.1				
ARL-89	S3098F4	0	0.01			10	0.1				
ARL-90	S3098F5	0	0.01			10	0.1	0.3			T-RB2
ARL-90	S3098F6	5758.5	0.04			10	0.4				
ARL-90	S3098F7	5887.5	0.04			10	0.4				
ARL-91	S3098F8	0	0.01			10	0.1	0.2			T-RB3
ARL-91	S3098F9	3273	0.03			10	0.3				
ARL-91	S3098F10	0	0.01			10	0.1				

Sample Name	FILE	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample	Avg Amt Sample	Amount Spiked	Spike Recovery	Train ID
ARL-92	S3098F11	26246	0.13			10	1.3	1.2			T-RB4
ARL-92	S3098F12	22009.06	0.12			10	1.2				
ARL-92	S3098F13	22154	0.11			10	1.1				
ISO-SCF-32293-4	S3098F14	1202486	5.62	5.41	4%	1	5.6	5.7			QC
ISO-SCF-32293-4	S3098F15	1212015	5.66	5.41	5%	1	5.7				
ISO-SCF-32293-4	S3098F16	1220969	5.70	5.41	6%	1	5.7				
ARL-94	S3098F17	0	0.01			10	0.1	0.2			A-RB1
ARL-94	S3098F18	5431	0.04			10	0.4				
ARL-94	S3098F19	0	0.01			10	0.1				
ARL-95	S3098F20	0	0.01			10	0.1	0.1			A-RB2
ARL-95	S3098F21	0	0.01			10	0.1				
ARL-95	S3098F22	0	0.01			10	0.1				
ARL-96	S3098F23	6352.5	0.04			10	0.4	0.4			A-RB3
ARL-96	S3098F24	6436	0.04			10	0.4				
ARL-96	S3098F25	5886	0.04			10	0.4				
ARL-97	S3098F26	25606	0.13			10	1.3	0.8			A-RB4
ARL-97	S3098F27	21034	0.11			10	1.1				
ARL-97	S3098F28	0	0.01			10	0.1				
ISO-SCF-32293-4	S3098F29	1164624	5.44	5.41	1%	1	5.4	5.4			QC
ISO-SCF-32293-4	S3098F30	1159319	5.42	5.41	0%	1	5.4				
ISO-SCF-32293-4	S3098F31	1149310	5.37	5.41	-1%	1	5.4				
ARL-99	S3098F32	0	0.01			10	0.1	0.1			ABS-RB
ARL-99	S3098F33	0	0.01			10	0.1				
ARL-99	S3098F34	0	0.01			10	0.1				
ARL-100	S3098F35	0	0.01			10	0.1	0.1			ABS-RB
ARL-100	S3098F36	0	0.01			10	0.1				
ARL-100	S3098F37	0	0.01			10	0.1				
ARL-101	S3098F38	15010.13	0.08			10	0.8	0.9			ABS-RB
ARL-101	S3098F39	15823	0.08			10	0.8				
ARL-101	S3098F40	23127	0.12			10	1.2				
ARL-102	S3098F41	0	0.01			10	0.1	0.1			ABS-RB
ARL-102	S3098F42	0	0.01			10	0.1				
ARL-102	S3098F43	0	0.01			10	0.1				

Sample Name	FILE	AREA	AMOUNT ug/mL	QC Con ug/mL	QC Bias %	Dilution Factor	Amount Sample	Avg Amt Sample	Amount Spiked	Spike Recovery	Train ID
ISO-SCF-32293-4	S3098F44	1187727	5.55	5.41	3%	1	5.5	5.6			QC
ISO-SCF-32293-4	S3098F45	1199251	5.60	5.41	4%	1	5.6				
ISO-SCF-32293-4	S3098F46	1206006	5.63	5.41	4%	1	5.6				
ARL-117	S3098F47	4701	0.03			10	0.3	0.3			MB-1
ARL-117	S3098F48	4680.5	0.03			10	0.3				
ARL-117	S3098F49	5001	0.03			10	0.3				
ARL-118	S3098F50	204000	0.96			10	9.6	9.7			MB-2
ARL-118	S3098F51	207157	0.98			10	9.8				
ARL-118	S3098F52	207481	0.98			10	9.8				
ARL-119	S3098F53	446217.5	2.09			10	20.9	20.7			MB-3
ARL-119	S3098F54	427833.1	2.01			10	20.1				
ARL-119	S3098F55	452112	2.12			10	21.2				
ISO-SCF-4893-1	S3098F56	1164164	5.44	5.41	1%	1	5.4	5.5			QC
ISO-SCF-4893-1	S3098F57	1176245	5.50	5.41	2%	1	5.5				
ISO-SCF-4893-3	S3098F58	1160212	5.42	5.41	0%	1	5.4				

J-120

2,4-TDI Summary Information

Amount of 2,4-TDI Spiked into the trains: 7827.81 ug

Percent Recovery for Spiked Quad Trains

Quad No.	1		2		3		4		5		6		7		8			
Train ID	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	Average	RSD
% Recovery	95.69%	86.10%	89.16%	95.22%	106.14%	111.93%	96.56%	97.97%	89.41%	95.59%	97.69%	99.46%	100.45%	85.63%	88.48%	83.01%	95%	8%
Total ug	12263	11520	13258	13733	11625	12076	9694	9805	12233	12717	15471	15610	10450	9290	11197	10770	11962	16%

Amount Collected in Unspiked Quad Trains

Quad No.	1		2		3		4		5		6		7		8			
Train ID	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	Average	RSD
Total ug	4735	4811	6287	6270	3466	3166	2132	2139	4947	5522	8042	7608	2558	2618	4088	4579	4560	41%

Percent Carry over from 1st Impinger in Spiked Quad Trains

Quad No.	1		2		3		4		5		6		7		8			
Train ID	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	Average	RSD
1st Impinger	98.48%	99.21%	99.21%	98.97%	99.02%	99.11%	96.38%	98.46%	98.95%	99.22%	98.83%	98.71%	98.03%	97.02%	98.44%	98.35%	98.52%	0.81%
2nd Impinger	1.52%	0.79%	0.79%	1.03%	0.98%	0.89%	3.62%	1.54%	1.05%	0.78%	1.17%	1.29%	1.97%	2.98%	1.56%	1.65%	1.48%	54.38%

Percent Carry over from 1st Impinger in Unspiked Quad Trains

Quad No.	1		2		3		4		5		6		7		8			
Train ID	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	Average	RSD
1st Impinger	99.59%	98.11%	98.81%	99.24%	99.04%	98.94%	99.14%	98.76%	99.64%	99.18%	98.69%	98.83%	98.93%	98.38%	98.51%	98.71%	98.91%	0.41%
2nd Impinger	0.41%	1.89%	1.19%	0.76%	0.96%	1.06%	0.86%	1.24%	0.36%	0.82%	1.31%	1.17%	1.07%	1.62%	1.49%	1.29%	1.09%	37.05%

AREAL WA 55 -- Method 301 Results

Using Modified Data

Run	Train				Amount	Precision of UNSpiked Samples			
#	A	B	C	D	Spiked	Diff	STDu	STDm	RSD
1	12263.0	11520.0	4735.0	4811.0	7827.81	-76.00	216.596	30.942	4.721
2	6287.0	6270.0	13258.0	13733.0	7827.81	17.00			
3	11625.0	12078.0	3466.0	3166.0	7827.81	300.00			
4	2132.0	2139.0	9694.0	9805.0	7827.81	-7.00			
5	12233.0	12717.0	4947.0	5522.0	7827.81	-575.00			
6	8084.0	7608.0	15471.0	15610.0	7827.81	476.00			
7	10450.0	9290.0	2557.0	2616.0	7827.81	-59.00			

AREAL WA 55 -- Method 301 Results

Using Modified Data

Run	Train				Amount	Precision of Spiked Samples				Bias				
#	A	B	C	D	Spiked	Diff	SDs	SDm	RSD	Run	Compound	SD	t Test	CF
1	12263.0	11520.0	4735.0	4811.0	7827.81	743.00	430.48	162.71	3.55	-709.31	-295.41	481.90	-1.622	N/A
2	6287.0	6270.0	13258.0	13733.0	7827.81	-475.00				-610.81			^	
3	11625.0	12078.0	3466.0	3166.0	7827.81	-453.00				707.69			|	
4	2132.0	2139.0	9694.0	9805.0	7827.81	-111.00				-213.81			critical Value	
5	12233.0	12717.0	4947.0	5522.0	7827.81	-484.00				-587.31			is 2.160	
6	8084.0	7608.0	15471.0	15610.0	7827.81	-139.00				-133.31				
7	10450.0	9290.0	2557.0	2616.0	7827.81	1160.00				-544.31				

AREAL WA 55 -- Method 301 Results

Using Modified Data

Run	Train				Amount	Precision of UNSpiked Samples			
#	A	B	C	D	Spiked	Diff	STDu	STDm	RSD
1	12263.0	11520.0	4735.0	4811.0	7827.81	-76.00	237.150	29.644	5.205
2	6287.0	6270.0	13258.0	13733.0	7827.81	17.00			
3	11625.0	12078.0	3466.0	3166.0	7827.81	300.00			
4	2132.0	2139.0	9694.0	9805.0	7827.81	-7.00			
5	12233.0	12717.0	4947.0	5522.0	7827.81	-575.00			
6	8084.0	7608.0	15471.0	15610.0	7827.81	476.00			
7	10450.0	9290.0	2557.0	2616.0	7827.81	-59.00			
8	4086.0	4579.0	11197.0	10947.0	7827.81	-493.00			

