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**Title: Results of the February 5-7, 1992
EPA-Required Air Emission
Compliance Tests at the Louisiana
Pacific Waferboard Plant In
Newberry, Michigan**

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RESULTS OF THE FEBRUARY 5 - 7, 1992
EPA-REQUIRED AIR EMISSION COMPLIANCE TESTS
AT THE LOUISIANA PACIFIC WAFERBOARD
PLANT IN NEWBERRY, MICHIGAN

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ABBREVIATIONS

ACFM	actual cubic feet per minute
cc (ml)	cubic centimeter (milliliter)
DSCFM	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 ⁶ BTU	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.

1 INTRODUCTION

During the Period February 5 - 7, 1992 Interpoll Laboratories personnel conducted EPA-required air emission compliance tests on the Konus, Press & unloader vent, and Dryer at the Louisiana Pacific Corporation (LP) Waferboard Plant located in Newberry, Michigan. On-site testing was performed by E. Trowbridge, D. Van Hoeven, C. Mosser, and P. O'Neil. Coordination between testing activities and plant operation was provided by Sue Somers of LP. The test was witnessed by L.J. Lins and Mark Moloney of the Environmental Protection Agency.

The two Konus burners are identical 25 10^6 BTU/HR wood-fired oil heaters installed in 1985. They are fired with waste wood and bark and are both equipped with underfeed stokers. They both vent into a common stack. Particulate emissions from each of the two oil heaters are controlled by identical CE Preheater pulse jet baghouses. During the test, the No. 2 Konus was on-line.

The dryer tested is an MEC Model 1360 rotary drum dryer. It is equipped with a McConnell burner for firing wood fines and has a design heat input capacity of 43 10^6 BTU/HR. Particulate emissions from the wafer dryer are controlled by a multiclone in series with an electrified filter bed manufactured by E.F.B. Inc.

The press vents tested are the exhaust from general ventilators positioned over the board press and unloader. Axial fans in the duct above the roof provide the air movement.

Particulate evaluations were performed in accordance with EPA Methods 2-5, CFR Title 40, Part 60, Appendix A (revised July 1, 1991). 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 to provide samples for methylene chloride extraction to determine total condensible organic compounds.

PM-10 determinations were performed in accordance with EPA Method 201A (Ibid, Part 51, Appendix M). An Interpoll Labs sampling train which meets or exceeds specifications in the above-cited reference was used to extract PM-10 samples by means of an Anderson PM-10 cyclone and a stainless steel probe. The cyclone used in this work meets or exceeds the specifications of Method 201A. Velocity pressure measurements were made prior to each run to determine the proper dwell times at each traverse point. PM-10 testing on the Press Vents was complicated by the fact that one nozzle was not adequate to cover the range of velocity pressures and sample isokinetically. Therefore two nozzles were used, one to sample the low velocity pressure points, and another to sample the high velocity pressure points. These two samplings were then combined to obtain the total PM-10 catch.

Formaldehyde samples were collected using draft EPA Method 0011 (SW 846 3rd Ed.) as a guideline. 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.

Integrated flue gas samples were extracted from the dryer and thermal oil heater exhaust gas streams using a specially designed gas sampling system. Integrated flue gas samples were collected in 44-liter Tedlar bags housed in a protective aluminum container. After sampling was complete, the bags were sealed and returned to the laboratory for Orsat analysis. Prior to sampling, the Tedlar bags are leak checked at 15 IN.HG. vacuum with an in-line rotameter. Bags with any detectable inleakage are discarded.

Carbon monoxide determinations were performed on the three sources tested using a continuous emission monitor in accordance with EPA Method 10.

Testing on the thermal oil heater and dryer was conducted from two test ports oriented at 90 degrees on each of the respective stacks. The test ports on the thermal oil heater are located 9.1 stack diameters downstream of the baghouse outlets and 1.6 stack diameters upstream of the stack exit. The test ports on the dryer are located 7.8 stack diameters upstream of the nearest flow disturbance and 7.2 diameters upstream of the stack exit. A 12-point traverse was used at each test site to isokinetically collect the particulate, PM-10 and formaldehyde samples. Each traverse point was sampled five minutes for the particulate and formaldehyde sampling to give a total sampling time of sixty minutes per run. The PM-10 run times varied from 77 to 81 minutes for the thermal oil heater and from 95 to 100 minutes for the dryer.

Testing on the press and unloader vents was conducted as one source by performing one half of the test run in one vent and one half the test run in the second vent. Sampling was performed from a set of eight test ports (four on each vent) situated horizontally on a vertical sections of duct. A 32-point traverse was used to collect the particulate, PM-10 and formaldehyde samples. Each traverse point was sampled two minutes for a total sampling time of 64 minutes per run. The PM-10 run times varied from 70 to 74 minutes.

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 test are summarized in Tables 1-3. The particulate results have been calculated using the dry catch only (a Tables) and again with the organic wet catch added (b Tables). The following emission rates are based on the dry catch only. As will be noted, the particulate emission rate for the Thermal Oil Heater averaged 0.049 LB/KLB flue gas adjusted to 50% excess air. The particulate emission rate for the Press & Unloader vents averaged 3.4 LB/HR. The particulate emission rate for the Dryer averaged 0.057 LB/KLB of flue gas and 1.35 LB/TFP.

The PM-10 results are summarized in Tables 4-6. The PM-10 emission rate averaged 1.7, 4.9, and 12.4 LB/HR for the Thermal Oil Heater, the Press & Unloader vents, and the Dryer, respectively.

The carbon monoxide results are summarized in Table 7. The emission rate averaged 9.0 LB/HR (9.2 LB/Ton Dry Fuel) for the Thermal Oil Heater, <2.7 LB/HR for the Press & Unloader Vents, and 41 LB/HR (5.12 LB/TFP) for the Dryer.

A summary of the formaldehyde results are presented in Table 8. The formaldehyde emission rate averaged 0.0030 LB/HR for the Thermal Oil Heater, 2.2 LB/HR (0.27 LB/TFP) for the Press & Unloader Vents, and 1.6 LB/HR (0.20 LB/TFP) for the Dryer.

The results of the Total Hydrocarbons tests are summarized in Table 9. The total hydrocarbon emission rate averaged 0.22 LB/HR for the Konus, 3.94 LB/HR for the Press & Unloader Vents and 1.04 LB/TFP for the Dryer.

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 this fact and a complete review of the entire 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 February 5, 1992 Particulate Emission Compliance Test on the Konus Stack at the Louisiana Pacific Waferboard Plant Located in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of test	02-05-92	02-05-92	02-05-92
Time runs were done (HRS)	900/1004	1055/1201	1230/1340
Process rate (LB/HR)	15880.0	15880.0	15880.0
Volumetric flow actual (ACFM)	18256	18878	18902
standard (DSCFM)	11798	12043	12001
Gas temperature (DEG-F)	275	274	275
Moisture content (%V/V)	8.58	9.80	10.16
Gas composition (%V/V, dry)			
carbon dioxide	5.60	5.80	6.00
oxygen	14.90	14.70	14.40
nitrogen	79.50	79.50	79.60
Isokinetic variation (%)	98.7	100.4	100.1
Particulate concentration			
actual (GR/ACF)	.00922	.0115	.0112
standard (GR/DSCF)	.0143	.0181	.0176
Part. emission rate (LB/HR)	1.44	1.87	1.81
(LB/KLB flue gas adj. to 50% Excess Air)	0.044	0.054	0.050

Note: Dry Catch Only

Table 1b Summary of the Results of the February 5, 1992 Particulate Emission Compliance Test on the Konus Stack at the Louisiana Pacific Waferboard Plant Located in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of test	02-05-92	02-05-92	02-05-92
Time runs were done (HRS)	900/1004	1055/1201	1230/1340
Process rate (LB/HR)	15880	15880	15880
Volumetric flow actual (ACFM)	18256	18878	18902
standard (DSCFM)	11798	12043	12001
Gas temperature (DEG-F)	275	274	275
Moisture content (%V/V)	8.58	9.80	10.16
Gas composition (%V/V, dry)			
carbon dioxide	5.60	5.80	6.00
oxygen	14.90	14.70	14.40
nitrogen	79.50	79.50	79.60
Isokinetic variation (%)	98.7	100.4	100.1
Particulate concentration actual (GR/ACF)	.00962	.0118	.0114
standard (GR/DSCF)	.0149	.0184	.0179
Part. emission rate (LB/HR)	1.51	1.90	1.84
(LB/KLB Flue Gas @50% Excess Air)	0.045	0.054	0.051

Note: Dry + Organic Wet Catch

Table 2a Summary of the Results of the February 6, 1992 Particulate Emission Compliance Test on the Press & Unloader Vent Stack at the Louisiana Pacific Waferboard Plant Located in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of test	02-06-92	02-06-92	02-06-92
Time runs were done (HRS)	1035/1215	1306/1427	1517/1643
Process rate (LB/HR)	16180.0	16180.0	16180.0
Volumetric flow actual (ACFM)	141746	121745	136553
standard (DSCFM)	133348	113472	127730
Gas temperature (DEG-F)	73	76	77
Moisture content (%V/V)	0.81	1.24	0.70
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 (%)	99.0	101.1	99.7
Particulate concentration			
actual (GR/ACF)	.00281	.00354	.00259
standard (GR/DSCF)	.00299	.00380	.00277
Part. emission rate (LB/HR)	3.42	3.69	3.03

.96

Note: Dry Catch Only

Table 2.b Summary of the Results of the February 6, 1992 Particulate Emission Compliance Test on the Press & Unloader Vent Stack at the Louisiana Pacific Waferboard Plant Located in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of test	02-06-92	02-06-92	02-06-92
Time runs were done (HRS)	1035/1215	1306/1427	1517/1643
Process rate (LB/HR)	16180	16180	16180
Volumetric flow actual (ACFM)	141746	121745	136553
standard (DSCFM)	133348	113472	127730
Gas temperature (DEG-F)	73	76	77
Moisture content (%V/V)	0.81	1.24	0.70
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 (%)	99.0	101.1	99.7
Particulate concentration actual (GR/ACF)	.00361	.00454	.00359
standard (GR/DSCF)	.00384	.00488	.00383
Part. emission rate (LB/HR)	4.38	4.74	4.20

Note: Dry + Organic Wet Catch

Table 2a Summary of the Results of the February 7, 1992 Particulate Emission Compliance Test on the Dryer Stack at the Louisiana Pacific Waferboard Plant Located in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of test	02-07-92	02-07-92	02-07-92
Time runs were done (HRS)	1235/1337	1408/1523	1558/1710
Process rate (LB/HR)	21075.0	21075.0	21075.0
Volumetric flow actual (ACFM)	60456	62072	61692
standard (DSCFM)	37304	35983	36294
Gas temperature (DEG-F)	211	211	210
Moisture content (%V/V)	18.60	23.51	23.24
Gas composition (%V/V, dry) carbon dioxide	3.70	3.80	3.80
oxygen	16.90	16.80	16.90
nitrogen	79.40	79.40	79.30
Isokinetic variation (%)	97.6	103.9	99.8
Particulate concentration actual (GR/ACF)	.0246	.0183	.0189
standard (GR/DSCF)	.0399	.0316	.0322
Part. emission rate (LB/HR) (LB/KLB Flue Gas)	12.76	9.74	10.00
(LB/TFP)	0.066	0.052	0.053
	1.59	1.22	1.24

Note: Dry Catch Only

Table 3b Summary of the Results of the February 7, 1992 Particulate Emission Compliance Test on the Dryer Stack at the Louisiana Pacific Waferboard Plant Located in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of test	02-07-92	02-07-92	02-07-92
Time runs were done (HRS)	1235/1337	1408/1523	1558/1710
Process rate (LB/HR)	21075	21075	21075
Volumetric flow actual (ACFM)	60456	62072	61692
standard (DSCFM)	37304	35983	36294
Gas temperature (DEG-F)	211	211	210
Moisture content (%V/V)	18.60	23.51	23.24
Gas composition (%V/V, dry)			
carbon dioxide	3.70	3.80	3.80
oxygen	16.90	16.80	16.90
nitrogen	79.40	79.40	79.30
Isokinetic variation (%)	97.6	103.9	99.8
Particulate concentration			
actual (GR/ACF)	.0287	.0271	.0251
standard (GR/DSCF)	.0466	.0468	.0427
Part. emission rate (LB/HR)	14.89	14.44	13.28
(LB/KLB of Flue Gas)	0.077	0.077	0.070
(LB/TFP)	1.86	1.80	1.66

Note: Dry + Organic Wet Catch

Table 4. Summary of the Results of the February 5, 1982 PM-10 Determinations on the Konus Stack at the Louisiana Pacific Waferboard Plant Located in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of test	02-05-92	02-05-92	02-05-92
Time runs were done (HRS)	1355/1530	1607/1729	1807/1937
Process rate (LB/HR)	15880	15880	15880
Volumetric flow actual (ACFM)	19345	19326	19530
standard (DSCFM)	12188	12217	12530
Gas temperature (DEG-F)	275	273	273
Moisture content (%V/V)	10.88	10.77	9.46
Gas composition (%V/V, dry) carbon dioxide	6.10	5.90	5.20
oxygen	14.40	14.60	15.30
nitrogen	79.50	79.50	79.50
Isokinetic variation (%)	97.2	97.3	94.0
PM-10 concentration..... actual.....(GR/ACF)	.0108	.0110	.00890
dry standard.....(GR/DSCF)	.0172	.0173	.0139
PM-10 mass rate.....(LB/HR)	1.80	1.82	1.49

Note: Dry + Organic Wet Catch

Table 4a: Summary of the Results of the February 5, 1992 PM-10 Determinations on the Konus Stack at the Louisiana Pacific Waferboard Plant Located in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of test	02-05-92	02-05-92	02-05-92
Time runs were done (HRS)	1355/1530	1607/1729	1807/1937
Process rate (LB/HR)	15880.0	15880.0	15880.0
Volumetric flow actual (ACFM)	19345	19326	19530
standard (DSCFM)	12188	12217	12530
Gas temperature (DEG-F)	275	273	273
Moisture content (%V/V)	10.88	10.77	9.46
Gas composition (%V/V, dry)			
carbon dioxide	6.10	5.90	5.20
oxygen	14.40	14.60	15.30
nitrogen	79.50	79.50	79.50
Isokinetic variation (%)	97.2	97.3	94.0
Particulate concentration			
actual (GR/ACF)	.0103	.0101	.00811
standard (GR/DSCF)	.0163	.0161	.0127
Part. emission rate (LB/HR)	1.71	1.68	1.36

Note: Dry Catch Only

Table 5. Summary of the Results of the February 6, 1992 PM-10 Determinations on the Press & Unloader Vent Stack at the Louisiana Pacific Waferboard Plant in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of Test	02-06-92	02-06-92	02-06-92
Time runs were done (HRS)	1440/1713	1740/1957	2033/2220
Process rate (LB/HR)	16180	16180	16180
Volumetric flow actual (ASFM)	122,675	124,442	122,357
standard (DSCFM)	114,298	115,958	114,339
Gas temperature (DEG-F)	78	79	78
Moisture content (%V/V)	.91	1.04	0.77
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 (%)	101.6	97.7	98.6
PM-10 concentration.....			
actual.....(GR/ACF)	.0037	.0049	.0042
dry standard.....(GR/DSCF)	.0039	.0052	.0045
PM-10 mass rate.....(LB/HR)	3.64	5.69	5.26

0.45 0.70 0.65

0.60 13/10W

Note: Dry + Organic Wet Catch

5: NEWBERRY.WD

Table 5. Summary of the Results of the February 6, 1992 PM-10 Determinations on the Press & Unloader Vent Stack at the Louisiana Pacific Waferboard Plant in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of Test	02-06-92	02-06-92	02-06-92
Time runs were done (HRS)	1440/1713	1740/1957	2033/2220
Process rate (LB/HR)	16180	16180	16180
Volumetric flow actual (ASFM)	122,675	124,442	122,357
standard (DSCFM)	114,298	115,958	114,339
Gas temperature (DEG-F)	78	79	78
Moisture content (%V/V)	.91	1.04	0.77
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 (%)	101.6	97.7	98.6
PM-10 concentration.....			
actual.....(GR/ACF)	.0024	.0030	.0024
dry standard.....(GR/DSCF)	2.27	3.30	2.75
PM-10 mass rate.....(LB/HR)	0.28	0.41	0.34

Note: Dry Catch Only

0.3415/100

Table 6a. Summary of the Results of the February 7, 1992 PM-10 Determinations on the Dryer Stack at the Louisiana Pacific Waferboard Plant Located in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of test	02-04-92	02-04-92	02-04-92
Time runs were done (HRS)	1235/1422	1454/1637	1710/1911
Process rate (LB/HR)	21075.0	21075.0	21075.0
Volumetric flow actual (ACFM)	63337	62598	62199
standard (DSCFM)	37453	36564	35515
Gas temperature (DEG-F)	211	211	211
Moisture content (%V/V)	21.94	23.66	24.67
Gas composition (%V/V, dry)			
carbon dioxide	3.60	3.60	3.60
oxygen	17.00	17.00	17.10
nitrogen	79.40	79.40	79.30
Isokinetic variation (%)	100.6	103.7	104.1
Particulate concentration actual (GR/ACF)	.0142	.0169	.0172
standard (GR/DSCF)	.0241	.0289	.0302
Part. emission rate (LB/HR)	7.73	9.06	9.18
	0.74	0.86	0.87
			0.82 14/1/92

Note: Dry Catch Only

Table 8: Summary of the Results of the February 7, 1992 PM-10 Determinations on the Dryer Stack at the Louisiana Pacific Waferboard Plant Located in Newberry, Michigan.

ITEM	Run 1	Run 2	Run 3
Date of test	02-04-92	02-04-92	02-04-92
Time runs were done (HRS)	1235/1422	1454/1637	1710/1911
Process rate (LB/HR)	21075	21075	21075
Volumetric flow actual (ACFM)	63337	62598	62199
standard (DSCFM)	37453	36564	35515
Gas temperature (DEG-F)	211	211	211
Moisture content (%V/V)	21.94	23.66	24.67
Gas composition (%V/V, dry)			
carbon dioxide	3.60	3.60	3.60
oxygen	17.00	17.00	17.10
nitrogen	79.40	79.40	79.30
Isokinetic variation (%)	100.6	103.7	104.1
PM-10 concentration.....			
actual.....(GR/ACF)	.0209	.0235	.0248
dry standard.....(GR/DSCF)	.0353	.0402	.0435
PM-10 mass rate.....(LB/HR)	11.35	12.59	13.24

1.2 134
1.2 134

Note: Dry + Organic Wet Catch

Table 7. Summary of the February 5 - 7, 1992 Carbon Monoxide Emission Compliance Tests at the Louisiana Pacific Waferboard Plant in Newberry, Michigan.

Test/Run	Volumetric		Emission Rate	
	Flow Rate (DSCFM)	Concentration (ppm,w)	(LB/HR)	
(Thermal Oil Heater)				(LB/TDF)
1/1	11800	185	10	10.3
1/2	12000	153	9	9.3
1/3	12000	122	7	7.2
Avg.		153	9	8.9
(Press & Unloader Vents)				
5/1	66675	<5	<1.5	
5/2	56740	<5	<1.2	
5/3	63865	<5	<1.4	
Avg.		<5	<1.4	
(Dryer)				(LB/TFP)
9/1	37300	179	36	0.77
9/2	35980	191	39	0.86
9/3	36290	230	47	1.1
Avg.		200	41	0.91

Note: TDF = Ton Dry Fuel (0.97/HR), TFP = Ton Finished Product (8.01/HR)

Table 8. Summary of the February 5 - 7, 1992 Formaldehyde Emission Compliance Tests at the Louisiana Pacific Waferboard Plant in Newberry, Michigan.

Test/Run	Volumetric		Emission Rate	
	Flow Rate (DSCFM)	Concentration (ppm,w)	(LB/HR)	(LB/TFP)
(Thermal Oil Heater)				
3/1	11880	.04	.0023	
3/2	11683	.05	.0033	
3/3	12151	.05	.0033	
Avg.		.05	.0030	
(Press & Unloader Vents)				
8/1	62283	3.2	1.9	0.23
8/2	67562	3.6	2.3	0.28
8/3	67859	3.9	2.5	0.31
Avg.		2.1	2.2	0.27
(Dryer)				
11/1	37386	8.1	1.8	0.22
11/2	36915	8.7	1.9	0.24
11/3	36364	5.2	1.2	0.15
Avg.		7.3	1.6	0.20

Table 9. Summary of the Results of the February 5-7, 1992 Total Hydrocarbon Determinations on the Korus, Press & Unloader Vents, and the Dryer at the Louisiana Pacific Waferboard Plant Located in Newberry, Michigan.

Test/Run	Time	Concentration	Emission Rate	
	(HRS)	(ppmC,w)	(LB/HR)	(LB/TFP)
(Thermal Oil Heater 2-5-92)				
4/1	2035-2135	13.2	0.33	
4/2	2145-2245	6.45	0.16	
4/3	2255-2355	6.60	0.16	
Average		8.75	0.22	
(Press & Unloader Vents 2-6-92)				
7/1	1434-1534	14.7	3.16	0.39
7/2	1542-1642	18.6	4.00	0.49
7/3	1649-1749	21.6	4.65	0.57
Average		18.3	3.94	0.48
(Dryer 2-7-92)				
12/1	2220-2320	96	8.26	1.03
12/2	2330-0040	130	11.2	1.40
12/3	0115-0215	65	5.59	0.70
Average		97	8.35	1.04

3 RESULTS

The results of all field and laboratory evaluations are presented in this section. Gas composition (orsat and moisture) are presented first followed by the computer printout of the particulate, PM-10, carbon monoxide and formaldehyde 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
Konus Stack

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

	Run 1	Run 2	Run 3
Date of run	02-05-92	02-05-92	02-05-92

Dry basis (orsat)

carbon dioxide.....	5.60	5.80	6.00
oxygen.....	14.90	14.70	14.40
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	79.50	79.50	79.60

Wet basis (orsat)

carbon dioxide.....	5.12	5.23	5.39
oxygen.....	13.62	13.26	12.94
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	72.68	71.71	71.51
water vapor.....	8.58	9.80	10.16

Dry molecular weight.....	29.49	29.52	29.54
Wet molecular weight.....	28.51	28.39	28.36
Specific gravity.....	0.985	0.981	0.980
Water mass flow.....(LB/HR)	3107	3672	3809

FO	1.071	1.069	1.083

Test No. 2
Konus Stack

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

	Run 1	Run 2	Run 3
Date of run	02-05-92	02-05-92	02-05-92

Dry basis (orsat)

carbon dioxide.....	6.10	5.90	5.20
oxygen.....	14.40	14.60	15.30
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	79.50	79.50	79.50

Wet basis (orsat)

carbon dioxide.....	5.44	5.26	4.71
oxygen.....	12.83	13.03	13.85
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	70.85	70.94	71.98
water vapor.....	10.88	10.77	9.46

Dry molecular weight.....	29.55	29.53	29.44
Wet molecular weight.....	28.30	28.29	28.36
Specific gravity.....	0.977	0.977	0.980
Water mass flow.....(LB/HR)	4172	4135	3672

FO	1.066	1.068	1.077

Test No. 3
Konus Stack

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

	Run 1	Run 2	Run 3
Date of run	02-05-92	02-05-92	02-05-92

Dry basis (orsat)

carbon dioxide.....	6.10	5.90	5.20
oxygen.....	14.40	14.60	15.40
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	79.50	79.50	79.40

Wet basis (orsat)

carbon dioxide.....	5.53	5.31	4.74
oxygen.....	13.05	13.14	14.05
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	72.04	71.54	72.45
water vapor.....	9.38	10.01	8.75

Dry molecular weight.....	29.55	29.53	29.45

Wet molecular weight.....	28.47	28.37	28.45

Specific gravity.....	0.983	0.980	0.983

Water mass flow.....(LB/HR)	0.00	0.00	0.00

FO	1.066	1.068	1.058

Test No. 5
Press & Unloader Vent Stack

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

Date of run	Run 1 02-06-92	Run 2 02-06-92	Run 3 02-06-92
Dry basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.90	20.90	20.90
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.73	20.64	20.75
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	78.43	78.09	78.52
water vapor.....	0.81	1.24	0.70
Dry molecular weight.....	28.84	28.84	28.84
Wet molecular weight.....	28.75	28.71	28.76
Specific gravity.....	0.993	0.992	0.994
Water mass flow.....(LB/HR)	3059	3994	2529
FO	0.000	0.000	0.000

Test No. 5
Press & Unloader Vent Stack

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

	Run 1	Run 2	Run 3
Date of run	02-06-92	02-06-92	02-06-92

Dry basis (orsat)

carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.90	20.90	20.90
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	79.07	79.07	79.07

Wet basis (orsat)

carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.73	20.64	20.75
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	78.43	78.09	78.52
water vapor.....	0.81	1.24	0.70

Dry molecular weight.....	28.84	28.84	28.84
Wet molecular weight.....	28.75	28.71	28.76
Specific gravity.....	0.993	0.992	0.994
Water mass flow.....(LB/HR)	3059	3994	2529

FO	0.000	0.000	0.000

Test No. 6
Press & Unloader Vent Stack

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

Date of run	Run 1 02-06-92	Run 2 02-06-92	Run 3 02-06-92
Dry basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.90	20.90	20.90
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.70	20.67	20.73
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	78.32	78.19	78.42
water vapor.....	0.95	1.12	0.82
Dry molecular weight.....	28.84	28.84	28.84
Wet molecular weight.....	28.74	28.72	28.75
Specific gravity.....	0.993	0.992	0.993
Water mass flow.....(LB/HR)	4132	4934	3592
FO	0.000	0.000	0.000

Test No. 6
Press & Unloader Vent Stack

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

Date of run	Run 1 02-06-92	Run 2 02-06-92	Run 3 02-06-92
Dry basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.90	20.90	20.90
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.77	20.90	20.90
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	78.58	79.07	79.07
water vapor.....	0.62	0.00	0.00
Dry molecular weight.....	28.84	28.84	28.84
Wet molecular weight.....	28.77	28.84	28.84
Specific gravity.....	0.994	0.996	0.996
Water mass flow.....(LB/HR)	519	0	0
FO	0.000	0.000	0.000

Test No. 8
Press & Unloading Vents Stacks

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

	Run 1	Run 2	Run 3
Date of run	02-06-92	02-06-92	02-06-92

Dry basis (orsat)

carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.90	20.90	20.90
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	79.07	79.07	79.07

Wet basis (orsat)

carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.69	20.70	20.73
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	78.27	78.33	78.45
water vapor.....	1.01	0.93	0.79

Dry molecular weight.....	28.84	28.84	28.84
Wet molecular weight.....	28.73	28.74	28.76
Specific gravity.....	0.992	0.993	0.993
Water mass flow.....(LB/HR)	0.00	0.00	0.00

FO	0.000	0.000	0.000

Test No. 9
Dryer Stack

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

	Run 1	Run 2	Run 3
Date of run	02-07-92	02-07-92	02-07-92

Dry basis (orsat)

carbon dioxide.....	3.70	3.80	3.80
oxygen.....	16.90	16.80	16.90
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	79.40	79.40	79.30

Wet basis (orsat)

carbon dioxide.....	3.01	2.91	2.92
oxygen.....	13.76	12.85	12.97
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	64.63	60.74	60.87
water vapor.....	18.60	23.51	23.24

Dry molecular weight.....	29.27	29.28	29.28
Wet molecular weight.....	27.17	26.63	26.66
Specific gravity.....	0.939	0.920	0.921
Water mass flow.....(LB/HR)	23912	31015	30817

FO	1.081	1.079	1.053

Test No. 10
Dryer Stack

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

	Run 1	Run 2	Run 3
Date of run	02-04-92	02-04-92	02-04-92

Dry basis (orsat)

carbon dioxide.....	3.60	3.60	3.60
oxygen.....	17.00	17.00	17.10
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	79.40	79.40	79.30

Wet basis (orsat)

carbon dioxide.....	2.81	2.75	2.71
oxygen.....	13.27	12.98	12.88
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	61.98	60.62	59.73
water vapor.....	21.94	23.66	24.67

Dry molecular weight.....	29.26	29.26	29.26
Wet molecular weight.....	26.79	26.59	26.48
Specific gravity.....	0.925	0.919	0.915
Water mass flow.....(LB/HR)	29533	31782	32633

FO	1.083	1.083	1.056

Test No. 11
Dryer Stack

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

Date of run	Run 1 02-07-92	Run 2 02-07-92	Run 3 02-07-92
Dry basis (orsat)			
carbon dioxide.....	3.70	3.60	3.50
oxygen.....	16.90	17.00	17.10
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	79.40	79.40	79.40
Wet basis (orsat)			
carbon dioxide.....	2.90	2.82	2.66
oxygen.....	13.25	13.32	12.99
carbon monoxide.....	0.00	0.00	0.00
nitrogen.....	62.23	62.21	60.33
water vapor.....	21.62	21.65	24.01
Dry molecular weight.....	29.27	29.26	29.24
Wet molecular weight.....	26.83	26.82	26.54
Specific gravity.....	0.927	0.926	0.917
Water mass flow.....(LB/HR)	0.00	0.00	0.00
FO	1.081	1.083	1.086

3.2 Results of Particulate Determinations

Test No. 1
Konus Stack

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

	Run 1	Run 2	Run 3
Date of run	02-05-92	02-05-92	02-05-92
Time run start/end.....(HRS)	900/1004	1055/1201	1230/1340
Static pressure.....(IN.WC)	-0.10	-0.10	-0.10
Cross sectional area (SQ.FT)	19.31	19.31	19.31
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	79.0	106.0	110.0
desiccant.....(GRAMS)	20.0	13.0	13.0
total.....(GRAMS)	99.0	119.0	123.0
Total particulate material..			
.....collected(grams)	0.0480	0.0617	0.0595
Gas meter coefficient.....	0.9993	0.9993	0.9993
Barometric pressure..(IN.HG)	29.44	29.44	29.44
Avg. orif.pres.drop..(IN.WC)	2.28	2.52	2.49
Avg. gas meter temp..(DEF-F)	61.1	67.6	71.5
Volume through gas meter....			
at meter conditions...(CF)	49.64	52.15	52.17
standard conditions.(DSCF)	49.72	51.62	51.26
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.502	.502	.502
Avg.stack gas temp ..(DEG-F)	275	274	275
Volumetric flow rate.....			
actual.....(ACFM)	18256	18878	18902
dry standard.....(DSCFM)	11798	12043	12001
Isokinetic variation.....(%)	98.7	100.4	100.1
Particulate concentration...			
actual.....(GR/ACF)	0.00962	0.01176	0.01137
dry standard.....(GR/DSCF)	0.01490	0.01844	0.01791
Particle mass rate...(LB/HR)	1.506	1.904	1.843

Test No. 5
Press & Unloader Vent Stack

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

	Run 1	Run 2	Run 3
Date of run	02-06-92	02-06-92	02-06-92
Time run start/end.....(HRS)	1035/1215	1306/1427	1517/1643
Static pressure.....(IN.WC)	-1.50	-1.50	-1.50
Cross sectional area (SQ.FT)	47.53	47.53	47.53
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	0.0	2.0	0.0
desiccant.....(GRAMS)	6.0	6.0	5.0
total.....(GRAMS)	6.0	8.0	5.0
Total particulate material..			
.....collected(grams)	0.0086	0.0095	0.0083
Gas meter coefficient.....	0.9993	0.9993	0.9993
Barometric pressure..(IN.HG)	28.78	28.76	28.78
Avg. orif.pres.drop..(IN.WC)	1.17	0.90	1.04
Avg. gas meter temp..(DEF-F)	67.9	69.9	68.5
Volume through gas meter....			
at meter conditions...(CF)	35.89	31.35	34.70
standard conditions.(DSCF)	34.59	30.06	33.40
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter.....(IN)	.189	.189	.189
Avg.stack gas temp ..(DEG-F)	73	76	77
Volumetric flow rate.....			
actual.....(ACFM)	141746	121745	136553
dry standard.....(DSCFM)	133348	113472	127730
Isokinetic variation.....(%)	99.0	101.1	99.7
Particulate concentration...			
actual.....(GR/ACF)	0.00361	0.00454	0.00359
dry standard.....(GR/DSCF)	0.00384	0.00488	0.00383
Particle mass rate...(LB/HR)	4.384	4.742	4.198

Test No. 9
Dryer Stack

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

	Run 1	Run 2	Run 3
Date of run	02-07-92	02-07-92	02-07-92
Time run start/end.....(HRS)	1235/1337	1408/1523	1558/1710
Static pressure.....(IN.WC)	-0.13	-0.13	-0.13
Cross sectional area (SQ.FT)	21.82	21.82	21.82
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	145.0	210.0	202.0
desiccant.....(GRAMS)	15.0	11.0	9.0
total.....(GRAMS)	160.0	221.0	211.0
Total particulate material..			
.....collected(grams)	0.0996	0.1029	0.0909
Gas meter coefficient.....	0.9951	0.9951	0.9951
Barometric pressure..(IN.HG)	28.84	28.84	29.12
Avg. orif.pres.drop..(IN.WC)	1.02	1.07	1.03
Avg. gas meter temp..(DEG-F)	73.5	75.9	86.7
Volume through gas meter....			
at meter conditions...(CF)	34.70	35.80	35.06
standard conditions.(DSCF)	33.01	33.91	32.87
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.246	.246	.246
Avg.stack gas temp ..(DEG-F)	211	211	210
Volumetric flow rate.....			
actual.....(ACFM)	60456	62072	61692
dry standard.....(DSCFM)	37304	35983	36294
Isokinetic variation.....(%)	97.6	103.9	99.8
Particulate concentration...			
actual.....(GR/ACF)	0.02871	0.02713	0.02510
dry standard.....(GR/DSCF)	0.04655	0.04682	0.04268
Particle mass rate...(LB/HR)	14.885	14.441	13.276

3.3 Results of PM-10 Determinations

Test No. 2
Konus Stack

Results of PM-10 Determinations -----

	Run 1	Run 2	Run 3
Date of run	02-05-92	02-05-92	02-05-92
Time run start/end.....(HRS)	1355/1530	1607/1729	1807/1937
Static pressure.....(IN.WC)	-0.10	-0.10	-0.10
Cross sectional area (SQ.FT)	19.31	19.31	19.31
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	74.0	70.0	60.0
desiccant.....(GRAMS)	6.0	7.0	10.0
total.....(GRAMS)	80.0	77.0	70.0
Total PM-10 material.....			
.....collected(grams)	0.0345	0.0338	0.0284
Gas meter coefficient.....	1.0085	1.0083	1.0083
Barometric pressure..(IN.HG)	29.44	29.44	29.44
Avg. orif.pres.drop..(IN.WC)	0.52	0.51	0.51
Avg. gas meter temp..(DEF-F)	75.4	76.7	76.4
Volume through gas meter....			
at meter conditions...(CF)	31.56	30.80	32.32
standard conditions.(DSCF)	30.91	30.09	31.59
Total sampling time....(MIN)	79.01	76.69	81.25
Nozzle diameter.....(IN)	.342	.342	.342
Avg.stack gas temp ..(DEG-F)	275	273	273
Volumetric flow rate.....			
actual.....(ACFM)	19345	19326	19530
dry standard.....(DSCFM)	12188	12217	12530
Isokinetic variation.....(%)	97.2	97.3	94.0
PM-10 cutpoint.....(um)	10.00	9.99	10.18
PM-10 concentration.....			
actual.....(GR/ACF)	0.01085	0.01095	0.00890
dry standard.....(GR/DSCF)	0.01722	0.01733	0.01387
PM-10 mass rate.....(LB/HR)	1.799	1.815	1.490

Test No. 10
Dryer Stack

Results of PM-10 Determinations -----

	Run 1 02-04-92	Run 2 02-04-92	Run 3 02-04-92
Date of run			
Time run start/end.....(HRS)	1235/1422	1454/1637	1710/1911
Static pressure.....(IN.WC)	-0.23	-0.23	-0.23
Cross sectional area (SQ.FT)	21.82	21.82	21.82
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	170.0	198.0	200.0
desiccant.....(GRAMS)	7.0	8.0	9.0
total.....(GRAMS)	177.0	206.0	209.0
Total PM-10 material.....			
.....collected(grams)	0.0680	0.0816	0.0848
Gas meter coefficient.....	0.9920	0.9920	0.9920
Barometric pressure..(IN.HG)	28.84	29.12	28.84
Avg. orif.pres.drop..(IN.WC)	0.34	0.35	0.35
Avg. gas meter temp..(DEF-F)	75.6	82.5	82.0
Volume through gas meter....			
at meter conditions...(CF)	31.48	33.34	32.28
standard conditions.(DSCF)	29.69	31.34	30.08
Total sampling time....(MIN)	95.24	99.92	98.34
Nozzle diameter.....(IN)	.182	.182	.182
Avg.stack gas temp ..(DEG-F)	211	211	211
Volumetric flow rate.....			
actual.....(ACFM)	63337	62598	62199
dry standard.....(DSCFM)	37453	36564	35515
Isokinetic variation.....(%)	100.6	103.7	104.1
PM-10 cutpoint.....(um)	10.31	10.13	10.12
PM-10 concentration.....			
actual.....(GR/ACF)	0.02089	0.02345	0.02483
dry standard.....(GR/DSCF)	0.03534	0.04017	0.04349
PM-10 mass rate.....(LB/HR)	11.346	12.590	13.240

Summary of PM-10 Results

The PM-10 determinations on the Press Vents at this facility were complicated by the fact that one nozzle was not adequate to perform an isokinetic traverse of the duct. Therefore, two nozzles were used, one to sample the low velocity pressure points and another to sample the high velocity pressure points. These two samplings were then combined to obtain the total PM-10 catch. A summary of critical parameters is given below:

Parameter	Run 1	Run 2	Run 3
Total Sampling Time (MIN)			
Low velocity	8.54	4.19	3.85
High Velocity	68.16	67.93	65.68
Total	76.70	72.12	69.53
Gas Meter Volume (DSCF)			
Low velocity	3.78	2.16	1.69
High velocity	29.65	29.18	28.53
Total	33.43	31.34	30.22
Isokinetics (%)			
Low velocity	146.4	156.5	150.9
High velocity	96.0	94.1	95.5
Total (Time weighted)	101.6	97.7	98.6
D ₅₀ (um)			
Low velocity	9.79	8.83	9.89
High velocity	9.93	10.00	9.85
Total (Volume weighted)	9.91	9.92	9.85
Concentration (GR/DSCF)			
Low velocity	0.0110	0.0221	0.0337
High velocity	0.0030	0.0040	0.0028
Total (Volume weighted)	0.0039	0.0052	0.0045
Mass Rate (LB/HR)			
Low velocity	0.944	2.067	2.783
High velocity	2.698	3.619	2.475
Total	3.64	5.69	5.26