REAL WA 55 -- Method 301 Results
Using Modified Data

...n	Train				Amount	Precision of Spiked Samples				Bias				
#	A	B	C	D	Spiked	Diff	SDs	SDm	RSD	Run	Compound	SD	t Test	CF
1	12263.0	11520.0	4735.0	4811.0	7827.81	743.00	407.50	144.07	3.40	-709.31	-394.53	471.48	-2.367	1.053
2	6287.0	6270.0	13258.0	13733.0	7827.81	-475.00				-610.81			^	
3	11625.0	12078.0	3466.0	3166.0	7827.81	-453.00				707.69			|	
4	2132.0	2139.0	9694.0	9805.0	7827.81	-111.00				-213.81			critical Value	
5	12233.0	12717.0	4947.0	5522.0	7827.81	-484.00				-587.31			is 2.131	
6	8084.0	7608.0	15471.0	15610.0	7827.81	-139.00				-133.31				
7	10450.0	9290.0	2557.0	2616.0	7827.81	1160.00				-544.31				
8	4086.0	4579.0	11197.0	10947.0	7827.81	250.00				-1088.31				

APPENDIX K

CALCULATION EQUATIONS

Report No. 6-8024

LP - SAGOLA
Sagola, Michigan

Oxides of Nitrogen LB/HR Calculations

E-Tube Outlet

RUN	NOx ppm	Flow	LB/DSCF	LB/HR
1	3.2	103228	3.82E-07	2.37
2	2.4	103158	2.87E-07	1.77
3	1.7	103160	2.03E-07	1.26
Avg	2.43			1.80

Dryer RTO Stack

RUN	NOx ppm	Flow	LB/DSCF	LB/HR
1	2.5	99560	2.98E-07	1.78
2	2.8	100405	3.34E-07	2.01
3	3.2	100405	3.82E-07	2.30
Avg	2.83			2.03

Press RTO Inlet

RUN	NOx ppm	Flow	LB/DSCF	LB/HR
1	8.2	64300	9.79E-07	3.78
2	7.6	68979	9.07E-07	3.76
3	6.2	72300	7.4E-07	3.21
Avg	7.33			3.58

Press RTO Stack

RUN	NOx ppm	Flow	LB/DSCF	LB/HR
1	36.3	77990	4.33E-06	20.28
2	34.3	76250	4.1E-06	18.74
3	34.9	77090	4.17E-06	19.27
Avg	35.17			19.43

Carbon Monoxide LB/HR Calculations

E-Tube Outlet

RUN	CO ppm	Flow	LB/DSCF	LB/HR
1	1817	103228	0.000132	817.7
2	1841	103158	0.000134	827.9
3	1851	103160	0.000134	832.5
Avg	1836			826.0

Dryer RTO Stack

RUN	CO ppm	Flow	LB/DSCF	LB/HR
1	212	99560	1.54E-05	92.0
2	234	100405	1.7E-05	102.4
3	241	100405	1.75E-05	105.5
Avg	229			100.0

Press RTO Inlet

RUN	CO ppm	Flow	LB/DSCF	LB/HR
1	5.0	64300	3.63E-07	1.4
2	5.3	68979	3.85E-07	1.6
3	4.4	72300	3.2E-07	1.4
Avg	4.9			1.5

Press RTO Stack

RUN	CO ppm	Flow	LB/DSCF	LB/HR
1	19.2	77990	1.4E-06	6.5
2	24.2	76250	1.76E-06	8.0
3	20.8	77090	1.51E-06	7.0
Avg	21.4			7.2

Report No. 6-8024

LOUISIANA PACIFIC CORPORATION
SAGOLA, MICHIGAN

Total HydroCarbons Calculations

Primary Cyclone Exhaust 1

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
2	1	24.9	1937	26838	129.34				0.5622716
	2	24.3	1796	27141	120.32				0.51721
	3	24.3	1677	27140	112.35				0.4829406
						1803.3333	120.6706		

Primary Cyclone Exhaust 2

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
2	1	25.1	2165	28278	152.73				0.6301335
	2	22.4	2125	29969	153.35				0.5969716
	3	22.4	1840	29970	132.79				0.5169072
						2043.3333	146.2888		

Primary Cyclone Exhaust 3

TEST #	RUN	MC%	CONC (ppmC,w)	GASFLOW (DSCFM)	MASSRATE (LB/HR)	AVERAGE (ppmC,w)	AVERAGE (LB/HR)		(GR/DSCF)
2	1	22.7	3498	27973	236.53				0.9864994
	2	20.8	2595	27234	166.74				0.7142803
	3	20.8	3474	27230	223.18				0.9562273
						3189	208.8168		

Report No. 6-8024

Total HydroCarbons Calculations

Dryer RTO Stack

			CONC	GASFLOW	MASSRATE	AVERAGE		
TEST #	RUN	MC%	(ppmC,w)	(DSCFM)	(LB/HR)	(ppmC,w)	(LB/HR)	(GR/DSCF)
2	1	22.9	24.5	99560	5.91			0.0069274
	2	23.5	8.0	100405	1.96			0.0022797
	3	23.5	18.8	100405	4.61			0.0053574
						17.1	4.161398	

Press RTO Inlet

			CONC	GASFLOW	MASSRATE	AVERAGE		
TEST #	RUN	MC%	(ppmC,w)	(DSCFM)	(LB/HR)	(ppmC,w)	(LB/HR)	(GR/DSCF)
8	1	3.9	705	64300	88.14			0.1599272
	2	2.9	764.0	68979	101.41			0.1715263
	3	3	744	72300	103.62			0.1672082
						737.66667	97.72591	

Press RTO Stack

			CONC	GASFLOW	MASSRATE	AVERAGE		
TEST #	RUN	MC%	(ppmC,w)	(DSCFM)	(LB/HR)	(ppmC,w)	(LB/HR)	(GR/DSCF)
8	1	2.9	11.9	77990	1.79			0.0026717
	2	3.3	19.4	76250	2.86			0.0043735
	3	3.4	6.8	77090	1.01			0.0015346
						12.7	1.886125	

LOUISIANA PACIFIC Report No. 6-8024

Sagola, Michigan

Press RTO Stack

MDI CALCULATIONS

RUN #	TIME (HRS)	Vstd (DSCF)		Mass (ug)	Flow DSCFM		Conc (mg/Nm3)		Conc ppm		Mass Rate (LB/HR)
1	1620-1720	26.3	<	6.2	77991	<	0.008	<	0.0008	<	0.002432
2	1800-1900	25.92	<	6.2	76253	<	0.008	<	0.0008	<	0.002413
3	1935-2035	26.3	<	6.2	77090	<	0.008	<	0.0008	<	0.002404
AVG			<	6.2		<	0.008	<	0.0008	<	0.0024

	LOUISIANA PACIFIC - SAGOLA					Report No. 6-8024			
	Sagola, Michigan								
	Gas Concentration Correction Calculations								
PCE#1		**THC Calculations**							
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	665.39	8.6	1	4.80	287	310	287	299	645.52
3	580.81	2.4	0	1.20	287	270	288	279	598.81
4	547.44	7.65	2.4	5.03	287	280	287	284	559.02
PCE #2									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	705.39	5.5	1	3.25	287	282	283	283	721.63
3	694.91	4	1	2.50	287	282	284	283	708.46
4	586.96	4	1	2.50	287	270	282	276	613.31
PCE #3									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	1124.87	1	2	1.50	287	269	287	278	1166.03
3	844.41	10	0	5.00	287	280	287	284	865.03
4	1143.93	0	0	0.00	287	284	283	284	1158.05
Dryer RTO Stack									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	27.37	0	0	0.00	30	27	30	29	28.81
3	12.36	1	0	0.50	30	29	30	30	12.27
4	22.21	2	0	1.00	30	27	30	29	23.14
Press RTO Inlet									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
1	233.39	0	0	0.00	285	281	285	283	235.04
2	255.7	1	0	0.50	285	287	285	286	254.75
3	252.27	0	0	0.00	285	292	287	290	248.35
Press RTO Stack									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
1	6.30	0	0.4	0.20	30.4	28.6	30.7	30	6.30
2	8.45	0	0	0.00	30.4	28.8	29.5	29	8.81
3	5.11	1.5	0	0.75	30.4	29.2	30.0	30	4.59

	Gas Concentration Correction Calculations								
		NOx Calculations							
E-Tube Outlet									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	4.26	1.3	0.9	1.10	91.9	92.9	91.7	92	3.18
3	3.66	1.3	1.3	1.30	91.9	92.5	92.9	93	2.37
4	2.53	0.4	1.3	0.85	91.9	92.0	92.5	92	1.69
Dryer RTO Stack									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	3.46	1	1	1.00	90.6	90.6	90.6	91	2.49
3	3.79	1	1	1.00	90.6	90.6	90.6	91	2.82
4	3.23	-1	1	0.00	90.6	90.6	90.6	91	3.23
Press RTO Inlet									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
1	9.18	2	0	1.00	90.6	93	90.6	92	8.16
2	8.1	1	0	0.50	90.6	90.6	90.6	91	7.64
3	7.16	1	1	1.00	90.6	92.6	90.6	92	6.16
Press RTO Stack									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
1	36.43	0.2	0.2	0.20	91.9	92.4	91.4	92	36.31
2	34.51	-0.1	0.2	0.05	91.9	92.5	92.4	92	34.27
3	34.88	-0.6	-0.1	-0.35	91.9	92.3	92.5	92	34.91

					LP - Sagola				
	Gas Concentration Correction Calculations								
		CO Calculations							
E-Tube Outlet									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	1805	3	-1	1.00	620	617	616	617	1817.19
3	1824	1	3	2.00	620	614	617	616	1841.30
4	1829	0	1	0.50	620	612.0	614	613	1850.89
Dryer RTO Stack									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	210.73	0	2	1.00	147	146	147	147	211.89
3	232.69	0	0	0.00	147	146	146	146	234.28
4	242.44	0	0	0.00	147	150.0	146	148	240.80
Press RTO Inlet									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
1	5.01	0	0	0.00	147	145	147	146	5.04
2	5.23	0	0	0.00	147	144	145	145	5.32
3	4.32	0	0	0.00	147	145.0	144	145	4.39
Press RTO Stack									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(ppm,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
1	18.88	0	0	0.00	143.3	140.2	141.5	141	19.21
2	23.37	-0.6	0	-0.30	143.3	139.8	140.2	140	24.18
3	19.73	-0.6	-0.6	-0.60	143.3	139.6	139.8	140	20.76

	Gas Concentration Correction Calculations								
		O2 Calculations							
E-Tube Outlet									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(%v/v,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	17.38	0	0	0.00	13.5	13.4	13.5	13	17.44
3	17.29	0	0	0.00	13.5	13.4	13.4	13	17.42
4	17.34	0	0	0.00	13.5	13.4	13.4	13	17.47
Dryer RTO Stack									
	Cbar				*Cma*				
	OUR CONC	**ZERO**	**ZERO**		**CONC**	**Upscale**	**Upscale**		
RUN #	(%v/v,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	16.95	0	0	0.00	13.5	13.5	13.5	14	16.95
3	16.98	0	0	0.00	13.5	13.6	13.5	14	16.92
4	16.54	0	0	0.00	13.5	13.5	13.5	14	16.54

	Gas Concentration Correction Calculations								
		CO2 Calculations							
E-Tube Outlet									
	Cbar				*Cma*				
	OUR CONC	ZERO	ZERO		CONC	Upscale	Upscale		
RUN #	(%V/V,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	3.17	0.2	0	0.10	10.8	10.9	10.8	11	3.08
3	3.12	0.2	0.2	0.20	10.8	10.9	10.9	11	2.95
4	3.05	0.2	0.2	0.20	10.8	10.8	10.9	11	2.89
Dryer RTO Stack									
	Cbar				*Cma*				
	OUR CONC	ZERO	ZERO		CONC	Upscale	Upscale		
RUN #	(%V/V,d)	(Final)	(Initial)	*Co*	(Upscale)	(Final)	(Initial)	*Cm*	*Cgas*
2	3.44	0	0	0.00	10.8	10.8	10.8	11	3.44
3	3.44	0	0	0.00	10.8	10.7	10.8	11	3.46
4	3.37	0	0	0.00	10.8	10.7	10.8	11	3.39

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.

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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, %

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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

$$V_{m(std)} = 17.65 \; V_m \; \gamma \; \left(\frac{P_{bar} + \overline{\Delta H}/13.6}{T_{m(avg)}}\right)$$

$$V_{w(std)} = 0.0472 \; V_{ls}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

$$I = 0.0944 \; \left(\frac{T_{s(avg)} \; V_{m(std)}}{P_s \; V_s \; A_n \; \theta \; (I - B_{ws})}\right)$$

$$C_s = \frac{15.43 \; M_p}{V_{m(std)}}$$

$$C_a = \frac{272.3 \; M_p \; P_s}{T_{s(avg)} \; (V_{w(std)} + V_{m(std)})}$$

$$(\dot{m}_p)_1 = 8.5714 \; x \; 10^{-3} \; C_s \; Q_{s,\,d}$$

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$$(\dot{m}_p)_2 = \frac{1.3228 \ x \ 10^{-1} \ M_p \ A}{\theta \ A_n}$$

$$\dot{m}_p = \frac{(\dot{m}_p)_1 + (\dot{m}_p)_2}{2}$$

METHOD 6

$$V_{std} = 17.64 \frac{V_m P_b \gamma}{T_m} \text{ (MIDGET IMPINGER VERSION)}$$

$$V_{std} = \frac{17.64\ V_m \left(P_b + \frac{\overline{\Delta H}}{13.6}\right)\gamma}{T_m} \text{ (LARGE IMPINGER VERSION)}$$

$$MEQ = (V_t - V_{tb})\ N \left(\frac{V_{soln}}{V_a}\right) DF$$

$$C_s = \frac{7.06 \times 10^{-5}\ MEQ}{V_{std}}$$

$$E = \frac{20.90\ C_s F_d}{20.90 - \overline{B}'_{O_2}} = \frac{F_c C_s}{\overline{B}'_{CO_2}}$$

$$C_s\ (MG/DSCM) = 1.60186 \times 10^7\ C_s$$

$$C_s\ (GR/DSCF) = 7000\ C_s$$

$$C_s\ (ppm, dry) = 6.02119 \times 10^6\ C_s$$

$$C_s\ (ppm, wet) = 6.02119 \times 10^6\ C_s \left(1 - \frac{MC}{100}\right)$$

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SYMBOLS

$\bar{B}\ O_2$	=	Average oxygen content in flue gas, % v/v, dry
$\bar{B}\ CO_2$	=	Average carbon dioxide content in flue gas, % v/v, dry
C_s	=	Concentration of sulfur dioxide in flue gas, dry basis, corrected to standard conditions, LB/DSCF
C_s (GR/DSCF)	=	Concentration of sulfur dioxide in flue gas, dry basis, corrected to standard conditions, GR/DSCF
C_s (MG/DSCM)	=	Concentration of sulfur dioxide in flue gas, dry basis, corrected to standard conditions, MG/DSCM
DF	=	Dilution Factor
E	=	Emission factor, LB of $SO_2/10^6$BTU
Fd	=	Dry oxygen F-Factor for given fuel type, DSCF/10^6BTU
Fc	=	Carbon dioxide F-Factor for given fuel type, DSCF/10^6BTU
ΔH	=	Average pressure drop across calibrated orifice. IN. W.C.
Υ	=	Dry test meter correction factor, dimensionless
MC	=	Moisture content of flue gas, % v/v
MEQ	=	Total milliequivalents of SO_2 in gas sample
N	=	Normality of barium perchlorate titrant
P_b	=	Barometric pressure at the dry gas meter, IN. HG.
C_s (ppm-dry)	=	Concentration of sulfur dioxide in flue gas, dry basis, (v/v), ppm
C_s (ppm-wet)	=	Concentration of sulfur dioxide in flue gas, wet basis, (v/v), ppm
T_m	=	Absolute average dry gas meter temperature, °R
V_a	=	Volume of sample aliquot titrated, cc
V_m	=	Dry gas volume as measured by the dry gas meter, DCF
V_{std}	=	Dry gas volume as measured by the dry gas meter, corrected to standard conditions (at 68 °F and 1 atmosphere), DSCF

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V_{soln} = Total volume of the solution in which the sulfur dioxide sample is contained, cc

V_t = Volume of barium perchlorate titrant used for the sample, cc (average of replicate titrations)

V_{tb} = Volume of barium perchlorate titrant used for the blank, cc

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CALCULATION EQUATIONS

METHOD 7

$$V_{m(std)} = 17.64\ (V_f - 25)\ [\frac{P_f}{T_f} - \frac{P_i}{T_i}]$$

$$C_s = 6.243\ x\ 10^{-5}\ \frac{M}{V_{m(std)}}$$

$$E = \frac{2090\ C_s F}{20.9 - \overline{B}'_{O_2}}$$

$$C_s\ (GR/DSCF) = 7000\ C_s$$

$$C_s\ (MG/DSCM) = 1.60186\ x\ 10^7\ C_s$$

$$C_s\ (ppm\text{-}dry) = 8.37552\ x\ 10^6\ C_s$$

$$C_s\ (ppm\text{-}3\%\ O_2) = 8.37552\ x\ 10^6\ C_s\ \{1 + [\frac{\overline{B}'_{O_2} - 3}{20.9 - B'_{O_2}}]\}$$

$$C_s\ (ppm\text{-}wet) = 8.37552\ x\ 10^6\ C_s\ (1 - \frac{MC}{100})$$

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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

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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)

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METHOD 25A

Total Gaseous Organics Calculation Equation

GR C/SCF = 2.180×10^{-4} (ppm, w)

GR C/DSCF = 2.180×10^{-4} (ppm, w)/(1-MC/100)

LB C/HR = 8.5714×10^{-3} (GR/DSCF) (DSCFM)

where:

GR C/SCF = grains of total gaseous organics as carbon per actual (wet) standard cubic foot

GR C/DSCF = grains of total gaseous organics as carbon per dry standard cubic foot

LB C/HR = pounds of total gaseous organics as carbon emitted per hour

Note 1: The Ratfisch Model RS 55 Heated FID Analyzer as normally operated with a heated filter, sample line and heated detector oven gives ppm, w.

Note 2: ppm, C = ppm as carbon = 3(ppm propane)

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CALCULATION EQUATIONS

Gas Chromatographic Method for Phenol in Air

PPM·DRY $= \frac{9.03 \times 10^{-3}\, m_t}{V_{std}}$

PP·WET = PPM·DRY (1-MC/100)

GR/DSCF $= 1.709 \times 10^{-3}$ (PPM·DRY)

mg/dscm = 3.913 (PPM·DRY)

$\dot{m}$ $= 8.5714 \times 10^{-3}$ (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)

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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
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

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INTERPOLL LABORATORIES, INC

Concentration Calculation Equations for MDI

1. Structure:	2. Molecular weight: 250.26 g/g-mole

3. Mass/volume Concentration:

$$Cug/Nm3 = \frac{35.314\ m}{Vstd}$$

where m = Total mass of MDI in sample in micrograms (ug), and

Vstd = Total volume of exhaust gas or air sampled in dry standard cubic feet (DSCF).

4. Volume/volume Concentration:

$$Cppmv = \left(\frac{24.054\ ul}{250.26\ ug}\right)\left(\frac{1 Nm^3}{1000 L}\right)\left(\frac{35.314\ m}{Vstd}\right)$$

$$Cppmv = (9.612 \times 10^{-5})\ Cug/Nm3$$

5. Notes: * see Excel spreadsheet: G:\STACK\EXCEL\TEMPLATE\MDI.TEM

Derived by: Sheri P.	Date: 4-27-95

Form S-511

APPENDIX L

SAMPLING TRAIN CALIBRATION DATA

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job: LP SAGOLA   Date: 7-24-96

Operator: S.BAINVILLE   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 28.31 in.Hg θ = .9957 ΔH@ 1.78 in.WC.