Test No. 6
Press & Unloader Vent Stack

Results of PM-10 Determinations -----

	Run 1	Run 2	Run 3
Date of run	02-06-92	02-06-92	02-06-92
Time run start/end.....(HRS)	1440/1510	1740/1800	2200/2220
Static pressure.....(IN.WC)	-1.30	-1.30	-1.30
Cross sectional area (SQ.FT)	16.00	16.00	16.00
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)	0.5	0.0	0.0
total.....(GRAMS)	0.5	0.0	0.0
Total PM-10 material.....			
.....collected(grams)	0.0027	0.0031	0.0037
Gas meter coefficient.....	1.0083	1.0083	1.0083
Barometric pressure..(IN.HG)	28.80	28.80	28.80
Avg. orif.pres.drop..(IN.WC)	0.63	0.63	0.63
Avg. gas meter temp..(DEF-F)	74.5	74.3	73.6
Volume through gas meter....			
at meter conditions...(CF)	3.94	2.25	1.76
standard conditions.(DSCF)	3.78	2.16	1.69
Total sampling time....(MIN)	8.54	4.19	3.85
Nozzle diameter.....(IN)	.298	.298	.298
Avg.stack gas temp ..(DEG-F)	78	79	78
Volumetric flow rate.....			
actual.....(ACFM)	10689	11589	10224
dry standard.....(DSCFM)	10001	10891	9626
Isokinetic variation.....(%)	146.4	156.5	150.9
PM-10 cutpoint.....(um)	9.79	8.83	9.89
PM-10 concentration.....			
actual.....(GR/ACF)	0.01030	0.02080	0.03175
dry standard.....(GR/DSCF)	0.01102	0.02214	0.03374
PM-10 mass rate.....(LB/HR)	0.944	2.067	2.783

Interpoll Labs Report No. 2-3500
Louisiana Pacific - Newberry
Newberry, Michigan

Test No. 6
Press & Unloader Vent Stack

Results of PM-10 Determinations -----

	Run 1	Run 2	Run 3
Date of run	02-06-92	02-06-92	02-06-92
Time run start/end.....(HRS)	1553/1713	1824/1959	2033/2144
Static pressure.....(IN.WC)	-1.30	-1.30	-1.30
Cross sectional area (SQ.FT)	32.11	32.11	32.11
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)	6.0	7.0	5.0
total.....(GRAMS)	6.0	7.0	5.0
Total PM-10 material.....			
.....collected(grams)	0.0058	0.0076	0.0051
Gas meter coefficient.....	1.0083	1.0083	1.0083
Barometric pressure..(IN.HG)	28.80	28.80	28.80
Avg. orif.pres.drop..(IN.WC)	0.64	0.63	0.64
Avg. gas meter temp..(DEF-F)	75.6	74.0	76.6
Volume through gas meter....			
at meter conditions...(CF)	30.95	30.37	29.84
standard conditions.(DSCF)	29.65	29.18	28.53
Total sampling time....(MIN)	68.16	67.93	65.68
Nozzle diameter.....(IN)	.160	.160	.160
Avg.stack gas temp ..(DEG-F)	79	78	78
Volumetric flow rate.....			
actual.....(ACFM)	111986	112853	112133
dry standard.....(DSCFM)	104297	105067	104713
Isokinetic variation.....(%)	96.0	94.1	95.5
PM-10 cutpoint.....(um)	9.93	10.00	9.85
PM-10 concentration.....			
actual.....(GR/ACF)	0.00281	0.00374	0.00257
dry standard.....(GR/DSCF)	0.00302	0.00402	0.00276
PM-10 mass rate.....(LB/HR)	2.698	3.619	2.475

3.4 Results of Carbon Monoxide Determinations

Test No. 1
Konus Stack

Results of CO Determinations -----Method 10

	Run 1	Run 2	Run 3
Date of run	02-05-92	02-05-92	02-05-92
Time run start/end.....(HRS)	0900-1004	1055-1201	1230-1340
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content.....(%V/V)	8.58	9.80	10.16
O2 Concentration.....(%V/V)	14.90	14.70	14.40
Volumetric flow rate (DSCFM)	11800	12000	12000
CO concentration.....			
(GR/DSCF).....	0.1028	0.0865	0.0692
(MG/DSCM).....	235.33	198.05	158.44
(PPM-WET).....	184.67	153.34	122.18
(PPM-DRY).....	202.00	170.00	136.00
(PPM-DRY @ 7% O2).....	463.61	377.78	288.48
CO emission rate.....(LB/HR)	10.396	8.897	7.118

CO = Carbon monoxide

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

Test No. 5
Press & Unloader Vent Stack

Results of CO Determinations -----Method 10

	Run 1	Run 2	Run 3
Date of run	02-06-92	02-06-92	02-06-92
Time run start/end.....(HRS)	1035-1215	1306-1427	1517-1643
Total sampling time....(MIN)	64.0	64.0	64.0
Moisture content.....(%V/V)	0.81	1.24	0.70
O2 Concentration.....(%V/V)	20.90	20.90	20.90
Volumetric flow rate (DSCFM)	133348	113472	127730
CO concentration.....			
(GR/DSCF).....	0.0025<	0.0025<	0.0025<
(MG/DSCM).....	5.83<	5.83<	5.83<
(PPM-WET).....	4.96<	4.94<	4.96<
(PPM-DRY).....	5.00<	5.00<	5.00<
(PPM-DRY @ 7% O2).....	700.00<	700.00<	700.00<
CO emission rate.....(LB/HR)	2.908<	2.474<	2.785<

CO = Carbon monoxide

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

Test No. 9
Dryer Stack

Results of CO Determinations -----Method 10

	Run 1	Run 2	Run 3
Date of run	02-07-92	02-07-92	02-07-92
Time run start/end.....(HRS)	1235-1337	1408-1523	1558-1710
Total sampling time....(MIN)	60.0	60.0	60.0
Moisture content.....(%V/V)	18.60	23.51	23.24
O2 Concentration.....(%V/V)	16.90	16.80	16.90
Volumetric flow rate (DSCFM)	37300	35980	36290
CO concentration.....			
(GR/DSCF).....	0.1119	0.1272	0.1527
(MG/DSCM).....	256.30	291.25	349.50
(PPM-WET).....	179.08	191.22	230.28
(PPM-DRY).....	220.00	250.00	300.00
(PPM-DRY @ 7% O2).....	751.22	833.33	1024.39
CO emission rate.....(LB/HR)	35.789	39.230	47.482

CO = Carbon monoxide

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

3.5 Results of Formaldehyde Determinations

Test No. 3
Konus Stack

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

	Run 1	Run 2	Run 3
Date of run	02-05-92	02-05-92	02-05-92
Time run start/end.....(HRS)	1415/1521	1608/1723	1856/2007
Static pressure.....(IN.WC)	-0.10	-0.10	-0.10
Cross sectional area (SQ.FT)	19.31	19.31	19.31
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	98.0	105.0	90.0
desiccant.....(GRAMS)	13.0	13.0	14.0
total.....(GRAMS)	111.0	118.0	104.0
Formaldehyde in sample..(uG)	74	105	105
Gas meter coefficient.....	0.9993	0.9993	0.9993
Barometric pressure..(IN.HG)	29.44	29.44	29.44
Avg. orif.pres.drop..(IN.WC)	2.43	2.36	2.47
Avg. gas meter temp..(DEF-F)	73.4	74.3	72.3
Volume through gas meter....			
at meter conditions...(CF)	51.66	51.21	52.10
standard conditions.(DSCF)	50.57	50.03	51.11
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.502	.502	.502
Avg.stack gas temp ..(DEG-F)	276	273	273
Volumetric flow rate.....			
actual.....(ACFM)	18573	18308	18797
dry standard.....(DSCFM)	11880	11683	12151
Isokinetic variation.....(%)	99.7	100.3	98.5
CH2O concentration.....			
(GR/DSCF).....	0.0000	0.0000	0.0000
(MG/DSCM).....	0.05	0.07	0.07
(PPM-DRY).....	0.04	0.06	0.06
(PPM-WET).....	0.04	0.05	0.05
CH2O emission rate...(LB/HR)	0.00231	0.00326	0.00332

CH2O = Formaldehyde

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

Test No. 8
Press & Unloading Vents Stacks

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

	Run 1	Run 2	Run 3
Date of run	02-06-92	02-06-92	02-06-92
Time run start/end.....(HRS)	1721/1842	1945/2100	2139/2305
Static pressure.....(IN.WC)	-1.50	-1.50	-1.50
Cross sectional area (SQ.FT)	47.53	47.53	47.53
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	5.0
impingers.....(GRAMS)	1.0	1.0	1.0
desiccant.....(GRAMS)	6.0	6.0	0.0
total.....(GRAMS)	7.0	7.0	6.0
Formaldehyde in sample..(uG)	3685	4485	4885
Gas meter coefficient.....	0.9993	0.9993	0.9993
Barometric pressure..(IN.HG)	28.78	28.18	28.73
Avg. orif.pres.drop..(IN.WC)	1.03	1.17	1.17
Avg. gas meter temp..(DEF-F)	70.1	72.1	73.5
Volume through gas meter....			
at meter conditions...(CF)	33.60	37.41	37.25
standard conditions.(DSCF)	32.24	35.03	35.47
Total sampling time....(MIN)	64.00	64.00	64.00
Nozzle diameter.....(IN)	.189	.189	.189
Avg.stack gas temp ..(DEG-F)	75	79	75
Volumetric flow rate.....			
actual.....(ACFM)	133046	148330	144944
dry standard.....(DSCFM)	124566	135124	135718
Isokinetic variation.....(%)	98.7	98.9	99.7
CH2O concentration.....			
(GR/DSCF).....	0.0018	0.0020	0.0021
(MG/DSCM).....	4.05	4.54	4.88
(PPM-DRY).....	3.24	3.63	3.91
(PPM-WET).....	3.21	3.60	3.88
CH2O emission rate...(LB/HR)	1.88720	2.29410	2.47872

CH2O = Formaldehyde

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

Test No. 11
Dryer Stack

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

	Run 1	Run 2	Run 3
Date of run	02-07-92	02-07-92	02-07-92
Time run start/end.....(HRS)	1746/1849	1946/2048	1023/1134
Static pressure.....(IN.WC)	-0.23	-0.23	-0.23
Cross sectional area (SQ.FT)	21.82	21.82	21.82
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	183.0	182.0	213.0
desiccant.....(GRAMS)	11.0	12.0	11.0
total.....(GRAMS)	194.0	194.0	224.0
Formaldehyde in sample..(uG)	12000	13000	8100
Gas meter coefficient.....	0.9951	0.9951	0.9951
Barometric pressure..(IN.HG)	28.84	28.84	28.64
Avg. orif.pres.drop..(IN.WC)	1.06	1.06	1.05
Avg. gas meter temp..(DEF-F)	86.3	85.6	75.8
Volume through gas meter....			
at meter conditions...(CF)	35.69	35.53	35.28
standard conditions.(DSCF)	33.16	33.10	33.42
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.246	.246	.246
Avg.stack gas temp ..(DEG-F)	207	203	199
Volumetric flow rate.....			
actual.....(ACFM)	62525	61390	61968
dry standard.....(DSCFM)	37386	36915	36364
Isokinetic variation.....(%)	97.8	98.9	101.3
CH2O concentration.....			
(GR/DSCF).....	0.0056	0.0061	0.0037
(MG/DSCM).....	12.82	13.91	8.58
(PPM-DRY).....	10.27	11.14	6.88
(PPM-WET).....	8.05	8.73	5.22
CH2O emission rate...(LB/HR)	1.79353	1.92177	1.16823

CH2O = Formaldehyde

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

4 RESULTS OF FUEL ANALYSES

INTERPOLL LABORATORIES INC.

Fuel Laboratory
(612) 786-6020

03-06-1992

Client: LP/NEWBERRY

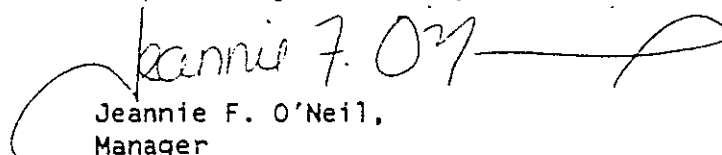
Laboratory Log Number: 5337-92-1225

Sample Identification: BARK KONUS FUEL

Short Proximate Analysis WT %

<u>Parameter</u>	<u>Moisture & Ash Free</u>	<u>Moisture Free</u>	<u>As Received</u>
Moisture, Total			51.11
Ash		3.20	1.56
Sulfur	0.26	0.25	0.12
Heating Value, BTU/LB.	9290	8993	4397

Respectfully submitted,



Jeannie F. O'Neil,
Manager
Inorganic Chemistry Group

INTERPOLL LABORATORIES INC.

Fuel Laboratory
(612) 786-6020

03-06-1992

Client: LP/NEWBERRY

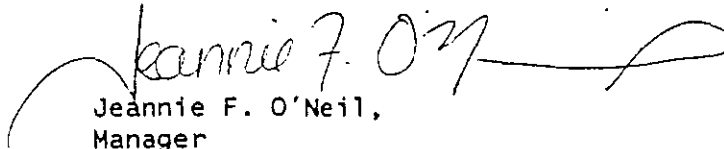
Laboratory Log Number: 5337-93-1226

Sample Identification: DRYER FUEL (WOOD) DRY FINES

Short Proximate Analysis WT %

<u>Parameter</u>	<u>Moisture & Ash Free</u>	<u>Moisture Free</u>	<u>As Received</u>
Moisture, Total			3.10
Ash		0.72	0.70
Sulfur	0.20	0.20	0.20
Heating Value, BTU/LB.	8717	8654	8386

Respectfully submitted,



Jeannie F. O'Neil,

Manager
Inorganic Chemistry Group

APPENDIX A

RESULTS OF VOLUMETRIC FLOW RATE DETERMINATIONS

Test No. 1
Konus Stack

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

Date of Determination.....	02-05-92
Time of Determination.....(HRS)	835
Barometric pressure.....(IN.HG)	29.44
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	12
Shape of duct.....	Round
Stack diameter.....(IN)	59.5
Duct area.....(SQ.FT)	19.31
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.095
Avg. gas temp.....(DEG-F)	271
Moisture content.....(% V/V)	8.58
Avg. linear velocity.....(FT/SEC)	16.1
Gas density.....(LB/ACF)	.05260
Molecular weight.....(LB/LBMOLE)	29.49
Mass flow of gas.....(LB/HR)	58819
Volumetric flow rate.....	
actual.....(ACFM)	18638
dry standard.....(DSCFM)	12106

Test No. 2
Konus Stack

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

Date of Determination.....	02-05-92
Time of Determination.....(HRS)	840
Barometric pressure.....(IN.HG)	29.44
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	12
Shape of duct.....	Round
Stack diameter.....(IN)	59.5
Duct area.....(SQ.FT)	19.31
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.095
Avg. gas temp.....(DEG-F)	270
Moisture content.....(% V/V)	10.88
Avg. linear velocity.....(FT/SEC)	16.1
Gas density.....(LB/ACF)	.05228
Molecular weight.....(LB/LBMOLE)	29.55
Mass flow of gas.....(LB/HR)	58642
Volumetric flow rate.....	
actual.....(ACFM)	18694
dry standard.....(DSCFM)	11855

Test No. 6
Press & Unloader Vent Stack

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

Date of Determination.....	02-06-92
Time of Determination.....(HRS)	1235
Barometric pressure.....(IN.HG)	28.8
Pitot tube coefficient.....	.84
Number of sampling ports.....	8
Total number of points.....	48
Shape of duct.....	Rectangular
Duct width.....(IN)	58.5
Duct length.....(IN)	117
Duct area.....(SQ.FT)	47.53
Direction of flow.....	UP
Static pressure.....(IN.WC)	-1.3
Avg. gas temp.....(DEG-F)	78
Moisture content.....(% V/V)	1.03
Avg. linear velocity.....(FT/SEC)	43.0
Gas density.....(LB/ACF)	.07152
Molecular weight.....(LB/LBMOLE)	29.37
Mass flow of gas.....(LB/HR)	526174
Volumetric flow rate.....	
actual.....(ACFM)	122620
dry standard.....(DSCFM)	114269

Test No. 9
Dryer Stack

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

Date of Determination.....	02-07-92
Time of Determination.....(HRS)	924
Barometric pressure.....(IN.HG)	29.12
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	20
Shape of duct.....	Round
Stack diameter.....(IN)	63.25
Duct area.....(SQ.FT)	21.82
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.13
Avg. gas temp.....(DEG-F)	181
Moisture content.....(% V/V)	18.60
Avg. linear velocity.....(FT/SEC)	43.8
Gas density.....(LB/ACF)	.05655
Molecular weight.....(LB/LBMOLE)	29.27
Mass flow of gas.....(LB/HR)	194612
Volumetric flow rate.....	
actual.....(ACFM)	57356
dry standard.....(DSCFM)	37416

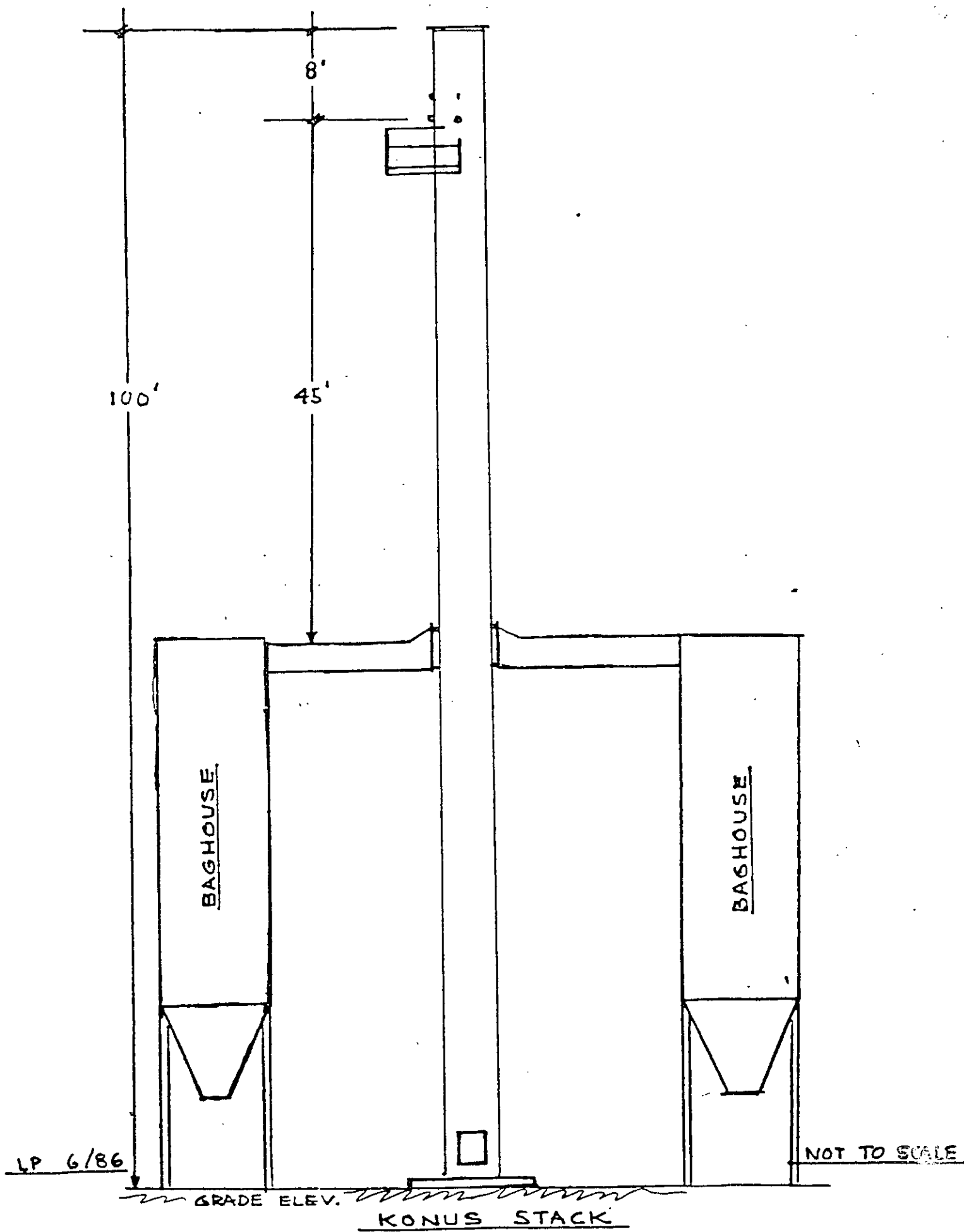
Test No. 10
Dryer Stack

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

Date of Determination.....	02-04-92
Time of Determination.....(HRS)	800
Barometric pressure.....(IN.HG)	28.84
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	12
Shape of duct.....	Round
Stack diameter.....(IN)	63.25
Duct area.....(SQ.FT)	21.82
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.23
Avg. gas temp.....(DEG-F)	181
Moisture content.....(% V/V)	21.94
Avg. linear velocity.....(FT/SEC)	46.4
Gas density.....(LB/ACF)	.05520
Molecular weight.....(LB/LBMOLE)	29.26
Mass flow of gas.....(LB/HR)	201171
Volumetric flow rate.....	
actual.....(ACFM)	60743
dry standard.....(DSCFM)	37624

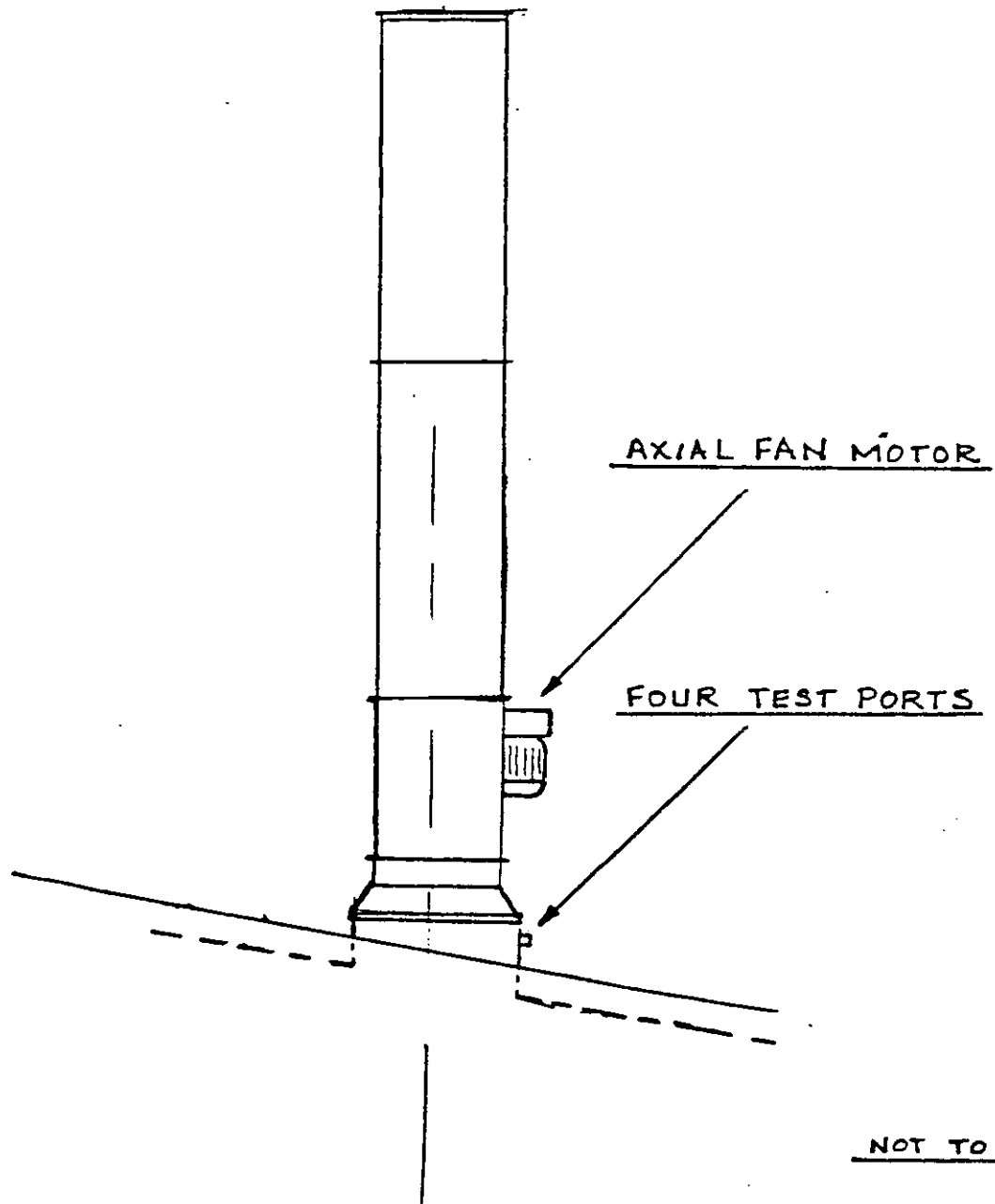
APPENDIX B

LOCATION OF TEST PORTS



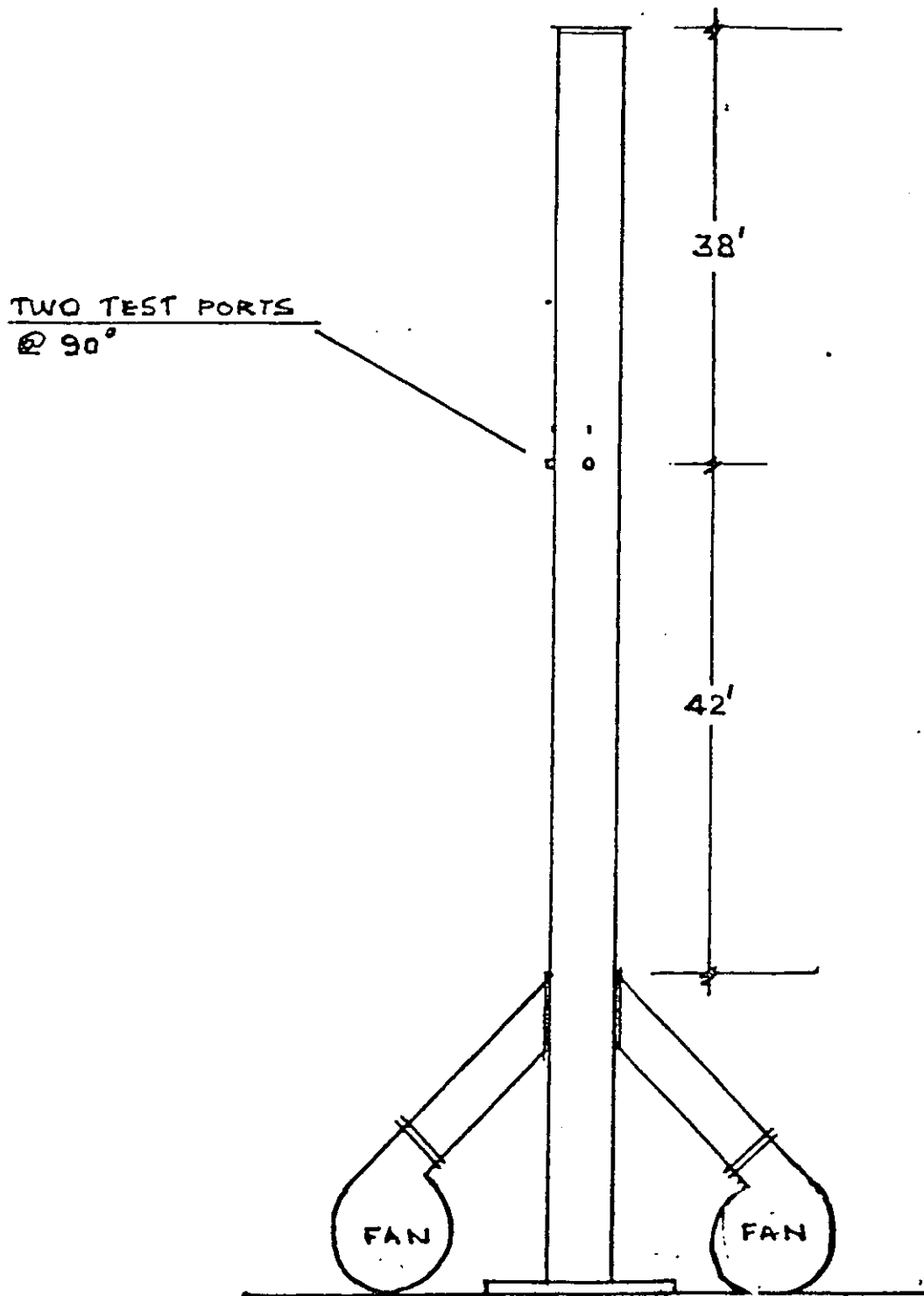
LP NEW BERRY

PRESS VENT



LP NEWBERRY

DRYER STACK



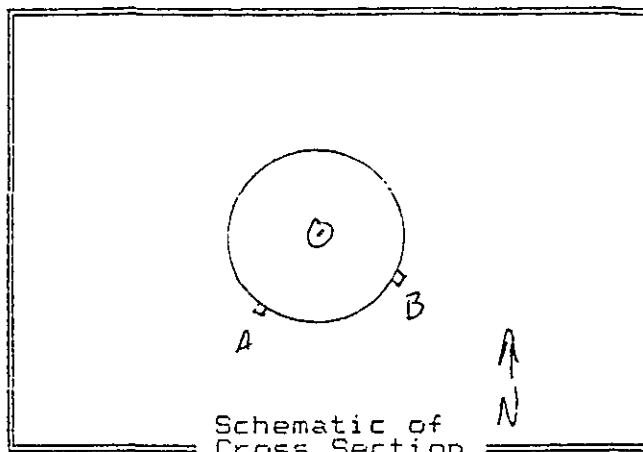
LP 6/86

NOT TO SCALE

APPENDIX C

KONUS FIELD DATA SHEETS

Job L.P. / NEWBERRY
Source Konus Stack
Test 1 Run Date 2/5/72
Stack dimen. 59.5 IN.
Dry bulb °F Wet bulb °F
Manometer: ☐ Reg. ☒ Exp. ☐ Elec.
Barometric pressure 29.44 in Hg
Static pressure - .095 in WC
Operators D. Van Heever & P. O'Neil
Pitot No. 123-5 Cp .84



Particulars

Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length:	4 in.	Time start: 0835 hrs	
A 1	.044	2.95	6.95	.032	
2	.146	8.69	12.69	.055	
3	.276	17.61	21.61	.061	270
4	.704	41.81	45.89	.068	
5	.854	50.81	54.81	.071	
6	.956	56.88	60.88	.065	
B 1				.038	
2				.056	
3				.065	272
4				.065	
5				.063	
6				.060	
Temp. meas. tool & S/N: * 8				Time end: hrs	

R or nothing = req. manometer; S = expanded; E = electronic S-392.1

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.O. NEWBERRY Date 2/5/92 Test 1 Run 1
 Source KONUS STACK 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) ☒
 Posttest: { 0 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 3824 Recovery solvent(s): ☒ acetone ☐ other(s) _____

No. of probe wash bottles: 1

Sample recovered by: DAK

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>279</u>	<u>200</u>	<u>79</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1422</u>	<u>1402</u>	<u>20</u>
Total			<u>99</u>

Integrated Gas Sampling Data:

Bag Pump No. B3 Box No. 6 Bag No. 1
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 0905 (HRS) Time end: 1004 (HRS)
 Sampling rate: 400 cc/min Operator: DAK
 S/N of O₂ Analyzer used to monitor train outlet: 11

CF-023

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. / NEWBERRY Date 2/5/92 Test 1 Run 2
 Source DRYER STACK No. of traverse points 12
 Method 5 Filter holder: 9/455 Filter type: glass fiber

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 11 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 4035 Recovery solvent(s) ☒ acetone ☐ other(s) _____
 No. of probe wash bottles: 1
 Sample recovered by: DWH

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	306	200	106
Impinger No. 3			
Condenser			
Desiccant	1340	1327	13
Total			119

Integrated Gas Sampling Data:

Bag Pump No. B3 Box No. 6 Bag No. 2
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 1100 (HRS) Time end: 1201 (HRS)
 Sampling rate: 400 cc/min Operator: DWH
 S/N of O₂ Analyzer used to monitor train outlet: 11

CF-023

110-17

9011	L.P. / Newberry	91
5000	54445	57
0016	2/5/92	

Department _____
 Water Box No. 8
 Generator Code. 1

70
KIP .9993 IN NE
1.88

Pituit No. U23-5
Bar. Press. 29.41
Noxide No. 5-8

CP, 84
1000-1000
1000-1000

Σ x
Σ z | N.

[illegible]

INTERPOL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. Newberry Date 2/5/92 Test 1 Run 3
 Source KONUS STACK 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) ☒
 Posttest: { 0 cfm at 11 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: 4065 Recovery solvent(s) ☒ acetone ☐ other(s) _____
 No. of probe wash bottles: 1
 Sample recovered by: DLH

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	310	200	110
Impinger No. 3			
Condenser			
Desiccant	1435	1422	13
Total			123

Integrated Gas Sampling Data:

Bag Pump No. B3 Box No. 6 Bag No. 3
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 1234 (HRS) Time end: 1340 (HRS)
 Sampling rate: 400 cc/min Operator: DLH
 S/N of O₂ Analyzer used to monitor train outlet: 11

CF-023

S-0046RR

L.P./NEWBERRY
KONUS STACK
7/592

DATE	L.R./NEWBERRY	
SUPPLY	KONIGS SLACK	
QUANTITY	2/5/92	1991 NOV 7

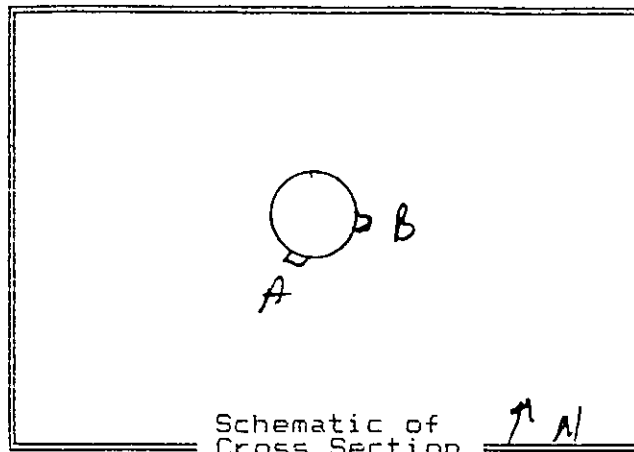
Duplicates
 Computer Box No. 5
 Computer cost. 2493
 DM & P.D.

Pilot No. 623-5 CP. 84
Bar. Press. 29.99 INHG. 7200
NOZZLE No. 5-5 NOZZLE DIA. 5

P. 101 of No. 623-5 CP 84
 Bur. Press. 2949 IN 9 12070 X
 INDEXING No. 5-8 INDEXING No. 582 IN.

[illegible]

Job LP / Newberry, Mich
Source KANUS STACK
Test 2 Run 1 Date 2-5-92
Stack dimen. 58.5 IN.
Dry bulb °F Wet bulb °F
Manometer: ☐ Reg. ☒ Exp. ☐ Elec.
Barometric pressure 29.44 in Hg
Static pressure - .095 in WC
Operators E TRIMBLER - C. MOSSER
Pitot No. 23V-6 Cp 840



PM-10

[illegible]

R or nothing = reg. manometer; S = expanded; E = electronic S-392.1

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP/NEWBERRY Date 2-5-92 Test 2 Run 1
 Source ROADSIDE STACK No. of traverse points 12
 Method PM-10 Filter holder: etc Filter type: 2 1/2" GLASS FIBER

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 5 in. Hg. (vac) ☒

Particulate Catch Data:

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

☒ acetone
☐ other(s)

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		(100)	
Impinger No. 2	251	100	51
Impinger No. 3		0	
Condenser			
Desiccant	1477	1469	8
Total			59

Integrated Gas Sampling Data:

Bag Pump No. 62 Box No. 26 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: 1257 (HRS)
 Sampling rate: 400 cc/min Operator: BT
 S/N of O₂ Analyzer used to monitor train outlet: 7

CF-023

28-5-2 101
57025 5000 401003
29 Nov 68

141407
X 09 1414H
3101414D

FT 10083

2111

Pitt. No.
Bur. Priv.
No. 11

CP 1004-1005

$$\begin{array}{r} 10 \times \\ \hline 584 \end{array} \quad \begin{array}{r} 14. \\ \hline \end{array}$$
[illegible]

INTERPOL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP/HW/BILLY Date 2-5-12 Test 2 Run 1
 Source KANUS STACK No. of traverse points 12
 Method PM-10 Filter holder: ERC Filter type: 2 1/2" GLASS FIBER

Sample Train Leak Check:

Pretest: { 0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: { 0 cfm at 5 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 5604 Recovery solvent(s): acetone
☒ other(s) ET

No. of probe wash bottles: 1

Sample recovered by: ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		(100)	
Impinger No. 2	274	{ 100 }	74
Impinger No. 3		{ 0 }	
Condenser			
Desiccant	1414	1408	6
Total			80

Integrated Gas Sampling Data:

Bag Pump No. B2 Box No. 26 Bag No. 2
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 1356 (HRS) Time end: 1529 (HRS)
 Sampling rate: 400 cc/min Operator: ET
 S/N of O₂ Analyzer used to monitor train outlet: 2

CF-023

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP INOWBERRY Date 2-5-92 Test 2 Run 2
 Source KANUS STACK No. of traverse points 12
 Method PM 10 Filter holder: ELC Filter type: 2 1/2 GLASS FIBER

Sample Train Leak Check:

Pretest: 0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 5 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 5606 Recovery solvent(s):
☒ acetone
☐ other(s)
 No. of probe wash bottles: 1
 Sample recovered by: ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		<u>(100)</u>	
Impinger No. 2	<u>270</u>	<u>{ 100 }</u>	<u>70</u>
Impinger No. 3		<u>0</u>	
Condenser			
Desiccant	<u>1250</u>	<u>1251</u>	<u>7</u>
Total			<u>77</u>

Integrated Gas Sampling Data:

Bag Pump No. 132 Box No. 26 Bag No. 3
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 1608 (HRS) Time end: 1728 (HRS)
 Sampling rate: 400 cc/min Operator: ET
 S/N of O₂ Analyzer used to monitor train outlet: 1

CF-023

[illegible][illegible]

INTERPOL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP/HW/RRV
 Source KANUS STACK
 Method PM 10 Filter holder: ERC

Date 2-5-82 Test 2 Run 3
 No. of traverse points 12
 Filter type: 2 1/4" GLASS FIBER

Sample Train Leak Check:

Pretest: { 0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: { 0 cfm at 5 in. Hg. (vac) ☒

Particulate Catch Data:

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

_____ ☒ acetone _____
 _____ ☐ other(s) _____

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		(100)	
Impinger No. 2	260	{ 100 }	60
Impinger No. 3		{ 0 }	
Condenser			
Desiccant	1404	1394	10
Total			70

Integrated Gas Sampling Data:

Bag Pump No. B32 Box No. 24 Bag No. 3

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

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

Time start: 1808 (HRS) Time end: 1936 (HRS)

Sampling rate: 400 cc/min Operator: ET

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

CF-023

Job LP / Newberry
 Emitter RONUS 576X
 Data 3-5-72

Sub LP / Newberry
Source Konus stack
Date 3-5-83 1981 2 HVN 3

[illegible]

$\frac{2}{2} \times 1.1 = 1.0083$

20-81-2

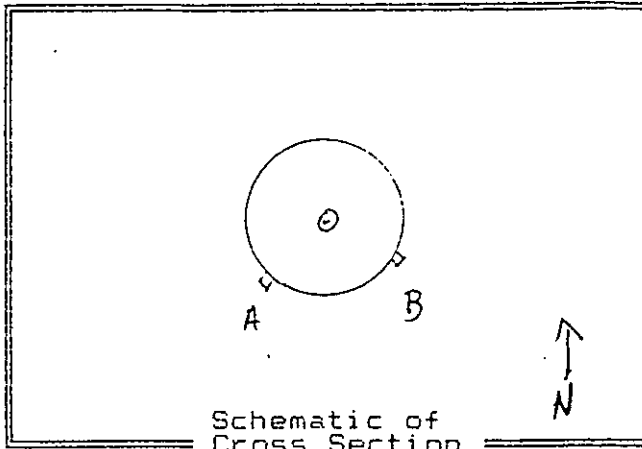
Pitt
Bur.
Wor.

CP, 846
H2
D10,

$$\frac{3\sqrt{2}}{2} - 11.$$
[illegible]

INTERPOLL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job L.P. NEWBERRY
Source KONUS STACK
Test 3 Run _____ Date 2/5/92
Stack dimen. 59.5 IN.
Dry bulb _____ °F Wet bulb _____ °F
Manometer: ☐ Reg. ☐ Exp. ☐ Elec.
Barometric pressure 29.44 in Hg
Static pressure -0.95 in WD
Operators D. Van Hoever & P. O'NEIL
Pitot No. V23-6 Cp .84



Formaldehyde

[illegible]

R or nothing = reg. manometer; S = expanded; E = electronic S-392.1

74
b
INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. / NEWBERRY Date 2/5/92 Test 3 Run 1
Source KONKS 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) ☒
Posttest: 0 cfm at 9 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: DH

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>298</u>	<u>200</u>	<u>98</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1353</u>	<u>1340</u>	<u>13</u>
Total			<u>111</u>

Integrated Gas Sampling Data:

Bag Pump No. B3 Box No. 9 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 1420 (HRS) Time end: 1521 (HRS)
Sampling rate: 400 cc/min Operator: DH
S/N of O₂ Analyzer used to monitor train outlet: 1

CF-023

4100 L.P. NEWBERRY
4100 JONES ST
4100 275/23

1001	L.P./NEWBERRY		
5001	1001	1001	1001
1001	1001	1001	1001

Opportunity *Dist. & P.O.*
Water Box No. *3*
County of *coll.*

IN 1.88 88.7 2623

Plot No. V23-6
 Ref. Page. 29.44
 No. 5-8

$\frac{C_p}{100} = \frac{H_2O}{100} \times$

[illegible]

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P./Newberry Date 2/5/92 Test 3 Run 2
 Source KONKS STARK No. of traverse points 12
 Method DOIL Filter holder: — Filter type: —

Sample Train Leak Check:

Pretest: { 0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: { 0 cfm at 11 in. Hg. (vac) ☒

Particulate Catch Data:

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

— ☐ acetone
— ☒ other(s) MELLS & DI H₂O

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	305	200	105
Impinger No. 3			
Condenser			
Desiccant	1417	1404	13
Total			118

Integrated Gas Sampling Data:

Bag Pump No. B₃ Box No. 9 Bag No. 2
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 1613 (HRS) Time end: 1723 (HRS)
 Sampling rate: 400 cc/min Operator: DWH
 S/N of O₂ Analyzer used to monitor train outlet: 7

CF-023

Unit L.P. / Newberry
Source Pencil sketch
Date 7/5/92

11/11/21

403 14148357
01 202 14148
310 10146

8

3111

Pittsburgh
Bar. P.
Maxill

CP 1214-1215

078 x
592 1 H.

[illegible]

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.A. / NEWBERRY Date 2/5/92 Test 2 Run 3
 Source KONUS Stack No. of traverse points 12
 Method 0011 Filter holder: Filter type:

Sample Train Leak Checks:

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

Particulate Catch Data:

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

 ☐ acetone
 ☒ other(s) MELL, & DI H₂O

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	290	200	90
Impinger No. 3			
Condenser			
Desiccant	1328	1314	14
Total			104

Integrated Gas Sampling Data:

Bag Pump No. B3 Box No. 9 Bag No. 3
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 14 in. Hg.
 Time start: 1900 (HRS) Time end: 2007 (HRS)
 Sampling rate: 400 cc/min Operator: DMH
 S/N of O₂ Analyzer used to monitor train outlet: 7

CF-023

L.P. NEWBERY
Konus Str.
US 92

DATE _____
 TIME _____
 BY _____

3-587-1121

Pitot
 Bar.
 No. 1

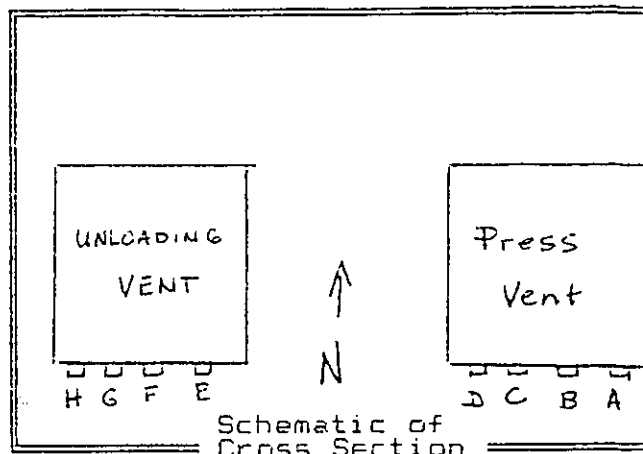
$$\begin{array}{r} 104 \\ 104 \overline{) 108} \\ \underline{104} \\ 40 \\ 40 \\ \underline{40} \\ 000 \end{array}$$
[illegible]

APPENDIX D

PRESS & UNLOADER VENT FIELD DATA SHEETS

INTERPOL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job L. P. / Newberry
 Source Press & Unloader Vent Stack
 Test 5 Run Date 2/6/92
 Stack dimen. 58.5 x 58.5 IN.
 Dry bulb °F Wet bulb °F
 Manometer: ☒ Reg. ☐ Exp. ☐ Elec.
 Barometric pressure 28.78 in Hg
 Static pressure -1.5 in WC
 Operators D. VanHoever & P. O'Neil
 Pitot No. 123-5 Cp .84



Particulate / CO

Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length: <u>6.5</u> in.		Time start: <u> </u> hrs	
A 1 G1		7.31	13.81		
2 2		21.94	28.44		
3 3		36.56	43.06		
4 4		51.19	57.69		
B 1 H1					
2 2					
3 3					
4 4					
C 1					
2					
3					
4					
D 1					
2					
3					
4					
E 1					
2					
3					
4					
F 1					
2					
3					
4					
Temp. meas. tool & S/N:				Time end: <u> </u> hrs	

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. / NEWBERRY Date 2/6/92 Test 5 Run 1
 Source _____ No. of traverse points 32
 Method 5 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: 4064 Recovery solvent(s)
☒ acetone _____
☐ other(s) _____
 No. of probe wash bottles: 1
 Sample recovered by: JEH

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>200</u>	<u>200</u>	<u>0</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1290</u>	<u>1284</u>	<u>6</u>
Total			<u>6</u>

Integrated Gas Sampling Data:

Bag Pump No. B3 Box No. 14 Bag No. 1
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 1040 (HRS) Time end: 1215 (HRS)
 Sampling rate: 400 cc/min Operator: JEH
 S/N of O₂ Analyzer used to monitor train outlet: 9

CF-023

pg 1 of 2

CF-011

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job L.P. Newberry Operators D. V. H. & P. O. Pitot No. V23-5 CP .84
Source P. Hess & Walbridge Vent Stack Meter Box No. 8 TR MC 9943 Bar. Press. 28.78 inHg 2 x
Date 8/6/92 Catalyst coil. 1 Nozzle No. 5-3 Nozzle Dia. .285 in.

Traverse Point No.	Sampling Time (min)	Supply Volume (cf)	Velocity Head (inHg)	Orifice Meter (inHg)	Det. Vol. (cf)	VAC. inHg	Temperature (°F)					Oxygen (xv/v)
							Stack	Probe	Oven	Inlet	Gas In	Gas Out
D 4	1035	622.14	.02	.02	2.34	—	70	250	251	32	61	61
3	4	623.70	1.10	1.49	3.66	5	70				61	61
2	6	625.06	1.05	1.40	4.98	5	80				64	61
1	8	625.53	.01	.01	5.10	—	80	254	251	33	64	60
C 4	10	626.78	1.40	1.87	6.62	5.5	80				61	60
3	12	628.16	1.20	1.64	8.04	5	65				61	60
2	14	629.53	1.10	1.51	9.40	5	65	253	252	33	61	60
1	16	630.57	.65	.87	0.43	2.5	78				65	61
B 4	18	632.03	1.50	2.04	2.01	5	71				69	66
3	20	633.60	1.20	1.65	3.45	4	69	257	252	33	70	66
2	22	634.97	1.20	1.65	4.88	4	69				71	66
1	24	635.70	.31	.42	5.61	1.5	75				71	67
A 4	26	636.94	1.10	1.50	6.98	5	75	258	254	34	70	67
3	28	638.46	1.20	1.64	8.40	5	75				71	67
2	30	639.78	1.05	1.45	9.75	5	70				72	68
1	32	640.05	.87	.09	0.10	—	70	259	250	34	71	67
H 4	34	641.40	1.05	1.45	1.44	5	70				70	69
3	36	642.70	.80	1.09	2.61	4	76				70	69
2	38	643.78	.69	.94	3.69	3	76	250	251	37	70	68
1	40	643.78	.01	.01	3.82	—	76				70	68
G 4	42	645.88	1.15	1.57	5.22	5	76				70	68
3	44	646.39	1.05	1.43	6.56	5	76	251	250	34	71	69
2	46	647.92	1.0	1.37	7.86	5	75				73	69
1	48	648.44	.16	.22	8.39	.	75				73	69
(over)												

5-00370

Sub A.P. NEWBERRY

Job 1. P. NEWBERRY
 Equip PRESS & UNLOADER VENT Stack
 Duty 2/16/52 Run 5

[illegible]

Prof + P.O.

ЗНАЧА

Printed No.
Bef. Press
No. 2219 No.

$$\begin{array}{r} 12291 \\ 12291 \\ \hline 24582 \end{array}$$

221

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Drift Meter (inWC)	Obs. Vol. (cf)	VAC. inHg	Temperature (°F)						Oxygen (XV/V)
							Stack	Probe	Dryn	Impg.	Gas/In	Gas/Out	
E 4	50	649.80	1.20	1.66	9.83	4	70	249	254	34	72	68	AMBI
3	52	651.18	1.10	1.50	1.20	4	75				73	69	AIR
2	54	652.38	1.00	1.38	2.57	4	72				74	69	
1	56	653.62	.64	.88	3.56	3	71	254	256	33	75	70	
F 4	58	655.10	1.30	1.80	5.07	4	71				73	70	
3	60	656.54	1.10	1.52	6.45	4	71				75	71	
2	62	657.95	1.05	1.43	7.79	4	79	251	257	33	76	71	
1	64	658.03	.03	.04	8.02	-	79				73	71	
(1215)													
Σ = 64		Σ = 33.89	Σ = 1.17								Av. = 67.9		Σ = 33.89

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job: L.P. / Newberry Date: 2/6/92 Test: 5 Run: 2
 Source: Press & Unloading Vent Stacks No. of traverse points: 32
 Method: 5 Filter holder: _____ Filter type: glass fiber

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: 4063 Recovery solvent(s):
☒ acetone _____
☐ other(s) _____
 No. of probe wash bottles: _____
 Sample recovered by: _____

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>202</u>	<u>200</u>	<u>2</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1365</u>	<u>1359</u>	<u>6</u>
Total			<u>8</u>

Integrated Gas Sampling Data:

Bag Pump No. B3 Box No. 14 Bag No. 2
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 1310 (HRS) Time end: 1427 (HRS)
 Sampling rate: 400 cc/min Operator: DAH
 S/N of O₂ Analyzer used to monitor train outlet: 9

CF-023

100 L.P. NEWBERRY
Source PRESS & UNIFORMS VENT STACK
Date 10/1/52 NV 5 NV 2

[illegible]

1001 L.R./Newberry
 SOURCE PRESS & Amloaders Vent Stacks
 1001 3 RUN 2
 2/6/92

[illegible]

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. / Newberry Date 2/6/92 Test 5 Run 3
 Source PRESS UNLOADER VENT Stack No. of traverse points 32
 Method 5 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:

Pretest: { 0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: { 0 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

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

4062 ☒ acetone
☐ other(s)

No. of probe wash bottles:

Sample recovered by:

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>200</u>	<u>200</u>	<u>0</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1389</u>	<u>1384</u>	<u>5</u>
Total			<u>5</u>

Integrated Gas Sampling Data: - AMBIENT AIR But need CO

Bag Pump No. B3 Box No. 14 Bag No. 3

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

Pretest leak check: 0 cc/min at 5 in. Hg.

Time start: 1521 (HRS) Time end: 1643 (HRS)

Sampling rate: 400 cc/min Operator:

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

CF-023

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job L.P./Newberry Operators D.M. & P.O. Pilot No. V23-5 CP 84
 Source Press & Unloading Cents - Stack Meter Box No. 8 185 IN NC 2875 INH4 120 X
 Date 2/27/91 Run 3 Counter 9593 Nozzle No. 5-3 Nozzle Dia. 1.57 IN.

Traverse Point No.	Sampling Time (min)	Supply Volume (cf)	Velocity Head (inH ₂ O)	Distance Meter (inH ₂ O)	Det. Vol. (cf)	VAC. inH ₄	Temperature (°F)						Oxygen (xx/vv)
							Stack	Probe	Down	Imp.	Gas/In	Gas/Out	
A 4	157	689.62	.45	.62	0.50	2	81	232	240	32	67	67	20.9
3	4	690.65	1.30	1.78	1.98	4.5	80				67	67	
2	6	691.97	1.05	1.44	3.32	4	80				68	66	
1	8	693.35	.52	.72	4.27	2.5	72	243	247	32	69	67	
B 4	10	694.44	.87	1.21	5.50	4	72				68	66	
3	12	695.68	1.20	1.65	6.73	5	78				69	66	
2	14	696.97	1.10	1.52	8.30	5	75	247	251	33	70	67	
1	16	698.36	.97	1.35	9.60	4.5	73				70	67	
C 4	18	699.74	1.30	1.81	1.10	5	73				69	66	
3	20	701.14	1.32	1.80	2.60	5	75	248	254	33	69	66	
2	22	702.75	1.10	1.52	3.97	4	75				70	66	
1	24	703.97	.33	.45	4.72	2	88				70	66	
D 4	26	704.75	.24	.33	5.30	2	81	251	254	32	68	66	
3	28	705.40	.48	.66	6.27	2.5	80				69	66	
2	30	706.28	.79	1.08	7.43	3	82				70	67	
1	32	707.34	.02	.02	7.61	—	74	254	257	32	69	67	
E 4	34	707.69	.17	.23	8.10	1	74				68	67	
3	36	708.28	.55	.70	9.13	2.5	74				69	67	
2	38	709.24	.68	.94	0.21	3	78	258	256	33	70	67	
1	40	710.24	.40	.53	1.04	2.5	78				72	68	
F 4	42	711.40	.47	.65	1.95	2.5	78				69	67	
3	44	712.08	.69	.96	3.04	2.8	75	259	258	33	71	68	
2	46	713.31	.90	1.21	4.28	3	79				72	68	
1	48	714.30	.09	.12	4.68		79				72	68	
		714.88											
Σ =											avg. =		

1006 L. P. Newberry
1007 ROOF VENTS
1008 8/6/97
1009

Operator Box No. 1400 conf. *2016 HZ*

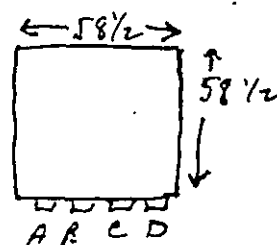
Patent No.
Burr. Press
Mazze No

Cy 10H₄H₂D — x
x 10D 10 — 1N.

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

[illegible]

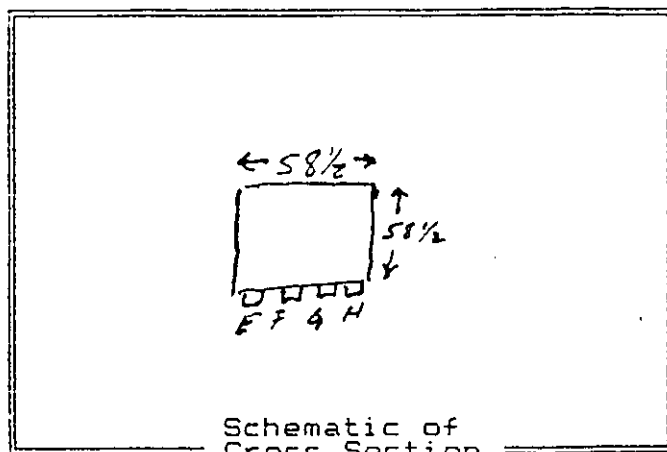
INTERPOLL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job LOUISIANA PACIFIC / NEWBERRY, MICHSource BLESS VENTTest 6 Run 1 Date 2-6-92Stack dimen. 58 1/2 x 58 1/2 IN.Dry bulb °F Wet bulb °FManometer: ☒ Reg. ☒ Exp. ☐ Elec.Barometric pressure 28.80 in HgStatic pressure -6.30 in WCOperators E. T. Lowbridge - C. M. SORPitot No. 23V-6 Cp .840Schematic of
Cross Section

Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length: <u>6 1/2 in.</u>		Time start: <u>1235 hrs</u>	
A	1			.10	78
	2			.70	
	3			.90	
	4			1.05	
	5			1.10	
	6			.025	
B	1			.10	78
	2			.98	
	3			.96	
	4			1.05	
	5			1.05	
	6			.030	
C	1			.78	78
	2			1.00	
	3			1.00	
	4			1.05	
	5			1.05	
	6			.062	
D	1			.03	78
	2			.45	
	3	RT/SL 42.24		1.05	
	4	ALPM 01301		.85	
	5	55072		.14	
	6			.06	
Temp. meas. tool & S/N: <u>PDT-12</u>				Time end: <u> </u> hrs	

INTERPOL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job LP/NEWBURY
 Source UNLOADER VENT
 Test 6 Run Date 2-6-92
 Stack dimen. 58 1/2 x 58 1/2 IN.
 Dry bulb °F Wet bulb °F
 Manometer: ☐ Reg. ☒ Exp. ☐ Elec.
 Barometric pressure 28.80 in Hg
 Static pressure -1.35 in WC
 Operators ETRONCICAL - P. MOSSER
 Pitot No. 234-6 Cp .840



PM10

Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length: <u>6 1/2 in.</u>		Time start: <u> </u> hrs	
F	1	4.88	11.38	.020	78
	2	14.63	21.13	1.05	
	3	24.38	30.88	1.10	
	4	34.13	40.63	1.30	
	5	43.88	50.38	1.50	
	6	53.63	60.13	.030	
F	1			.25	78
	2			1.10	
	3			1.10	
	4			1.10	
	5			1.30	
	6			.020	
G	1			.16	78
	2			1.20	
	3			1.20	
	4			1.25	
	5			1.60	
	6			.030	
H	1	42.39		.020	78
	2	60.458		.95	
	3	55.209		1.00	
	4			.25	
	5			1.00	
	6			.020	
Temp. meas. tool & S/N:				Time end: <u> </u> hrs	

R or nothing = reg. manometer; S = expanded; E = electronic S-392.1

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP/MW/BALBY Date 2-6-92 Test 6 Run 1
 Source PRESS & UNLOADER No. of traverse points 8
 Method PIM-1D Filter holder: ERC Filter type: _____

Sample Train Leak Check:

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

Particulate Catch Data:

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

5601 ☒ acetone _____
☐ other(s) _____

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		{ 1.00 }	
Impinger No. 2	2.00	{ 1.00 }	0
Impinger No. 3		{ 0 }	
Condenser			
Desiccant	1350.5	1350.0	.5
Total			.5

Integrated Gas Sampling Data:

Bag Pump No. B2 Box No. 8 Bag No. 1
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: _____ (HRS) Time end: _____ (HRS)
 Sampling rate: 400 cc/min Operator: ET
 S/N of O₂ Analyzer used to monitor train outlet: 7

CF-023

LP/Non-Perry

Printer's
Mark
Counter

£800/-
28.1.11
JN 11
F. Threlkeld - C. W. 1000

Pilot No. 27V-2
Bur. Price. \$8.88
No. 12 No. 11

$$\begin{array}{r} 1120 \\ 448 \overline{) 496} \\ \underline{448} \\ 48 \end{array}$$

29814.

[illegible]

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP/NEWBERRY Date 2-6-92 Test 6 Run 1B
 Source Pure & Unleaded Vent No. of traverse points 10
 Method PM10 Filter holder: ERC Filter type: 2 1/2" GLASS FIBER

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: 5625 Recovery solvent(s) ☒ acetone
☐ other(s) _____
 No. of probe wash bottles: 1
 Sample recovered by: ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		<u>100</u>	
Impinger No. 2	<u>2.00</u>	<u>100</u>	<u>0</u>
Impinger No. 3		<u>0</u>	
Condenser			
Desiccant			<u>6</u>
Total			<u>6</u>

Integrated Gas Sampling Data:

Bag Pump No. _____ Box No. N/A 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 O₂ Analyzer used to monitor train outlet: _____

CF-023

Sub K.P. Newberry
500000 PLSS 94N100E
Date 3-4-92 100

3000 K-P / New York
 3000 Pressman Cooper vent
 3000 2-4-92
 3000 1001 C KUD 18

Output Manager

No. 7 2 1.8
 Date 7 11 1983
 FT-CM

25 M 22

Peter Pan
Barrie

234-6 CP 840
28.88 INH H2D
11 H2D D10

1	2	3	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	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

[illegible]

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP/NEWBERRY
 Source MESS & UNLOADER VENT
 Method PM 10 Filter holder: ERC

Date 2-6-92 Test 6 Run 2
 No. of traverse points 8
 Filter type: 2 1/2" Glass Fiber

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ✓
 Posttest: 0 cfm at ✓ in. Hg. (vac) ✓

Particulate Catch Data:

No.s of filters used: 5603 Recovery solvent(s)
☒ acetone
☐ other(s) _____

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		(100)	
Impinger No. 2	200	100	0
Impinger No. 3		0	
Condenser			
Desiccant	1420	1420	0
Total			0

Integrated Gas Sampling Data:

Bag Pump No. 82 Box No. 8 Bag No. 2
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: _____ (HRS) Time end: _____ (HRS)
 Sampling rate: 400 cc/min Operator: ET
 S/N of O₂ Analyzer used to monitor train outlet: 7

CF-023

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job SP/Howell Operator ET-AM Pilot No. 23V-6 Cp 1.816
 Source Mississippi River Motor Box No. 7 XHP 1.86 TR MC Bar. Press. 29.80 inHg H₂O
 Date 2-6-82 Recorder 1051 Run 3A Gas analyzer serial 10083 Nozzle No. PA-12 Nozzle Dia. 2.98 in.

Transfer Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inHg)	Ductile Meter (inHg)	Det. Vol. (cf)	VAC. inHg	Temperature (°F)					Oxygen (xx/yy)
							Stack	Probe	Duct	Imp.	Gas/Out	
A	1.75	706.00	.08	.63	1.75	2.5	79	247	246	34	73	72
B	2.11	707.18	.04	.63	.35	2.5	79				75	73
D	2.41	708.20	.03	.63	.30	2.5	79	246	244	34	75	73
E	2.84	708.40	.06	.63	.43	2.5	79				76	74
F	3.34	707.72	.08	.63	.49	2.5	79	247	248	34	75	74
G	3.69	707.92	.04	.63	.35	2.5	79				76	74
H	3.94	708.15	.02	.63	.24	2.5	79	249	248	34	76	74
I	4.19	708.25	.02	.63	.24	2.5	79				76	74
1800												
0 = 4.19		V = 2.25		ΔH = .63							Avg. = 74.3	

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job 2P/NEWARK Date 2-6-92 Test 6 Run 2B
 Source Power + Catalyst Vent No. of traverse points 16
 Method PM10 Filter holder: ERC Filter type: 2 1/2" glass fiber

Sample Train Leak Check:

Pretest: { 0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: { 0 cfm at 5 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 5605 Recovery solvent(s) acetone
☒ other(s) _____
 No. of probe wash bottles: 1
 Sample recovered by: ET

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		<u>100</u>	
Impinger No. 2	<u>0</u>	<u>100</u>	<u>0</u>
Impinger No. 3		<u>0</u>	
Condenser			
Desiccant	<u>1509</u>	<u>1502</u>	<u>7</u>
Total			<u>7</u>

Integrated Gas Sampling Data:

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 O₂ Analyzer used to monitor train outlet: _____

CF-023

INTERPOL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job AP / New Berry Date 2-6-92 Test 6 Run JB
 Source PROCESS UNLOADER VENT No. of traverse points 16
 Method PM10 Filter holder: ERC Filter type: 2 1/2" GLASS FIBER

Sample Train Leak Check:

Pretest: 0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 5 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 5623 Recovery solvent(s) acetone
☒ other(s) ET

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		(100)	
Impinger No. 2	200	{ 100 }	0
Impinger No. 3		{ 0 }	
Condenser			
Desiccant			5
Total			5

Integrated Gas Sampling Data:

Bag Pump No. _____ Box No. N/A 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 O₂ Analyzer used to monitor train outlet: _____

CF-023

S-0046RR

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP/Hubberty Date 2-6-92 Test 6 Run 3 A
 Source Power + Undercar Vent No. of traverse points 8
 Method PM 10 Filter holder: ERC Filter type: 2 1/2" glass FIBER

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 4 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 5624 Recovery solvent(s) ☒ acetone ☐ other(s) _____
 No. of probe wash bottles: 1
 Sample recovered by: ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		(100)	
Impinger No. 2	0	100	0
Impinger No. 3		0	
Condenser			
Desiccant	1260	1260	0
Total			0

Integrated Gas Sampling Data:

Bag Pump No. _____ Box No. N/A 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 O₂ Analyzer used to monitor train outlet: _____

CF-023

LP / Newberry

[illegible]

23001-
987 Mill
ET-17

Pittet No.
Buc. P. 1
Nozila

07-10
03-83
7-15

5111

0211-
875-8

111

Gravity Point No.	Sampling Time (min)	Supply Volume (cc)	Velocity Head (in H ₂ O)	Orifice Water (in H ₂ O)	Vol. (cc)	VAC. in Hg	Temperature (°F)						Oxygen (XV/V)
							Stack	Prob	Depth	Temp.	Cas/in	Cas/Out	
A - 1	2200	772.20	1.08	1.63	1.86		78	250	254		74	73	
B	2.00	773.20	1.03	1.62	2.20	30	78				74	73	
D 1	2.31	773.30	1.02	1.62	2.8		78				74	73	
C	2.74	773.44	1.06	1.62	1.43		78	252	251		74	73	
E 1	3.14	773.58	1.03	1.62	1.36		78				74	73	
G	3.35	773.76	1.03	1.63	1.30		78				75	73	
H 1	3.60	773.84	1.02	1.63	2.4		78				75	73	
I	3.85	773.96	1.02	1.63			78	250	252		75	73	
(2220)													
Total = 1.76 Avg. = 73.6													

INTERPOL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job L.P./Newberry
 Source Press & Unloading Vents Stacks
 Test 8 Run _____ Date 2/6/92
 Stack dimen. 58.5 x 58.5 IN.
 Dry bulb _____ °F Wet bulb _____ °F
 Manometer: ☒ Reg. ☐ Exp. ☐ Elec.
 Barometric pressure 28.78 in Hg
 Static pressure -1.5 in WC
 Operators D. VanHoever & P. O'Neil
 Pitot No. V23-5 Cp .84

Schematic of
Cross Section

Formaldehyde

Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length:	6.5 in.	Time start:	hrs
A 1	61	7.31	13.81		
2	2	21.94	28.44		
3	3	36.56	43.06		
4	4	51.19	57.69		
B 1	H1				
2	2				
3	3				
4	4				
C 1					
2					
3					
4					
D 1					
2					
3					
4					
E 1					
2					
3					
4					
F 1					
2					
3					
4					
Temp. meas. tool & S/N:				Time end:	hrs

R or nothing = reg. manometer; S = expanded; E = electronic S-392.1

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. Newberry Date 2/6/92 Test 8 Run 1
 Source Press & Unloading Vents No. of traverse points 32
 Method 0011 Filter holder: NA Filter type: NA

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: (0 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

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

☐ acetone
☒ other(s) MCCl₂ & DI H₂O

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	201	200	1
Impinger No. 3			
Condenser			
Desiccant	1283	1277	6
Total			7

Integrated Gas Sampling Data: -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 O₂ Analyzer used to monitor train outlet: _____

CF-023

JOB L.P./NEWBERRY
SOURCE Press & Union
DATE 2/6/97

Operator
Master Box
Counter

Duffy P.O.

20 ML

Pittsburg
Barzile

$\frac{12}{12} \times \frac{12}{12} = 1$

11-11-11

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (in WC)	Drifted Water (in WC)	Dep. Vol. (cf)	VAC. in Hg	Temperature (°F)						Oxygen (xv/v)
							Stack	Probe	Duct	Ingr.	Coolin	Coolout	
A 4	1721	724.80	18	25	486	15	72	231	244	34	68	68	20.7
3	4	736.08	96	132	614	4	79				70	68	
2	6	727.38	94	131	742	4	74				72	69	
1	8	738.50	58	81	843	25	71	238	246	34	73	69	
B 4	10	729.31	42	59	929	25	71				71	65	
3	12	730.66	96	134	058	3	76				71	65	
2	14	731.90	97	135	188	3	73	248	254	34	72	69	
1	16	733.14	85	119	310	3	73				73	69	
F 4	18	734.16	57	80	410	2.5	73				72	69	
3	20	735.54	110	151	548	4	73	257	256	34	72	69	
2	22	736.91	96	134	678	3.5	73				73	69	
1	24	738.20	95	133	807	3.5	73	257	261	34	70	65	
E 4	26	738.21	101	01	820	—	75				70	68	
3	28	739.13	48	67	912	2.5	75				71	68	
2	30	740.41	93	124	038	3	75	260	258	34	70	68	
1	32	740.70	04	05	065	—	75				70	68	
D 4	34	741.43	27	37	133	.5	75				73	69	
3	36	742.78	130	180	253	5	77				73	69	
2	38	744.20	105	146	418	4	77	261	259	34	73	69	
1	40	745.43	89	124	542	4	77				74	69	
C 4	42	746.14	21	29	603	.5	77				71	68	
3	44	747.54	125	174	750	5	73	264	258	34	73	69	
2	46	748.94	115	161	892		74				73	69	
1	48	750.10	78	109	009		74				74	69	
											Av. =		
													2222322

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job L.P./Newberry Operator D. V. H. & P. O. Pitot No. CP
 Source Press Vent & Understack Meter Box No. 111 Bar. Press. 10Hg H₂O X
 Date 2/2/97 Run 1 Gas meter serial 8 Nozzle No. 111 Nozzle Dia. 1/4

Transfer Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Hood (fpm)	Orifice Meter (fpm)	Duc. Vol. (cf)	VAC. inHg	Temperature (°F)					Oxygen (XV/V)
							Stack	Probe	Duct	Inlet	Duct/Out	
B 4	50	751.60	1.05	1.47	1.44	4	75	253	257	71	68	20.9
3	52	751.96	1.20	1.67	2.87	4	75			72	69	
2	54	754.30	1.10	1.53	4.27	4	75			72	69	
1	56	755.79	1.10	1.52	5.65	4	79	256	258	73	69	
A 4	58	755.99	.05	.06	5.94	—	79			73	69	
3	60	756.86	.46	.64	6.84	2	79			72	69	
2	62	758.12	.87	1.21	8.07	4	77	260	254	71	68	
1	64	758.40	.64	.05	8.33		77			71	68	
(1842)												
0 = 64		33.6		103							70.1	

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. / NEWBERRY. Date 2/6/92 Test 8 Run 2
 Source Press & Unloading Vents - Stack No. of traverse points 32
 Method 0011 Filter holder: NP Filter type: AA

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

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

_____ ☐ acetone
 _____ ☒ other(s) DI H₂O + MECL₂

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	201	200	1
Impinger No. 3			
Condenser			
Desiccant	1265	1259	6
Total			7

Integrated Gas Sampling Data: - 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 O₂ Analyzer used to monitor train outlet: _____

CF-023

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job L.P. / NEWVERLY
 Date 8/16/91
 Source PRESS VENT 1 UNLOADING VENT
 Test 8

Operator DR. H. P. 30
 Analyzer Box No. 8
 Recorder Code 8093

Pitot No. U23-6
 Bar. Press. 28.78
 Nozzle No. 533

DP .84
 IN HG H2O
 Nozzle Dia. .189 IN.

Transfer Point No.	Sampling Time (min)	Sample Volume (cc)	Velocity Head (in H ₂ O)	Orifice Meter (in H ₂ O)	Dsg. Vol. (cc)	VAC. in Hg	Temperatures (°F)					Oxygen (xv/v)
							Stack	Probe	Duct	Inlet	Outlet	
H 4	1945	759.10	.18	.25	9.66	5	73	260	753	68	67	20.5
3	2	759.60	.94	1.31	0.93	3.5	73			72	68	✓
2	4	760.96	.86	1.19	2.15	3	80			73	68	
1	6	762.16	.22	.13	2.77	5	80	261	258	73	68	
4	8	762.94	.23	.31	3.40	5	77			71	68	
3	10	763.43	1.05	1.45	4.75	4	77			73	69	
2	12	764.77	1.00	1.39	6.06	4	77	260	257	73	69	
1	14	766.14	.87	1.21	7.29	3.5	77			74	69	
F 4	16	767.32	1.0	1.37	8.61	4	77	258	256	74	69	
3	18	768.64	1.0	1.39	9.93	4	77			74	69	
2	20	769.97	.97	1.35	1.23	4	79			75	70	
1	22	771.40	.60	1.39	2.55	4	77			74	69	
F 4	24	772.67	.08	.11	2.92	—	77	261	257	74	69	
3	26	772.93	1.20	1.67	4.37	5	77			75	70	
2	28	774.35	.83	1.16	5.57	3	77			76	70	
1	30	775.66	.40	.56	6.41	2	77	260	258	76	70	
4	32	776.50	.20	.27	7.00	5	80			74	70	
3	34	777.16	.96	1.33	8.30	4	78			75	71	
2	36	778.35	1.10	1.53	9.68	5	78	757	258	76	71	
1	38	779.70	1.05	1.46	1.04	5.0	78			76	71	
4	40	781.00	.76	1.06	2.19		78			74	70	
3	42	782.19	1.2	1.70	3.65	5	69			76	71	
2	44	783.70	1.2	1.70	5.11	5	69			76	71	
1	46	785.23	1.10	1.51	6.49		85			76	71	
4	48	786.62										
3	0000											
2												
1												
00000000	0000											

106 L.P./NEWBERRY
Source PRESS VENT FULCRONIC VENT STAFFS SHP TR NC
Date 2/6/92 1051 8 Run 2 Generator cost. _____
Operator P. H. & P. C. _____
Pitot No. _____ Cp _____
Sur. Press. _____ IN Hg H2O _____
Nozzle No. _____ Nozzle Dia _____ IN

[illegible]

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P./Newberry Date 2/6/92 Test 8 Run 3
 Source Press + Unloading Vents/Stacks No. of traverse points 32
 Method 0011 Filter holder: Filter type:

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 6 in. Hg. (vac) ☒

Particulate Catch Data:

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

 ☐ acetone
 ☒ other(s) DI H₂O + MECL₂

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		200	
Impinger No. 2	201		1
Impinger No. 3			
Condenser	1396	1391	5
Desiccant			
Total			6

Integrated Gas Sampling Data: 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 O₂ Analyzer used to monitor train outlet:

CF-023

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Lu. Newberry
 Source Press Vent a Unloading Vent Stack
 Date 2/6/92

Operator Duff
 Meter Box No. 8
 Counter 0003

Pilot No. 123-6 CP 84
 Bar. Press. 28.0 in Hg H2O
 Nozzle No. 5-3 Nozzle Dia. .189 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (in H ₂ O)	Orifice Meter (in H ₂ O)	Dens. Vol. (cf)	VAC. in Hg	Temperatures (°F)					Oxygen (xx/vv)
							Stack	Probe	Duct	Gas In	Gas Out	
D 4	2	796.71	.15	.2	7.22	5	82	237	240	71	71	20.5
3	4	797.83	.18	.24	7.77	5	82			74	72	
2	6	799.17	1.10	1.52	9.16	5	82			75	72	
1	8	800.50	1.05	1.45	8.81	5	82	244	253	75	71	
A 4	10	801.71	.77	1.06	1.66	3	82			74	70	
3	12	803.11	1.15	1.57	3.07	5	86			75	70	
2	14	804.61	1.30	1.83	4.58	5	80	251	254	76	71	
1	16	806.07	1.20	1.70	6.04	5	70			77	71	
B 4	18	806.36	.04	.05	6.31	—	70			74	70	
3	20	807.77	1.30	1.81	7.81	5	78	260	256	73	70	
2	22	809.27	1.20	1.67	9.46	5	78			76	71	
1	24	810.77	1.05	1.46	0.601	4	78			77	72	
C 4	26	811.87	.88	1.23	1.56	3.5	78	257	258	74	71	
3	28	813.41	1.30	1.81	3.36	5	68			78	72	
2	30	814.92	1.20	1.71	4.83	5	68			78	72	
1	32	816.31	1.10	1.57	6.23	5	68	260	251	78	72	
H 4	34	816.56	.06	.05	6.56	—	68			75	72	
3	36	817.51	.48	.68	7.49	2	68			75	72	
2	38	818.44	.52	.72	8.44	2	77	261	257	75	72	
1	40	819.40	.44	.61	9.32	2	77			77	72	
G 4	42	820.45	.69	.96	0.43	2.5	77			73	71	
3	44	821.80	1.10	1.54	1.82		73	257	258	77	71	
2	46	823.08	1.05	1.48	3.18		73			77	72	
1	48	824.40	.95	1.34	4.48		73			78	72	
Over												
V. =							Ave. =					20.5

Lab 1.7 / Newberry

Job	L.P. Newberry
Source	PRESS & UNLOADING VENT STACK
Date	2/6/61 8 Nov 3

Operator Don + Po
 Water Box No.
 Governor Court.

DATE _____ TIME _____

Pitot No.
Bar. Pres.
Nozzle No

[illegible]

APPENDIX E

DRYER FIELD DATA SHEETS

INTERPOL LABORATORIES EPA METHOD 2 FIELD DATA SHEET

Job L.P. NEWBERRY

Source Dryer Stack

Test 9 Run 0 Date 2/7/92

Stack dimen. 63.25 IN.