Time (min)	Volume (CF)	Meter Temp (°F)	
		Inlet	Outlet
	(933.00)		
2.5	934.87	71	64
5.0	936.75	73	68
7.5	938.65	73	68
10	940.66	74	69
	V_m = 7.66	Avg(t_m) = 70	°F

Calculate Y_{qa} as follows:

$$Y_{qa} = \frac{1.786}{\theta\, V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{qa} = \frac{1.786}{(.9957)\,(7.66)}\left[\frac{(70) + 460}{(28.31)}\right]^{0.5}$$

Y_{qa} = 1.013

If Y_{qa} 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, INC.
(612) 786-6020

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job: L.P. Sagola — Date: 7-22-96

Operator: ES — Module No.: 5

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 28.32 in.Hg θ = 1.0032 ΔH@ 1.77 in.WC

Time (min)	Volume (CF)	Meter Temp (°F)	
		Inlet	Outlet
	(356.50)		
2.5	358.49	93	89
5.0	360.46	95	89
7.5	362.45	97	90
10	364.44	98	91
	V_m = 7.94	Avg(t_m) = 92.75 °F	

Calculate Y_{cm} as follows:

$$Y_{cm} = \frac{1.786}{\theta\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cm} = \frac{1.786}{(1.0032)\ (7.94)}\left[\frac{(92.75) + 460}{(28.32)}\right]^{0.5}$$

Y_{cm} = .991

If Y_{cm} 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, INC.
(612) 786-6020

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job LP/Sagola, MI Date 7-23-96

Operator D. Hulleman Module No. 5

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 28.33 in.Hg θ = 1.0056 ΔH@ 1.80 in.WC.

Time (min)	Volume (CF)	Meter Temp (°F)	
		Inlet	Outlet
	(929.60)		
2.5	931.55	66	63
5.0	933.47	68	63
7.5	935.42	72	64
10	937.35	74	65
	V_m = 7.75	Avg(t_m) =	67.12 °F

Calculate Y_{cm} as follows:

$$Y_{cm} = \frac{1.786}{\theta\ V_m} \left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cm} = \frac{1.786}{(1.0056)\ (7.75)} \left[\frac{(67.12) + 460}{(28.33)}\right]^{0.5}$$

Y_{cm} = .99

If Y_{cm} 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, INC.
(612) 786-6020

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job L.I.P. / Saginaw, MI   Date 7-23-96
Operator M. Koehler   Module No. 10

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 28.35 in.Hg θ= .9973 ΔH@ 1.93 in.WC.

Time (min)	Volume (CF)	Meter Temp (°F)	
		Inlet	Outlet
	(529.00)		
2.5	530.98	70	70
5.0	532.97	70	70
7.5	534.95	72	70
10	536.93	74	70
	V_m = 7.93	Avg(t_m) = 70.75 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\theta\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9973)\ (7.93)}\left[\frac{(70.75) + 460}{(28.35)}\right]^{0.5}$$

Y_{cn} = .977

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, INC.
(612) 786-6020

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job L.P. / Sagola, MI Date 7-24-96
Operator M. Kaehler Module No. 10

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 28.31 in.Hg θ= .9973 ΔH@ 1.93 in.WC.

Time (min)	Volume (CF)	Meter Temp (°F)	
		Inlet	Outlet
	(840.60)		
2.5	842.58	78	77
5.0	844.53	80	77
7.5	846.50	83	77
10	848.39	85	77
	V_m = 7.79	$Avg(t_m)$ = 79.25 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\theta\ V_m} \left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9973)\ (7.79)} \left[\frac{(79.25) + 460}{(28.31)}\right]^{0.5}$$

Y_{cn} = 1.003

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, INC.
(612) 786-6020

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job L.P. / Sagola, MI Date 7-25-96
Operator M. Kaehler Module No. 10

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 28.45 in.Hg θ= .9973 ΔH@ 1.93 in.WC.

Time (min)	Volume (CF)	Meter Temp (°F)	
		Inlet	Outlet
	(8.40)		
2.5	10.43	77	77
5.0	12.33	78	77
7.5	14.26	80	77
10	16.18	81	77
	V_m = 7.78	Avg(t_m) = 78.00	°F

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\theta\ V_m} \left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9973)\ (7.78)} \left[\frac{(78.00) + 460}{(28.45)}\right]^{0.5}$$

Y_{cn} = 1.001

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, INC.
(612) 786-6020

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job LP/Sagola — Date 7-22-96

Operator S. Fjelsta — Module No. 13

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 28.33 in.Hg θ= 1.0029 ΔH@ 1.84 in.WC.

Time (min)	Volume (CF)	Meter Temp (°F)	
		Inlet	Outlet
	(702.50)		
2.5	704.45	88	88
5.0	706.36	91	88
7.5	708.33	93	88
10	710.24	96	88
	V_m = 7.74	$Avg(t_m)$ = 90 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\theta\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(\quad)(\quad)}\left[\frac{(\quad) + 460}{(\quad)}\right]^{0.5}$$

Y_{cn} = 1.01377

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, INC.
(612) 786-6020

EPA Method 5 Gas Metering System Quality Control Check Data Sheet

Job LP/SAGOLA Date 7-23-96

Operator J.B Module No. 15

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 28.31 in.Hg θ = .9964 ΔH@ 1.79 in.WC.

Time (min)	Volume (CF)	Meter Temp (°F)	
		Inlet	Outlet
	(519.21)		
2.5	521.12	68	68
5.0	523.04	69	69
7.5	524.95	71	70
10	526.87	72	71
	V_m = 526.87	Avg(t_m) = 70	°F

Calculate Y_{cm} as follows:

$$Y_{cm} = \frac{1.786}{\theta\ V_m} \left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

.234001675

$$Y_{cm} = \frac{1.786}{(\quad)(\quad)} \left[\frac{(\quad) + 460}{(\quad)}\right]^{0.5}$$

Y_{cm} = 1.012

If Y_{cm} 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, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: August 5, 1996

Meter Box No. : 4 (Rockwell Dry Test Meter Serial No. 964552)

Date of Last Calibration: June 28, 1996
Calibration Technician: L. Hansen
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 24, 1996	6-8024	933.00	1453.77	520.77	520.77

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: August 5, 1996

Meter Box No. : 5 (Rockwell Dry Test Meter Serial No. 949230)

Date of Last Calibration: April 23, 1996
Calibration Technician: S. Fjelsta
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 16, 1996	6-7992	385.00	929.05	544.05	544.05
July 23, 1996	6-8024	929.60	1278.95	349.35	893.40

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: August 5, 1996

Meter Box No. : 10 (Rockwell Dry Test Meter Serial No. 1334112)

Date of Last Calibration: June 7, 1996
Calibration Technician: L. Hansen
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 20, 1996	6-7863	493.20	500.78	7.58	7.58
July 23, 1996	6-8024	529.00	1320.30	791.30	798.88

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: August 5, 1996

Meter Box No. : 13 (Rockwell Dry Test Meter Serial No. 1334119)

Date of Last Calibration: March 25, 1996
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 22, 1996	6-8024	702.50	1092.18	389.68	389.68

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: August 5, 1996

Meter Box No. : 14 (Rockwell Dry Test Meter Serial No. 1334123)

Date of Last Calibration: May 10, 1996
Calibration Technician: S. Fjelsta
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 25, 1996	6-8024	979.90	1125.76	145.86	145.86

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: August 5, 1996

Meter Box No. : 15 (Rockwell Dry Test Meter Serial No. 1334118)

Date of Last Calibration: March 26, 1996
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.)
April 11, 1996	6-7558	336.01	439.73	103.72	381.83
April 16, 1996	6-7588	449.04	765.54	316.50	698.33
May 02, 1996	6-7648	787.00	903.40	116.40	814.73
June 24, 1996	6-7870	907.00	1044.88	137.88	952.61
June 27, 1996	6-7908	1051.50	1233.85	182.35	1134.96
July 11, 1996	6-7959	1253.00	1384.97	131.97	1266.93
July 23, 1996	6-8024	1393.33	1698.75	305.42	1572.35

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: August 5, 1996

Meter Box No. : 17 (Rockwell Dry Test Meter Serial No. 1334113)

Date of Last Calibration: February 29, 1996
Calibration Technician: S. Kelker
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 23, 1996	6-8024	356.50	719.98	363.48	363.48

* Total volume through meter since last calibration.

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Meter Calibration Sheet EPA/Method 5

Date: 6/28/96
Bar. Press.: 29.03 IN.HG
Wet Test Meter No.: AL-20

Control Module No.: 4
Serial No. DTM: 964552
Technician: SK LLH

ΔH (IN.WC)		Gas Volume Wet Test Meter	* Cal. Index φ	* Diff. Wet Test Meter ΔP_w	Gas Volume Dry Test Meter (ft³)		Gas Temperatures			Time θ	Meter Coeff.	Orifice Const.	C_r
							Wet Test t_w (°F)	Dry Test					
Nominal	Actual	(ft³)	(%)	(IN.WC.)	V_{di}	V_{df}		t_{di} (°F)	t_{do} (°F)	(Min/Sec)	Y	ΔH@	
0.5	0.5	2	99.85	0.01	908.91	910.92	72	79	76	4/35	1.0025	1.74	
1.2	1.2	3	99.91	0.025	911.93	914.97	72	80	77	4/51	.9949	1.80	
2.0	2.0	3	99.93	0.055	904.86	907.90	72	80	76	3/44	.9921	1.78	
3.3	3.3	5	100.00	0.09	915.98	921.05	72	84	78	4/52	.9943	1.79	
4.7	4.7	5	100.02	0.12	922.05	927.13	72	88	80	4/06	.9945	1.79	
	2	3	4	5	6	7	8	9	10	11/12 Avg	.9957	1.78	

Positive leak check performed by: L. Hansen
Meter was in tolerance: X
Approved by: [signature]

Meter was not in tolerance
Meter was not in tolerance
Date: 7/2/96

☐: readjusted linkage
☐: changed dry test meter

*Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Meter Calibration Sheet EPA/Method 5