Dry bulb 181 °F Wet bulb 146 °F

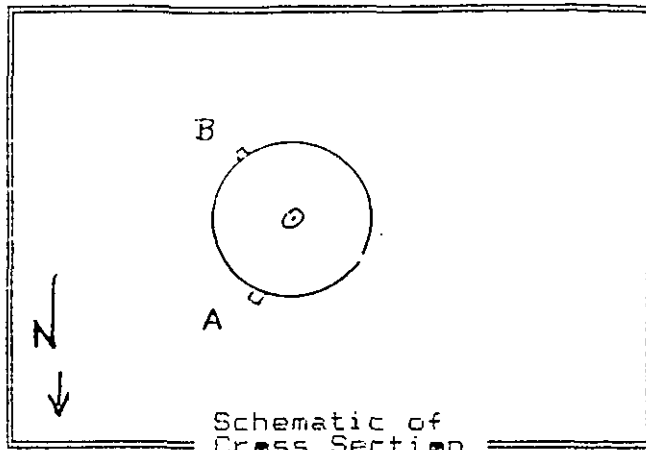
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 29.12 in Hg

Static pressure 7.13 in WC

Operators J. Van Hoever & P. O'Neil

Pitot No. V23-6 Cp .84



Particulate

Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length:	3.5 in.	Time start: 0924 hrs	
A 1	.026	1.64	5.14	.37	
2	.082	5.19	8.69	.33	181
3	.146	9.23	12.73	.33	
4	.226	14.29	17.79	.42	
5	.342	21.63	25.13	.45	181
6	.658	41.61	45.12	.55	
7	.774	48.95	52.46	.55	
8	.854	54.02	57.52	.56	181
9	.918	58.06	61.56	.56	
10	.974	61.60	65.10	.52	
B 1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
Temp. meas. tool & S/N:				Time end: hrs	

R or nothing= reg. manometer; ~~6~~ expanded; E = electronic S-392.1

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. Newberry Date 2/7/92 Test 9 Run 1
 Source Dryer Stack No. of traverse points 20
 Method 5 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: 4060 Recovery solvent(s) ☒ acetone ☐ other(s) _____
 No. of probe wash bottles: 1
 Sample recovered by: JS

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		} 200	
Impinger No. 2	345		145
Impinger No. 3			
Condenser			
Desiccant	1335	1340	15
Total			160

Integrated Gas Sampling Data:

Bag Pump No. 1316 Box No. 8 Bag No. 1
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 1240 (HRS) Time end: 1337 (HRS)
 Sampling rate: 400 cc/min Operator: ET
 S/N of O₂ Analyzer used to monitor train outlet: 11

CF-023

101	L.P./Newberry	1
500	Dyer	2
100	2/2/92	2

ck 9 Nov 1

[illegible]

D. Van H.
No. 2.

181
111 1557 TW NC
over + P. O. Wre 1

Pitt
Bur.
Norix

✓ 23-6 CP, 84
28.84 1049 1120
5-7 1011 0.0

$$\begin{array}{r} 111 \\ \times 22 \\ \hline \end{array}$$
[illegible]

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. Newberry Date 2/9/92 Test 9 Run 2
 Source Dryer Stack No. of traverse points 20
 Method 6 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

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

☒ acetone
☐ other(s)

No. of probe wash bottles:

Sample recovered by:

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	410	200	210
Impinger No. 3			
Condenser			
Desiccant	1470	1459	11
Total			221

Integrated Gas Sampling Data:

Bag Pump No. B16 Box No. 8 Bag No. 1
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 1415 (HRS) Time end: 1523 (HRS)
 Sampling rate: 400 cc/min Operator: DH
 S/N of O₂ Analyzer used to monitor train outlet: 11

CF-023

L.P/Newberry
PRYER ST
8/7/92

400	L.P./Newberry	1341	9	400	2
500	DAVEN STICK	43100	21/12	400	2

Duplicates
 Meter Box No. 2
 Counter Code 11

Deft & Co
 211
 995

787-TH-AC

Pilot No. 123-6 Cp 84
Bar. Press. 28.87 InHg H2O
Nozzle No. 5-4 Nozzle Dir. -

100

[illegible]

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. Newberry Date 2/9/92 Test 9 Run 3
 Source Dryer Stack No. of traverse points 20
 Method 5 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:

Pretest: 0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

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

☒ acetone
☐ other(s)

No. of probe wash bottles: 1

Sample recovered by: DAH

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	402	200	202
Impinger No. 3			
Condenser			
Desiccant	1375	1366	9
Total			211

Integrated Gas Sampling Data:

Bag Pump No. B16 Box No. 8 Bag No. 3
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 1603 (HRS) Time end: 1710 (HRS)
 Sampling rate: 400 cc/min Operator: DAH
 S/N of O₂ Analyzer used to monitor train outlet: 11

CF-023

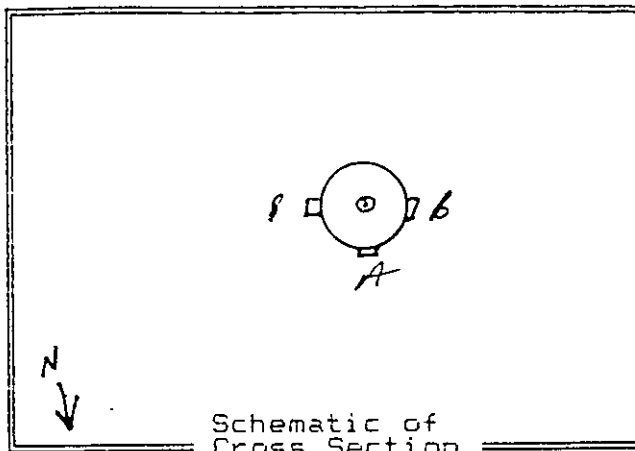
S-0046RR

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XII.

S-00378

Job L.P. / Newberry
Source Dryer Stack
Test 10 Run 1 Date 2-4-92
Stack dimen. 63.25 IN.
Dry bulb 181 °F Wet bulb 146 °F
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.
Barometric pressure 28.84 in Hg
Static pressure -0.23 in WC
Operators E. T. POWELL - C. MOSSER
Pitot No. 23V-6 Cp 840



Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
Port length: 3.5 in.				Time start: 0800 hrs	
A 1	.044	2.78	6.28	.40	34 181
2	.146	9.23	12.73	.48	.48
3	.296	18.72	22.22	.52	.52
4	.704	44.52	48.02	.65	.56
5	.854	54.01	57.51	.70	.58
6	.956	60.46	63.96	.67	.56
B 1				.42	34 181
2				.58	.48
3				.60	.45
4				.61	.60
5				.62	.60
6				.58	.58
FT/SIC - 48.92		45.74			
ACFM - 44052		59.889			
DSCFM 40029		37.428			
Temp. meas. tool & S/N: 10T-12				Time end: 0820 hr	

R or nothing = rec. manometer; S = expanded; E = electronic S-392.

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP/NEWBERRY Date 2-1-92 Test 10 Run 1
 Source DRYER - STAIR No. of traverse points 12
 Method PM-10 Filter holder: ERC Filter type: 2 1/2 GLASS FIBER

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 5 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 5634 Recovery solvent(s)
☒ acetone
☐ other(s) _____
 No. of probe wash bottles: 1
 Sample recovered by: ET

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		<u>100</u>	
Impinger No. 2		<u>100</u>	<u>170</u>
Impinger No. 3		<u>0</u>	
Condenser			
Desiccant	<u>1292</u>	<u>1285</u>	<u>7</u>
Total			<u>177</u>

Integrated Gas Sampling Data:

Bag Pump No. 816 Box No. 8 Bag No. 1
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 15 in. Hg.
 Time start: 1236 (HRS) Time end: 1421 (HRS)
 Sampling rate: 440 cc/min Operator: ET
 S/N of O₂ Analyzer used to monitor train outlet: 8

CF-023

[illegible][illegible]

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP NEWBERRY Date 2-11-92 Test 10 Run 2
 Source DRYER - STACK No. of traverse points 12
 Method PM 10 Filter holder: ERL Filter type: 2 1/2 GLASS FIBER

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 5 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 5615 Recovery solvent(s) ☒ acetone ☐ other(s) _____

No. of probe wash bottles: 1

Sample recovered by: ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		(110)	
Impinger No. 2	398	{ 100 }	198
Impinger No. 3		{ 0 }	
Condenser			
Desiccant	1418	1410	8
Total			206

Integrated Gas Sampling Data:

Bag Pump No. 816 Box No. 8 Bag No. 2

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

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

Time start: 1455 (HRS) Time end: 1636 (HRS)

Sampling rate: 400 cc/min Operator: ET

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

CF-023

4001	4002	4003	4004	4005	4006	4007	4008	4009	4010	4011	4012	4013	4014	4015	4016	4017	4018	4019	4020	4021	4022	4023	4024	4025	4026	4027	4028	4029	4030	4031	4032	4033	4034	4035	4036	4037	4038	4039	4040	4041	4042	4043	4044	4045	4046	4047	4048	4049	4050	4051	4052	4053	4054	4055	4056	4057	4058	4059	4060	4061	4062	4063	4064	4065	4066	4067	4068	4069	4070	4071	4072	4073	4074	4075	4076	4077	4078	4079	4080	4081	4082	4083	4084	4085	4086	4087	4088	4089	4090	4091	4092	4093	4094	4095	4096	4097	4098	4099	4100	4101	4102	4103	4104	4105	4106	4107	4108	4109	4110	4111	4112	4113	4114	4115	4116	4117	4118	4119	4120	4121	4122	4123	4124	4125	4126	4127	4128	4129	4130	4131	4132	4133	4134	4135	4136	4137	4138	4139	4140	4141	4142	4143	4144	4145	4146	4147	4148	4149	4150	4151	4152	4153	4154	4155	4156	4157	4158	4159	4160	4161	4162	4163	4164	4165	4166	4167	4168	4169	4170	4171	4172	4173	4174	4175	4176	4177	4178	4179	4180	4181	4182	4183	4184	4185	4186	4187	4188	4189	4190	4191	4192	4193	4194	4195	4196	4197	4198	4199	4200	4201	4202	4203	4204	4205	4206	4207	4208	4209	4210	4211	4212	4213	4214	4215	4216	4217	4218	4219	4220	4221	4222	4223	4224	4225	4226	4227	4228	4229	4230	4231	4232	4233	4234	4235	4236	4237	4238	4239	4240	4241	4242	4243	4244	4245	4246	4247	4248	4249	4250	4251	4252	4253	4254	4255	4256	4257	4258	4259	4260	4261	4262	4263	4264	4265	4266	4267	4268	4269	4270	4271	4272	4273	4274	4275	4276	4277	4278	4279	4280	4281	4282	4283	4284	4285	4286	4287	4288	4289	4290	4291	4292	4293	4294	4295	4296	4297	4298	4299	4300	4301	4302	4303	4304	4305	4306	4307	4308	4309	4310	4311	4312	4313	4314	4315	4316	4317	4318	4319	4320	4321	4322	4323	4324	4325	4326	4327	4328	4329	4330	4331	4332	4333	4334	4335	4336	4337	4338	4339	4340	4341	4342	4343	4344	4345	4346	4347	4348	4349	4350	4351	4352	4353	4354	4355	4356	4357	4358	4359	4360	4361	4362	4363	4364	4365	4366	4367	4368	4369	4370	4371	4372	4373	4374	4375	4376	4377	4378	4379	4380	4381	4382	4383	4384	4385	4386	4387	4388	4389	4390	4391	4392	4393	4394	4395	4396	4397	4398	4399	4400	4401	4402	4403	4404	4405	4406	4407	4408	4409</

[illegible]

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP/NEWBERRY
 Source DRYER STACK
 Method PM10 Filter holder: ELC

Date 2-7-92 Test 10 Run 3
 No. of traverse points 12
 Filter type: 2 1/2 GLASS FIBER

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 11 in. Hg. (vac) ☒

Particulate Catch Data:

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

5619 ☒ acetone
☐ other(s)

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		<u>100</u>	
Impinger No. 2	<u>400</u>	<u>100</u>	<u>200</u>
Impinger No. 3		<u>0</u>	
Condenser			
Desiccant	<u>1299</u>	<u>1290</u>	<u>9</u>
Total			<u>209</u>

Integrated Gas Sampling Data:

Bag Pump No. B-16 Box No. 8 Bag No. 1

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

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

Time start: 1111 (HRS) Time end: 1910 (HRS)

Sampling rate: 400 cc/min Operator: ET

S/N of O₂ Analyzer used to monitor train outlet: 8

CF-023

LP/NEW Buddy
PRXPR - STAK
2-2-82

1414307
X99 1414M
519171410

6-7

2011 5817 99206

Patent No. 1,120,111

1949-50 840

11-11-11

[illegible]

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P. / NEWBERRY Date 2/7/92 Test 16 Run 1
 Source DRYER STACK No. of traverse points 20
 Method DO11 Filter holder: — Filter type: NA

Sample Train Leak Checks:

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

Particulate Catch Data:

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

☐ acetone
☒ other(s) MELLS & DE H2O

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	383	200	183
Impinger No. 3			
Condenser			
Desiccant	1492	1481	11
Total			194

Integrated Gas Sampling Data:

Bag Pump No. B8 Box No. 21 Bag No. 1
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 14 in. Hg.
 Time start: 1749 (HRS) Time end: 1849 (HRS)
 Sampling rate: 400 cc/min Operator: DA
 S/N of O₂ Analyzer used to monitor train outlet: 7

CF-023

	Pilot No.	VZ-6	Cy .84
	Bur. Price	288 ⁰⁰ /-	In Hq
	Mozila No.	5-9	Hollis D.O.
			274 IN.

IN DE

Duplicators	<i>Dick</i>	
Water Box No.	2	x HP 1.81
Generator capl.		.945

SOURCE	A.P./Newberry	RUN	1
SOURCE	JERRY STACK	RUN	1
DATE	3/27/96	RUN	1

[illegible]

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LIP/NEWBERRY Date 2/7/92 Test 11 Run 2
 Source DRYER STACK No. of traverse points _____
 Method 6011 Filter holder: ✓ Filter type: HA

Sample Train Leak Check:

Pretest: { 0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

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

_____ ☐ acetone
 _____ ☒ other(s) MELC₂ & DI H₂O

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>282</u>	<u>5200</u>	<u>182</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1365</u>	<u>1353</u>	<u>12</u>
Total			<u>194</u>

Integrated Gas Sampling Data:

Bag Pump No. BS Box No. 21 Bag No. 2

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

Pretest leak check: 0 cc/min at 14 in. Hg.

Time start: 1946 (HRS) Time end: 2048 (HRS)

Sampling rate: 400 cc/min Operator: DAH

S/N of O₂ Analyzer used to monitor train outlet: 7

CF-023

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job L.P./Newberry Operator D. V. A. & C. M. Pilot No. V23-6 CP 84
 Source POWER STAGE Water Box No. 2 HWP 1.81 IN MC 28.57 IN H₂O 22.1
 Date 2/2/72 Generator Conf. 2 8851 Nozzle No. 5-4 Nozzle Dia. 242 IN.

Traverse Point No.	Sampling Time (min)	Supply Volume (cu)	Velocity Head (in WC)	Orifice Water (in WC)	Dpt. Vol. (cu)	VAC. in Hg	Temperature (°F)						Oxygen (cc/vol)
							Stack	Probe	Duct	Inpy.	Gas In	Gas Out	
A 10	19.46	573.10	62	1.30	5.08	4	205	257	262	43	80	79	17.0
9	6	575.06	63	1.30	7.05	4	205				89	77	16.7
8	9	577.05	65	1.35	9.06	4	205				89	76	17.0
7	12	579.07	66	1.27	1.02	4	204	258	261	43	90	77	17.0
6	15	581.03	58	1.21	2.93	4	204				92	77	17.0
5	18	582.96	51	1.06	4.72	4	204				93	77	17.0
4	21	584.77	37	.77	6.25	3	204	260	257	43	93	78	16.8
3	24	586.27	29	.60	7.61	3	204				93	78	16.8
2	27	587.63	28	.58	8.94	3	204				92	78	17.4
1	30	588.94	25	.52	0.20	3	204	261	258	43	93	79	17.2
B 10	33	590.28	56	1.17	2.08	4	204				92	79	17.0
9	36	592.06	57	1.19	5.99	4	204				92	79	17.0
8	39	593.97	55	1.15	5.85	4	204	264	257	43	93	80	17.3
7	42	595.87	52	1.10	7.67	3.5	200				94	80	17.4
6	45	597.82	54	1.14	9.53	4	200				95	80	17.0
5	48	599.70	54	1.06	1.33	4	200	264	257	43	96	80	17.2
4	51	601.57	53	1.12	3.17	4	200				96	81	17.0
3	54	603.06	55	1.16	5.05	4	200				95	81	17.2
2	57	605.04	52	1.10	6.88	4	200	263	258	44	95	81	17.2
1	60	606.88	47	.99	8.62	3	200				96	82	17.1
(2048)													

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job L.P./NEWBERRY Date 2/7/92 Test 11 Run 3
 Source DRYER STACK No. of traverse points 20
 Method 0011 Filter holder: — Filter type: —

Sample Train Leak Check:

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

Particulate Catch Data:

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

— ☐ acetone —
— ☒ other(s) —

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	413	3200	213
Impinger No. 3			
Condenser			
Desiccant	1500	1489	11
Total			224

Integrated Gas Sampling Data:

Bag Pump No. B 8 Box No. 21 Bag No. 3
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 14 in. Hg.
 Time start: 1025 (HRS) Time end: 1134 (HRS)
 Sampling rate: 400 cc/min Operator: W.H.
 S/N of O₂ Analyzer used to monitor train outlet: 7

CF-023

Unit	L.P. / Newberry	Operator	Tom G.P.O.	Pilot No.	123-6	Cp	84
Source	Deffen Stuck	Water Box No.	3	Bar. Press.	25.84	InHg	H2O 22.2
Unit	27791	Compressor Code	11	Nozzle No.	5-4	Nozzle	D10 245 IN.

[illegible]

APPENDIX F

INTERPOLL LABORATORIES ANALYTICAL DATA

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EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job L.P./Newberry
Team Leader DVH
Date Submitted 2-8-92
Test No. 1
Date of Analysis 2-10-92

Source KOHUS
Test Site STACK
Date of Test 2-5-92
No. of Runs Completed 3
Technician R. G. G.

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO ₂ %v/v Dry	Conc. O ₂ %v/v Dry	F ₀
			Zero Pt.	After CO ₂	After O ₂			
1/1	5337-07 ☒ B ☐ F	1	0.00	5.60	20.50	5.60	14.90	1.07
		2	0.00	5.60	20.50	5.60	14.90	1.07
		Avg				5.60	14.90	
1/2	-11 ☒ B ☐ F	1	0.00	5.80	20.50	5.80	14.70	1.07
		2	0.00	5.80	20.50	5.80	14.70	1.07
		Avg				5.80	14.70	
1/3	-15 ☒ B ☐ F	1	0.00	6.00	20.40	6.00	14.40	1.08
		2	0.00	6.00	20.40	6.00	14.40	1.08
		Avg				6.00	14.40	
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						

- ☒ Ambient Air QA Check
☒ Orsat Analyzer System Leak Check
☐ F₀ Within EPA M-3 Guidelines
for fuel type.

Where $F_0 = \frac{20.9 - O_2}{CO_2}$

EPA Method 3 Guidelines

Fuel Type	F ₀ 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	1.000-1.100

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job L.P. / Newberry Source Konur
 Team Leader ET Test Site STACK
 Date Submitted 2-8-92 Date of Test 2-8-92
 Test No. 2 No. of Runs Completed 3
 Date of Analysis 2-10-92 Technician R. G. Kim

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO ₂ %v/v Dry	Conc. O ₂ %v/v Dry	F ₀
			Zero Pt.	After CO ₂	After O ₂			
2/1	5337-22 ☒ B ☐ F	1	0.00	6.10	20.50	6.10	14.40	1.07
		2	0.00	6.10	20.50	6.10	14.40	1.07
		Avg				6.10	14.40	
2/2	-26 ☒ B ☐ F	1	0.00	5.90	20.50	5.90	14.60	1.07
		2	0.00	5.90	20.50	5.90	14.60	1.07
		Avg				5.90	14.60	
2/3	-30 ☒ B ☐ F	1	0.00	5.20	20.50	5.20	15.30	1.08
		2	0.00	5.20	20.50	5.20	15.30	1.08
		Avg				5.20	15.30	
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						

- ☒ Ambient Air QA Check
☒ Orsat Analyzer System Leak Check
☐ F₀ Within EPA M-3 Guidelines
 for fuel type.

Where $F_0 = \frac{20.9 - O_2}{CO_2}$

F=Flask (250 cc all glass)
 B=Tedlar Bag (5-layer)

EPA Method 3 Guidelines
 Fuel Type F₀ Range

Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job L.P. Newberry
Team Leader W.H.
Date Submitted 2/18/92
Test No. 3
Date of Analysis 2/10/92

Source Konigs
Test Site Stack
Date of Test 2/10/92
No. of Runs Completed 3
Technician R.O. K...

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO ₂	Conc. O ₂	F ₀
			Zero Pt.	After CO ₂	After O ₂	%v/v Dry	%v/v Dry	
3/1	5337-94 □ B □ F	1	0.00	6.10	20.50	6.10	14.40	1.07
		2	0.00	6.10	20.50	6.10	14.40	1.07
		Avg				6.10	14.40	
3/2	-95 □ B □ F	1	0.00	5.90	20.50	5.90	14.60	1.07
		2	0.00	5.90	20.50	5.90	14.60	1.07
		Avg				5.90	14.60	
3/3	-95 □ B □ F	1	0.00	5.20	20.60	5.20	15.40	1.06
		2	0.00	5.20	20.60	5.20	15.40	1.06
		Avg				5.20	15.40	
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						

- ☒ Ambient Air QA Check
☐ Orsat Analyzer System Leak Check
☐ F₀ Within EPA M-3 Guidelines
for fuel type.

Where $F_0 = \frac{20.9 - O_2}{CO_2}$

EPA Method 3 Guidelines	
Fuel Type	F ₀ Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Dil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.596
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job L.P. Newberry
Team Leader DVT
Date Submitted 1/8/92
Test No. 9
Date of Analysis 2/19/92

Source Dryer
Test Site Stack
Date of Test 2/7/92
No. of Runs Completed 3
Technician A. Cullem

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO ₂ %v/v Dry	Conc. O ₂ %v/v Dry	F _o
			Zero Pt.	After CO ₂	After O ₂			
9/1	5337-97 ☒ B ☐ F	1	0.00	3.70	20.60	3.70	16.90	1.08
		2	0.00	3.70	20.60	3.70	16.90	1.08
		Avg				3.70	16.90	
9/2	-98 ☒ B ☐ F	1	0.00	3.80	20.60	3.80	16.80	1.08
		2	0.00	3.80	20.60	3.80	16.80	1.08
		Avg				3.80	16.80	
9/3	-99 ☒ B ☐ F	1	0.00	3.80	20.70	3.80	16.90	1.05
		2	0.00	3.80	20.70	3.80	16.90	1.05
		Avg				3.80	16.90	
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						

- ☒ Ambient Air QA Check
☒ Orsat Analyzer System Leak Check
☐ F_o Within EPA M-3 Guidelines
for fuel type.

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

EPA Method 3 Guidelines	
Fuel Type	F _o Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job LP / Newberry Source Driver
Team Leader ET Test Site Stack
Date Submitted 2-8-92 Date of Test 2/2/92
Test No. 10 No. of Runs Completed 2
Date of Analysis 2-10-92 Technician R. Gibson

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO ₂	Conc. O ₂	F ₀
			Zero Pt.	After CO ₂	After O ₂	%v/v Dry	%v/v Dry	
10/1	5337-80 □ B □ F	1	0.00	3.60	20.60	3.60	17.00	1.08
		2	0.00	3.60	20.60	3.60	17.00	1.08
		Avg				3.60	17.00	
10/2	-88 □ B □ F	1	0.00	3.60	20.60	3.60	17.00	1.08
		2	0.00	3.60	20.60	3.60	17.00	1.08
		Avg				3.60	17.00	
10/3	-88 □ B □ F	1	0.00	3.60	20.70	3.60	17.10	1.06
		2	0.00	3.60	20.70	3.60	17.10	1.06
		Avg				3.60	17.10	
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						

- ☐ Ambient Air QA Check
☐ Orsat Analyzer System Leak Check
☐ F₀ Within EPA M-3 Guidelines
for fuel type.

Where $F_0 = \frac{20.9 - O_2}{CO_2}$

EPA Method 3 Guidelines

Fuel Type	F ₀ 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	1.600-1.936
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.100

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job L.P. / Nicotberry Source Dryer
Team Leader DVT Test Site STACK
Date Submitted 2-8-92 Date of Test 2-7-92
Test No. 11 No. of Runs Completed 2
Date of Analysis 2-10-92 Technician A. Cullen

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO ₂ %v/v Dry	Conc. O ₂ %v/v Dry	F _o
			Zero Pt.	After CO ₂	After O ₂			
11/ 1	5337-100 B F	1	0.00	3.70	20.60	3.70	16.90	1.08
		2	0.00	3.70	20.60	3.70	16.90	1.08
		Avg				3.70	16.90	
11/ 2	-101 B F	1	0.00	3.60	20.60	3.60	17.00	1.08
		2	0.00	3.60	20.60	3.60	17.00	1.08
		Avg				3.60	17.00	
11/ 3	-102 B F	1	0.00	3.50	20.60	3.50	17.10	1.09
		2	0.00	3.50	20.60	3.50	17.10	1.09
		Avg				3.50	17.10	
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						

- ☒ Ambient Air QA Check
☒ Orsat Analyzer System Leak Check
☒ F_o Within EPA M-3 Guidelines
for fuel type.

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

EPA Method 3 Guidelines	
Fuel Type	F _o 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	1.600-1.936
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.100

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job LP Newberry Source Press & Unloader
Team Leader ET Test Site Vent
Date Submitted 2-8-92 Date of Test 2-6-92
Test No. 6A No. of Runs Completed 3
Date of Analysis 2-10-92 Technician C. Helgeson

0	Test <u> </u> Run <u>0</u> Field Blank Log Number <u> </u> Comments <u> </u>	Filter No. <u> </u> Filter Type <u> </u> Filter Tare Wt. <u> </u> g Filter+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
1	Test <u>6</u> Run <u>1-A</u> Log Number <u>5337-48</u> Comments <u> </u>	Filter No. <u>5601</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2648</u> g Filter+Sample Wt. <u>.2652</u> g Sample Wt. <u>0.0004</u> g
2	Test <u>6</u> Run <u>2-B</u> Log Number <u>-51</u> Comments <u> </u>	Filter No. <u>5603</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2604</u> g Filter+Sample Wt. <u>.2607</u> g Sample Wt. <u>0.0003</u> g
3	Test <u>6</u> Run <u>3-A</u> Log Number <u>-54</u> Comments <u> </u>	Filter No. <u>5624</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2513</u> g Filter+Sample Wt. <u>.2516</u> g Sample Wt. <u>0.0003</u> g
4	Test <u> </u> Run <u> </u> Log Number <u> </u> Comments <u> </u>	Filter No. <u> </u> Filter Type <u> </u> Filter Tare Wt. <u> </u> g Filter+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
5	Test <u> </u> Run <u> </u> Log Number <u> </u> Comments <u> </u>	Filter No. <u> </u> Filter Type <u> </u> Filter Tare Wt. <u> </u> g Filter+Sample Wt. <u> </u> g Sample Wt. <u> </u> g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0004	0.0003	0.0003		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0027	0.0031	0.0037		

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job LP New Berry Source Press + Unload
Team Leader ET Test Site Vent
Date Submitted 2-8-92 Date of Test 2-6-92
Test No. 6 A No. of Runs Completed 3
Date of Analysis 2-10-92 Technician C. Helgeson
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

0	Test _____ Run <u>0</u>	Dish No. _____
	Field Blank	Dish Tare Wt. _____ g
	Log Number _____	Dish+Sample Wt. _____ g
	Vol. of Solvent _____ ml	Sample Wt. _____ g
	*Solvent Residue <u>3.33</u> ug/ml	
1	Test <u>6</u> Run <u>1 - 4</u>	Dish No. <u>401</u>
	Vol. of Solvent <u>30</u> ml	Dish Tare Wt. <u>49.5314</u> g
	Log Number <u>5337-47</u>	Dish+Sample Wt. <u>49.5320</u> g
	Comments _____	Sample Wt. <u>0.0006</u> g
2	Test <u>6</u> Run <u>2 - 4</u>	Dish No. <u>404</u>
	Vol. of Solvent <u>20</u> ml	Dish Tare Wt. <u>47.6400</u> g
	Log Number <u>-50</u>	Dish+Sample Wt. <u>47.6408</u> g
	Comments _____	Sample Wt. <u>0.0008</u> g
3	Test <u>6</u> Run <u>3 - 4</u>	Dish No. <u>405</u>
	Vol. of Solvent <u>20</u> ml	Dish Tare Wt. <u>48.4911</u> g
	Log Number <u>-53</u>	Dish+Sample Wt. <u>48.4918</u> g
	Comments _____	Sample Wt. <u>0.0007</u> g
4	Test _____ Run _____	Dish No. _____
	Vol. of Solvent _____ ml	Dish Tare Wt. _____ g
	Log Number _____	Dish+Sample Wt. _____ g
	Comments _____	Sample Wt. _____ g
5	Test _____ Run _____	Dish No. _____
	Vol. of Solvent _____ ml	Dish Tare Wt. _____ g
	Log Number _____	Dish+Sample Wt. _____ g
	Comments _____	Sample Wt. _____ g

*Solvent Residue _____ ug/ml = [(Sample Wt. _____ g) (10⁶)] / Vol. of Sol. _____ ml

EPA-M5 Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	<u>0.0005</u>	<u>0.0007</u>	<u>0.0006</u>		

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job LP New Berry Source Press unloader
Team Leader ET Test Site Vent
Date Submitted 2-8-92 Date of Test 2-6-92
Test No. 6 A No. of Runs Completed 3
Date of Analysis 2-11-92 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>6</u> Run <u>1</u> <u>A</u> Log Number <u>5337-49</u> Comments _____	Dish No. <u>411</u> Dish Tare Wt. <u>46.6831</u> g Dish+Sample Wt. <u>46.6854</u> g Sample Wt. <u>0.0023</u> g
2	Test <u>6</u> Run <u>2</u> <u>A</u> Log Number <u>-52</u> Comments _____	Dish No. <u>508</u> Dish Tare Wt. <u>46.5020</u> g Dish+Sample Wt. <u>46.5046</u> g Sample Wt. <u>0.0026</u> g
3	Test <u>6</u> Run <u>3</u> <u>A</u> Log Number <u>-55</u> Comments _____	Dish No. <u>521</u> Dish Tare Wt. <u>50.5954</u> g Dish+Sample Wt. <u>50.5987</u> g Sample Wt. <u>0.0033</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. 0.0005g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0018	0.0021	F-190.0028		

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job LP Newberry Source Konus
Team Leader ET Test Site Stack
Date Submitted 2-8-92 Date of Test 2-5-92
Test No. 2 No. of Runs Completed 3
Date of Analysis 2-10-92 Technician C. Helgeson

0	Test <u>2</u> Run <u>0</u> Field Blank Log Number <u>5337-17</u> Comments _____	Filter No. <u>5607</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2581</u> g Filter+Sample Wt. <u>.2581</u> g Sample Wt. <u>0.0000</u> g
1	Test <u>2</u> Run <u>1</u> Log Number <u>-20</u> Comments _____	Filter No. <u>5604</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2634</u> g Filter+Sample Wt. <u>.2893</u> g Sample Wt. <u>0.0259</u> g
2	Test <u>2</u> Run <u>2</u> Log Number <u>-24</u> Comments _____	Filter No. <u>5606</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2672</u> g Filter+Sample Wt. <u>.2914</u> g Sample Wt. <u>0.0242</u> g
3	Test <u>2</u> Run <u>3</u> Log Number <u>-28</u> Comments _____	Filter No. <u>5611</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2630</u> g Filter+Sample Wt. <u>.2853</u> g Sample Wt. <u>0.0223</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0259	0.0242	0.0223		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0345	0.0338	0.0284		

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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job LP Newberry Source Konus
Team Leader ET Test Site Stack
Date Submitted 2-8-92 Date of Test 2-5-92
Test No. 2 No. of Runs Completed 3
Date of Analysis 2-10-92 Technician C. Helgeson
Transport Leakage ☐ None ☐ _____ ml Solvent Acetone

0	Test <u>2</u> Run <u>0</u> Field Blank Log Number <u>5337-16</u> Vol. of Solvent <u>150</u> ml *Solvent Residue <u>3.33</u> ug/ml	Dish No. <u>410A</u> Dish Tare Wt. <u>46.4708</u> g Dish+Sample Wt. <u>46.4713</u> g Sample Wt. <u>0.0005</u> g
	Test <u>2</u> Run <u>1</u> Vol. of Solvent <u>40</u> ml Log Number <u>-19</u> Comments _____	Dish No. <u>410</u> Dish Tare Wt. <u>50.5560</u> g Dish+Sample Wt. <u>50.5629</u> g Sample Wt. <u>0.0069</u> g
	Test <u>2</u> Run <u>2</u> Vol. of Solvent <u>60</u> ml Log Number <u>-23</u> Comments _____	Dish No. <u>505</u> Dish Tare Wt. <u>48.4511</u> g Dish+Sample Wt. <u>48.4584</u> g Sample Wt. <u>0.0073</u> g
	Test <u>2</u> Run <u>3</u> Vol. of Solvent <u>40</u> ml Log Number <u>-27</u> Comments _____	Dish No. <u>507</u> Dish Tare Wt. <u>47.8417</u> g Dish+Sample Wt. <u>47.8454</u> g Sample Wt. <u>0.0037</u> g
	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue _____ ug/ml = [(Sample Wt. _____ g) (10⁶)] / Vol. of Sol. _____ ml
EPA-M5 Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0068	0.0071	F-17	0.0036		

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job LP New Berry Source Konns
Team Leader JGT Test Site St. Paul
Date Submitted 2-8-92 Date of Test 2-5-92
Test No. 2 No. of Runs Completed 3
Date of Analysis 2-11-92 Technician C. Helgeson

0	Test <u>2</u> Run <u>0</u> Field Blank Log Number <u>5337-18</u> Comments _____	Dish No. <u>11</u> Dish Tare Wt. <u>47.7594</u> g Dish+Sample Wt. <u>47.7599</u> g Sample Wt. <u>0.0005</u> g
1	Test <u>2</u> Run <u>1</u> Log Number <u>-21</u> Comments _____	Dish No. <u>15</u> Dish Tare Wt. <u>49.2390</u> g Dish+Sample Wt. <u>49.2413</u> g Sample Wt. <u>0.0023</u> g
2	Test <u>2</u> Run <u>2</u> Log Number <u>-25</u> Comments _____	Dish No. <u>17</u> Dish Tare Wt. <u>46.3752</u> g Dish+Sample Wt. <u>46.3782</u> g Sample Wt. <u>0.0030</u> g
3	Test <u>2</u> Run <u>3</u> Log Number <u>-29</u> Comments _____	Dish No. <u>24</u> Dish Tare Wt. <u>56.8225</u> g Dish+Sample Wt. <u>56.8255</u> g Sample Wt. <u>0.0030</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. 0.0005g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0018	0.0025 F	160.0025		

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L P Newberry Source Dryer
Team Leader DUH Test Site Stack
Date Submitted 2-8-92 Date of Test 2-7-91
Test No. 9 No. of Runs Completed 3
Date of Analysis 2-10-92 Technician C. Helgeson

0	Test <u> </u> Run <u>0</u> Field Blank Log Number <u> </u> Comments <u> </u>	Filter No. <u> </u> Filter Type <u> </u> Filter Tare Wt. <u> </u> g Filter+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
1	Test <u>9</u> Run <u>1</u> Log Number <u>5337-69</u> Comments <u> </u>	Filter No. <u>4060</u> Filter Type <u>4" GFF</u> Filter Tare Wt. <u>.9740</u> g Filter+Sample Wt. <u>1.0303</u> g Sample Wt. <u>0.0563</u> g
2	Test <u>9</u> Run <u>2</u> Log Number <u>-72</u> Comments <u> </u>	Filter No. <u>4061</u> Filter Type <u>4" GFF</u> Filter Tare Wt. <u>.9718</u> g Filter+Sample Wt. <u>1.0235</u> g Sample Wt. <u>0.0517</u> g
3	Test <u>9</u> Run <u>3</u> Log Number <u>-75</u> Comments <u> </u>	Filter No. <u>4059</u> Filter Type <u>4" GFF</u> Filter Tare Wt. <u>.9691</u> g Filter+Sample Wt. <u>1.0189</u> g Sample Wt. <u>0.0498</u> g
4	Test <u> </u> Run <u> </u> Log Number <u> </u> Comments <u> </u>	Filter No. <u> </u> Filter Type <u> </u> Filter Tare Wt. <u> </u> g Filter+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
5	Test <u> </u> Run <u> </u> Log Number <u> </u> Comments <u> </u>	Filter No. <u> </u> Filter Type <u> </u> Filter Tare Wt. <u> </u> g Filter+Sample Wt. <u> </u> g Sample Wt. <u> </u> g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0563	0.0517	0.0498		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0996	0.1029	0.0909		

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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job LP New Berry Source Dryer
Team Leader DUB Test Site Stack
Date Submitted 2-8-92 Date of Test 2-7-92
Test No. 9 No. of Runs Completed 3
Date of Analysis 2-11-92 Technician C. Helgeson
Transport Leakage ☐ None ☐ _____ ml Solvent Acetone

0	Test <u>Run 0</u> Field Blank Log Number _____ Vol. of Solvent _____ ml *Solvent Residue <u>3.33</u> ug/ml	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>9</u> Run <u>1</u> Vol. of Solvent <u>110</u> ml Log Number <u>5337-68</u> Comments _____	Dish No. <u>31</u> Dish Tare Wt. <u>45.8037</u> g Dish+Sample Wt. <u>45.8332</u> g Sample Wt. <u>0.0295</u> g
2	Test <u>9</u> Run <u>2</u> Vol. of Solvent <u>110</u> ml Log Number <u>-71</u> Comments _____	Dish No. <u>58</u> Dish Tare Wt. <u>50.2237</u> g Dish+Sample Wt. <u>50.2418</u> g Sample Wt. <u>0.0181</u> g
3	Test <u>9</u> Run <u>3</u> Vol. of Solvent <u>90</u> ml Log Number <u>-74</u> Comments _____	Dish No. <u>203</u> Dish Tare Wt. <u>46.8697</u> g Dish+Sample Wt. <u>46.8887</u> g Sample Wt. <u>0.0190</u> g
4	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue _____ ug/ml = [(Sample Wt. _____ g) (10⁶)] / Vol. of Sol. _____ ml

EPA-M5 Acetone Residue Blank Spec. {7.8 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	<u>0.0291</u>	<u>0.0177</u>	<u>0.0187</u>		

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job L.P. Newberry Source Dryer
Team Leader DUH Test Site Stack
Date Submitted 2-8-92 Date of Test 2-7-92
Test No. 9 No. of Runs Completed 3
Date of Analysis 2-11-92 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number Comments	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>9</u> Run <u>1</u> Log Number <u>5337-70</u> Comments	Dish No. <u>60</u> Dish Tare Wt. <u>49.6264</u> g Dish+Sample Wt. <u>49.6411</u> g Sample Wt. <u>0.0147</u> g
2	Test <u>9</u> Run <u>2</u> Log Number <u>-73</u> Comments	Dish No. <u>120</u> Dish Tare Wt. <u>48.2245</u> g Dish+Sample Wt. <u>48.2585</u> g Sample Wt. <u>0.0340</u> g
3	Test <u>9</u> Run <u>3</u> Log Number <u>-76</u> Comments	Dish No. <u>515</u> Dish Tare Wt. <u>50.0147</u> g Dish+Sample Wt. <u>50.0376</u> g Sample Wt. <u>0.0229</u> g
4	Test <u>Run</u> Log Number Comments	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number Comments	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. 0.0005g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0142	0.0335	0.0224		

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job LP Newberry Source Press & Unloader Vents
Team Leader DUH Test Site Stack
Date Submitted 2-8-92 Date of Test 2-6-91
Test No. 5 No. of Runs Completed 3
Date of Analysis 2-10-92 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>5</u> Run <u>1</u> Log Number <u>5337-36</u> Comments _____	Filter No. <u>4064</u> Filter Type <u>4" GFF</u> Filter Tare Wt. <u>.9607</u> g Filter+Sample Wt. <u>.9614</u> g Sample Wt. <u>0.0007</u> g
2	Test <u>5</u> Run <u>2</u> Log Number <u>-40</u> Comments _____	Filter No. <u>4063</u> Filter Type <u>4" GFF</u> Filter Tare Wt. <u>.9702</u> g Filter+Sample Wt. <u>.9710</u> g Sample Wt. <u>0.0008</u> g
3	Test <u>5</u> Run <u>3</u> Log Number <u>-44</u> Comments _____	Filter No. <u>4062</u> Filter Type <u>4" GFF</u> Filter Tare Wt. <u>.9637</u> g Filter+Sample Wt. <u>.9644</u> g Sample Wt. <u>0.0007</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0007	0.0008	0.0007		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0086	0.0095	0.0083		

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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job LP Newberry Source Press & Unloader Vents
Team Leader DJH Test Site Stack
Date Submitted 2-6-92 Date of Test 2-6-92
Test No. 3 No. of Runs Completed 3
Date of Analysis C. Helgeson Technician Acetone
Transport Leakage ☐ None ☐ ml Solvent Acetone

0	Test <u>Run 0</u> Field Blank Log Number <u> </u> Vol. of Solvent <u> </u> ml *Solvent Residue <u>3.33</u> ug/ml	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
1	Test <u>5</u> Run <u>1</u> Vol. of Solvent <u>110</u> ml Log Number <u>5337-35</u> Comments <u> </u>	Dish No. <u>200</u> Dish Tare Wt. <u>44.9376</u> g Dish+Sample Wt. <u>44.9439</u> g Sample Wt. <u>0.0063</u> g
2	Test <u>5</u> Run <u>2</u> Vol. of Solvent <u>100</u> ml Log Number <u>-39</u> Comments <u> </u>	Dish No. <u>306</u> Dish Tare Wt. <u>48.6371</u> g Dish+Sample Wt. <u>48.6440</u> g Sample Wt. <u>0.0069</u> g
3	Test <u>5</u> Run <u>3</u> Vol. of Solvent <u>90</u> ml Log Number <u>-43</u> Comments <u> </u>	Dish No. <u>402</u> Dish Tare Wt. <u>47.5797</u> g Dish+Sample Wt. <u>47.5853</u> g Sample Wt. <u>0.0056</u> g
4	Test <u> </u> Run <u> </u> Vol. of Solvent <u> </u> ml Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
5	Test <u> </u> Run <u> </u> Vol. of Solvent <u> </u> ml Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g

*Solvent Residue ug/ml = [(Sample Wt. g) (10⁶)] / Vol. of Sol. ml
EPA-M5 Acetone Residue Blank Spec. {7.3 ug/ml

Results:
Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	<u>0.0060</u>	<u>0.0066</u>	<u>0.0053</u>		

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job LP New Berry Source Press + Unloader Vents
Team Leader DUH Test Site Stack
Date Submitted 2-8-92 Date of Test 2-6-92
Test No. 5 No. of Runs Completed 3
Date of Analysis 2-11-92 Technician C. Helgeson

0	Test <u> </u> Run <u>0</u> Field Blank Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u>0.0005</u> g
1	Test <u>S</u> Run <u>1</u> Log Number <u>5337-37</u> Comments <u> </u>	Dish No. <u>201</u> Dish Tare Wt. <u>42.2304</u> g Dish+Sample Wt. <u>42.2328</u> g Sample Wt. <u>0.0024</u> g
2	Test <u>S</u> Run <u>2</u> Log Number <u>-41</u> Comments <u> </u>	Dish No. <u>209</u> Dish Tare Wt. <u>43.2094</u> g Dish+Sample Wt. <u>43.2120</u> g Sample Wt. <u>0.0026</u> g
3	Test <u>S</u> Run <u>3</u> Log Number <u>-45</u> Comments <u> </u>	Dish No. <u>212</u> Dish Tare Wt. <u>50.3589</u> g Dish+Sample Wt. <u>50.3617</u> g Sample Wt. <u>0.0028</u> g
4	Test <u> </u> Run <u> </u> Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
5	Test <u> </u> Run <u> </u> Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g

Blank Solvent Wt. 0.0005g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0019	0.0021	0.0023		

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L.P Newberry Source KONUS
Team Leader DUH Test Site Stack
Date Submitted 2-8-92 Date of Test 2-5-92
Test No. 1 No. of Runs Completed 3
Date of Analysis 2-10-92 Technician C. Helgeson

0	Test <u> </u> Run <u>0</u> Field Blank Log Number <u> </u> Comments <u> </u>	Filter No. <u> </u> Filter Type <u> </u> Filter Tare Wt. <u> </u> g Filter+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
1	Test <u>1</u> Run <u>1</u> Log Number <u>5337-05</u> Comments <u> </u>	Filter No. <u>3824</u> Filter Type <u>4" GFF</u> Filter Tare Wt. <u>.8978</u> g Filter+Sample Wt. <u>.9242</u> g Sample Wt. <u>0.0264</u> g
2	Test <u>1</u> Run <u>2</u> Log Number <u>-09</u> Comments <u> </u>	Filter No. <u>4035</u> Filter Type <u>4" GFF</u> Filter Tare Wt. <u>.9896</u> g Filter+Sample Wt. <u>1.0150</u> g Sample Wt. <u>0.0254</u> g
3	Test <u>1</u> Run <u>3</u> Log Number <u>-13</u> Comments <u> </u>	Filter No. <u>4065</u> Filter Type <u>4" GFF</u> Filter Tare Wt. <u>.9656</u> g Filter+Sample Wt. <u>1.0002</u> g Sample Wt. <u>0.0346</u> g
4	Test <u> </u> Run <u> </u> Log Number <u> </u> Comments <u> </u>	Filter No. <u> </u> Filter Type <u> </u> Filter Tare Wt. <u> </u> g Filter+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
5	Test <u> </u> Run <u> </u> Log Number <u> </u> Comments <u> </u>	Filter No. <u> </u> Filter Type <u> </u> Filter Tare Wt. <u> </u> g Filter+Sample Wt. <u> </u> g Sample Wt. <u> </u> g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0264	0.0254	0.0346		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0480	0.0617	0.0595		

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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job LP Newberry Source Konus
Team Leader DUH Test Site Stack
Date Submitted 2-8-92 Date of Test 2-5-92
Test No. 1 No. of Runs Completed 3
Date of Analysis 2-10-92 Technician C. Helgeson
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

0	Test <u> </u> / Run <u>0</u> Field Blank Log Number <u>5337-01</u> Vol. of Solvent <u>150 ml</u> *Solvent Residue <u>3.33</u> ug/ml	Dish No. <u>44</u> Dish Tare Wt. <u>47.6226</u> g Dish+Sample Wt. <u>47.6231</u> g Sample Wt. <u>0.0005</u> g
1	Test <u> </u> / Run <u>1</u> Vol. of Solvent <u>150 ml</u> Log Number <u>-04</u> Comments _____	Dish No. <u>46</u> Dish Tare Wt. <u>46.2229</u> g Dish+Sample Wt. <u>46.2430</u> g Sample Wt. <u>0.0201</u> g
2	Test <u> </u> / Run <u>2</u> Vol. of Solvent <u>120 ml</u> Log Number <u>-08</u> Comments _____	Dish No. <u>55</u> Dish Tare Wt. <u>47.7785</u> g Dish+Sample Wt. <u>47.8140</u> g Sample Wt. <u>0.0355</u> g
3	Test <u> </u> / Run <u>3</u> Vol. of Solvent <u>160 ml</u> Log Number <u>-12</u> Comments _____	Dish No. <u>59</u> Dish Tare Wt. <u>50.1528</u> g Dish+Sample Wt. <u>50.1771</u> g Sample Wt. <u>0.0243</u> g
4	Test <u> </u> Run <u> </u> Vol. of Solvent <u> </u> ml Log Number <u> </u> Comments _____	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
5	Test <u> </u> Run <u> </u> Vol. of Solvent <u> </u> ml Log Number <u> </u> Comments _____	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g

*Solvent Residue 3.33 ug/ml = [(Sample Wt. 0.0005 g) (10⁶)] / Vol. of Sol. 150 ml
EPA-M5 Acetone Residue Blank Spec. {7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	<u>0.0196</u>	<u>0.0351</u>	<u>F-8</u>	<u>0.0238</u>		

Interpoll Laboratories
(612) 786-6320

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job LP New Berry Source Kongs
Team Leader DH Test Site Stack
Date Submitted 2-8-92 Date of Test 2-5-92
Test No. 1 No. of Runs Completed 3
Date of Analysis 2-11-92 Technician C. Helgeson

Test <u>1</u> Run <u>0</u> Field Blank Log Number <u>5337-03</u> Comments _____	Dish No. <u>26</u> Dish Tare Wt. <u>48.3845</u> g Dish+Sample Wt. <u>48.3850</u> g Sample Wt. <u>0.0005</u> g
Test <u>1</u> Run <u>1</u> Log Number <u>-06</u> Comments _____	Dish No. <u>27</u> Dish Tare Wt. <u>52.4439</u> g Dish+Sample Wt. <u>52.4464</u> g Sample Wt. <u>0.0025</u> g
Test <u>1</u> Run <u>2</u> Log Number <u>-10</u> Comments _____	Dish No. <u>406</u> Dish Tare Wt. <u>49.6177</u> g Dish+Sample Wt. <u>49.6194</u> g Sample Wt. <u>0.0017</u> g
Test <u>1</u> Run <u>3</u> Log Number <u>-14</u> Comments _____	Dish No. <u>510</u> Dish Tare Wt. <u>49.3705</u> g Dish+Sample Wt. <u>49.3721</u> g Sample Wt. <u>0.0016</u> g
Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. 0.0005g

Results:

Field Blk.

Run 1

Run 2

Run 3

Run 4

Run 5

	<u>0.0020</u>	<u>0.0012</u>	<u>0.0011</u>		

LSC-03.GR

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job LP New Berry Source Prosser Unloader
 Team Leader ET Test Site Vent
 Date Submitted 2-8-92 Date of Test 2-6-92
 Test No. 6 B No. of Runs Completed 3
 Date of Analysis 2-11-92 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>6</u> Run <u>1</u> <u>B</u> Log Number <u>5337-58</u> Comments _____	Dish No. <u>408</u> Dish Tare Wt. <u>47.6260</u> g Dish+Sample Wt. <u>47.6279</u> g Sample Wt. <u>0.0019</u> g
2	Test <u>6</u> Run <u>2</u> <u>B</u> Log Number <u>-61</u> Comments _____	Dish No. <u>512</u> Dish Tare Wt. <u>49.3552</u> g Dish+Sample Wt. <u>49.3581</u> g Sample Wt. <u>0.0029</u> g
3	Test <u>6</u> Run <u>3</u> <u>B</u> Log Number <u>-64</u> Comments _____	Dish No. <u>514</u> Dish Tare Wt. <u>48.7132</u> g Dish+Sample Wt. <u>48.7151</u> g Sample Wt. <u>0.0019</u> g
4	Test <u>Run</u> _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. 0.0005g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0014	0.0024	0.0014		

LSC-03.GR

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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job LP New Berry Source Press - unloader
Team Leader ET Test Site Vent
Date Submitted 2-8-92 Date of Test 2-6-92
Test No. 6 B No. of Runs Completed 3
Date of Analysis 2-16-92 Technician C. Helgeson
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

0	Test _____ Run <u>0</u> Field Blank Log Number _____ Vol. of Solvent _____ ml *Solvent Residue <u>3.33</u> ug/ml	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>6</u> Run <u>1</u> <u>B</u> Vol. of Solvent <u>20</u> ml Log Number <u>5337-56</u> Comments _____	Dish No. <u>54</u> Dish Tare Wt. <u>51.8968</u> g Dish+Sample Wt. <u>51.8974</u> g Sample Wt. <u>0.0006</u> g
2	Test <u>6</u> Run <u>2</u> <u>B</u> Vol. of Solvent <u>30</u> ml Log Number <u>-59</u> Comments _____	Dish No. <u>57</u> Dish Tare Wt. <u>50.0187</u> g Dish+Sample Wt. <u>50.0193</u> g Sample Wt. <u>0.0006</u> g
3	Test <u>6</u> Run <u>3</u> <u>B</u> Vol. of Solvent <u>20</u> ml Log Number <u>-62</u> Comments _____	Dish No. <u>57A</u> Dish Tare Wt. <u>47.9142</u> g Dish+Sample Wt. <u>47.9149</u> g Sample Wt. <u>0.0007</u> g
4	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue _____ ug/ml = [(Sample Wt. _____ g) (10⁶)] / Vol. of Sol. _____ ml
EPA-M5 Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	<u>0.0005</u>	<u>0.0005</u>	<u>F 20.0006</u>		

LSC-01YR

Interpoll Laboratories
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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job LP Newberry Source Press & unloader
Team Leader ET Test Site Vent
Date Submitted 2-8-92 Date of Test 2-6-92
Test No. 6 B No. of Runs Completed 3
Date of Analysis 2-10-92 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>6</u> Run <u>1B</u> Log Number <u>5337-57</u> Comments _____	Filter No. <u>5625</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2518</u> g Filter+Sample Wt. <u>.2557</u> g Sample Wt. <u>0.0039</u> g
2	Test <u>6</u> Run <u>2B</u> Log Number <u>-60</u> Comments _____	Filter No. <u>5605</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2618</u> g Filter+Sample Wt. <u>.2665</u> g Sample Wt. <u>0.0047</u> g
3	Test <u>6</u> Run <u>3B</u> Log Number <u>-63</u> Comments _____	Filter No. <u>5623</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2556</u> g Filter+Sample Wt. <u>.2587</u> g Sample Wt. <u>0.0031</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0039	0.0047	0.0031		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0058	0.0076	0.0051		

LSC-02PR

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job LP New Berry Source Dryer
Team Leader ET Test Site Stack
Date Submitted 2-8-92 Date of Test 2-7-92
Test No. 10 No. of Runs Completed 3
Date of Analysis 2-11-92 Technician C Helgeson

0	Test <u> </u> Run <u>0</u> Field Blank Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
1	Test <u>10</u> Run <u>1</u> Log Number <u>5337-79</u> Comments <u> </u>	Dish No. <u>2</u> Dish Tare Wt. <u>46.2271</u> g Dish+Sample Wt. <u>46.2491</u> g Sample Wt. <u>0.0222</u> g
2	Test <u>10</u> Run <u>2</u> <u>-83</u> Log Number <u> </u> Comments <u> </u>	Dish No. <u>25</u> Dish Tare Wt. <u>44.3438</u> g Dish+Sample Wt. <u>44.3672</u> g Sample Wt. <u>0.0234</u> g
3	Test <u>10</u> Run <u>3</u> <u>-87</u> Log Number <u> </u> Comments <u> </u>	Dish No. <u>29</u> Dish Tare Wt. <u>49.8002</u> g Dish+Sample Wt. <u>49.8267</u> g Sample Wt. <u>0.0265</u> g
4	Test <u> </u> Run <u> </u> Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
5	Test <u> </u> Run <u> </u> Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g

Blank Solvent Wt. g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0217	0.0229F-250.0260		

LSC-03 GR

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job LP New Berry Source Dryer
Team Leader ET Test Site Stack
Date Submitted 2-8-92 Date of Test 2-7-92
Test No. 10 No. of Runs Completed 3
Date of Analysis 2-11-92 Technician C. Helgeson
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

0	Test <u>Run 0</u> Field Blank Log Number _____ Vol. of Solvent _____ ml *Solvent Residue <u>3.33</u> ug/ml	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>10</u> Run <u>1</u> Vol. of Solvent <u>50</u> ml Log Number <u>5337-77</u> Comments _____	Dish No. <u>523</u> Dish Tare Wt. <u>49.8063</u> g Dish+Sample Wt. <u>49.8103</u> g Sample Wt. <u>0.0040</u> g
2	Test <u>10</u> Run <u>2</u> Vol. of Solvent <u>50</u> ml Log Number <u>-81</u> Comments _____	Dish No. <u>524</u> Dish Tare Wt. <u>48.0404</u> g Dish+Sample Wt. <u>48.0446</u> g Sample Wt. <u>0.0042</u> g
3	Test <u>10</u> Run <u>3</u> Vol. of Solvent <u>50</u> ml Log Number <u>-85</u> Comments _____	Dish No. <u>407</u> Dish Tare Wt. <u>47.9929</u> g Dish+Sample Wt. <u>47.9984</u> g Sample Wt. <u>0.0055</u> g
4	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue _____ ug/ml = [(Sample Wt. _____ g) (10⁶)] / Vol. of Sol. _____ ml

EPA-M5 Acetone Residue Blank Spec. (7.8 ug/ml)

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0038	0.0040	F-260.0053		

LSC-01YR

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job L9 Newberry Source Dryer
Team Leader ET Test Site Stack
Date Submitted 2-8-92 Date of Test 2-7-92
Test No. 10 No. of Runs Completed 3
Date of Analysis 2-10-9 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>10 Run 1</u> Log Number <u>5337-78</u> Comments _____	Filter No. <u>5634</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2512</u> g Filter+Sample Wt. <u>.2937</u> g Sample Wt. <u>0.0425</u> g
2	Test <u>10 Run 2</u> Log Number <u>-82</u> Comments _____	Filter No. <u>5615</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2561</u> g Filter+Sample Wt. <u>.3108</u> g Sample Wt. <u>0.0547</u> g
3	Test <u>10 Run 3</u> Log Number <u>-86</u> Comments _____	Filter No. <u>5619</u> Filter Type <u>2.5" GFF</u> Filter Tare Wt. <u>.2542</u> g Filter+Sample Wt. <u>.3077</u> g Sample Wt. <u>0.0535</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0425	0.0547	0.0535		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0680	0.0816	0.0848		

LSC-02PR

```

NDIR Analyzer:  Fugl ACS Model I 3300
                  Mon. Lab Model I 3310
                  Dasibi Model 3003
                  Range: 0 - 200 ppm
                  Flow rate: 100 cc/min

```

Job Name L. P. Newberry
Source Renoir
Date of Analysis 7-17-92
Technician R. G. Gorman

Post-test Calibration			
	Conc.	Reading	
Zero gas:	0.00	ppm	Vendor:
Upscale gas:	38	ppm	Vendor:
Upscale gas:	148	ppm	Vendor:
Upscale gas:		ppm	Vendor:

Zero gas:	0.00	ppm	
Upscale gas:	38	ppm	
Upscale gas:	148	ppm	
Upscale gas:		ppm	

[illegible]

1/1	5337-07	10	20.2	702-
1/2	-11	10	17	170
1/3	-15	1	136	136

Note 1: If sample dilution is required the sample is diluted with CO-free gas prior to analysis.
 Note 2: The Fugl ACS model 3300 has a rejection ratio for CO to CO₂ greater than 100,000: 1 and the Mon. Labs Model E310 and Dasibi Model 3003 have rejection ratios greater than 200,000:1 and thus CO₂ 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.

EPA Method 10 NDIR Analysis

Job Name L.P. Newberry
Source Road
Date of Analysis 2-10-92
Technician A. G. G. G.

NDIR Analyzer: Fuji ACS Model 3300
Mon. Lab Model 8310
Dasibi Model 3003
Range: 0 - 200 ppm
Flow rate: 1000 cc/min

Pretest Calibration				
Conc.	Reading			
Zero gas: 0.00 ppm	0.00	ppm	Vendor: Linde	
Upscale gas: 38 ppm	38	ppm	Vendor: J	
Upscale gas: 148 ppm	148	ppm	Vendor: J	
Upscale gas: 148 ppm		ppm	Vendor: J	

Post-test Calibration				
Conc.	Reading			
Zero gas: 0.00 ppm	0.00	ppm	Vendor: Linde	
Upscale gas: 38 ppm	38	ppm	Vendor: J	
Upscale gas: 148 ppm	147.9	ppm	Vendor: J	
Upscale gas: 148 ppm		ppm	Vendor: J	

Sample Description Test/Run	Sample Log Number	CO Conc. (ppm, Dry)	
		Dilution Factor	Actual ppm
3/1	5037-94	1	156
3/2	-95	1	148
3/3	-96	10	21

Sample Description Test/Run	Sample Log Number	CO Conc. (ppm, Dry)	
		Dilution Factor	Actual ppm

- Note 1: If sample dilution is required the sample is diluted with CO-free gas prior to analysis.
 Note 2: The Fuji ACS model 3300 has a rejection ratio for CO to CO₂ greater than 100,000: 1 and the Mon. Labs Model 8310 and Dasibi Model 3003 have rejection ratios greater than 200,000:1 and thus CO₂ 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.

EPA Method 10 NDIR Analysis

Job Name: L.P. Newberry
Source: Press & Unloader
Date of Analysis: 7-10-92
Technician: R. G. G.

NDIR Analyzer: Fuji RCS Model 3300
Mon. Lab Model 8310
✓ Dasibi Model 3003
Range: 0 - 200 ppm
Flow rate: 1000 cc/min

Pretest Calibration

Zero gas: 0.00 ppm Reading 0.00 ppm Vendor: Linde
Upscale gas: 38 ppm Reading 38 ppm Vendor: I
Upscale gas: 148 ppm Reading 148 ppm Vendor: I
Upscale gas: ppm Reading ppm Vendor:

Post-test Calibration

Zero gas: 0.00 ppm Reading 0.00 ppm Vendor: Linde
Upscale gas: 38 ppm Reading 38 ppm Vendor: I
Upscale gas: 148 ppm Reading 147.9 ppm Vendor: I
Upscale gas: ppm Reading ppm Vendor:

Sample Description Test/Run	Sample Log Number	CO Conc. (ppm, Dry)	
		Dilution Factor	Reading Actual ppm
5/1	5337-38	1	<5
5/2	-42	1	<5
5/3	-46	1	<5

Sample Description Test/Run	Sample Log Number	CO Conc. (ppm, Dry)	
		Dilution Factor	Reading Actual ppm

- Note 1: If sample dilution is required the sample is diluted with CO-free gas prior to analysis.
 Note 2: The Fuji ACS model 3300 has a rejection ratio for CO to CO₂ greater than 100,000: 1 and the Mon. Labs Model 8310 and Dasibi Model 3003 have rejection ratios greater than 200,000:1 and thus CO₂ 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.

Job Name L.A. Newberry
Source Dryer
Date of Analysis 7/10/92
Technician A. Gaudin

```

NDIR Analyzer:      Fugl. ACS Model I 3300
                   Mon. Lab Model I 2310
                   Dosibi Model 3003
                   Range: 0 - 200 ppm
                   Flow rate: 1000 cc/min

```

Protest Calibration		
	Conc.	Reading
Zero gas:	ppm	Vendor:
Upscale gas:	ppm	Vendor:
Upscale gas:	ppm	Vendor:
Upscale gas:	ppm	Vendor:

Post-test Calibration		
	Conc.	Reading
Zero gas:	_____ppm	_____ppm Vendor:
Upscale gas:	_____ppm	_____ppm Vendor:
Upscale gas:	_____ppm	_____ppm Vendor:
Upscale gas:	_____ppm	_____ppm Vendor:

[illegible][illegible]

Note 1: If sample dilution is required the sample is diluted with CO-free gas prior to analysis.

Note 2: The Fuji ACS model 3300 has a rejection ratio for CO to CO₂ greater than 100,000; 1 and the Mon. Labs Model B310 and Dasibi Model 3003 have rejection ratios greater than 200,000; 1 and thus CO₂ removal prior to analysis is not required.

200,000:1 and thus CO₂ removal prior to analysis is not required,

Note 3: The analyzer must be zeroed and spanned immediately before and after sample analysis. Additional checks may be performed between sample analyses if required.

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Louisiana Pacific/Newberry
Laboratory Log No. 5337

Results of Formaldehyde Analysis

Test: 3
Source: Konus Stack
Sample Type: Impinger Catch

Sample Log No.	Sample Description	Formaldehyde ^a
		Total ug
5337-31	Run 0, Field Blank	15
5337-32	Run 1	89
5337-33	Run 2	120
5337-34	Run 3	120

^aEPA Method 0011

INTERPOLL LABORATORIES, INC.
(612)786-6020

Louisiana Pacific/Newberry
Laboratory Log No. 5337

Results of Formaldehyde Analysis

Test: 8
Source: Press & Unloading Vents Stack
Sample Type: Impinger Catch

Sample Log No.	Sample Description	Formaldehyde ^a
		Total ug
5337-65	Run 1	3700
5337-66	Run 2	4500
5337-67	Run 3	4900

^aEPA Method 0011

INTERPOLL LABORATORIES, INC.
(612)786-6020

Louisiana Pacific/Newberry
Laboratory Log No. 5337

Results of Formaldehyde Analysis

Test: 11
Source: Dryer Stack
Sample Type: Impinger Catch

Sample Log No.	Sample Description	Formaldehyde ^a
		Total ug
5337-89	Run 1	12000
5337-90	Run 2	13000
5337-91	Run 3	8100

^aEPA Method 0011

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Chain of Custody
Sample Deposition Sheet

Job L.P. Newberry Source Konus
Team Leader DWH Test Site Stack
Date Submitted 2/3/91 Date of Test 2/5/92
Test No. 1 No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
4	Probe Wash: ☒ Acetone ☐ D.I. Water	☒ As per EPA M-5 ☐ Other _____	
4	Filter: ☒ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☒ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
4	Impinger Catch: ☒ D.I. Water ☐ 3% H ₂ O ₂ ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ☐ Other _____	☒ M ² Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☐ Other _____	<u>methylene chloride</u>
3	Integrated Gas sample	☒ As per EPA M-3 ☒ As per EPA M-10 ☐ Other _____	<u>CO!</u>
	Oxides of Nitrogen (NO _x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

- 1) Type of Source: ☐ Boiler ☐ Asphalt Plant ☐ Incinerator ☐ Dryer
☒ Other Oil heater
- 2) Fuel: ☐ Coal ☒ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other _____
- 3) Is sample combustible? ☒ No ☐ Yes
- 4) Does sample need special handling? ☒ No ☐ Yes If yes, explain _____

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job LP/Now Bally Source KANUS
Team Leader E. Trawick Test Site STARK
Date Submitted _____ Date of Test 2-5-92
Test No. 2 No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
4	Probe Wash: ☒ Acetone ☐ D.I. Water	☒ As per EPA M-5 ☐ Other _____	
4	Filter: ☒ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☒ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
4	Impinger Catch: ☒ D.I. Water ☐ 3% H ₂ O ₂ ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ☐ Other _____	☒ ^{ATLH} Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☐ Other _____	Methylene Chloride
3	Integrated Gas sample	☒ As per EPA M-3 ☐ As per EPA M-10 ☐ Other _____	
	Oxides of Nitrogen (NO _x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

- 1) Type of Source: ☐ Boiler ☐ Asphalt Plant ☐ Incinerator ☐ Dryer
☐ Other _____
- 2) Fuel: ☐ Coal ☐ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other _____
- 3) Is sample combustible? ☐ No ☐ Yes
- 4) Does sample need special handling? ☐ No ☐ Yes If yes, explain _____

S-278RRRR

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job L.P./NEWBERRY Source KONUS
Team Leader JWH Test Site Stack
Date Submitted 2/8/92 Date of Test 2/5/92
Test No. 3 No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
	Probe Wash: ☐ Acetone ☐ D.I. Water	☐ As per EPA M-5 ☐ Other _____	
	Filter: ☐ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☐ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
4	Impinger Catch: ☐ D.I. Water ☐ 3% H ₂ O ₂ ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ☐ Other <u>2,4-DNPH</u>	☐ MN Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☐ Other _____	
3	Integrated Gas sample	☒ As per EPA M-3 ☒ As per EPA M-10 ☐ Other _____	
	Oxides of Nitrogen (NO _x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

- 1) Type of Source: ☐ Boiler ☐ Asphalt Plant ☐ Incinerator ☐ Dryer
☒ Other Thermal oil heater
- 2) Fuel: ☐ Coal ☒ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other _____
- 3) Is sample combustible? ☒ No ☐ Yes
- 4) Does sample need special handling? ☒ No ☐ Yes If yes, explain _____

S-278RRRR

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job L.P./Newberry
Team Leader DWH
Date Submitted 2/8/91
Test No. 85

Source Press & Unloader Vent
Test Site Stack
Date of Test 2/6/91
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
3	Probe Wash: ☒ Acetone ☐ D.I. Water	☒ As per EPA M-5 ☐ Other _____	
3	Filter: ☒ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☒ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
3	Impinger Catch: ☒ D.I. Water ☐ 3% H ₂ O ₂ ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ☐ Other _____	☒ ^{high} Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☐ Other _____	<u>methylene chloride</u>
3	Integrated Gas sample	☐ As per EPA M-3 ☒ As per EPA M-10 ☐ Other _____	<u>CO only?</u>
	Oxides of Nitrogen (NO _x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

- 1) Type of Source: ☐ Boiler ☐ Asphalt Plant ☐ Incinerator ☐ Dryer
☒ Other Vent
- 2) Fuel: ☐ Coal ☐ Wood ☐ Gas ☐ Oil ☐ RDF ☒ Other none
- 3) Is sample combustible? ☒ No ☐ Yes
- 4) Does sample need special handling? ☒ No ☐ Yes If yes, explain _____

S-278RRRR

Interpoll Laboratories
(612) 796-6020

Chain of Custody
Sample Deposition Sheet

Job LP/NEWBORRAT Source Press & unloader
Team Leader ETROWER, DGP Test Site STACK
Date Submitted 2-8-92 Date of Test 2-6-92
Test No. 6 No. of Runs Completed _____

No. of Samples	Type of Sample	Analysis Required	Comments
6	Probe Wash: ☒ Acetone ☐ D.I. Water	☒ As per EPA M-5 ☐ Other _____	
6	Filter: ☐ 4" G.F. ☐ S.S. Thimble ☒ 2.5" G.F. ☐ 47 mm G.F.	☒ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
6	Impinger Catch: ☒ D.I. Water ☐ 3% H ₂ O ₂ ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ☐ Other _____	~~NIOSH~~ ☒ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☐ Other _____	methylene chloride
C	Integrated Gas sample	☐ As per EPA M-3 ☐ As per EPA M-10 ☐ Other _____	
	Oxides of Nitrogen (NO _x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

- 1) Type of Source: ☐ Boiler ☐ Asphalt Plant ☐ Incinerator ☐ Dryer
☒ Other _____
- 2) Fuel: ☐ Coal ☐ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other _____
- 3) Is sample combustible? ☐ No ☐ Yes
- 4) Does sample need special handling? ☐ No ☐ Yes If yes, explain _____

S-278RRRR

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job L.P./Newberry
Team Leader DRH
Date Submitted 2/8/91
Test No. 8

Source Press Vent & Unloading Vent
Test Site Sticks
Date of Test 2/6/91
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
3	Probe Wash: ☐ Acetone ☒ D.I. Water <u>MELTZ</u>	☐ As per EPA M-5 ☐ Other _____	<u>Probe & Impinger Rinse</u>
	Filter: ☐ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☐ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
3	Impinger Catch: ☐ D.I. Water ☐ 3% H ₂ O ₂ ☐ 4MS Hg Only ☐ 4MS Metals ☐ 1.0 N NaOH ☐ Other <u>2,4-DNPH</u>	☐ MN Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☐ Other _____	
0	Integrated Gas sample	☐ As per EPA M-3 ☐ As per EPA M-10 ☐ Other _____	<u>Ambient Air</u>
	Oxides of Nitrogen (NO _x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

- 1) Type of Source: ☐ Boiler ☐ Asphalt Plant ☐ Incinerator ☐ Dryer
☒ Other Vent
- 2) Fuel: ☐ Coal ☐ Wood ☐ Gas ☐ Oil ☐ RDF ☒ Other none
- 3) Is sample combustible? ☒ No ☐ Yes
- 4) Does sample need special handling? ☒ No ☐ Yes If yes, explain _____

S-278RRRR

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(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job L.P. Newberry Source Dryer
Team Leader D. Van Heever Test Site Stack
Date Submitted 2/7/92 Date of Test 2/6/92
Test No. 9 No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
4	Probe Wash: ☒ Acetone ☐ D.I. Water	☒ As per EPA M-5 ☐ Other _____	
4	Filter: ☒ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☒ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
4	Impinger Catch: ☒ D.I. Water ☐ 3% H ₂ O ₂ ☐ 4MS Hg Only ☐ 4MS Metals ☐ 1.0 N NaOH ☐ Other _____	☒ ^{Mich} Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☐ Other _____	Methylene chloride
3	Integrated Gas sample	☒ As per EPA M-3 ☒ As per EPA M-10 ☐ Other _____	
	Oxides of Nitrogen (NO _x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

- 1) Type of Source: ☐ Boiler ☐ Asphalt Plant ☐ Incinerator ☒ Dryer
☐ Other _____
- 2) Fuel: ☐ Coal ☒ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other _____
- 3) Is sample combustible? ☒ No ☐ Yes
- 4) Does sample need special handling? ☒ No ☐ Yes If yes, explain _____

S-278RRRR

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Chain of Custody
Sample Deposition Sheet

Job LP/NEWBELLY Source Dryer
Team Leader E. Thompson Test Site Stack
Date Submitted 2-8-92 Date of Test 2-7-92
Test No. 10 No. of Runs Completed _____

No. of Samples	Type of Sample	Analysis Required	Comments
3	Probe Wash: ☒ Acetone ☐ D.I. Water	☒ As per EPA M-5 ☐ Other _____	
3	Filter: ☐ 4" G.F. ☐ S.S. Thimble ☒ 5" G.F. ☐ 47 mm G.F.	☒ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
3	Impinger Catch: ☒ D.I. Water ☐ 3% H ₂ O ₂ ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ☐ Other _____	☒ ~~EPA~~ ^{NIOSH} Protocol ☐ OVI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☐ Other _____	Methylene chloride
3	Integrated Gas sample	☒ As per EPA M-3 ☐ As per EPA M-10 ☐ Other _____	
	Oxides of Nitrogen (NO _x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

- 1) Type of Source: ☐ Boiler ☐ Asphalt Plant ☐ Incinerator ☒ Dryer
☐ Other _____
- 2) Fuel: ☐ Coal ☐ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other _____
- 3) Is sample combustible? ☐ No ☐ Yes
- 4) Does sample need special handling? ☐ No ☐ Yes If yes, explain _____

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job L.P./Newbury Source Dryer Stack
Team Leader DWH Test Site 11
Date Submitted 2/4/92 Date of Test 2/2/92
Test No. 11 No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
	Probe Wash: ☐ Acetone ☐ D.I. Water	☐ As per EPA M-5 ☐ Other _____	
	Filter: ☐ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☐ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
3	Impinger Catch: ☐ D.I. Water ☐ 3% H ₂ O ₂ ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ☐ Other <u>2M-DWH</u>	☐ MN Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☐ Other _____	
3	Integrated Gas sample	☐ As per EPA M-3 ☐ As per EPA M-10 ☐ Other _____	
	Oxides of Nitrogen (NO _x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

- 1) Type of Source: ☐ Boiler ☐ Asphalt Plant ☐ Incinerator ☒ Dryer
☐ Other _____
- 2) Fuel: ☐ Coal ☒ Wood ☐ Gas ☐ Oil ☐ RDF ☐ Other _____
- 3) Is sample combustible? ☒ No ☐ Yes
- 4) Does sample need special handling? ☒ No ☐ Yes If yes, explain _____

S-278RRRR

APPENDIX G

TOTAL HYDROCARBONS STRIPCHART

-295
don
probe

545
131AS

31.1
THRU
PROBE

LP / NEW BERRY
DRYER STACK
2-7-92

2.00

31.1 PPM

CAL. ERROR CK

39.5 PPM

LP / NEW BERRY
2-7-91

DRYER STACK

THE
LP / NEW BERRY, MICH

31.1 PPM

2.00

LAST FLAME

232.0 A2

31.4 PPM

202.1

232.0

END A1

7

203.12
Run 1

0-100 PPM PROPANE
START SPEED
10.0 cm/hr

0 10 20 30 40 50 60 70 80 90 100

G-2

293
down
probe

SYSTEM
BIAS

CHART NO. 10-5100-501

000000 000000 000000 000000 000000 000000 000000 000000 000000 000000

T
0115

filter plug

R3 0056
2-8-92

3m HM

2000

0040 2-8-92

210
Ro

0 10 20 30 40 50 60 70 80 90 100

LAST FLAME

CHART NO. CUC 01-9-031

31.7 PM

0010

END TEST 0215

001000 4-70 1000000 00240

0115

filter head

R3 0056
2-6-92

G-4

31.7 PM

TEST 4
RUN 1 2035
CHART
10 CM/HR
0-100 PPM

295 PPM

31.1 PPM

2040

SYSTEM
BIAS

OUT STOP OK

3.000

295 PPM
KI TANE

31.1

0.42
ERROR

2040

LP
KORUS

2-5-92
TEST 4
TNG

↑
2145 RUN 2

SYSTEM
RMS

37 PPM

2060

END R1 2135

0 10 20 30 40 50 60 70 80 90 100

G-6

TEST 4
UNIT

2035

31.1 PPM SYSTEM BIAS

zero

END Run 1 2355

2255 RUN 9

31.1 PPM SYSTEM BIAS

zero

END Run 2 2245

00 50 60 70 80 90 100 110 120 130 140 150

unloading vent half
of test - 6 (in unloading
vent stack)