Date 4-23-96
Bar. Press. 29.31 IN.HG
Wet Test Meter No. AL-20

Control Module No. 5
Serial No. DTM 949230
Technician SF

ΔH (IN.WC) Nominal	ΔH (IN.WC) Actual	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}	Gas Volume Dry Test Meter (ft³) V_{df}	Gas Temperatures Wet Test t_w (°F)	Gas Temperatures Dry Test t_{di} (°F)	Gas Temperatures Dry Test t_{do} (°F)	Time θ (Min/Sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_i
0.5	0.5	2	99.85	0.01	353.86	355.89	65	86	71	5/02	1.0028	1.758	
1.2	1.2	3	99.91	0.025	356.41	359.48	65	90	72	4/53	1.0030	1.755	
2.0	2.0	3	99.93	0.055	359.79	362.86	65	93	73	3/51	1.0048	1.811	
3.3	3.3	5	100.00	0.09	363.78	368.86	65	90	75	5/01	1.0085	1.825	
4.7	4.7	5	100.02	0.12	369.37	374.48	65	95	75	4/15	1.0038	1.857	
										Avg	1.0056	1.801	

Positive leak check performed by SF
Meter was in tolerance ☒
Approved by [signature]

Meter was not in tolerance ☐: readjusted linkage
Meter was not in tolerance ☐: changed dry test meter
Date 5/7/96

*Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Meter Calibration Sheet EPA/Method 5

Date 6-7-96
Bar. Press. 29.13 IN.HG
Wet Test Meter No. AL-20

Control Module No. 10
Serial No. DTM 1334112
Technician L. Hansen

ΔH (IN.WC) Nominal	ΔH (IN.WC) Actual	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}	Gas Volume Dry Test Meter (ft³) V_{df}	Gas Temperatures Wet Test t_w (°F)	Gas Temperatures Dry Test t_{di} (°F)	Gas Temperatures Dry Test t_{do} (°F)	Time θ (Min/Sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_f
0.5	.5	2	99.85	0.01	485.725	487.750	68	82	72	5:06	1.002	1.84	
1.2	1.2	3	99.91	0.025	481.680	484.720	68	82	72	5:03	.9997	1.93	
2.0	2	3	99.93	0.055	464.595	467.630	68	75	69	3:56	.9869	1.96	
3.3	3.3	5	100.00	0.09	468.635	473.650	68	75	70	5:06	.9970	1.96	
4.7	4.7	5	100.02	0.12	474.650	479.661	68	81	71	4:18	1.001	1.97	
1	2	3	4	5	6	7	8	9	10	11/12 Avg	.9973	1.93	

Positive leak check performed by L. Hansen
Meter was in tolerance ☒
Approved by [signature]

Meter was not in tolerance ☐: readjusted linkage
Meter was not in tolerance ☐: changed dry test meter
Date 7/2/96

*Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Meter Calibration Sheet EPA/Method 5

Date 3-26-96
Bar. Press. 28.95 IN.HG
Wet Test Meter No. AL-20

Control Module No. 13
Serial No. DTM 1334119
Technician [illegible]

ΔH (IN.WC)		Gas Volume Wet Test Meter	* Cal. Index ϕ	* Diff. Wet Test Meter ΔP_w	Gas Volume Dry Test Meter (ft³)		Gas Temperatures			Time θ	Meter Coeff.	Orifice Const.	C_i
							Wet Test t_w (°F)	Dry Test					
Nominal	Actual	(ft³)	(%)	(IN.WC.)	V_{di}	V_{df}		t_{di} (°F)	t_{do} (°F)	(Min/ Sec)	Y	ΔH@	
0.5	.5	2	99.85	0.01	672.700	674.719	61	74	63	4/58	1.0020	1.74	
1.2	1.2	3	99.91	0.025	675.000	678.042	61	79	64	4/59	1.0020	1.85	
2.0	2.0	3	99.93	0.055	669.500	672.504	61	73	63	3/50	.9994	1.84	
3.3	3.3	5	100.00	0.09	680.500	685.550	61	86	65	5/02	1.0059	1.86	
4.7	4.7	5	100.02	0.12	686.000	691.080	61	88	66	4/16	1.0024	1.89	
1	2	3	4	5	6	7	8	9	10	11/12 Avg	1.0029	1.84	

Positive leak check performed by ET
Meter was in tolerance ☒
Approved by [signature]

Meter was not in tolerance ☐: readjusted linkage
Meter was not in tolerance ☐: changed dry test meter
Date 4/19/96

*Based on AI-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

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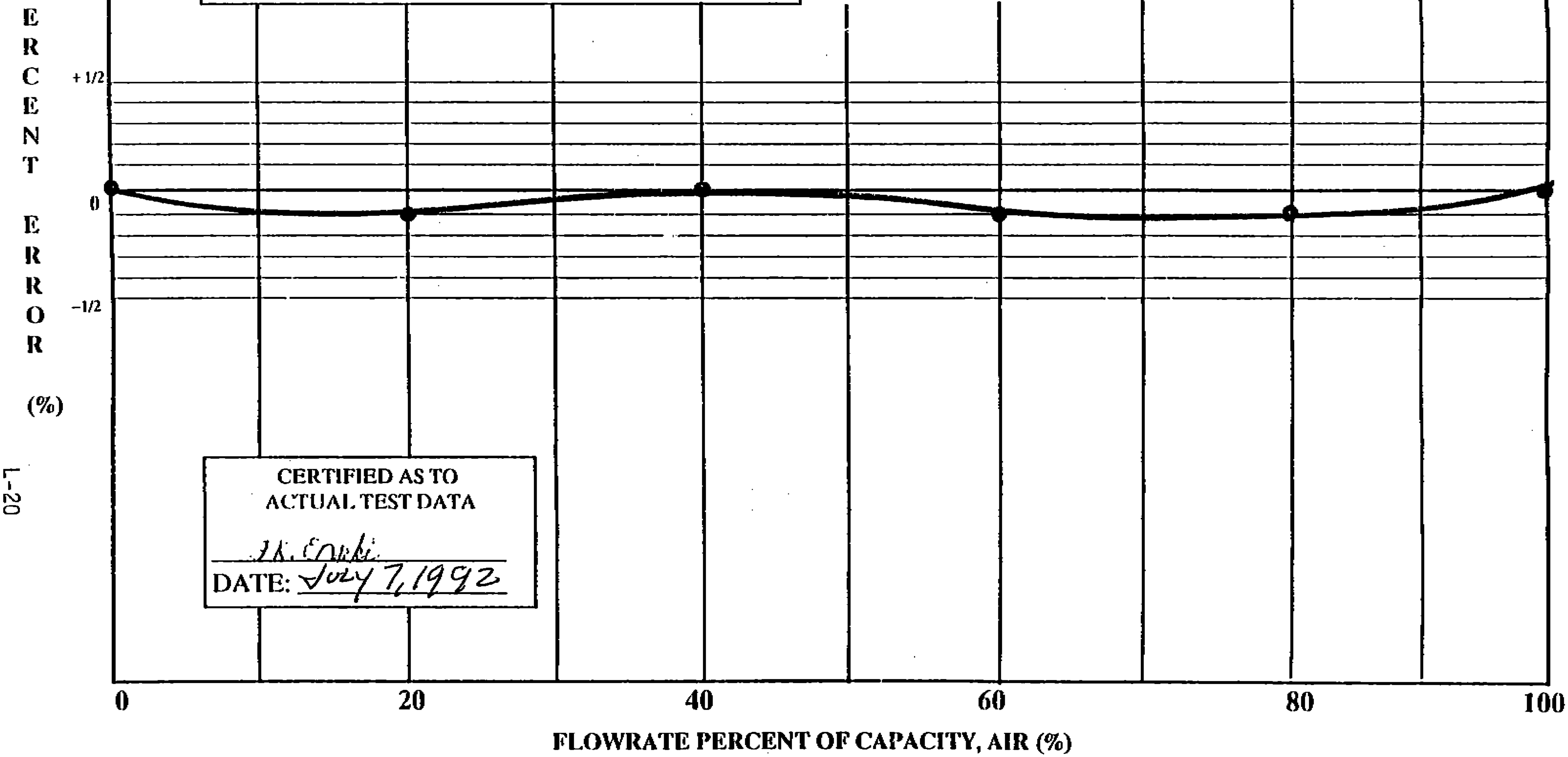
CURVE NUMBER 8

Equimeter
INCORPORATED A BTR Company
805 Liberty Blvd., DuBois, PA 15801

TEST METER PERFORMANCE

METER SIZE: R-275 STD
SERIAL NUMBER: 1334119
CUSTOMER NAME: CONTROLS & METERS INC
ORDER NUMBER: 613-73640-001

Meter Box #
13



CERTIFIED AS TO
ACTUAL TEST DATA

J.K. Enoki
DATE: July 7, 1992

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Meter Calibration Sheet EPA/Method 5

Date 5-10-96
Bar. Press. 29.18 IN.HG
Wet Test Meter No. AL-20

Control Module No. 14
Serial No. DTM 1334123
Technician SF

ΔH (IN.WC) Nominal	ΔH (IN.WC) Actual	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}	Gas Volume Dry Test Meter (ft³) V_{df}	Gas Temperatures Wet Test t_w (°F)	Gas Temperatures Dry Test t_{di} (°F)	Gas Temperatures Dry Test t_{do} (°F)	Time θ (Min/Sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_t
0.5	0.5	2	99.85	0.01	956.03	958.01	68	74	66	4/55	1.01111	1.732	
1.2	1.2	3	99.91	0.025	959.21	962.24	68	82	67	4/54	.99830	1.817	
2.0	2.0	3	99.93	0.055	962.75	965.80	68	85	68	3/49	.99360	1.830	
3.3	3.3	5	100.00	0.09	966.84	971.91	68	89	69	4/59	.99821	1.842	
4.7	4.7	5	100.02	0.12	972.75	977.78	68	92	70	4/12	1.0064	1.856	
	1	2	3	4	5	6	7	8	9	10 Avg	1.00152	1.815	

Positive leak check performed by SF
☒ Meter was in tolerance
Approved by [signature]
Meter was not in tolerance ☐: readjusted linkage
Meter was not in tolerance ☐: changed dry test meter
Date 5/14/96

*Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

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CURVE NUMBER 12

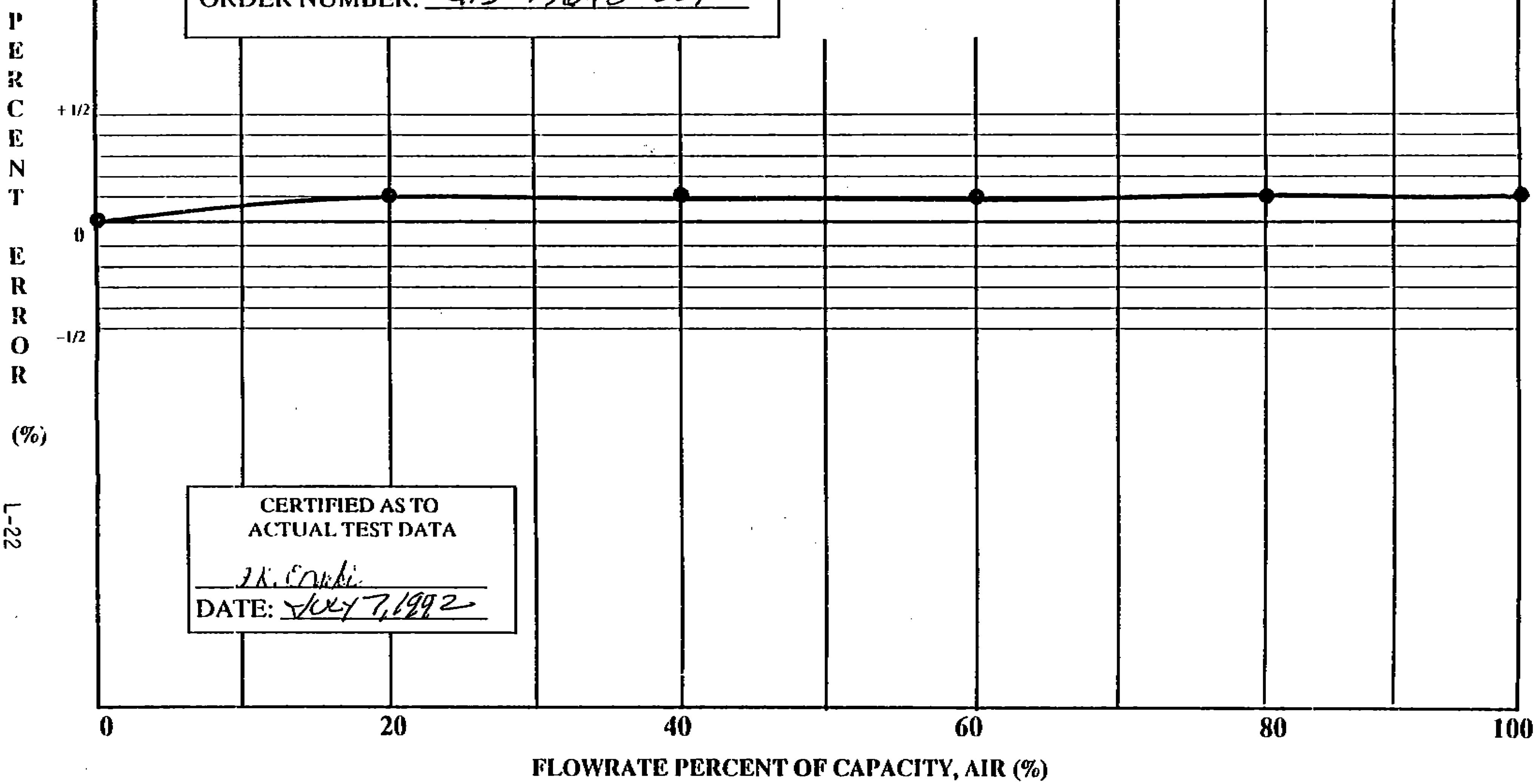
Equimeter INCORPORATED A BTR Company

805 Liberty Blvd., DuBois, PA 15801

TEST METER PERFORMANCE

METER SIZE: R-275 STD
SERIAL NUMBER: 1334123
CUSTOMER NAME: CONTROLS & METERS, INC,
ORDER NUMBER: G13-73640-001

Meter Box # 14



CERTIFIED AS TO ACTUAL TEST DATA

[signature]

DATE: July 7, 1992

L-22

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Meter Calibration Sheet EPA/Method 5

Date 3-26-96
Bar. Press. 29.49 IN.HG
Wet Test Meter No. AL-20

Control Module No. 15
Serial No. DTM 1334118
Technician E. Trowbridge

AH (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	302.000	304.030	65	74	65	5/00	.9909	1.75	
1.2	1.2	3	99.91	0.025	304.500	307.533	65	78	66	4/53	.9983	1.77	
2.0	2.0	3	99.93	0.055	298.500	301.531	65	73	65	3/49	.9915	1.82	
3.3	3.3	5	100.00	0.09	308.000	313.060	65	84	67	4/56	.9994	1.78	
4.7	4.7	5	100.02	0.12	313.500	316.556	65	87	68	4/12	1.0018	1.83	
	1	3	4	5	6	7	8	9	10	11/12 Avg	.9964	1.79	

Positive leak check performed by E.T.
Meter was in tolerance
Approved by [signature]

Meter was not in tolerance ☐: readjusted linkage
Meter was not in tolerance ☐: changed dry test meter
Date 5/19/96

*Based on Al-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

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CURVE NUMBER 11

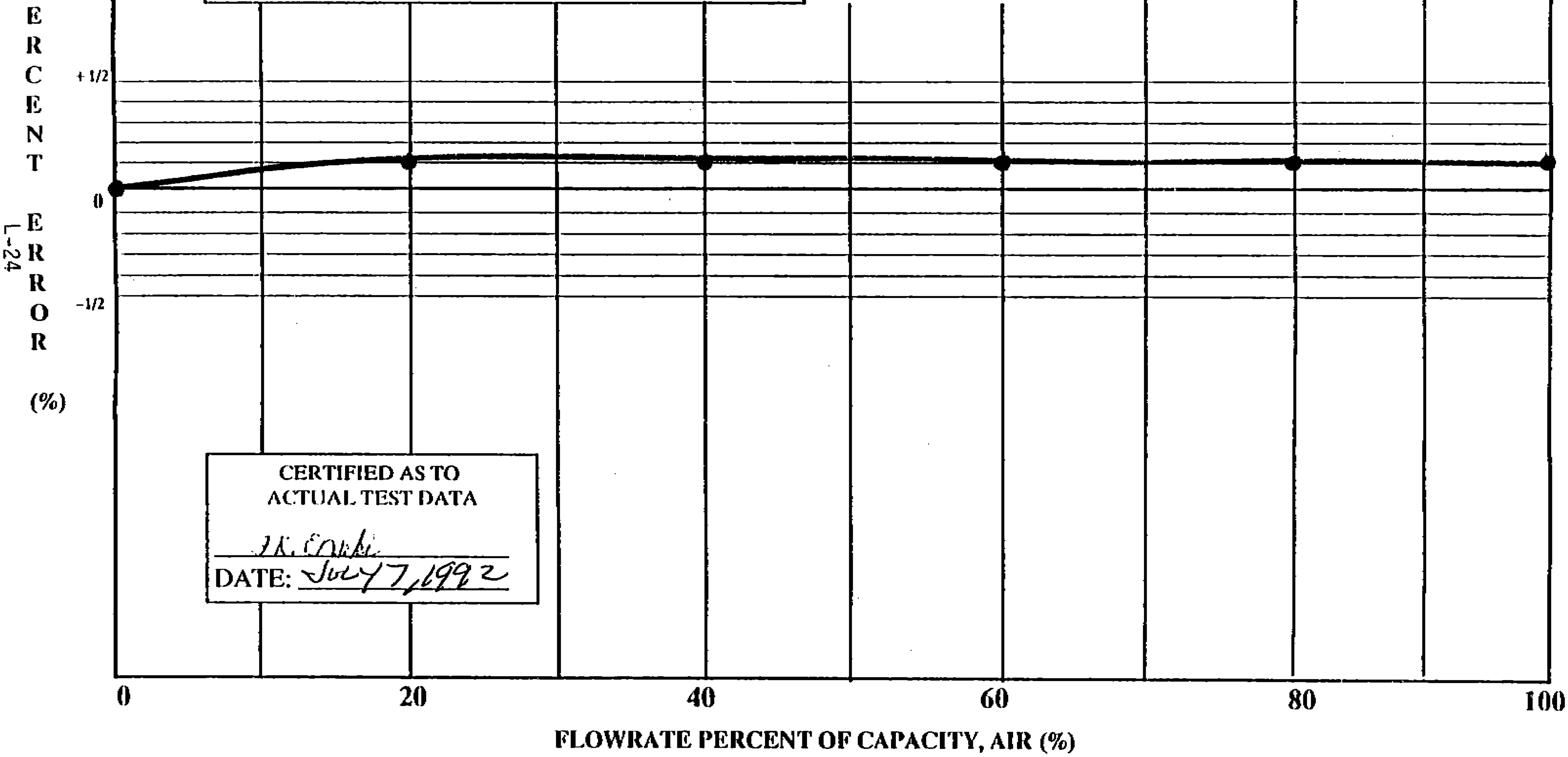
Equimeter INCORPORATED A BTR Company

805 Liberty Blvd., DuBois, PA 15801

TEST METER PERFORMANCE

METER SIZE: R-275 STD
SERIAL NUMBER: 1334122
CUSTOMER NAME: CONTROLS & METERS, INC.
ORDER NUMBER: G13-73640-001

Meter Box #
15



CERTIFIED AS TO
ACTUAL TEST DATA

[signature]
DATE: July 7, 1992

L-24

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Meter Calibration Sheet EPA/Method 5