Test # 7 Run # 1

start 1434 M25a On Press
and Unloading Vent Stack

Chart speed 10cm/hr

zero gas - 216/92

31 ppm gas

zero gas system bias

zero gas

00 90 80 70 60 50 40 30 20 10 0

31.1 ppm

SYSTEM
BIAS

1000

END
R3

2355

Good good gas

1642

1642

unloading vent

start test 7 km²
1542

pro gas

31 ppm gas

stop run 1 1534

press vent

unloading vent half
of test (on unloading
vent stick

zero gas

span gas

STOP
1749

adjusted to press vert stack

start test 7 Run 3 at 1699

0 10 20 30 40 50 60 70 80 90 100

31 ppm gas

end zero gas

stop test 7 Run 2 1642

at unloading vert G-10

APPENDIX H

THC ANALYZER SPECIFICATIONS



TOTAL HYDROCARBON ANALYZER (FLAME IONIZATIO
Model RS 55

TECHNICAL DATES

MAINS : 115V/60H

RECORDER OUTPUT : 0 - 5 V / 4-20mA

MODEL: X Manual switching
— Solenoid valves

HOUSING: — Case, — 19"-Rack

MEASURING RANGES: 1 = 0 - 10 C₁-
2 = 0 - 100 C₁
3 = 0 - 1,000 C₁
4 = 0 - 10,000 C₁

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

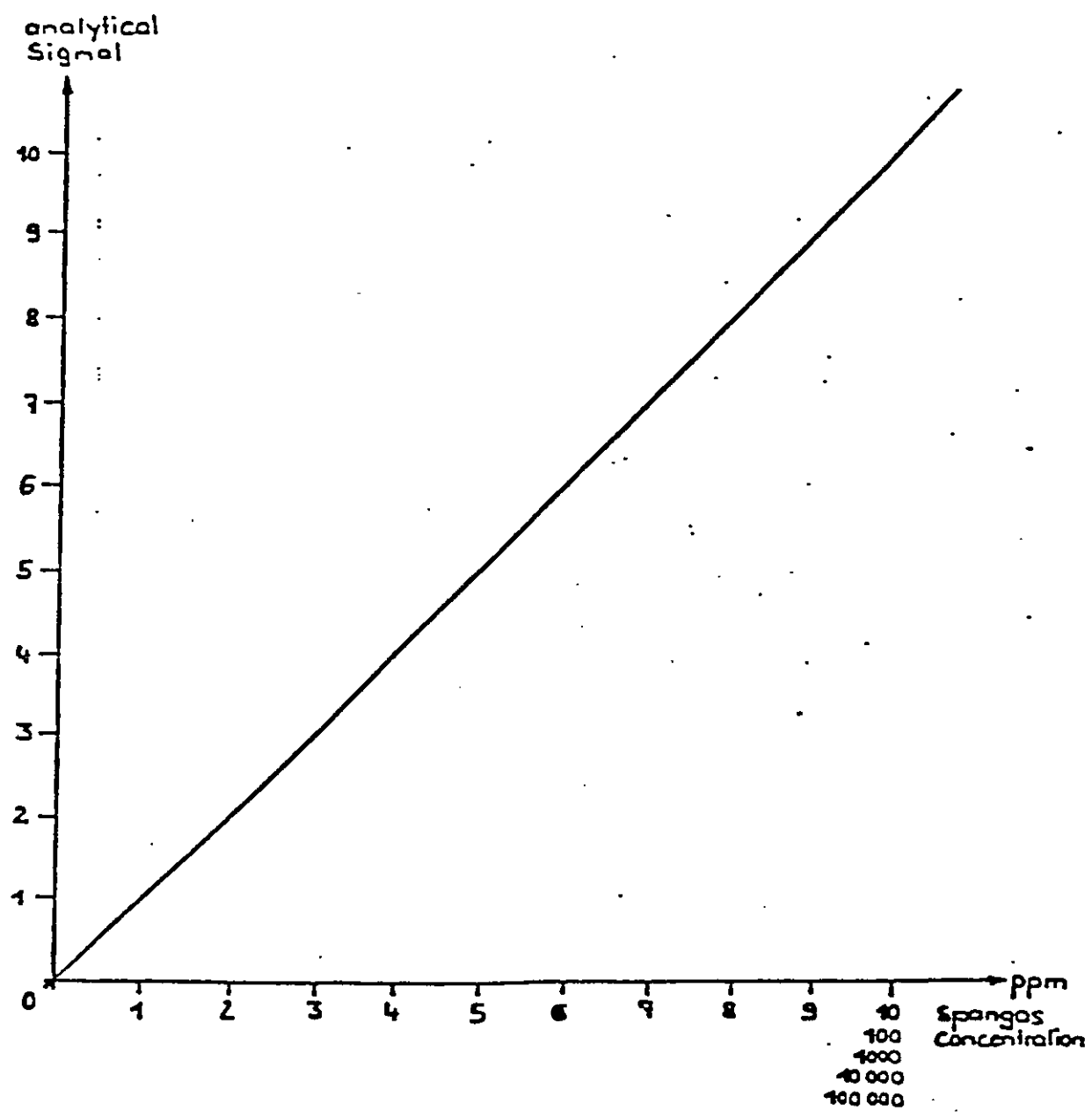
Fuel: Hydrogen : ..0,35 bar

Combustion Air : 0,80 bar

Span Gases : ..300. ppm C₁
24.000. ppm C₁

INTERPOL LABORATORIES
4500 BALL ROAD N.E.
CIRCLE PINES, MN 55014-1819
(612) 786-6020

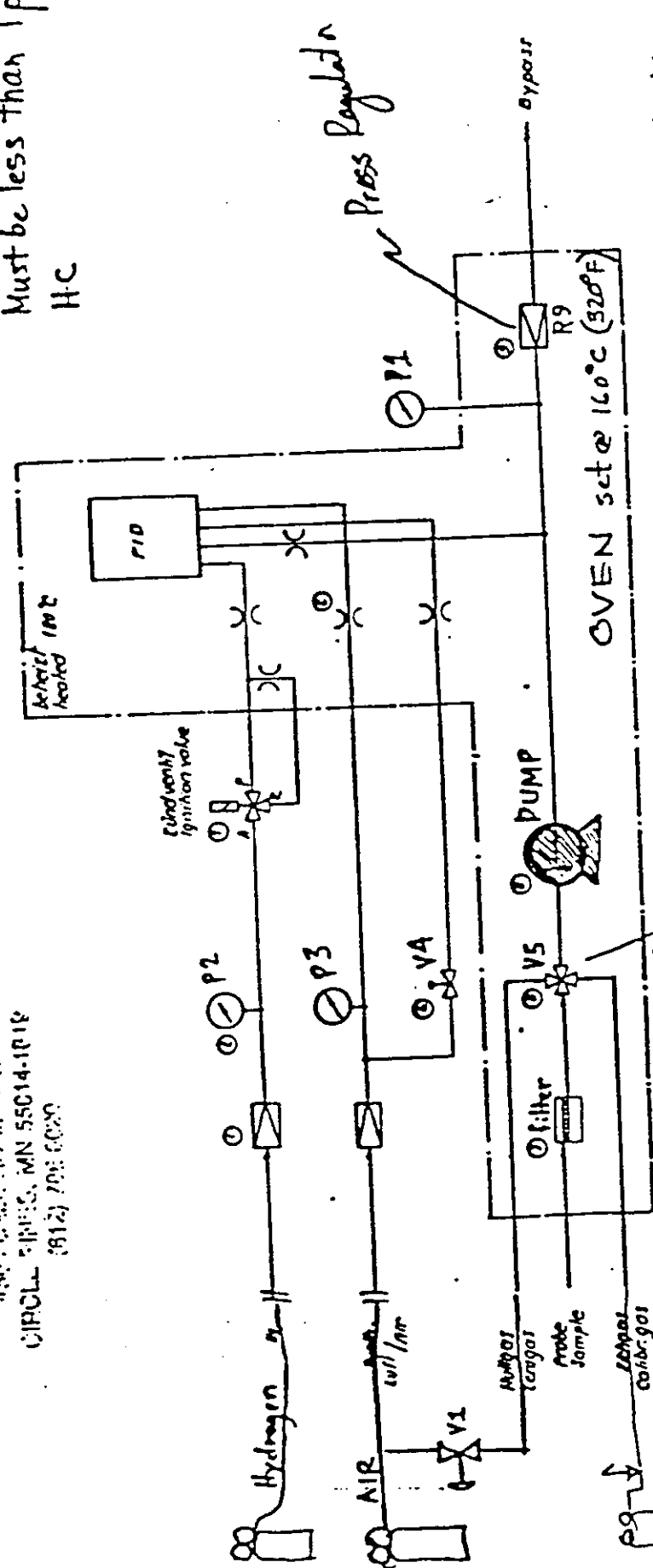
CALIBRATION DIAGRAMM



INTERPOL LABORATORIES
4500 BALL ROAD N.E.
CIRCLE PINES, MN 55014-1819
(612) 786-6020

Hydrogen & Air
Must be less than 1 ppm
HC

INTERCONAL LABORATORY, INC.
4800 BROADVIEW AVE.
CIRCLE SPRING, MN 55014-1018
(812) 708-0020



Valve 4 allows air to be bled into
Sample gas with very low O_2 and
very high HC conc, which might not
combust completely before passing by the
collector electrodes ($O_2 < 0.5\%$) and
THC > 5000 ppm

Knob on front
of instrument
Zirconium
Ignition valve
P.A. oxygen
energized
R.A. stopper
at rest

1. Indirect pressure regulator
2. Manometer
3. Gauge
4. Filter
5. Nozzle valve
6. 3-way valve
7. Capillary
8. Solenoid valve
9. Pump
10. Fuel and regulator
11. Good pressure regulator

* Must hold ignition switch in until red light goes off;

Handumatching
Manual switching

		FLAMMEN IONISATIONS DETECTOR
Flame Ionization detector		
Flow diagram	RS 35	
13.04.88		

Range 4 = 10,000

APPENDIX I

MEASUREMENT SYSTEMS PERFORMANCE SPECIFICATIONS

INTERPOL LABORATORIES
(612) 786-6020

THC System Bias Check

Job L P/NEWBERRY Source KONUS
Test 4 Run 1273 Date 2-5-92 Site STACK
Operator E THORNTON

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm)		Diff. CE-SB (ppm)	Span Val (PPM)	% of span
				Cal Err	Sys Bias			
1	2020	Zero gas	0	0	0	0	100	0
		Upscale	31.1	31	31	.1	100	.1
2	2137	Zero gas	0		0	0	100	0
		Upscale	31.1		31	.1	100	.1
3	2247	Zero gas	0		0	0	100	0
		Upscale	31.1		31	.1	100	.1
4	2357	Zero gas	0		0	0	100	0
		Upscale	31.1		30	1.1	100	1.1
5		Zero gas	0					
		Upscale						
6		Zero gas	0					
		Upscale						
7		Zero gas	0					
		Upscale						
8		Zero gas	0					
		Upscale						
9		Zero gas	0					
		Upscale						
10		Zero gas	0					
		Upscale						
11		Zero gas	0					
		Upscale						
12		Zero gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

S420-11R

INTERPOLL LABORATORIES

Calibration Error Check

Job LP/ NEWBERRYTest 4 Run 1 Date 2-5-92Operator E THOWBRIDGE

THC

~~NO~~ Calibration:Time (HRS) 2000

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	100	0
Mid level	31.1	31	.1	100	.1
High level	295	296	1	1000	.1

NO_x Calibration:

Time (HRS) _____

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

O₂ Calibration:

Time (HRS) _____

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

CO₂ Calibration:

Time (HRS) _____

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

Must be within 2% of the span for each calibration gas

S-420-10

INTERPOLL LABORATORIES
(612) 786-6020

THC System Bias Check

Job LP/NEWBERRY Source PRESS & UNLOADING
Test 7 Run 1243 Date 2-6-82 Site UNITS
Operator D.V.H.

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm)		Diff. CE-SB (ppm)	Span Val (PPM)	% of span
				Cal Err	Sys Bias			
1	1330	Zero gas	0	0	0	0	100	0
		Upscale	31.1	31.5	31.0	.1	100	.1
2	1535	Zero gas	0		0	0	100	0
		Upscale	31.1		30	1.1	100	1.1
3	1643	Zero gas	0		0	0	100	0
		Upscale	31.1		29.9	1.2	100	1.2
4	1750	Zero gas	0		0	0	100	0
		Upscale	31.1		30	1.1	100	1.1
5		Zero gas	0					
		Upscale						
6		Zero gas	0					
		Upscale						
7		Zero gas	0					
		Upscale						
8		Zero gas	0					
		Upscale						
9		Zero gas	0					
		Upscale						
10		Zero gas	0					
		Upscale						
11		Zero gas	0					
		Upscale						
12		Zero gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

S420-11R

INTERPOL LABORATORIES

EPA Method 25A

Calibration Error Check & Drift Determination

Job LP/NEWBERRY
 Test 7 Run 1 Date 2-6-92
 Operator DVH

THC Calibration (Low Range):

Time(HRS): 1310

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	100	0
Low level	31.1	31.5	.4	100	.4
Mid level	295	300	5	1000	.5
High level					

THC Calibration (High Range):

Time(HRS): _____

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Span					

O₂ Calibration:

Time(HRS): _____

***	Cylinder Value (%)	Analyzer Response (%)	Difference (%)	Span Value (%)	Percent of Span
Zero gas	0				
Mid level					
High level					

CO₂ 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

S-420-14

INTERPOLL LABORATORIES
(612) 786-6020

THC System Bias Check

Job LP/NEWBERRY Source Dryer
Test 12 Run 1,243 Date 2-7-62 Site Stash
Operator W. J. Smith

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm) Cal Err	Sys Bias	Diff. CE-SB (ppm)	Span Val (PPM)	% of span
1	2000	Zero gas	0	0	0	0	100	0
		Upscale	31.1		30.5	.6	100	.5
2	2322	Zero gas	0		0	0	100	0
		Upscale	31.1		30	1.1	100	1.1
3	0042	Zero gas	0		0	0	100	
		Upscale	31.1		30.5	.6	100	
4	0218	Zero gas	0				100	
		Upscale	31.1		31	.1	100	
5		Zero gas	0					
		Upscale						
6		Zero gas	0					
		Upscale						
7		Zero gas	0					
		Upscale						
8		Zero gas	0					
		Upscale						
9		Zero gas	0					
		Upscale						
10		Zero gas	0					
		Upscale						
11		Zero gas	0					
		Upscale						
12		Zero gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

S420-11R

INTERPOLL LABORATORIES

Calibration Error Check

Job LP/NEWBERRYTest 12 Run 1 Date 2-7-93Operator [Signature]

TMC

Calibration:

Time (HRS) _____

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	100	0
Mid level	31.1	30.5	0.6	100	.6
High level	295	310	15	1000	1.5

NO_x Calibration:

Time (HRS) _____

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

O₂ Calibration:

Time (HRS) _____

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

CO₂ Calibration:

Time (HRS) _____

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0				
Mid level					
High level					

Must be within 2% of the span for each calibration gas

S-420-10

APPENDIX J

CALIBRATION GAS CERTIFICATION SHEETS

GS # 150



Union Carbide Industrial Gases, Inc.
Linde Division
4550 Kennedy Avenue
East Chicago, IN 46312

DATE : FEBRUARY 7, 1990

TO: OXYGEN SERVICE COMPANY
1111 PIERCE BUTLER ROUTE
ST PAUL, MN 55104

LINDE ORDER NUMBER : 030.043.03
CUSTOMER PO NUMBER : 9742SA
CUSTOMER REL NUMBER :

DEAR SIR/MADAM:

THIS IS YOUR CERTIFICATE OF ANALYSIS FOR:

<u>CYLINDER NUMBER</u>	<u>MIXTURE COMPONENTS</u>	<u>REQUESTED COMPOSITION</u>	<u>CERTIFIED COMPOSITION</u>	<u>CERTIFICATION ACCURACY</u>
HB 0940	PROPANE AIR	3,000 PPM BALANCE	3,000 PPM BALANCE	± 1% RELATIVE

RECEIVED

FEB 15 1990

INTERPOLL LABORATORIES

APPROVED BY

COA-6MP

IMPORTANT
The information contained herein has been prepared at your request by qualified experts within the Linde Division of Union Carbide Corporation. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user in no event shall Union Carbide's liability arising out of the use of the information contained herein exceed the fee paid for providing such information.



Union Carbide Industrial Gases, Inc.
Linde Division
4550 Kennedy Avenue
East Chicago, IN 46312

GS# 148

DATE : FEBRUARY 7, 1990

TO: OXYGEN SERVICE COMPANY
1111 PIERCE BUTLER ROUTE
ST PAUL, MN 55104

LINDE ORDER NUMBER : 030.043.01
CUSTOMER PO NUMBER : 9742SA
CUSTOMER REL NUMBER :

DEAR SIR/MADAM:

THIS IS YOUR CERTIFICATE OF ANALYSIS FOR:

<u>CYLINDER NUMBER</u>	<u>MIXTURE COMPONENTS</u>	<u>REQUESTED COMPOSITION</u>	<u>CERTIFIED COMPOSITION</u>	<u>CERTIFICATION ACCURACY</u>
HA 6720	PROPANE AIR	300 PPM BALANCE	295 PPM BALANCE	+ 1% RELATIVE

RECEIVED

FEB 15 1990

INTERPOL LABORATORIES

Dale A. Kugler

COA-6MP

APPROVED BY

IMPORTANT

The information contained herein has been prepared at your request by qualified experts within the Linde Division of Union Carbide Corporation. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall Union Carbide's liability arising out of the use of the information contained herein exceed the fee established for providing such information.



Scott Specialty Gases

1290 COMBERMERE STREET, TROY, MICHIGAN 48064 (313) 589-2950
a division of
Scott Environmental Technology, Inc.

Shipped From: Scott Michigan
Our Project #: 528651
Your P.O. #: 4571-5A

Customer:

OXYGEN SERVICE
111 PIERCE BUTLER ROUTE
ST. PAUL, MN. 55104

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES
PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability Procedure # 81
Protocol # 1
Expiration Date: 4-16-93
Cylinder Number: ALM-001720
Cylinder Pressure: 1900 psig

File # PO-1336
Certified Accuracy 1% NBS Traceable

ANALYZED CYLINDER	
COMPONENT	CERTIFIED CONC.
PROPANE	31.10 PPM
BALANCE GAS	AIR

REFERENCE STD		INSTRUMENTATION	
SRM # (CRM #)	CYLINDER NUMBER	CONC.	LAST CALIBRATION DATE
1668B	CLM-000694	95.30 PPM	9-23-91
6M1S	ALM-008846	31.20 PPM	

ANALYTICAL PRINCIPLE
FLAME IONIZATION DETECTOR

CE APPROVED

ANALYSIS

DATE: 10-16-92

ZERO		TEST		REFERENCE GAS	
GAS	RESULTS (mV)	GAS	RESULTS (mV)	CONC.	PPM
0.00	31.40	31.10	95.30	95.30 PPM	95.30
0.00	31.40	31.10	95.30	95.30	95.30
0.00	31.40	31.10	95.30	95.30	95.30

CALCULATED RESULTS
31.10
31.10
31.10

AVERAGE: 31.10 PPM

CALIBRATION CURVE					2 nd DEGREE
SRM #	CONC.	SPLIT	DVM	FILTED	PERCENT
(CRM #)	PPM	PT (%)	(mV)	VALUE	ERROR
1668B	95.30	100	95.30	95.30	-0.00
	31.20	33	31.60	31.30	0.32
	22.61	24	22.70	22.45	-0.72
	8.171	9	8.30	8.171	0.00
	0.0000	0	0.00	0.0000	0.00
		0		0.0000	0.00
		0		0.00	0.00
6M1S	8.171	LOW	8.30	8.171	0.00
1668B	95.30	HIGH	95.30	95.30	-0.00

6M1S - GAS MANUFACTURER'S INTERNAL STANDARD of this Company shall which fails to comply with this standard, the user shall be responsible for replacement thereof by the Company without charge.

L. P. Davis
APPROVED BY

APPENDIX K

PROCESS RATE INFORMATION

NEWBERRY TESTING FEB 5-7, 1992

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NEWBERRY STACK TESTING
FEB 5-7 1992

TEST SCHEDULE

KONUS TESTING FEB 5, 1992

TEST #	ITEM	RUN #1	RUN #2	RUN #3
#3	HCHO	1415-1521	1608-1723	1856-2007
#2	PM	0900-1004	1055-1201	1230-1340
#1	PM-10	1355-1530	1607-1729	1807-1937
#4	VOC	2035-2135	2145-2245	2255-2355

PRESS VENT TESTING FEB 6, 1992

#5	PM	1035-1215	1306-1427	1517-1643
#8	HCHO	1721-1842	1945-2100	2139-2305
#6	PM-10 A	1440-1510	1740-1800	2200-2220
	B	1553-1713	1824-1959	2033-2144
#7	VOC	1434-1534	1542-1642	1649-1749

DRYER TESTING FEB 7, 1992 - FEB 8, 1992

#1	PM	1235-1337	1408-1523	1558-1710
#11	HCHO	1746-1849	1946-2048	2223-2334
#10	PM-10	1235-1422	1454-1637	1710-1911
#12	VOC	2220-2320	2330-0040	0055-0215

NEWBERRY TESTING FEB 5-7, 1992

DATA SPECIFIED IN TEST PLAN

7a. THERMAL OIL HEATER OPERATING DATA:

7a1. Design heat input is 29.8mm BTU per unit. Operating heat input to be based on f factor. Heat output to be determined by efficiency calculations. *HEAT OUTPUT = INPUT x 0.67*

7a2. Type of fuel to be used is 100% green bark and green wood fines.

7a3. ACFM of air through the Thermal Oil Heater will be provided.
SEE ATTACHED PAGE

7a4. Tons of dry fuel burned during testing will be determined by bark infeed counts and moisture content and auger calibration.

SEE ATTACHED PAGE

7a5. Plant production rate is tons of finished product per hour as described in 7c10.

SEE ATTACHED PAGE

7a6. Thermal Oil Heater operating parameters including:

- Refractory temperature
- Incoming oil temperature
- Outgoing oil temperature
- Fuel feed setting
- Pond heat set point, building heat setpoint and thermal oil temperature setpoint.

SEE ATTACHED PAGE

7a7. Control equipment parameters to be recorded include:

- Baghouse pressure drop

SEE ATTACHED PAGE

7b. DRYER OPERATING DATA:

7b1. Moisture content of wet wafers. *59.1% AVG.*
Moisture content of dry wafers. *5.5% AVG.*

7b2. Wood to be processed will be $\geq 99\%$ green wood, $\leq 1\%$ dried, dead wood.

7b3. Wood to be processed will be $\geq 99\%$ hardwood, $\leq 1\%$ softwood.

BURNER TEMP. NOT MONITERED

- 7b4. Dryer operating temperature to be recorded:
- Burner outlet temperature, operating and setpoint.
 - Inlet temperature, and operating. *SEE ATTACHED*
 - Outlet temperature, operating and setpoint. *SEE ATTACHED*

7b5. Design airflow rate is 60,000 acfm, actual airflow will be determined during sampling.

7b6. Type of fuel to be burned is dry fines. Waste oil is not burned in the drying process. The percent of reacted (solid, not liquid) resin burned will be determined by percent of resin in finished product and percent of trim material in dry fuel.

7b7. The heat content of the dry fuel will be determined by analysis.

7b8. The dryer is 13' diameter and 60' long. Actual and design revolutions per minute will be recorded.

7b9. Dryer production rate in pounds of dry furnish per hour based on press production plus screened fines and board trim using the following formula:

$$\frac{\text{lb. Dryer Production}}{\text{HR}} = \frac{\text{Tons press production/hr.} / 2000}{1 - (0.16 + 0.08)}$$

Where: Board Trim = 16% of finished product weight
screened fines = 8% of finished product weight

Design rate is 27,700 lb. dry furnish/hr. *(BASED ON PRESS)*
Test rate is 23,900 lb. dry furnish/hr.
ACTUAL TEST RATE = 21,075 lb/hr

7b10. The level of the dry fines (in feet) will be recorded before and after testing and bin dimensions will be supplied. *BINS WERE AT 1/2 (21 FEET) BEFORE + AFTER TESTING*

7b11. Plant production rate in tons of finished product per hour based on press production. See 7c10. *8.01 TONS FINISHED PRODUCT / HR*

7b12. Additional dryer operating parameters to be recorded include

- Wet bin feed rate

7b13. EFB operating parameters to be recorded include:

- Bed voltage
- Bed amperage
- Ionizer voltage
- Ionizer amperage
- EFB pressure drop

NEWBERRY TESTING 2-5 THROUGH 2-7 1992
PROCESS DATA SUMMARY

THERMAL OIL HEATER TESTING 0900-2400
2-5-92

PLANT PRODUCTION RATE = 7.99 TONS FINISHED
PRODUCT / HR

DRY FUEL INPUT (AS MEASURED BY
AUGER COUNTS) =
0.97 TONS DRY
FUEL PER HOUR

PRESS VENT TESTING 1000-1236 AND 1250-2330
2-6-92

PLANT PRODUCTION RATE = 8.09 TONS FINISHED
PRODUCT / HR

BOARD PRODUCED = 15/32" THICK
4' X 18' PANELS

MDI RESIN = 162 lb / HR, 1.0% OF F.P.
PHENOLIC RESIN = 354 lb / HR, 2.19% OF F.P.
WAX = 109 lb / HR, 0.67% OF F.P.

DRYER TESTING 1215 2-7-92 TO 0215 2-8-92

PLANT PRODUCTION RATE = 8.01 TONS FINISHED
PRODUCT / HR

FURNISH PRODUCED BY DRYER = 21,075 lb / HR

DRY FUEL INPUT = 3,976 lb / HR

AVERAGE INLET TEMP = 1316 ° F

WOOD MOISTURE = AVG. 54.1% IN 5.5% OUT

7c. PRESS OPERATING DATA:

- 7c1. Board thickness. *15/32"*
- 7c2. Number of sheets produced per hour to be determined by press chart. *160.4 4'X18' SHEETS PER HOUR*
- 7c3. Pounds of resin used per hour to be recorded. *LB MDI /HR LB PF /HR*
- 7c4. Pounds of wax used per hour to be recorded. *LB PER HOUR*
- 7c5. Type of resin used to be recorded. *MDI AND LIQUID PHENOLIC*
- 7c6. Press temperature to be recorded. *400° F*
- 7c7. Press vent hooding to be verified.
- 7c8. There are two exhaust fans.
- 7c9. Design airflow is 75,000 acfm each. Actual acfm will be determined during sampling.
- 7c10. Tons of finished product produced during test will be determined by board weights and press charts. *107.4 TONS FROM 1000-1236 AND 1250-2330*
8. Copies of field data forms are included in attachment.
9. The names and titles of personnel are not available at this time. Testing will be performed by Interpoll Laboratories, Inc.
10. Procedures for maintaining sample integrity and chain of custody are provided in the attachments. Interpoll Laboratories QA-QC manual will be followed. Due to the size of this document, it has not been included here but can be provided on request.
11. Calibration sheets will be provided prior to testing.
12. Filter lists will be provided prior to testing.

*= 11,548.8
(convert) $72/hr \times (15/32)$
to $3/8"$ board*

NEWBERRY KONUS TESTING 2-5-92

BTU INPUT BY FUEL USAGE

FUEL CALIBRATION = 13.6 lb / COUNT

FUEL COUNTS FROM 0900 - 2400 =
9593 cts - 5611 cts = 3982 counts

3982 cts $\times$ 13.6 lb / ct. = 54,155 lb wet
fuel input

$\frac{54,155 \text{ lbs}}{15 \text{ HRS}} = 3610 \text{ lb WET FUEL / HR}$

AVERAGE MOISTURE CONTENT 0900 - 1200 =
46%

ASSUMED BTU CONTENT OF FUEL
(TO BE VERIFIED BY ANALYSIS) = 9300 BTU / LB
DRY

BTU VALUE WET = $9300 \text{ BTU / LB} \times (1 - 0.46) =$
5022 BTU / LB

HEAT INPUT =

$3610 \text{ lb / HR} \times 5022 \text{ BTU / LB} = 18.1 \text{ mm BTU / HR}$

HEAT OUTPUT (ASSUMING 67% EFFICIENCY) =

$18.1 \text{ mm BTU / HR} \times 0.67 = 12.1 \text{ mm BTU / HR}$

TONS OF DRY FUEL / HR =

$3610 \text{ lb WET FUEL} \times (1 - 0.46) / 2000 \text{ lb} = 0.97$
TON
DRY
FUEL / HR

47-101	30	SHEETS	5 SQUARE
47-102	100	SHEETS	5 SQUARE
47-109	200	SHEETS	5 SQUARE

3/8" x 18' x 4' UNTRIMMED MATS PRODUCED
FROM 10:00 - 17:13

102	103	99	AVERAGE UNTRIMMED WEIGHT = 100.0 lb PER MAT
101	103	100	
101	101	102	WEIGHT OF FINAL PRODUCT (16% TRIM) =
96	102	101	$100.0 \text{ lb} \times (1 - 0.16)$
99	102	103	= 84 lb PER
96	100	103	3/8" x 18' x 4'
100	97	103	BOARD
99	100	99	
103	98	100	100
105	83	99	100

15/32" x 18' x 4' UNTRIMMED MATS PRODUCED
FROM 17:13 - 2400

126	123	125	AVERAGE UNTRIMMED
122	119	125	WEIGHT = 123.1 lb
120	116	130	PER MAT
122	122	122	WEIGHT OF FINAL
121	123	127	PRODUCT (16% TRIM)
120	125	128	= $123.1 \times (1 - 0.16)$
118	125	127	= 103.4 lb PER
			15/32" x 18' x 4'
			BOARD

NEWBERRY THERMAL OIL HEATER
TESTING 2-5-92

PLANT PRODUCTION RATE
FROM 0900-2400

(109 PRESSLOADS $3/8"$ X 14 BOARDS X
84 lb PER BOARD) + (76 PRESSLOADS $5/32"$ X
14 BOARDS X 103.4 lb PER BOARD) / 2000 lb =

119.1 TONS
FINAL PRODUCT

119.1 TONS T.F.P. / 15 HOURS = 7.94 TONS
FINISHED
PRODUCT / HR

T-O HEATER LOG

DATE: 2-5-92

PLANT: Newberry

BY: OPERATOR

FUEL FEED SETTING: 16.0

1. READINGS EVERY 15 MINUTES.

2. BARK MOISTURE ONCE PER HOUR.

3. NOTE IF SET-POINTS ARE CHANGED.

FOND SET POINT: 110°

ELDS HEAT SET POINT: 205°

T-O OUTLET SET POINT: 510°

Fuel cal = 13.6 lb/ct.

TIME	OIL TEMP		FLOW (GPM)	FUEL COUNT		FURNACE TEMP °F	BARK MOISTURE %	CYCLONE		Δ P	T-CMP °F		PRESSURE DROP BAGHOUSE
	IN	OUT		A	FLUE-O GPM			BAGHOUSE	BLUENDAR		AFTER	KNOWING	
7:30	423	470	1.13	5822	723	680		7.5	2.75	706	347	-1	(OVER PA)
8:00	421	470	1.13	5841	741	680		6	3	742	349	-1	✓
8:15	427	480	1.11	5823	768	680							7.25
8:30	425	475	1.15	5837	748	680	44.8%	7.25	2.5	748	348	-2	
8:45	421	470	1.0615	5893	749	680							
9:00	425	475		5811	751	700	44.3%	5	2.5	742	349	-1	5.5
9:15	418	465		5829	731	700							
9:30	421	465		5790	731	700	45.5%	6.5	2.5	722	347	-1	6.75
9:45	421	470		5851	734	700							
10:00	420	470		5831	749	700		7.75	2.5	726	348	-1	8.0
10:15	434	480		5894	750	700							
10:30	440	485		6064	746	700	46.1%	9	2.5	741	348	-1	5.0
10:45	440	485		6137	743	700							
11:00	439	485		6139	745	700		4.5	2.5	745	348	-2	4.75
11:15	439	485		6204	745	700							
11:30	442	485		6322	740	700	44.8%	6	2.5	762	349	-1	5.5
11:45	450	500		6411	770	700							
12:00	450	500		6472	782	705	44.8%	7	2.5	782	349	-1	7.0
12:15	436	485		6521	770	705							
12:30	424	470		6579	747	705	45.8%	5	2.5	747	349	-1	4.75
12:45	418	470		6648	757	710							
1:00	418	470		6699	757	710	46.0%	6	2.5	755	349	-1	6.5
1:15	423	475		6784	767	720							
1:30	426	480		6836	768	720	44.7%	7	2.5	769	348	-2	7.5
1:45	422	470		6922	764	720	46.5%						
2:00	428	490		6978	782	730		3.5	2.5	782	348	-1	4.0
2:15	437	490		7041	779	730							
2:30	432	485		7090	770	735	47.8%	5	2.5	763	348	-1	5.0
2:45	429	480		7185	762	738							
3:00	434	480		7250	762	739	45.1%	6.5	2.5	771	348	-1	6.5

T-O HEATER LOG

SLANT

Newtack
OPERATOR

DATE:

2-5-92

BY:

FUEL FEED SETTING:

160

POND SET POINT:

110°

BLDG HEAT SET POINT:

225°

T-O OUTLET SET POINT:

510°

1. READINGS EVERY 15 MINUTES.

2. BARK MOISTURE ONCE PER HOUR

3. NOTE IF SET-POINTS ARE CHANGED.

TIME	OIL TEMP		FLOW (GPM)	FUEL COUNT			FURNACE TEMP	BARK MOISTURE %	TEMP °F		FROSTED DECK	
	IN	OUT		A	B				FLUE	AFTER BLDG	RIKOTAC	OVERLAY EACH HOUR
3:30	437	490	.43	7381	781		740	49.2%	2.5 768	398	-1	7.25
3:45	448	499	.43	7441	778		740					
4:00	452	500	.41	7491	784		740	47.0%	2.5 800	397	-1	6.0
4:15	450	499	.45	7559	783		740					
4:30	442	489	4.00 Gals	7614	750		740	49.0%	2.5 755	347	-1	7.0
4:45	455	480		7688	754		740					
5:00	430	480		7746	752		740		2.5 750	348	-1	6.1
5:15	437	485		7830	763		739					
5:30	435	485		7880	765		735	45.8%	2.75 765	347	-1	7.5
5:45	437	485		7950	774		735	45.4%	2.25 771	348	-2	4.25
6:00	439	485		8035	772		735					
6:15	431	475		8085	731		765		5.5 2.5 719	345	-1	
6:30	430	470		8147	719		725	47.9%	Sample Taken from wavy deck			
6:45	430	470		8211	720		735	47.9%	6.5 2.5 735	346	-1	2.4-7
7:00 PM	454	470		8307	735		729					
7:15	418	460		8403	726		720		7.5 2.5 735	345	-1	↓
7:30	417	460		8429	737		720					
7:45	414	460		8500	713		720		5.5 2.5 720	348	-1	
8:00	419	460		8550	697		720					
8:15	419	450		8626	698		720		6 2.5 709	347	-1	
8:30	418	450		8744	703		700					
8:45	415	450		8846	701		700		8 2.5 752	347	-1	
9:00	426	470		8946	701		700					
9:15	438	490		9066	710		700		6 2.5 767	347	-1	
9:30	450	490		9197	707		700	48.4				
9:45	441	480		9299	717		700		7.5 2.5 751	346	-1	
10:00	456	490		9399	717		700					
10:15	453	500		9436	752		700		8.5 2.5 741	346	-1	
10:30	455	500		9599	749		700					
10:45	450	480		9667	708		700					
11:00	416	460		9730	708		700		4.5 2.5 740	346	-1	

Uniberry
OPERATOR

DATE: 2-5-92

57

1. READINGS EVERY ~~10~~ MINUTES.
2. DARK MOISTURE ONCE PER HOUR
3. NOTE IF SET-POINTS ARE CHANGED.

GN1125 Q33F 73.1F

160

END LES
: END :

110

BLDG HEAT SET POINT: 135 LEH 5073

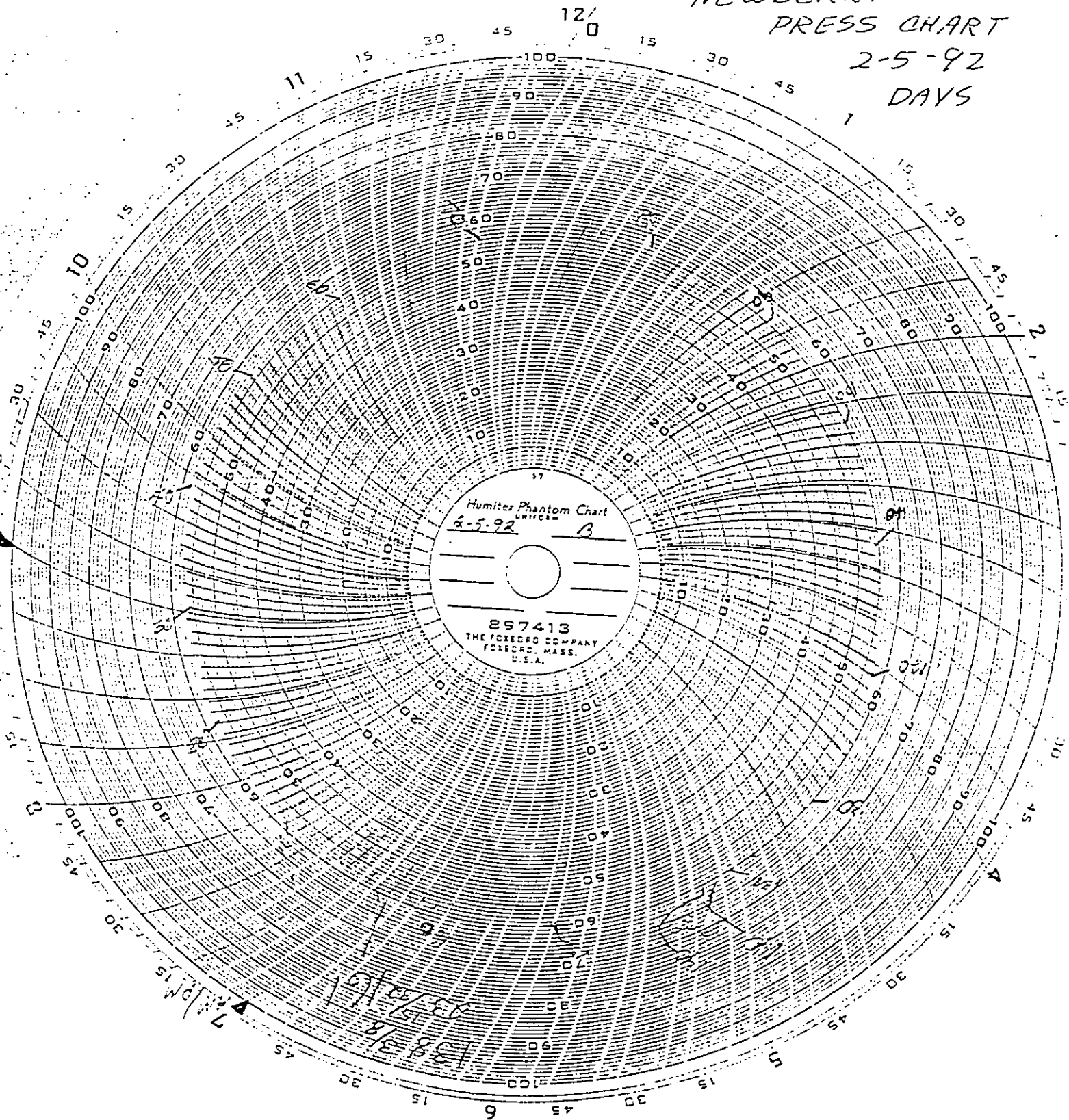
205

WFO 137100 6-1

510°

[illegible]

NEWBERRY
PRESS CHART
2-5-92
DAYS



PRESSLOADS 0900-1900
= 109 $\frac{3}{8}$ " AND
23 $\frac{15}{32}$ "

PRESS CHART
2-5-92
NIGHTS

Humiter Phantom Chart
D-1114
RELAND
2-5-92
WEND
897413
THE FORBES COMPANY
FARMINGTON, MASS., U.S.A.

PRESSLOADS 1900 - 2400
= 53 OF 15/32"

PRESS/DRYER DOWNTIME REPORT
NEWBERRY PLANT

OPERATOR; PAVEY DATE; 2-5-92
SUPERVISOR; ED CREW; B SHIFT; DAYS

	DOWNTIME FROM	TO	TOTAL	REASON
1)			(1.2)	
2)				
3)				
4)				
5)				
6)				
7)				
8)				
9)				
10)				

	REPAIR DONE	REPAIR BY
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

COMMENTS;

3

PRESS/DRYER DOWNTIME REPORT
NEWBERRY PLANT

OPERATOR; CHRIS VOGEL DATE; 2-5-92

SUPERVISOR; ROLAND CREW; D SHIFT; NIGHTS

	DOWNTIME		TOTAL	REASON
	FROM	TO		
1)	11:21	11:23	2	TRIANGLE CONV. OVERTRAVELED
2)	11:42	11:44	2	TRIANGLE CONV. OVERTRAVELED
3)	11:57	12:06	9	TRIANGLE CONV. OVERTRAVELED #7 RETURN CONV. OVERTRAVELED
4)	1:39	1:44	5	SIZE CHANGE
5)	2:01	2:02	1	#13 DIDN'T CLAMP
6)				
7)			19	
8)				
9)				
10)				

	REPAIR DONE	REPAIR BY
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

COMMENTS;

NEWBERRY THERMAL OIL HEATER TESTING 2-5-92

ESTIMATION OF AIRFLOW THROUGH THERMAL OIL HEATER

A SIX POINT TRAVERSE WAS PERFORMED IN A SECTION OF 27" DIA. DUCT PRIOR TO THE BLEND AIR DAMPER

TRAVERSE POINT NO.	DIST. FROM STACK WALL	VELOCITY PRESSURE	
1	1.19 "	0.0	
2	3.94	0.0	
3	7.99	0.7	
4	19.0	0.6	
5	23.05	0.6	AVG = 0.4166
6	25.81	0.6	= ΔP

BAROMETRIC PRESSURE = 29.44

GAS TEMPERATURE = 500 °F

$T_s = 500^\circ F + 459.69^\circ R = 959.69^\circ R$

MOISTURE CONTENT = 15%

PITOT TUBE COEFFICIENT = 0.84 = C_p

STATIC PRESSURE IN DUCT = 9.25" W.C. = ≈ 0.7 " Hg

ABSOLUTE GAS PRESSURE, $P_s = 29.44 + 0.7 = 30.14$

MOLECULAR WEIGHT (EST) 28.17 = M_s

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

$$V_s = 85.49 (0.84) \sqrt{0.4166} \sqrt{\frac{959.69}{30.14 \times 28.17}}$$

$$V_s = 49.28 \text{ ft/sec}$$

$$27" \text{ Duct area} = 3.976 \text{ ft}^2$$

$$Q = 60 V_s A = 49.28 \text{ ft/sec} \times 3.976 \text{ ft}^2 \times \frac{60 \text{ sec}}{\text{min}} = 11,756 \text{ ACFM}$$

NEWBERRY PRESS VENT TESTING 2-6-92

PRODUCTION: AND
BOARD WEIGHTS 15/32" BOARD

WEIGHTS OF APPROXIMATELY EVERY 50th
BOARD FROM AUTOMATIC SCALE PRINTOUT
FROM 1000 - 1236 AND 1250 - 2330
(14 MIN DOWNTIME) TOTAL 13.27 HRS

121	121	119	119
123	121	119	118
123	120	117	119
120	120	121	117
121	119	119	121
123	122	116	123
122	121	120	
122	121	120	AVERAGE UNTRIMMED WEIGHT = 120.1 lb
123	120	119	TRIMMED WEIGHT (16% TRIM) = $120.1 \times (1 - 0.16) =$
127	118	120	100.9 lb
119	120	118	AVERAGE WEIGHT FOR 4' x 18' x 23/32" BOARD
121	117	117	
120	121	117	

TOTAL NUMBER OF BOARDS PRODUCED
FROM 1000 - 2330 = 152 PRESSLOADS x
14 BOARDS / LOAD = 2128

2128 BOARDS x 100.9 lb = 214,715 lb

FINISHED
PRODUCT PRODUCED

214,715 lb / 2000 lb / 13.27 HRS = 8.09

TON FINISHED
PRODUCT / HR

214,715 lb / 13.27 HRS = 16,180 lb FINISHED
PRODUCT PER HOUR

NEWBERRY PRESS VENT TESTING 2-6-92

WAX AND RESIN USAGE

DERIVED FROM DAILY QUALITY CONTROL SHEETS

TIME	LBS MDI USED	LBS PHENOLIC USED **
0850	415	584
1000	* 538	* 818
1030	633	999
1130	776	1292
1330	1062	1885
1600	1446	2732
1900	1936	3816
2200	2368	4786
2330	2690	5516

RESIN USED FROM 1000 - 2330

MDI = 2690 lbs - 538 lbs = 2152 lbs TOTAL

LIQUID PHENOLIC = 5516 lbs - 818 lbs =

4698 lbs TOTAL

* EXTRAPOLATED FROM 0850 AND 1030 READINGS

** ADJUSTED FROM 54.43% TO 100% SOLIDS

NEWBERRY PRESS VENT TESTING 2-6-92

WAX AND RESIN USED (CONT.)

AVERAGE HOURLY RESIN USED DURING
TESTING FROM 1000-1236 AND 1250-2330
(14 MIN DOWNTIME) TOTAL 13.27 HRS

$$2152 \text{ lbs TOTAL MDI} / 13.27 \text{ HRS} = 162 \text{ lb MDI PER HOUR}$$

$$4698 \text{ lbs TOTAL PHENOLIC} / 13.27 \text{ HRS} = 354 \text{ lb LIQUID PHENOLIC PER HOUR}$$

MDI AS % OF FINAL PRODUCT:
 $162 \text{ lb MDI} / 16180 \text{ lb PRODUCT} = 1.0\%$

PHENOLIC AS % OF FINAL PRODUCT:
 $354 \text{ lb PHENOLIC} / 16180 \text{ lb PRODUCT} = 2.19\%$

WAX USAGE

TOTAL WAX USED 2-6-92 = 6435 lb
AT 48% SOLIDS = 3089 LBS AT 100%
SOLIDS

WAX IS APPLIED AT A CONSTANT
RATE IN PROPORTION TO PRODUCTION

TOTAL PRODUCTION 2-6-92 = 327,348 ft² 3/8" BASIS
PRODUCTION FROM 1000-2330 = 153,216 ft² 3/8" BASIS

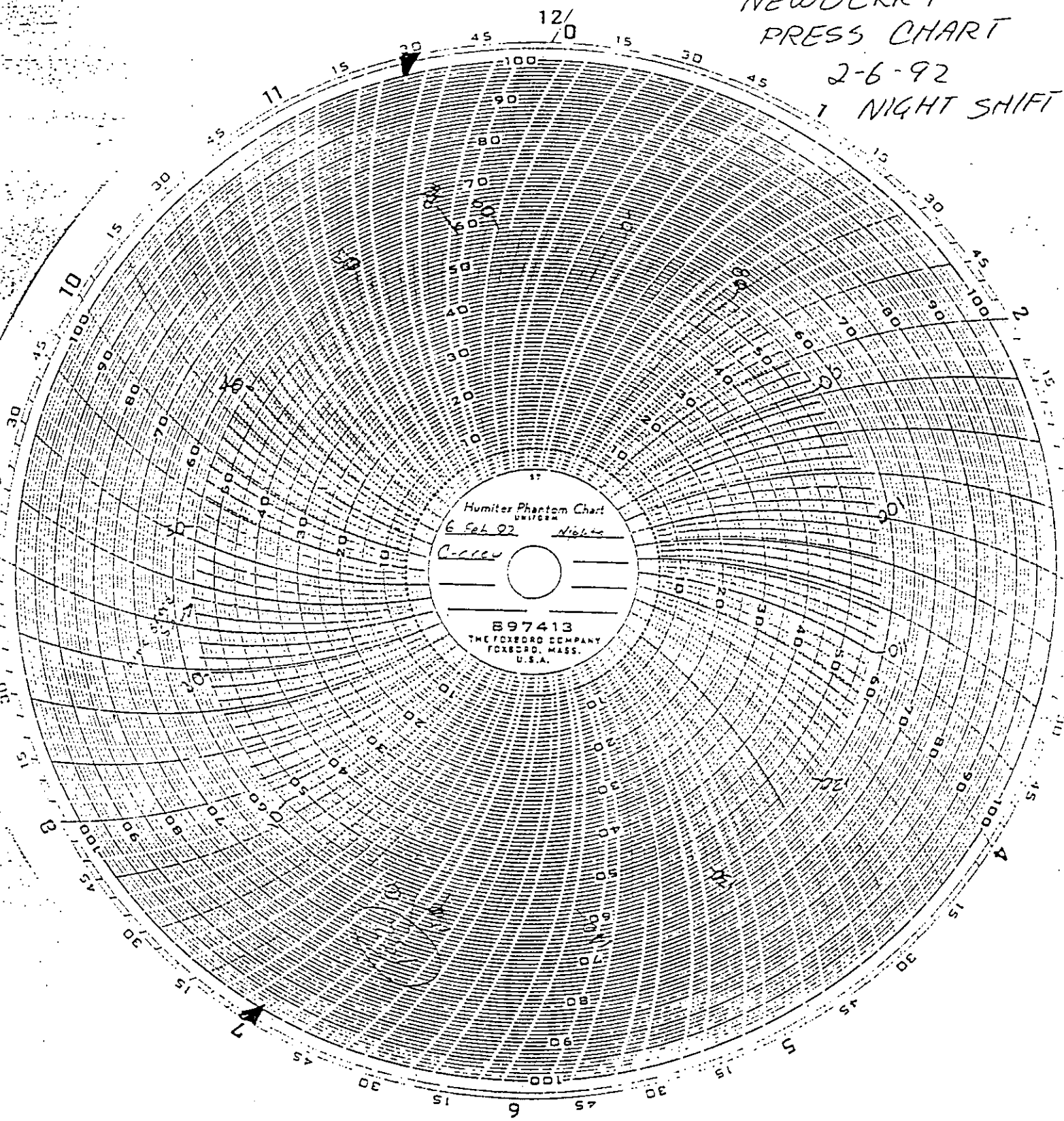
$$\therefore \text{WAX USED FROM 1000-2330} = \frac{153,216}{327,348} \times 3089 = 1445 \text{ lbs}$$

$$1445 \text{ lbs TOTAL WAX} / 13.27 \text{ HRS} = 109 \text{ lb WAX PER HOUR}$$

WAX AS % OF FINAL PRODUCT:
 $109 \text{ lb WAX} / 16180 \text{ lb PRODUCT} = 0.67\%$

NEWBERRY
PRESS CHART

2-6-92
1 NIGHT SHIFT

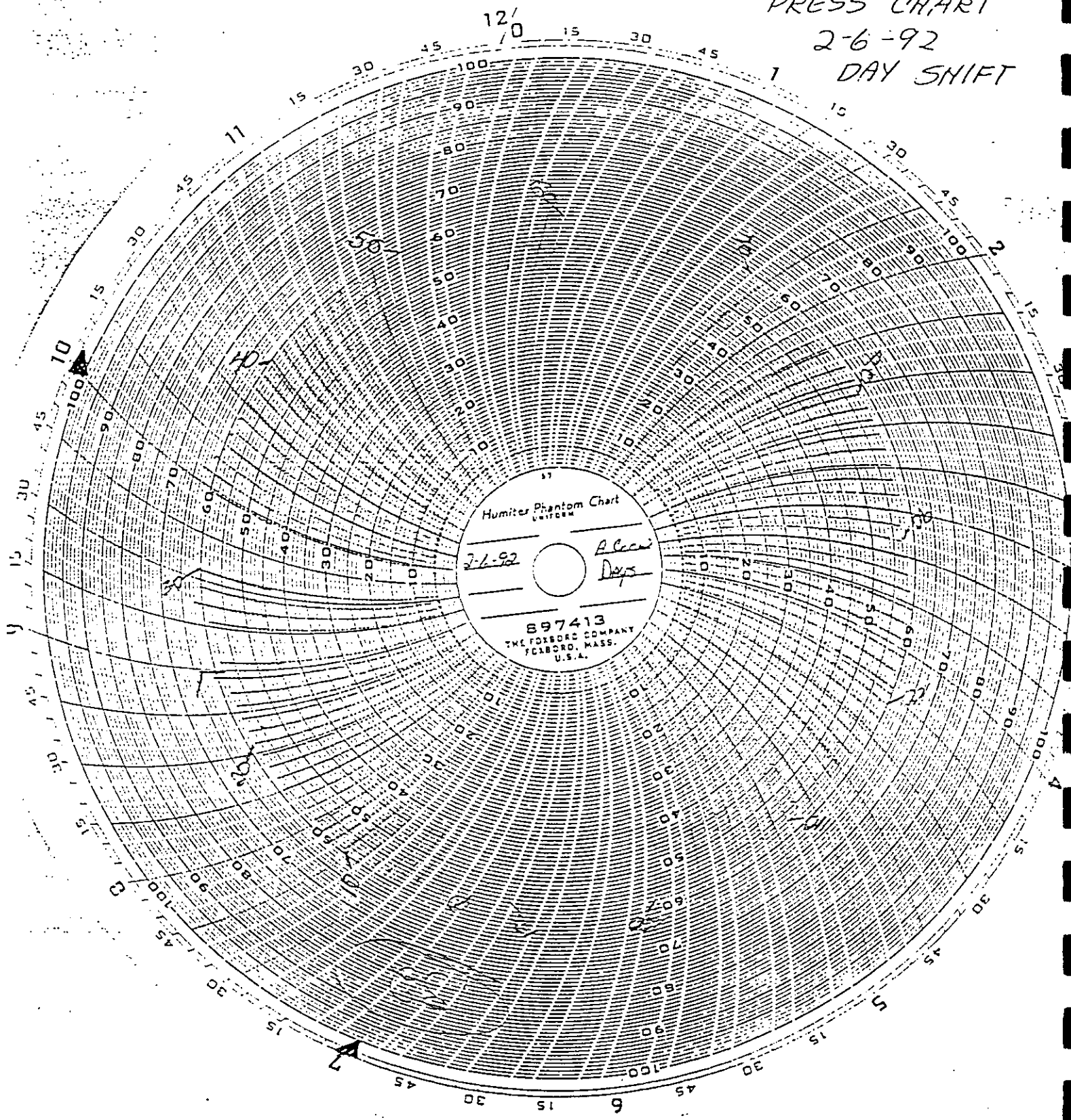


PRESS LOADS 1900-2330
= 52 15/32"

NEWBERRY PRESS CHART

2-6-92

1 DAY SHIFT



PRESS LOADS 1000-1900 =
100 '5/32"

PRESS/DRYER DOWNTIME REPORT
NEWBERRY PLANT

OPERATOR; Smutek DATE; 2-6-92
SUPERVISOR; Evans CREW; A SHIFT; Nights

	DOWNTIME FROM	TO	TOTAL	REASON
1)	7:42	7:43	1	#13 unclamped 1/2 the way out of press
2)	9:05	9:15	10	7FL take over. size change.
3)	9:36	9:55	19	Plugged surface blender
4)	11:19	11:21	2	7FL take over.
5)	12:11	12:13	2	weigh conv tripped out.
6)	12:36	12:50	14	plugged surface blender
7)	2:15	2:17	2	#1 return not running.
8)				
9)				
10)				

50

	REPAIR DONE	REPAIR BY
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

COMMENTS;

PRESS/DRYER DOWNTIME REPORT
NEWBERRY PLANT

OPERATOR; E. Birdsley DATE; 06 Feb 92
SUPERVISOR; E. Salter CREW; C SHIFT; Nights

	DOWNTIME		TOTAL	REASON
	FROM	TO		
1)	9:44	9:45	1	Dropped Head Bar #13
2)	10:45	10:46	1	dirty former full indicator
3)	12:25	12:26	1	Dropped Head Bar #13
4)	2:47	2:49	2	Dropped # head Bar 7/8 way out of loader
5)				
6)				
7)				
8)				
9)				
10)				

	REPAIR DONE	REPAIR BY
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

COMMENTS;

TECH: *KL*DATE: *2-6-92*
SHIFT: *7AM-7PM*

TOTAL PRODUCTION WT. =

24760

PICK LEVELS

LBS. USED

18' not 1 1/2" 5 3.0 3/8
3-3.0 C 2.2
C-2 550 solids

TIME	9AM	1230pm	3PM	AVE.
BOARD NO.	8 3/8	8 1/2	8 1/2	
WEIGHT	44 (44.9)	48 (44.8)	48 (44.8)	
THICKNESS	329	470	474	(441)
DENSITY	38.7	38.3	38	(38.3)
I.B.'s	51.585	40.585	50C	(46.5)
I.B.'s	51.85	62.5C	30	(46.5)

4'17/8 = N.D.I. = 3'11/4 N.D.I. = 1936
15'2 1/2 = WAX = 14'9 1/2 WAX = 2525 .65
15'1 = PHE = 14'6" PHE = 7010
5 1/2 = U.T. = 27 1/2"

TIME TESTED	ROLL NO. AND TYPE	INITIAL THICKNESS	INITIAL WEIGHT	BOILED THICKNESS	BOILED WEIGHT	% SWELL	% ABSORB	SAMPLE DENSITY
	3/8	377	142	474	211	25.7	48.6	38.9
	1/2	457	163	617	275	34.4	68.7	37.6
	1 1/2	465	166	615	277	32.3	66.9	37.8
	(134)	(157)	(507)	(254)	(30.8)	(61.4)	(38.4)	
28 HR		373	573	438	865	32.8	54.5	

2777-2781-(4)

TIME	7AM	8AM	9AM	1030AM	1130AM	1230PM	430PM	7PM		
LINE SPEED	60	60	50	53	53	53	53	53		
B.S.L.B. SET PT.	342	338	380	395	395	391	391	398	68	68
C.L.B. SET PT.	684	676	546	573	573	568	567	531	463	559
T.S.L.B. SET PT.	342	338	380	395	395	391	390	398	564	716
SURF. RESIN SET PT.	174	174	182	197	193	200	195	200	423	358
SURF. DRY BIN L.B. 50	560	560	450	710	695	680	635	665	233	190
CORE DRY BIN L.B. 50	570	570	460	460	445	455	435	405	720	583
CORE RESIN SET PT.	95	95	74	69	69	68	65		470	580
DENSIFICATION SET PT.	300	300	360	361	361	361	361	361	73	99
THICKNESS POT PT.	163 1/2	163 1/2	199	198	197 1/2	197 1/2	197 1/2	197 1/2	300	300
BOARD WEIGHT AVE.	100	98	120	120	120	120	120	120	163 1/2	163 1/2

TIME	SET PT.	LBS/MIN	WAX	RESIN LBS.	PRODUCTION WEIGHT	FORMULA WEIGHT	3 HR	SHIFT
8:00 AM	174	9.6	15.5	610	(14)	(190)	50	17818
9:00 AM	95	3.7	15.5	237	19600	50	9800	3.42
8:30 AM			19	1073	(25)	(100)	50	31818
10:30 AM	197	11	19	762	35000	50	12500	3.31
11:30 AM	74	1.85	12.9	218	14	(120)	61	26086
12:30 PM	193	10.5	19	1302	23520	39	9173	2.92
1:30 PM	69	2.7	12.9	361	24	(120)	61	44719
2:30 PM	200	11.1	19	2391	40320	39	15725	2.90
3:30 PM	69	2.7	12.9	647	44	(120)	61	81984
4:30 PM	195	10.9	19.5	3946	73920	39	28829	2.92
5:30 PM	68	2.6	13.0	1031	71	(120)	61	132892
6:30 PM	200	11.1	19.5	5937	119280	39	46519	3.09
7:00 PM	65	2.59	13	1821	107	(130)	61	199370
					179760	31	70106	2.97

3/8" PRODUCTION

50/50

2

K-25

15/32 PRODUCTION

61/39

25

15 4K18
32 8.103.0 55.5
2.1 55.5

TECH: NCD

DATE: 2-6-92
SHIFT: PM

TOTAL PRODUCTION WT. = 228480

PICK LEVELS

LBS. USED

TIME	8:10 ^{PM}	12:45	4:51	AVE.
BOARD NO.	8 1/2	8 3/4	7 3/4	
WEIGHT	47	39.5	39	
THICKNESS	.667	.380	.376	
DENSITY	22.7	38.98	38.9	
I.B.'s	35	46	55	45
I.B.'s	61	43	50	50

3'4" = N.D.I. = 3'8 1/4" N.D.I. = 1838
 4'9 1/2" WAX = 14 3/4" WAX = 3510 .25
 11'6" PHE = 13'8" PHE = 2577
 17 1/2" U.T. = 9 1/2"

Wax = 585 161
in

2781-2784

TIME TESTED	ROLL NO. AND TYPE	INITIAL THICKNESS	INITIAL WEIGHT	BOILED THICKNESS	BOILED WEIGHT	% SWELL	% ABSORB	SAMPLE DENSITY
8:10 ^{PM}	1/2 RS	468	170.1	595	296.7	27.1	74.4	31.4
12:45 ^{PM}	3/4 RS	382	141.6	527	244.4	37.9	72.5	39.2
4:51 ^{PM}	3/4 RS	391	142.8	555	263.5	41.9	84.5	39.6
24 HR		466	676	566	1814.2	35.6	77.1	
		1562		38		21.4	45.7	

TIME	7:00	8:00	10:00	11:30	12:00	1:00	4:00	7:00			
LINE SPEED	53	53	55	55	66	66	60	63			
B.S.L.B. SET PT.	398	398	419	419	432	429	409	392			
C.L.B. SET PT.	531	531	659	659	582	578	545	530			
T.S.L.B. SET PT.	398	398	418	418	432	429	409	398			
SURF. RESIN SET PT.	200	200	208	208	199	199	188	194			
SURF. DRY BIN L.B.	665	665	680	680	720	710	655	635			
CORE DRY BIN L.B.	485	485	460	460	459	445	425	400			
CORE RESIN SET PT.	65	65	67	67	71	71	61	63			
DENSIFICATION SET PT.	361	361	361	361	300	300	300	300			
THICKNESS POT PT.	197 1/2	197 1/2	197 1/2	197 1/2	163	163	163	163			
BOARD WEIGHT AVE.	120	120	120	120	100	100	100	100			

TIME		SET PT.	LBS/MIN	WAX	RESIN LBS.	PRODUCTION WEIGHT	FORMULA WEIGHT	3 HR	SHIFT
10:00	SURF	209	11.1	19.5	1781	(32) (120)	59625	2.98	
	CORE	67	2.65	13	432	(56) (120)	20966	2.06	
11:30	SURF	208	11.1	20.4	(3123)	(94080)	104343	3.00	2.99
	CORE	67	2.65	13.5	(754)	(2076) (100)	36691	2.04	2.15
1:00	SURF	199	10.8	20.4	4016/823	(2076) (100)	81054	2.87	
	CORE	71	2.8	12.5	989/235	(61/117) (100)	10920	2.15	
4:00	SURF	188	10.2	18	5939/206	(96/152) (100)	33306	2.07	2.10
	CORE	61	2.4	12	1454/710		149062	3.01	2.99
7:00	SURF	174	10.5	18.5	7577/454		52416	2.00	2.06
	CORE	63	2.45	12.5	1938/1114				
10:00	SURF					228480			
	CORE								
11:00	SURF								
	CORE								

61/39 Ratio All Shift
K-26

QUALITY/COST ANALYSIS SUMMARY

LP NEWBERRY

NEWBERRY, MICHIGAN

DATE 2-6-92

PRODUCTION 327348

PRODUCTION MTD 1480147

INVENTORY

1480147 1 0

TANK LEVEL	PHYSICAL INVENTORY	AMOUNT USED	\$/100	CURRENT INVENTORY	TOTAL USED MTD	DOLLARS USED MTD	\$/1000 MTD	RAW MATERIAL
8' 9 3/4"	32986	4	3774	28767	17017			MDI
14' 3 1/2"	100322	4	6435	06576	89573			WAX
13' 8"	121651	24	13234	97205	61526			PHEN
				1097582				PAPER
				878.5				GLD
				3707-377				PAINT
				1537383				

INVENTORY INCREASE

RELEASE NO.

CORDS	WOOD TYPE	%
	ASPEL	100

DENSITY
THICKNESS
PRODUCTION
WEIGHT

(MDI 177286)	(E-WAX 923417)	(PHE 483534)
78 23		
38.8		
379		
169400		

(443240)

- WAFER ANALYSIS -

DAY	IB	15 MIN. BOIL		24 HR. SOAK	
		SWELL	ABS	SWELL	ABS
	48	35.6	77.1	21.4	45.7
NITE	49	30.8	61.4	22.8	54.5
AVE.	48.5	33.2	69.2	22.1	50.1

WEIGHT	PERCENT	% LARGE
1.5	1.0	13
.75	103.2	13.9
.50	128.2	17.2
.38	107.6	14.4
.25	140.0	18.8
.19	72.8	10.0
PAN	189.5	25.5
TOT	744.3	

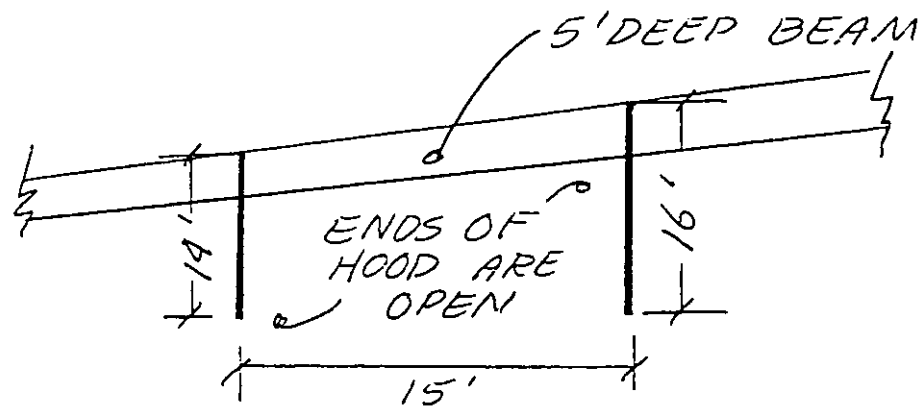
WAFER THICKNESS .026 IN.

GRADE OUT SUMMARY

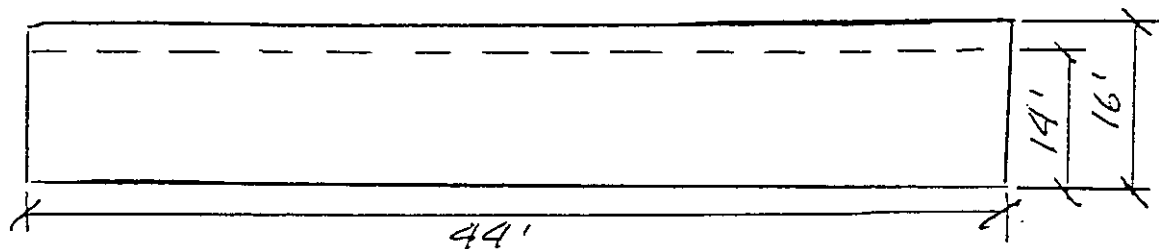
Thick	Thin	Bad Corners	Low Density	Blows
Footage <u>240</u>	<u>350</u>		<u>750</u>	
Percent <u>.07</u>	<u>.10</u>		<u>.23</u>	
Low Resin	Cut Problems	Other		
Footage <u>2520</u>	<u>40</u>	<u>640</u>		
Percent <u>.77</u>	<u>.01</u>	<u>19</u>		

TOTAL DOWNGRADE FOOTAGE 4540 : 1.4

NEWBERRY STACK TESTING 2-6-92
VERIFICATION OF PRESS HOODING



FACING WEST



FACING SOUTH

30 SHEETS 5 SQUARE
40 SHEETS 5 SQUARE
50 SHEETS 5 SQUARE
60 SHEETS 5 SQUARE
70 SHEETS 5 SQUARE
80 SHEETS 5 SQUARE
90 SHEETS 5 SQUARE
100 SHEETS 5 SQUARE
110 SHEETS 5 SQUARE
120 SHEETS 5 SQUARE
130 SHEETS 5 SQUARE
140 SHEETS 5 SQUARE
150 SHEETS 5 SQUARE
160 SHEETS 5 SQUARE
170 SHEETS 5 SQUARE
180 SHEETS 5 SQUARE
190 SHEETS 5 SQUARE
200 SHEETS 5 SQUARE
210 SHEETS 5 SQUARE
220 SHEETS 5 SQUARE
230 SHEETS 5 SQUARE
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960 SHEETS 5 SQUARE
970 SHEETS 5 SQUARE
980 SHEETS 5 SQUARE
990 SHEETS 5 SQUARE
1000 SHEETS 5 SQUARE

NEWBERRY DRYER TESTING 2-7-92

PRODUCTION :

BOARD WEIGHTS

WEIGHTS OF APPROXIMATELY EVERY 50th BOARD FROM AUTOMATIC SCALE PRINTOUT FROM 1215 - 0215 - TOTAL 14 HOURS

99	106	102	102	101	098
98	98	99	101	98	100
97	96	101	104	100	99
96	99	103	104	96	
93	100	102	104	101	
91	104	103	103	100	
95	105	103	103	104	
96	100	105	103	101	
97	100	103	103	100	
100	100	101	103	100	

AVERAGE UNTRIMMED WEIGHT = 100.4 lb

TRIMMED WEIGHT (16% TRIM =
 $100.4 \times (1 - 0.16) = 84.3$ lb AVERAGE
 WEIGHT FOR 4' x 18' x 3/8" BOARD

TOTAL NO. OF BOARDS PRODUCED
 FROM 1215 - 0215 = 190 PRESSLOADS x 14 BOARDS
 = 2660 BOARDS
 $2660 \text{ BOARDS} \times 84.3 \text{ lb} = 224,238 \text{ lb}$
 FINISHED PRODUCT
 PRODUCED

$224,238 \text{ lb} / 2000 \text{ lb} / 14 \text{ HRS} = 8.01$
 TON FINISHED
 PRODUCT /HR

$224,238 \text{ lb} / 14 \text{ HRS} = 16,017 \text{ lb}$

NEWBERRY DRYER TESTING 2-7-92

DRYER PRODUCTION IN LB/HR

$$\frac{\text{16 DRYER PRODUCTION}}{\text{HR}} = \frac{\text{TONS PRESS PROD./HR} \times 2000 \text{ lb}}{1 - (0.16 + 0.08)}$$

WHERE: BOARD TRIM = 16% OF FINISHED
PRODUCT WEIGHT

SCREENED FINES = 8% OF FINISHED
PRODUCT WEIGHT

$$\text{PRESS PRODUCTION} = 8.01 \text{ TONS FINISHED PRODUCT /HR}$$

$$\frac{16017 \text{ lb F.P. /HR}}{1 - (0.16 + 0.08)} = 21,075 \text{ lb OF PRODUCTION THROUGH DRYER PER HOUR}$$

NEWBERRY DRYER TESTING 2-7-92

FUEL BURNING RATE

FUEL BURNED FROM 1215 - 0215, 14 HRS
(12936 COUNTS + 5617 COUNTS) + 7619
COUNTS = 14,938 COUNTS TOTAL

FUEL CALIBRATION = 3.725 lb / COUNT

TOTAL FUEL BURNED =

$$14,938 \times 3.725 \text{ lb} = 55,644 \text{ lb}$$

$$55,644 \text{ lb} / 14 \text{ HRS} = 3,976 \text{ lb / HR}$$

ESTIMATED BTU INPUT =

$$3976 \text{ lb DRY FUEL / HR} \times 8600^* \text{ BTU / LB} =$$

$$34.18 \text{ MM BTU / HR}$$

RESIN BURNED :

66.7 % FUEL FROM TRIM

33.3 % FUEL FROM SCREENED FINES

% OF MDI RESIN IN TRIM = 2.07 % OF 39%
OF BOARD = $0.0207 \times 0.39 = 0.81\%$

% OF PF RESIN IN TRIM = 3.12 % OF 61%
OF BOARD = $0.0312 \times 0.61 = 0.19\%$

MDI BURNED =

$$3976 \text{ lb} \times 0.667 \times 0.0081 = 21.6 \text{ lb / HR}$$

PHENOLIC RESIN BURNED =

$$3976 \text{ lb} \times 0.667 \times 0.019 = 50.4 \text{ lb / HR}$$

* TO BE VERIFIED BY ANALYSIS

DRYER DATA SHEET

DATE: 2-7-92

BY: OPERATOR

PLANT: NEWBERRY

OUTLET TEMP SET POINT: AS SHOWN

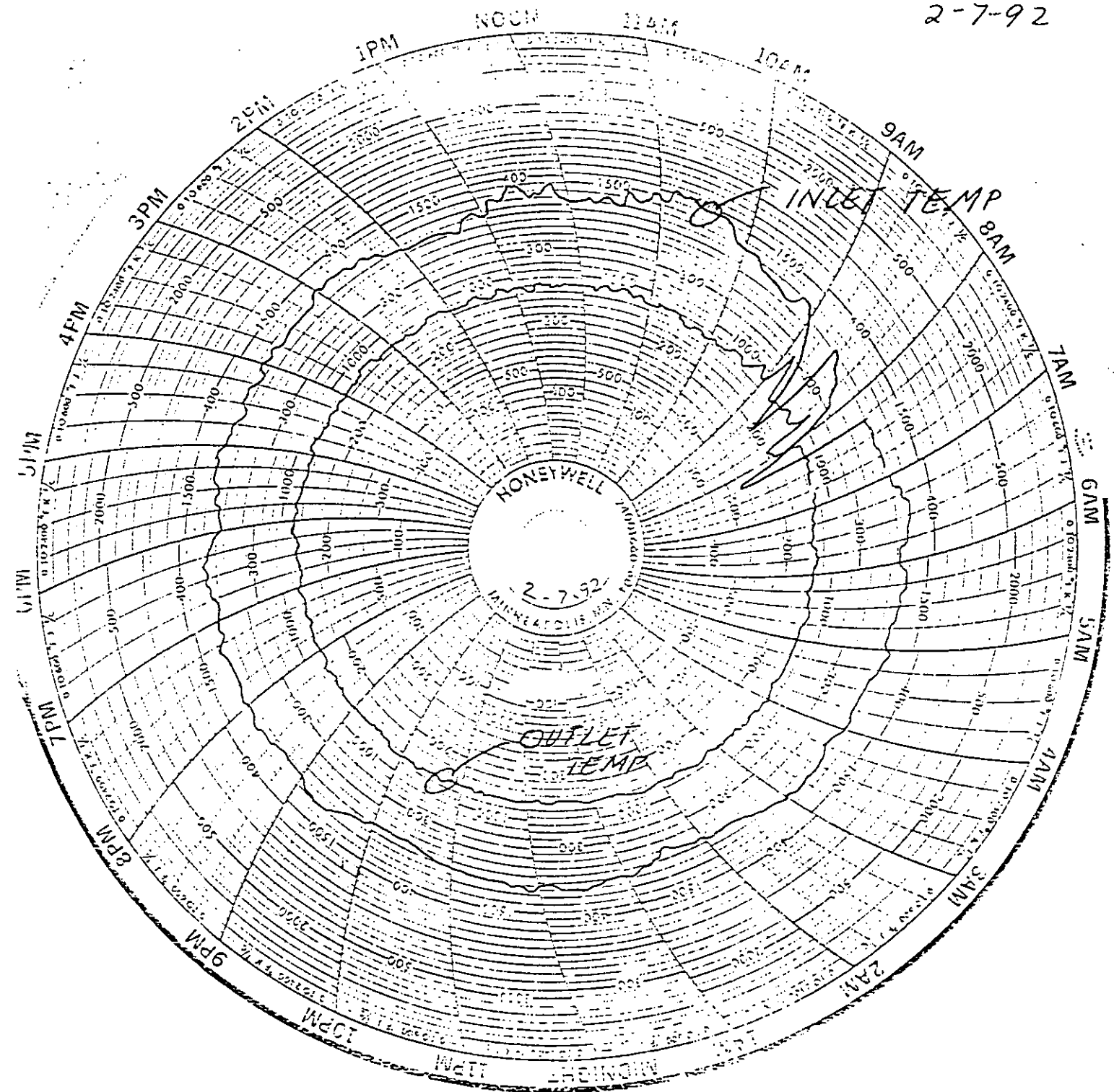
REVOLUTIONS per MINUTE: 6.5

FUEL CALIBRATION: 3.725

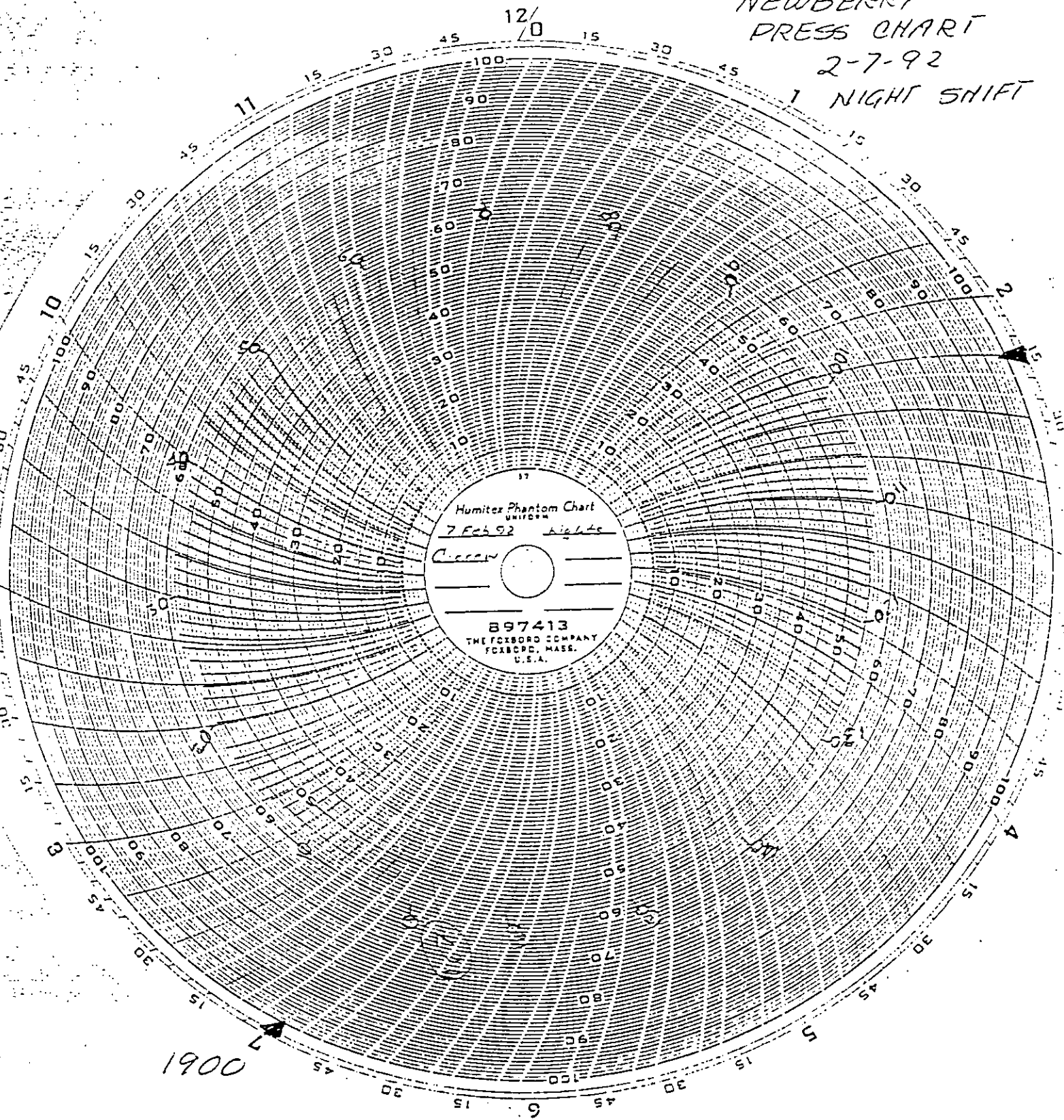
1. READINGS EVERY ¹⁵~~10~~ MINUTES.
2. MOISTURE % EVERY HOUR.
3. BIN LEVEL EVERY ^{1/2}~~1~~ HOUR.
4. NOTE ANY CHANGES IN SETPOINTS.