Date 2/29/96
Bar. Press. 29.27 IN.HG
Wet Test Meter No. AL-20

Control Module No. 17
Serial No. DTM 1334113
Technician Steve Kelker

ΔH (IN.WC)		Gas Volume Wet Test Meter	* Cal. Index ϕ	* Diff. Wet Test Meter ΔP_w	Gas Volume Dry Test Meter (ft³)		Gas Temperatures			Time θ	Meter Coeff.	Orifice Const.	C_t
							Wet Test	Dry Test					
Nominal	Actual	(ft³)	(%)	(IN.WC.)	V_{di}	V_{df}	t_w (°F)	t_{di} (°F)	t_{do} (°F)	(Min/Sec)	Y	ΔH@	
0.5	0.5	2	99.85	0.01	333.678	335.664	70	73	67	4/43	1.0043	1.60	
1.2	1.2	3	99.91	0.025	336.662	339.650	70	77	69	4/47	1.0057	1.74	
2.0	2.0	3	99.93	0.055	329.677	332.676	70	71	66	3/43	.9917	1.77	
3.3	3.3	5	100.00	0.09	340.645	345.622	70	80	71	4/52	1.0084	1.77	
4.7	4.7	5	100.02	0.12	346.615	351.568	70	78	71	4/04	1.0061	1.77	
										Avg	1.0032	1.73	

Positive leak check performed by [signature]
Meter was in tolerance ☒
Approved by [signature]

Meter was not in tolerance ☐: readjusted linkage
Meter was not in tolerance ☐: changed dry test meter
Date 3/14/96

*Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

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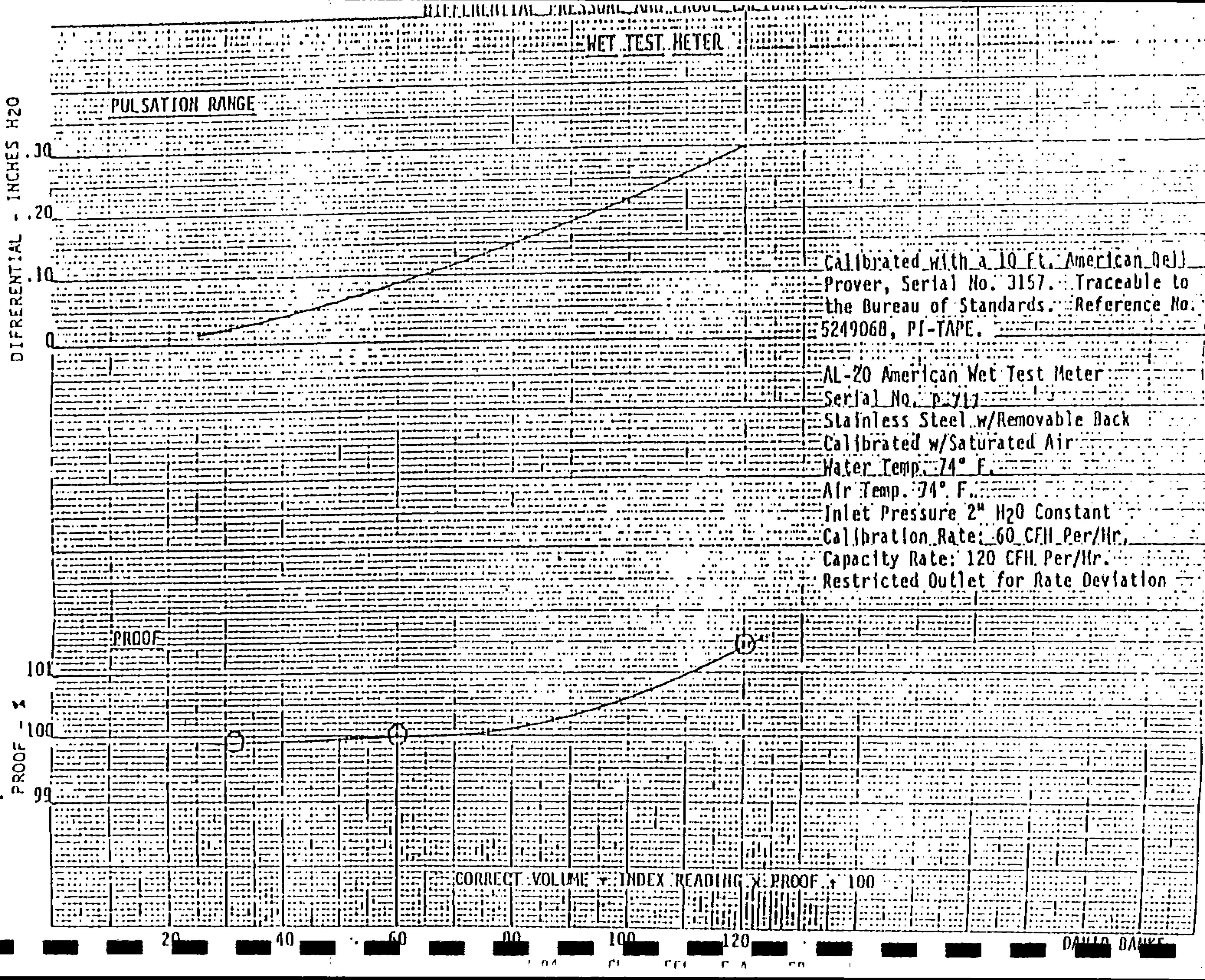
WET TEST METER
PULSATION RANGE
DIFRERENTIAL - INCHES H2O
.30
.20
.10
0
Calibrated With a 10 Ft. American Bell
Prover, Serial No. 3157. Traceable to
the Bureau of Standards. Reference No.
5249060, PI-TAPE.
AL-20 American Wet Test Meter
Serial No. P-717
Stainless Steel w/Removable Back
Calibrated w/Saturated Air
Water Temp. 74° F.
Air Temp. 74° F.
Inlet Pressure 2" H2O Constant
Calibration Rate: 60 CFH Per/Hr.
Capacity Rate: 120 CFH Per/Hr.
Restricted Outlet for Rate Deviation
PROOF
PROOF - %
101
100
99
CORRECT VOLUME = INDEX READING X PROOF ÷ 100
20
40
60
80
100
120

Interpoll Laboratories
(612) 786-6020

Nozzle Calibration Data Sheet

Date of Calibration: 7-25-96
Technician: Mark Kaehler
Nozzle Number: 1-5

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	0.181
2	0.181
3	0.181
Average	0.181

Interpoll Laboratories
(612) 786-6020

Nozzle Calibration Data Sheet

Date of Calibration: 7-23-96
Technician: Scott Fjelsta
Nozzle Number: 4-3

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	0.189
2	0.189
3	0.189
Average	0.189

Interpoll Laboratories
(612) 786-6020

Nozzle Calibration Data Sheet

Date of Calibration: 7-23-96
Technician: Duane Van Hoever
Nozzle Number: 6-3

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	0.178
2	0.179
3	0.181
Average	0.179

Interpoll Laboratories
(612) 786-6020

Nozzle Calibration Data Sheet

Date of Calibration: 7-23-96
Technician: Ed Juers
Nozzle Number: 8-3

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	0.189
2	0.189
3	0.188
Average	0.189

Interpoll Laboratories
(612) 786-6020

Nozzle Calibration Data Sheet

Date of Calibration: 7-23-96
Technician: Jamie Bainville
Nozzle Number: 5-2

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	0.245
2	0.244
3	0.245
Average	0.245

Interpoll Laboratories
(612) 786-6020

Nozzle Calibration Data Sheet

Date of Calibration: 7-23-96
Technician: Jamie Bainville
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	0.270
2	0.270
3	0.270
Average	0.270

Interpoll Laboratories
(612) 786-6020

Nozzle Calibration Data Sheet

Date of Calibration: 7-23-96
Technician: Mark Kaehler
Nozzle Number: 2-3

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	0.188
2	0.188
3	0.187
Average	0.188

Interpoll Laboratories
(612) 786-6020

Nozzle Calibration Data Sheet

Date of Calibration: 7-24-96
Technician: Mark Kaehler
Nozzle Number: 6-4

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	0.225
2	0.227
3	0.228
Average	0.227

Interpoll Laboratories
(612) 786-6020

Nozzle Calibration Data Sheet

Date of Calibration: 7-24-96
Technician: Mark Kaehler
Nozzle Number: 2-4

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	0.252
2	0.250
3	0.252
Average	0.251

Interpoll Laboratories
(612) 786-6020

Nozzle Calibration Data Sheet

Date of Calibration: 7-25-96
Technician: Mark Kaehler
Nozzle Number: G-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	0.240
2	0.241
3	0.241
Average	0.241

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Temperature Measurement Device Calibration Sheet

Unit Under Test:

Vendor: WAVETEK
Model: DM23XT
Range: 0 – 1700 °F
Date of Calibration: 3-13-96
Serial Number: 50610065
Thermocouple Type: K
Technician: [illegible]
PDT No.: MULTIMETER 50610065

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	0	0	
100	100	95	5	~~1.06~~ .89
200	200	199	1	0.15
300	300	297	3	0.39
400	400	395	5	0.58
500	500	494	6	0.63
600	600	597	3	0.28
700	700	698	2	~~0.02~~ 0.17
800	800	802	2	.16
900	900	905	5	.37
1000	1000	1010	10	.68
1100	1100	1114	14	.90
1200	1200	1220	20	1.20
1300	1300	1321	21	1.19
1400	1400	1425	25	1.34
1500	1500	1523	23	1.77
1600	1600	1625	25	1.21
1700	1700	1720	20	.93
1800	1800	1818	18	.80
1900	1900	1910	10	.42
2000	OF	OF	OF	OF
2100	OF	OF	OF	OF
		Averages:	10.9	.673

OF = off scale response by unit under test (°F)

% dev = 100 $\Delta t/(460 + t)$

☒ Unit in tolerance

☐ Unit was not in tolerance: recalibrated - See new calibration sheet.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Temperature Measurement Device Calibration Sheet

Unit Under Test:

Vendor: Omega
Model: HH81 | Serial Number: 735X1495
Range: 0 - 2100 °F | Thermocouple Type: K
Date of Calibration: 7-11-96 | Technician: D. Hulleman
Method of Calibration: | PDT No.: #31

☐ 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 ± 1 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	-3	3	0.65
100	100	97	3	0.53
200	200	200	0	0.00
300	300	298	2	0.26
400	400	397	3	0.35
500	500	498	2	0.21
600	600	598	2	0.19
700	700	698	2	0.17
800	800	800	0	0.00
900	900	899	1	0.07
1000	1000	999	1	0.07
1100	1100	1097	3	0.19
1200	1200	1199	1	0.06
1300	1300	1296	4	0.23
1400	1400	1400	0	0.00
1500	1500	1498	2	0.10
1600	1600	1601	1	0.05
1700	1700	1699	1	0.04
1800	1800	1800	0	0.00
1900	1900	1899	1	0.04
2000	2000	2000	0	0.00
2100	2100	2095	5	0.20
		Averages:		

OF = off scale response by unit under test (°F)
☒ Unit in tolerance

% dev = 100 Δt/(460 + t)
☐ Unit was not in tolerance: recalibrated - See new calibration sheet.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Temperature Measurement Device Calibration Sheet

Unit Under Test: 35
Vendor: Omega
Model: HH81
Range: 0 - 2100 °F
Date of Calibration: 2/20/96
Serial Number: 74JX0332
Thermocouple Type: K
Technician: Mark Petersen
PDT No. 35

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	-3	3	0.65
100	100	98	2	0.36
200	200	200	0	0
300	300	298	2	0.26
400	400	398	2	0.23
500	500	499	1	0.10
600	600	600	0	0
700	700	699	1	0.09
800	800	801	1	0.08
900	900	900	0	0
1000	1000	1000	0	0
1100	1100	1100	0	0
1200	1200	1201	1	0.06
1300	1300	1299	1	0.06
1400	1400	1402	2	0.11
1500	1500	1500	0	0
1600	1600	1603	3	0.15
1700	1700	1701	1	0.05
1800	1800	1803	3	0.13
1900	1900	1901	1	0.04
2000	2000	2001	1	0.04
2100	2100	2099	1	0.04
		Averages:	1.18	0.111

OF - off scale response by unit under test (°F)
☐ Unit in tolerance

% dev = 100 Δt/(460 + t)
☐ Unit was not in tolerance: recalibrated - See new calibration sheet.

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INTERPOLL LABORATORIES, INC.
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Temperature Measurement Device Calibration Sheet

Unit Under Test:

Vendor	Omega		
Model	HH 81	Serial Number	743 X1119
Range	0 - 2100 °F	Thermocouple Type	K
Date of Calibration	4-8-96	Technician	SF
Method of Calibration:		PDT No.	40

☐ 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	-4	4	0.869
100	100	97	3	0.536
200	200	199	1	0.152
300	300	297	3	0.395
400	400	397	3	0.349
500	500	498	2	0.208
600	600	599	1	0.0943
700	700	698	2	0.172
800	800	800	0	0.000
900	900	899	1	.0735
1000	1000	1000	0	0.000
1100	1100	1098	2	0.128
1200	1200	1201	1	0.0602
1300	1300	1298	2	0.114
1400	1400	1401	1	0.0538
1500	1500	1500	0	0.000
1600	1600	1602	2	0.0971
1700	1700	1701	1	0.0463
1800	1800	1803	3	0.133
1900	1900	1901	1	0.0424
2000	2000	2001	1	0.0407
2100	2100	2099	1	0.0391
		Averages:	1.59	0.101

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.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Temperature Measurement Device Calibration Sheet

Unit Under Test:

Vendor: Omega
Model: HH-81
Range: -160 - 1372 °C
Date of Calibration: 5-20-96
Serial Number: 74 JX 1377
Thermocouple Type: K
Technician: ES
PDT No. 42

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	1	.22
100	100	100	0	0
200	200	202	2	.30
300	300	300	0	0
400	400	400	0	0
500	500	500	0	0
600	600	602	2	.19
700	700	700	0	0
800	800	803	3	.24
900	900	902	2	.15
1000	1000	1003	3	.21
1100	1100	1100	0	0
1200	1200	1202	2	.12
1300	1300	1301	1	.06
1400	1400	1404	4	.22
1500	1500	1502	2	.10
1600	1600	1604	4	.19
1700	1700	1703	3	.14
1800	1800	1804	4	.18
1900	1900	1902	2	.08
2000	2000	2003	3	.12
2100	2100	2100	0	0
		Averages:	1.72	.11

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.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Temperature Measurement Device Calibration Sheet

Unit Under Test:
Vendor: Omega
Model: HH81
Range: °F
Date of Calibration: 7-11-9[illegible]
Method of Calibration:

Serial Number: 74JX1560 ~~[illegible]~~ D
Thermocouple Type: K
Technician: D. Hulleman
PDT No.: 45

☐ 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	-3	3	0.65
100	100	98	2	0.35
200	200	200	0	0.00
300	300	298	2	0.26
400	400	398	2	0.23
500	500	498	2	0.21
600	600	600	0	0.00
700	700	698	2	0.17
800	800	801	1	0.08
900	900	899	1	0.07
1000	1000	1000	0	0.00
1100	1100	1100	0	0.00
1200	1200	1200	0	0.00
1300	1300	1298	2	0.11
1400	1400	1401	1	0.05
1500	1500	1499	1	0.05
1600	1600	1602	2	0.10
1700	1700	1700	0	0.00
1800	1800	1802	2	0.16
1900	1900	1900	0	0.00
2000	2000	2000	0	0.00
2100	2100	2099	1	0.04
		Averages:	1.09	0.11

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.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Temperature Measurement Device Calibration Sheet

Unit Under Test:

Vendor: Omega
Model: HH 81 — Serial Number:
Range: -160 — +1372 °F — Thermocouple Type: K
Date of Calibration: 5-20-96 — Technician: ES
Method of Calibration: — PDT No.: 47

☐ 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	99	1	.18
200	200	201	1	.15
300	300	299	1	.13
400	400	399	1	.12
500	500	499	1	.10
600	600	600	0	0
700	700	700	0	0
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	1300	0	0
1400	1400	1402	2	.11
1500	1500	1501	1	.05
1600	1600	1604	4	.19
1700	1700	1701	1	.05
1800	1800	1803	3	.13
1900	1900	1901	1	.04
2000	2000	2001	1	.04
2100	2100	2099	1	.04
		Averages:	1.0	.07

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.

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Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 22-4

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" .01
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: 4-8-94

Inspected by: [signature]

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. 22-5

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" .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: 4-8-94

Inspected by: [signature]

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. 23-5

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 .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: 2-8-94

Inspected by: [signature]

CFR Title 40 Part 60 Appenidix A Method 2

S-348

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Probe or Pitot Tube No. 27-5

Pitot tube dimensions:

1. External tubing diameter (D_t) .312 IN.
2. Base to Side A opening plane (P_A) .4675 IN.
3. Base to Side B opening plane (P_B) .4515 IN.

Alignment:

4. α_1 < 10° <10° 0° 35'
5. α_2 < 10° <10° 0° 35'

6. B_1 < 5° <5° 0° 0' 30"
7. B_2 < 5° <5° 0° 50'

8. Z <.125" <.125" .013"
9. W <.0625" <.0625" A .013" B .001"

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle 3/4" .750"
11. Pitot to probe sheath 4 3/8" 4.380
12. Pitot to thermocouple (parallel to probe) 3" 2.956"
13. Pitot to thermocouple (perpendicular to probe) NA

☒ 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: 8-1-95

Inspected by: [signature]

CFR Title 40 Part 60 Appenidix A Method 2

S-348

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Probe or Pitot Tube No 27-10

Pitot tube dimensions:

1. External tubing diameter (D_t) 3/8 IN.
2. Base to Side A opening plane (P_A) .467 IN.
3. Base to Side B opening plane (P_B) .464 IN.

Alignment:

4. α_1 < 10° ≤10° 2° 5′
5. α_2 < 10° ≤10° 1° 0′

6. B_1 < 5° ≤5° 0° 20′
7. B_2 < 5° ≤5° 1° 0′

8. Z <.125" ≤.125" .019"
9. W <.0625" ≤.0625" A .003" B .011"

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle 3/4" .764"
11. Pitot to probe sheath 4 3/8" 4.385"
12. Pitot to thermocouple (parallel to probe) 3" 2.954"
13. Pitot to thermocouple (perpendicular to probe) NA

☒ 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: 8-1-95

Inspected by: Gary Blenkush

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. MM5-8

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° 2
7. B_2 < 5° 2

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: 4-7-93

Inspected by: [signature]

CFR Title 40 Part 60 Appenidix A Method 2

S-348

4-7-93 C:\STACK\WP\FORMS\S-348

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 10-17-95
Technician R.R.
Mercury Column Barometer No. NOVA-1
Aneroid Barometer No. 560209

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (P_{ba} - P_{bm})
28.91	82	.14	28.77	28.76	.01

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain.

BAROMETER HAS BEEN REPAIRED

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. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 4-8-96
Technician SF
Mercury Column Barometer No. F.lle ~~[illegible]~~ Room
Aneroid Barometer No. 20901010

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (P_{ba} - P_{bm})
29.310 ~~[illegible]~~	70	.111	29.199	29.21	0.011

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. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date: 7-8-96
Technician: E. Juers
Mercury Column Barometer No.: 1
Aneroid Barometer No.: 10729004

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference ($P_{ba} - P_{bm}$)
28.93	74	.119	28.81	28.91	.1

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. ________

offset - -1419
Slope .9251

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. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 7-11-96
Technician Mark Kaehler
Mercury Column Barometer No. LAB 1
Aneroid Barometer No. 21029004

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (P_{ba} - P_{bm})
29.18	80	.137	29.043	29.05	.007

Has this barometer shown any consistent problems with calibration? Yes/No (No circled) 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. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 5/9/96
Technician D. Van Hoever
Mercury Column Barometer No.
Aneroid Barometer No. Dust's

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (P_{ba} - P_{bm})
29.19	69	.109	29.08	29.06	-.02

Has this barometer shown any consistent problems with calibration? Yes/No. (No circled) 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. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

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