TIME	FEED RATE	DRYER INLET TEMP	DRYER OUTLET TEMP	FLAKE MOISTURE		DRY BIN LEVEL		
				IN	OUT	1/2	1/2	
12:15 PM	330	1403	264			1/2	1/2	5617
12:30 237	330	1449	258			1/2	1/2	5927
12:45	330	1381	264	58.0				6201
1:00	330	1327	265		4.0	1/2	1/2	6505
1:15	330	1301	260					6785
1:30	330	1293	260		4.6	1/2	1/2	7045
1:45	330	1284	260	55.4				7324
2:00	330	1299	262		5.8	1/2	1/2	7586
2:15	330	1339	257					7892
2:30	330	1351	260	59.2		1/4	1/4	8180
2:45	330	1373	258		6.6			8473
3:00	330	1376	258		6.6	1/4	1/4	8765
3:15	330	1334	261	52.2				9035
3:30	330	1333	258		6.0	1/4	1/4	9308
3:45	330	1351	257	53.2				9584
4:00	330	1351	257		6.8	1/4	1/4	9836
4:15	330	1335	257					10110
4:30	330	1313	260			1/4	1/4	10406
4:45	330	1331	257	55.0				10660
5:00	330	1344	257		5.2	1/4	1/4	10920
5:15	330	1351	258					11185
5:30	330	1302	262	54.0		1/4	1/4	11440
5:45	330	1291	260					11702
6:00 236	340	1291	257		6.0	1/4	1/4	11960
6:15	340	1352	256		4.8			12227
6:30 232	340	1355	251	55.0		1/4	1/4	12495
6:45	340	1302	256		5.4			12766
7:00	340	1334	252					12930 = 0
								7:00 = 87

NEWBERRY
DRYER CHART
2-7-92



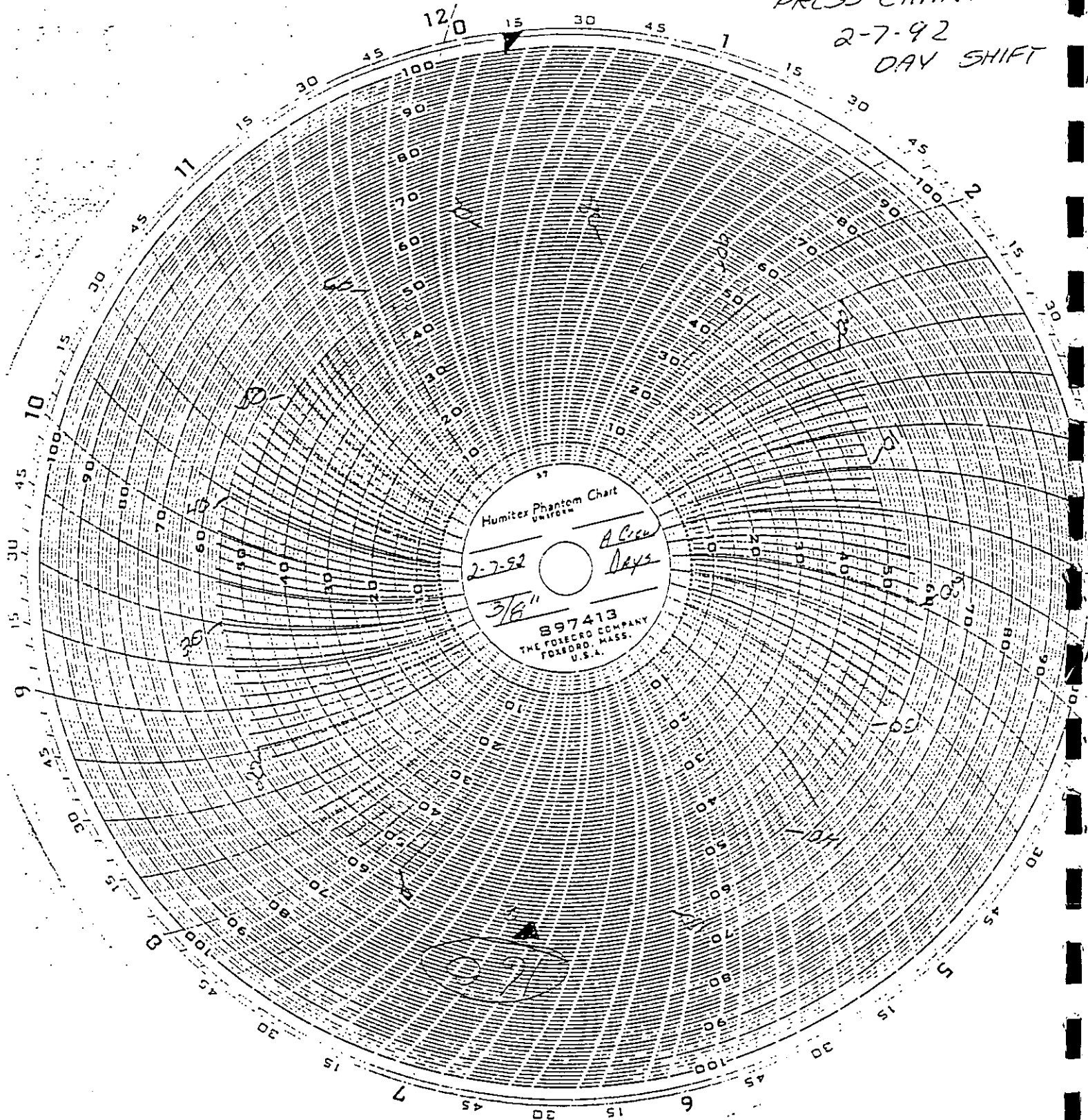
NEWBERRY
PRESS CHART
2-7-92
1 NIGHT SHIFT



PRESSLOADS 1900-0215
= 99

NEWBERRY
PRESS CHART

2-7-92
DAY SHIFT



PRESSLOADS 1215 - 1900

= 91

PRESS/DRYER DOWNTIME REPORT
NEWBERRY PLANT

OPERATOR; Smutek DATE; 2-7-92

SUPERVISOR; Evans CREW; A SHIFT; Days

	DOWNTIME			
	FROM	TO	TOTAL	REASON
1)	7:50	7:51	1	#13 unclamped pulled screen.
2)	8:10	8:21	2	7 Fh take over pulled screen.
3)	8:26	8:36	10	shut down to dry EFB.
4)			$\frac{3}{8} \times 4 \times 18$	2:40 went from 64 to 62
5)			11	6:00 went from 62 to 60
6)				6:20 went from 60 to 62
7)				
8)				
9)				
10)				

	REPAIR DONE	REPAIR BY
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

COMMENTS;

**PRESS/DRYER DOWNTIME REPORT
NEWBERRY PLANT**

OPERATOR; E. Birdsey DATE; 7 Feb 92

SUPERVISOR; E. Salter CREW; C SHIFT; nights

	DOWNTIME			
	FROM	TO	TOTAL	REASON
1)	8:24	8:29	5	size change 8x10 to 9x9
2)				10:30 PM 62 to 64
3)				1:30 AM 64 to 66
4)				
5)				
6)				
7)				
8)				
9)				
10)				

	REPAIR DONE	REPAIR BY
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		

COMMENTS;

E.F.B. READINGS

DATE: 2-7-92

PLANT: NEWBERRY

BY: OPERATOR

TIME	E.F.B. I N	BED "A"		BED "B"		IONIZER A		IONIZER B		PRESSURE DROP	
		KV	A	KV	A	KV	MA	KV	MA	E.F.B.	BAGHOUSE
7:00 AM		6.5	.2	5	.2	40.5	3.8	40	4.2		
8:05/221		14	.06	13.5	.06	37.5	4	37.5	4	2.3	1.3
9:00/233		2.5	.22	1.5	.22	39	4	39.5	4	2.3	1.3
10:00/223		4.5	.2	4	.2	38.5	4	39.5	4	3	1.4
11:07/229		3.5	.2	2	.2	39	4	39.5	4	3.2	1.7
12:00/223		5.5	.22	3	.2	38.5	4	39	3.8	3.2	1.7
12:55/229		6	.18	4	.18	39	3.8	39	4	3.3	1.8
1:10/226		6	.19	4.5	.2	39	3.8	39.5	4		
1:25/227		9.5	.2	8	.2	59	3.6	39	3.8	3.2	1.7
1:40/226		10	.2	8.5	.2	40	4	40	4		
1:55/227		12	.23	11	.24	40	4.5	40	4.6	3.4	1.7
2:10/226		8	.2	7.5	.21	40	4.6	40	4.4		
2:25/223		6	.2	5.5	.22	39	4	39	3.8		
2:40/225		5	.2	5	.22	39	4	39	3.8	3.2	1.7
2:55/227		5	.26	3.5	.2	39	3.6	39.5	3.8		
3:10/226		4.5	.2	5.5	.18	39	3.4	39	4		
3:25/226		7.5	.24	6	.21	40	3.8	39.5	3.6		
3:40/227		8	.23	6.5	.24	40	3.8	39.5	3.8	3.4	1.7
3:55/226		7	.22	5.5	.2	40	4	40	3.8		
4:10/226		8.5	.21	7	.22	40	4	40	3.8	2.8	1.6
4:25/225		7	.23	6.5	.21	40	3.8	39.5	3.8		
4:40/225		7	.2	6	.18	40	3.8	39.5	3.6		
4:55/225		6.5	.22	5.5	.2	40	3.8	39.5	3.8	3.3	1.7
5:10/223		6	.2	5	.2	40	3.8	39.5	3.6		
5:25/224		7.5	.2	6	.2	40	3.8	39.5	3.8		
5:40/225		8.5	.2	7	.2	40	3.8	39.5	3.8		
5:55/227		10	.2	9	.18	40	3.6	39.5	3.8		
6:10/222		6.5	.24	5	.22	40	3.6	39.5	3.6	3.3	1.7
6:25/221		5.5	.24	4	.2	40	3.8	39.5	3.6	3.3	1.7
6:40/220		5	.2	4.5	.2	40	3.8	39.5	3.6		
6:55/220		5.5	.2	4.5	.21	40	3.8	39.5	3.7		

FILE: 123:\FORMS\ENV\GEN-EFB1.WR1

E.F.B. READINGS

DATE: 2.7.92

PLANT: NEWBERRY

RY: OPERATOR

[illegible]

FILE: 123: \FORMENV\GEN-EFB1.WH1

TECH: *W. D. H.*

DATE: 2-7-92

SHIFT: 7AM-7PM

TOTAL PRODUCTION WT. = 224000

TIME	8:45am	11:30am	3PM	AVE.
BOARD NO.	8 (48)	8 (48)	8 (48)	
WEIGHT	39 3/4	38.5 3/4	37.5 3/4	
THICKNESS	378	383	382	(381)
DENSITY	38.7	38.7	38.8	(38.7)
I.B.'s	(8573)	5385	3953	7085 59
I.B.'s	4583	4305	5275	5075 43

TANK LEVELS

LBS. USED

3'8 3/4" N.D.I. = 3'6 1/16" N.D.I. = 1926
 4'3 1/4" WAX = 13'9 1/2" WAX = 3510 175
 13'8 1/4" PRE = 12'10" PRE = 7943
 9 1/8" = U.T. = 1911

2784 - 2788 - (4)

TIME TESTED	ROLL NO. AND TYPE	INITIAL THICKNESS	INITIAL WEIGHT	BOILED THICKNESS	BOILED WEIGHT	% SWELL	% ABSORB	SAMPLE DENSITY
8:45am		379	137	546	247	44.1	80.3	38.2
12:45am		384	142	523	233	36.2	64.1	39.1
3:45am		378	137	569	253	50.5	84.6	38.4
		(380)	(139)	(546)	(244)	(43.6)	(76.3)	(38.6)
27 HR		380	639	493	835	27.7	54.9	38.9

TIME	7:00am	10AM	1PM	4AM	5:30am	7PM	TBS		
LINE SPEED	62	67	64	62	62	62	50% 40C	40C	30% 40C
B.S.L.B. SET PT.	401	431	431	437	440	446	44% TBS	30% 40C	(40)
C.L.B. SET PT.	534	574	574	583	560	556			
T.S.L.B. SET PT.	401	431	431	437	420	416			
SURF. RESIN SET PT.	194	210	198	205	205	195			
SURF. DRY HIN L.B.	635	675	680	720	720	734			
CORE DRY HIN L.B.	485	435	450	490	460	460			
CORE RESIN SET PT.	65	70	66	66	66	67			
DENSIFICATION SET PT.	301	301	301	301	301	301			
THICKNESS POT PT.	163	163	163	163	163	163			
BOARD WEIGHT AVE.	100	100	100	100	100	100			

TIME		SET PT.	LBS/MIN	WAX	RESIN LBS.	PRODUCTION WEIGHT	FORMULA WEIGHT	3 HR	SHIFT
8:00 AM	SURF	194	11	18.5	622	(13) (100)	20186	3.08	
	CORE	65	2.52	12.5	149	18200	7098	3.1	
10:00 AM	SURF	210	11.3	19.9	1714	(36) (100)	55898	3.06	3.07
	CORE	70	2.7	13.5	417	50400	19656	2.13	2.12
12:00 PM	SURF	198	10.7	18.7	3751	(80) (100)	124218	2.98	3.02
	CORE	66	2.58	12.7	903	112000	43680	2.02	2.03
4:00 PM	SURF	205	11.3	18.1	5657	(119) (100)	184775	3.15	3.06
	CORE	66	2.58	12.3	1353	166000	64974	2.11	2.08
5:30 PM	SURF	205	13.4	18.1	6978	(143) (100)	222040	3.55	3.14
	CORE	66	2.58	12.3	1629	200200	78078	2.11	2.09
7:00 PM	SURF	195	12.9	18.1	7943	(160) (100)	248436	3.67	3.2
	CORE	67	2.59	12.3	1824	224000	87360	2.12	2.09
8:00	SURF								
	CORE								

61/39 Ratio All Shift

K-4126 58 (7438) (3.07) ACTUAL USAGE ACTUAL DATE 41

TECH: NCO

DATE: 2-7-92
SHIFT: PM

TOTAL PRODUCTION WT. = 233800

TANK LEVELS

LBS. USED

TIME	10:20 AM	2:50 PM		AVE.
BOARD NO.	8	8		
WEIGHT	45	45		
THICKNESS	.375	.384		
DENSITY	39.6	38.7		
I.B.'s	575	643	406	575 (54)
I.B.'s	583	352	482	352 (44)

5'6 1/4" = N.D.I. = 3'3 5/8" N.D.I. = 1869
 5'7 1/2" = WAX = 13 3/4" WAX = 3510 .72
 11'0" = PRE = 11'11" PRE = 2890
 17' = U.T. = 25 1/4"

2788-2792-(4)

TIME TESTED	ROLL NO. AND TYPE	INITIAL THICKNESS	INITIAL WEIGHT	BOILED THICKNESS	BOILED WEIGHT	% SWELL	% ABSORB	SAMPLE DENSITY
10:20 AM		375	140.1	546	264	45.6	88.4	39.5
2:50 PM		390	142.3	577	280.1	47.9	96.8	39.4
24 HR		462	641.2	578	945.4	25.1	47.4	

TIME	7:00	9:00	12:00	2:00	5:00	7:00			
LINE SPEED	62	62	64	66	66	66			
B.S.L.B. SET PT.	416	407	415	422	440	431			
C.L.B. SET PT.	556	543	553	563	587	574			
T.S.L.B. SET PT.	416	407	416	422	440	431			
SURF. RESIN SET PT.	195	193	206	215	218	221			
SURF. DRY BIN L.B.	734	724	700	712	715	717			
CORE DRY BIN L.B.	460	440	435	454	465	460			
CORE RESIN SET PT.	67	67	69	71	72	72			
DENSIFICATION SET PT.	301	300	300	300	300	300			
THICKNESS POT PT.	163	163	163	163	163	163			
BOARD WEIGHT AVE.	100	100	100	100	100	100			

TIME		SET PT.	LBS/MIN	WAX	RESIN LBS.	PRODUCTION WEIGHT	FORMULA WEIGHT	3 HR %	SHIFT %
9:00	SURF	195	15.0	18.1	7179 (1564)	(25) (100)	61 38818		4.55 (2.5)
	CORE	67	2.5	12.3	286	35000	59 13650		2.1
12:00	SURF	206	14.9	14.5	7051 (4355)	(67) (100)	104032	2.54	2.93
	CORE	67	2.6	13	761	93800	36582	2.07	2.08
2:00	SURF	215	14.6	19.5	7430 (4119)	(96) (100)	149062	3.06	2.97
	CORE	71	2.7	13	1085	134400	52416	1.88	2.07
5:00	SURF	218	13.1	20.5	7450 (2553)	(138) (100)	214276	3.09	3.01
	CORE	72	2.6	14	1554	193200	75348	2.04	2.06
7:00	SURF	221	12.8		7890 (4012)	(167) (100)	259305	3.19	3.04
	CORE	72	2.6		1869	233800	91182	1.77	2.04
:00	SURF					() ()			
	CORE								
:00	SURF					() ()			
	CORE								

61/39

ALL

SHIFT

OIL SURFACE

K-42

42

QUALITY/COST ANALYSIS SUMMARY

LP NEWBERRY

NEWBERRY, MICHIGAN

DATE 2/7/92

PRODUCTION 329 616

PRODUCTION MTD 1 809 763

INVENTORY

1 809 763

TANK LEVEL	PHYSICAL INVENTORY	AMOUNT USED	\$/1000	CURRENT INVENTORY	TOTAL USED MTD	DOLLARS USED MTD	\$/1000 MTD	RAW MATERIAL
3' 3 3/4"	29 138	3645	2.07	25072	20 712			MDI
13' 3 1/4"	43 303	7020	.74	89556	36 563			WAX
11' 11"	106 074	14361	3.12	82 844	75 887			PHEN
		/	/	1497582	/	/	/	PAPER
		/	/	878.5	/	/	/	610
		/	/	3707-377	/	/	/	PAINT
		/	/	1537 383	/	/	/	736P

INVENTORY INCREASE

RELEASE NO.

(MDI 178 542) (E-WAX 953 750) (PHE 507 742)

CORDS	WOOD TYPE	%
	ASPER	100

DENSITY
THICKNESS
PRODUCTION
WEIGHT

38053 18					
39.0					
380					
457 800					

(457 800)

- WAFER ANALYSIS -

DAY	IB	15 MIN. BOIL		24 HR. SOAK	
		SWELL	ABS	SWELL	ABS
47	47	43.6	76.3	29.1	54.9
NITE	49	46.8	92.6	25.1	47.4
AVE.	48	45.2	84.5	27.1	51.2

WEIGHT	PERCENT	
1.5	5.6	.8 % LARGE
.75	114.8	16.2
.50	132.2	19.0 65.8% GOOD WAFERS
.38	101.9	14.4
.25	114.7	16.2 33.3% PINES
.19	60.8	9.1
PAN	171.2	24.2
TOT	707.2	WAFER THICKNESS .026 IN.

GRADE OUT SUMMARY

Thick	Thin	Bad Corners	Low Density	Blows
Footage <u>168</u>		<u>304</u>	<u>160</u>	<u>0</u>
Percent <u>.05</u>		<u>.09</u>	<u>.05</u>	<u>0</u>
Low Resin	Cut Problems	Other		
Footage <u>0</u>	<u>0</u>	<u>2648</u>		
Percent <u>0</u>	<u>0</u>	<u>.79</u>		

TOTAL DOWNGRADE FOOTAGE 3280 ; 1.0

Results Comparisons

APPENDIX L

PROCEDURES

Particulate Loadings and Emission Rates

The particulate emission rates were determined per EPA Methods 1-5, CFR title 40, Part 60, Appendix A (revised July 1, 1987). 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. In addition, the sampling module also houses the impinger case and a Drierite drying column. The sampling module is connected by means of an umbilical cord to the control module which houses the dry test gasmeter, the calibrated orifice, a leakless pump, two inclined manometers, and all controls required for operating the sampling train.

Particulate samples were collected as follows: The sample gas was drawn in through the sampling probe isokinetically and passed through a 4-inch diameter Gelman Type A/E glass fiber filter. The particulates were removed at this point and collected on the filter. The gases then passed through an ice-cooled impinger train and a desiccant-packed drying column which quantitatively absorb all moisture from the sample gas stream after which the sample gas passes through the pump and the dry test gasmeter which integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gasmeter provides instantaneous flow rate data.

A representative particulate sample was acquired by sampling for equal periods of time at the centroid of a number of equal area regions in the duct. The sampling rate is adjusted at each site such that an isokinetic sampling condition prevails. Nomographs are used to aid in the rapid determination of the sampling rate.

Particulate Loadings and Emission Rates

The particulate emission rates were determined per EPA Methods 1-5, CFR title 40, Part 60, Appendix A (revised July 1, 1987). In this procedure, a preliminary velocity profile of the gases in the flue is obtained by means of a temperature and velocity traverse. On the basis of these values, sampling nozzles of appropriate diameter are selected to allow isokinetic sampling, a necessary prerequisite for obtaining a representative sample.

The sampling train consists of a heated glass or stainless steel-lined sampling probe equipped with a Type S pitot and a thermocouple. The probe is attached to a sampling module which houses the all-glass in line filter holder in a temperature controlled oven. In addition, the sampling module also houses the impinger case and a Drierite drying column. The sampling module is connected by means of an umbilical cord to the control module which houses the dry test gasmeter, the calibrated orifice, a leakless pump, two inclined manometers, and all controls required for operating the sampling train.

Particulate samples were collected as follows: The sample gas was drawn in through the sampling probe isokinetically and passed through a 4-inch diameter Gelman Type A/E glass fiber filter. The particulates were removed at this point and collected on the filter. The gases then passed through an ice-cooled impinger train and a desiccant-packed drying column which quantitatively absorb all moisture from the sample gas stream after which the sample gas passes through the pump and the dry test gasmeter which integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gasmeter provides instantaneous flow rate data.

A representative particulate sample was acquired by sampling for equal periods of time at the centroid of a number of equal area regions in the duct. The sampling rate is adjusted at each site such that an isokinetic sampling condition prevails. Nomographs are used to aid in the rapid determination of the sampling rate.

When sampling is complete the filter is removed with tweezers and placed in a clean container. The nozzle, pitot tube 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 the rinse is transferred to a tared 120 cc porcelain evaporating dish. The acetone is then evaporated off at 97 - 105 °F. At this elevated temperature condensation of atmospheric moisture is prevented. The acetone-free sample is then dried at 105 °C for 30 minutes, cooled in a desiccator over Drierite, and weighed to the nearest 0.01 mg. The filter sample is transferred to a 6 inch watch glass and dried at 105 °C for two hours. The filter and watch glass are then cooled in a desiccator and the filter weighed to the nearest 0.01 mg. All weighings are performed in a balance room where the relative humidity is maintained at less than 50%. Microscopic examination of the samples is performed if any unusual characteristics are observed. The weight of the acetone rinse blank is subtracted from the samples. The Drierite column is weighed on-site and the water absorbed by the Drierite is added to the condensate to give the total amount of absorbed water.

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Condensible Organic Compounds Analysis
(State of Wisconsin - EPA Method 5)
Method II-8672-WI

Equipment: Separatory funnel - 500 cc with Teflon stopcock
 Powder funnel - 75 mm ID with a glass wood plug
 Evaporating dish(es) - 200 cc or 250 cc beaker

Reagents: Methylene chloride

 Sodium sulfate - (ACS) granular anhydrous (purified by
 heating for four hours in a shallow tray)

SAMPLING:

An all-glass impinger assembly is used in the back half of the EPA Method 5 sampling train when an organic wet catch is to be collected. The impinger assembly consists of a modified impinger, a Greenburg Smith impinger followed by another modified impinger. The third impinger should have a temperature measuring device at the outlet upstream of a final impinger or desiccant column to monitor the temperature of the outlet gas stream. Prior to the start of the test, each of the first two impingers should be charged with 100 g of Class I water. The Method 5 train should be operated as provided for in EPA Method 5. Ice should be added to the impinger bath to keep the temperature of the gas at the outlet at or less than 68 °F. After the post test leak check, the impinger train is removed and impinger contents poured into a tared all-glass sample bottle and closed with a Teflon-lined cap. The sample bottle is then weighed and the total condensate calculated by subtraction of the bottle tare weight and the

weight of initial water added to the impingers (200 g). A label is affixed and the sample is returned to the laboratory for analysis. The sample should be stored at 4 °C if the analysis is not conducted within 48 hours.

ANALYSIS:

1. Sample bottles are removed from storage and the contents quantitatively transferred to a clean 500 cc separatory funnel equipped with a Teflon stopcock.
2. Rinse the sample container with distilled water and add to separatory funnel.
3. Then rinse the sample container with acetone and pour through sodium sulfate into a tare beaker marked A.
4. The sample is then extracted consecutively with three 50 cc aliquots of methylene chloride. The extraction is performed according to normal laboratory practice observing the customary safety precaution of releasing excess pressure after each shaking.
5. After each of the three extractions are completed, the organic solvent should be dried by passing it through a funnel containing anhydrous sodium sulfate and collecting it and two 50 cc rinses in the tared beaker marked A (the same one used to catch the acetone container rinse).
6. Evaporate to dryness in a hood at 70 °F or less. Do not evaporate so quickly as to allow evaporative cooling to lower the temperature of the container below the dew point otherwise water will be condensed in the container.

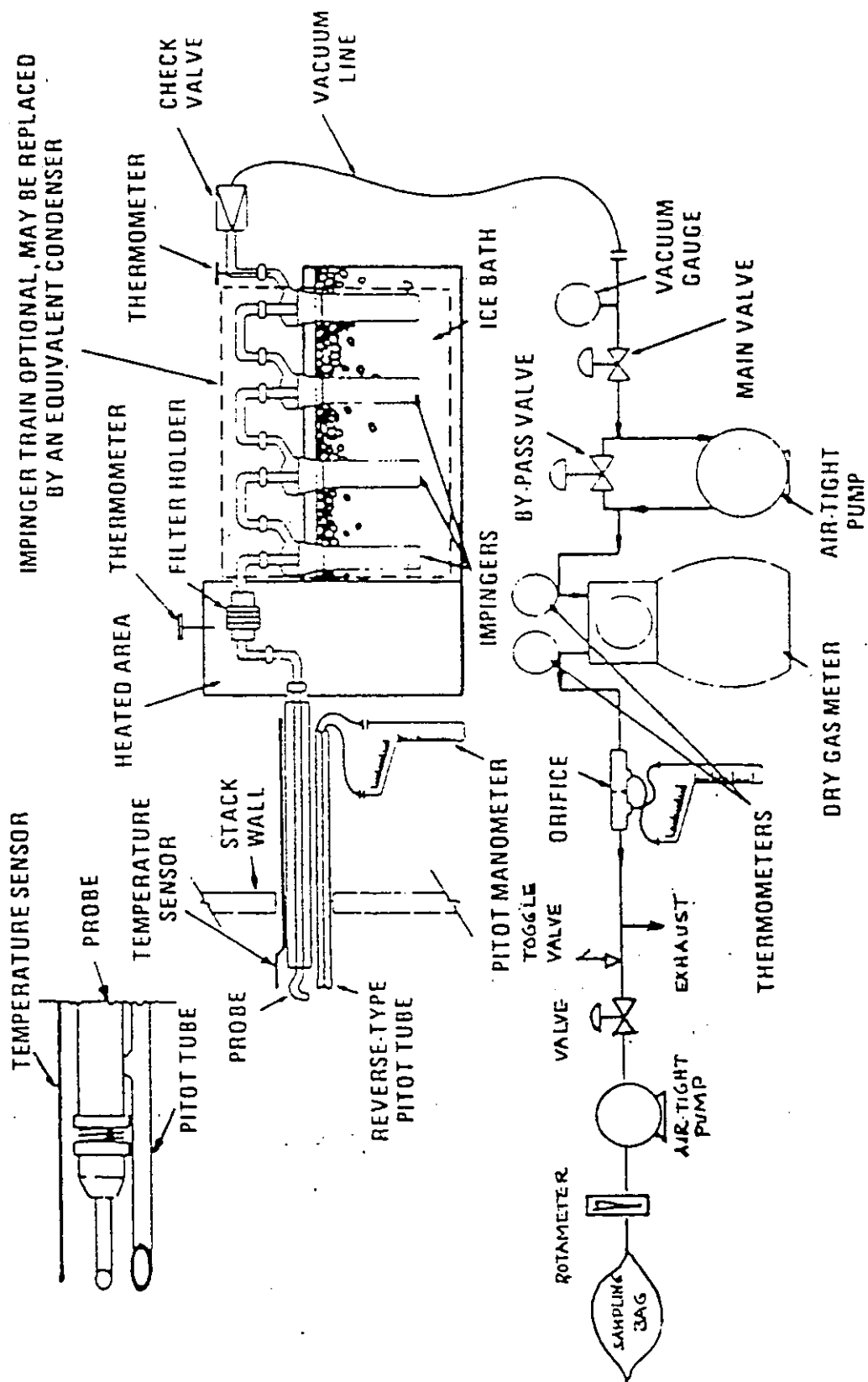
7. Desiccate for two hours in a sealed desiccator and final weigh. Report all results in grams. All weighings should be made to nearest 0.1 mg (four places).
8. The remaining liquid in the separatory funnel is then transferred to a tared beaker marked B and is evaporated to dryness at $220^{\circ}\text{F} \pm 10^{\circ}\text{F}$. The analyst may take an aliquot of the sample, transferring it to a tared beaker and evaporate to dryness at $220^{\circ}\text{F} \pm 10^{\circ}\text{F}$. If an aliquot is used, the weight of the sample and aliquot will have to be taken to correct for the total sample weight.
9. After the drying step, the sample is cooled in a desiccator and weighted to a constant weight to the nearest 0.1 mg.

Calculation (if aliquot is taken):

$$\text{grams} = \frac{(\text{grams recovered from aliquot}) \times (\text{total volume (ml) or grams of sample})}{(\text{aliquot volume (ml) or grams used})}$$

If volume is used, it must be used for both the aliquot and sample. The same goes for using weight.

10. A field blank should be analyzed in an identical manner. If a field blank is not submitted, take an aliquot of Class I water equal in volume to the samples and analyze in a similar manner.
11. The results for container A are to be marked in the organic section of Interpoll Form #LSC-036.
12. The results for container B are to be marked in the inorganic section of Interpoll Form #LSC-036.



Particulate sampling train.

METHOD 201A - DETERMINATION OF PM_{10} EMISSIONS
(Constant Sampling Rate Procedure)

(55 FR 14246)

1. Applicability and Principle

1.1 Applicability. This method applies to the in-stack measurement of particulate matter (PM) emissions equal to or less than an aerodynamic diameter of nominally 10 μm (PM_{10}) from stationary sources. The EPA recognizes that condensible emissions not collected by an in-stack method are also PM_{10} , and that emissions that contribute to ambient PM_{10} levels are the sum of condensible emissions and emissions measured by an in-stack PM_{10} method, such as this method or Method 201. Therefore, for establishing source contributions to ambient levels of PM_{10} , such as for emission inventory purposes, EPA suggests that source PM_{10} measurement include both in-stack PM_{10} and condensible emissions. Condensible emissions may be measured by an impinger analysis in combination with this method.

1.2 Principle. A gas sample is extracted at a constant flow rate through an in-stack sizing device, which separates PM greater than PM_{10} . Variations from isokinetic sampling conditions are maintained within well-defined limits. The particulate mass is determined gravimetrically after removal of uncombined water.

2. Apparatus

NOTE: Methods cited in this method are part of 40 CFR Part 60, Appendix A.

2.1 Sampling Train. A schematic of the Method 201A sampling train is shown in Figure 1. With the exception of the PM_{10} sizing device and in-stack filter, this train is the same as an EPA Method 17 train.

2.1.1 Nozzle. Stainless steel (316 or equivalent) with a sharp tapered leading edge. Eleven nozzles that meet the design specifications in Figure 2

are recommended. A large number of nozzles with small nozzle increments increase the likelihood that a single nozzle can be used for the entire traverse. If the nozzles do not meet the design specifications in Figure 2, then the nozzles must meet the criteria in Section 5.2.

2.1.2 PM_{10} Sizer. Stainless steel (316 or equivalent), capable of determining the PM_{10} fraction. The sizing device shall be either a cyclone that meets the specifications in Section 5.2 or a cascade impactor that has been calibrated using the procedure in Section 5.4.

2.1.3 Filter Holder. 63-mm, stainless steel. An Andersen filter, part number SE274, has been found to be acceptable for the in-stack filter.

NOTE: Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

2.1.4 Pitot Tube. Same as in Method 5, Section 2.1.3. The pitot lines shall be made of heat resistant tubing and attached to the probe with stainless steel fittings.

2.1.5 Probe Liner. Optional, same as in Method 5, Section 2.1.2.

2.1.6 Differential Pressure Gauge, Condenser, Metering System, Barometer, and Gas Density Determination Equipment. Same as in Method 5, Sections 2.1.4, and 2.1.7 through 2.1.10, respectively.

2.2 Sample Recovery.

2.2.1 Nozzle, Sizing Device, Probe, and Filter Holder Brushes. Nylon bristle brushes with stainless steel wire shafts and handles, properly sized and shaped for cleaning the nozzle, sizing device, probe or probe liner, and filter holders.

2.2.2 Wash Bottles, Glass Sample Storage Containers, Petri Dishes, Graduated Cylinder and Balance, Plastic Storage Containers, Funnel and Rubber

Policeman, and Funnel. Same as in Method 5, Sections 2.2.2 through 2.2.8, respectively.

2.3 Analysis. Same as in Method 5, Section 2.3.

3. Reagents

The reagents for sampling, sample recovery, and analysis are the same as that specified in Method 5, Sections 3.1, 3.2, and 3.3, respectively.

4. Procedure

4.1 Sampling. The complexity of this method is such that, in order to obtain reliable results, testers should be trained and experienced with the test procedures.

4.1.1 Pretest Preparation. Same as in Method 5, Section 4.1.1.

4.1.2 Preliminary Determinations. Same as in Method 5, Section 4.1.2, except use the directions on nozzle size selection and sampling time in this method. Use of any nozzle ^{less than} greater than 0.16 in. in diameter require a sampling port diameter of 6 inches. Also, the required maximum number of traverse points at any location shall be 12. ? See pg. 22

4.1.2.1 The sizing device must be in-stack or maintained at stack temperature during sampling. The blockage effect of the CSR sampling assembly will be minimal if the cross-sectional area of the sampling assembly is 3 percent or less of the cross-sectional area of the duct. ^{ie $D_s \geq 17.5$ inches} If the cross-sectional area of the assembly is greater than 3 percent of the cross-sectional area of the duct, then either determine the pitot coefficient at sampling conditions or use a standard pitot with a known coefficient in a configuration with the CSR sampling assembly such that flow disturbances are minimized.

* When $D_s \leq 17.5$ inches, blockage exceeds 3%

4.1.2.2 The setup calculations can be performed by using the following procedures.

4.1.2.2.1 In order to maintain a cut size of $10\ \mu\text{m}$ in the sizing device, the flow rate through the sizing device must be maintained at a constant, discrete value during the run. If the sizing device is a cyclone that meets the design specifications in Figure 3, use the equations in Figure 4 to calculate three orifice ^{pressure drops} heads (ΔH): one at the average stack temperature, and the other two at temperatures $\pm 28^\circ\text{C}$ ($\pm 50^\circ\text{F}$) of the average stack temperature. Use the ΔH calculated at the average stack temperature as the ^{orifice} pressure head for the sample flow rate as long as the stack temperature during the run is within 28°C (50°F) of the average stack temperature. If the stack temperature varies by more than 28°C (50°F), then use the appropriate ΔH .

4.1.2.2.3 To select a nozzle, use the equations in Figure 5 to calculate $\Delta p_{\min}$ and $\Delta p_{\max}$ for each nozzle at all three temperatures. If the sizing device is a cyclone that does not meet the design specifications in Figure 3, the example worksheets can be used.

4.1.2.2.4 Correct the Method 2 pitot readings to Method 201A pitot readings by multiplying the Method 2 pitot readings by the square of a ratio of the Method 201A pitot coefficient to the Method 2 pitot coefficient.

Select the nozzle for which $\Delta p_{\min}$ and $\Delta p_{\max}$ bracket all of the corrected Method 2 pitot readings. If more than one nozzle meets this requirement,

select the nozzle giving the greatest symmetry. Note that if the expected pitot reading for one or more points is near a limit for a chosen nozzle, it may be outside the limits at the time of the run.

4.1.2.2.5 Vary the dwell time, or sampling time, at each traverse point proportionately with the point velocity. Use the equations in Figure 6 to calculate the dwell time at the first point and at each subsequent point. It is recommended that the number of minutes sampled at each point be rounded to the nearest 15 seconds.

4.1.3 Preparation of Collection Train. Same as in Method 5, Section 4.1.3, except omit directions about a glass cyclone.

4.1.4 Leak-Check Procedure. The sizing device is removed before the post-test leak-check to prevent any disturbance of the collected sample prior to analysis.

4.1.4.1 Pretest Leak-Check. A pretest leak-check of the entire sampling train, including the sizing device, is required. Use the leak-check procedure in Method 5, Section 4.1.4.1 to conduct a pretest leak-check.

4.1.4.2 Leak-Checks During Sample Run. Same as in Method 5, Section 4.1.4.1.

4.1.4.3 Post-Test Leak-Check. A leak-check is required at the conclusion of each sampling run. Remove the cyclone before the leak-check to prevent the vacuum created by the cooling of the probe from disturbing the collected sample and use the procedure in Method 5, Section 4.1.4.3 to conduct a post-test leak-check.

4.1.5 Method 201A Train Operation. Same as in Method 5, Section 4.1.5, except use the procedures in this section for isokinetic sampling and flow rate adjustment. Maintain the flow rate calculated in Section 4.1.2.2.1

throughout the run provided the stack temperature is within 28°C (50°F) of the temperature used to calculate ΔH . If stack temperatures vary by more than 28°C (50°F), use the appropriate ΔH value calculated in Section 4.1.2.2.1. Calculate the dwell time at each traverse point as in Figure 6.

4.2 Sample Recovery. If a cascade impactor is used, use the manufacturer's recommended procedures for sample recovery. If a cyclone is used, use the same sample recovery as that in Method 5, Section 4.2, except an increased number of sample recovery containers is required.

4.2.1 Container Number 1 (In-Stack Filter). The recovery shall be the same as that for Container Number 1 in Method 5, Section 4.2.

4.2.3 Container Number 2 (Cyclone or Large PM Catch). This step is optional. The anisokinetic error for the cyclone PM is theoretically larger than the error for the PM_{10} catch. Therefore, adding all the fractions to get a total PM catch is not as accurate as Method 5 or Method 201. Disassemble the cyclone and remove the nozzle to recover the large PM catch. Quantitatively recover the PM from the interior surfaces of the nozzle and cyclone, excluding the "turn around" cup and the interior surfaces of the exit tube. The recovery shall be the same as that for Container Number 2 in Method 5, Section 4.2.

4.2.4 Container Number 3 (PM_{10}). Quantitatively recover the PM from all of the surfaces from the cyclone exit to the front half of the in-stack filter holder, including the "turn around" cup inside the cyclone and the interior surfaces of the exit tube. The recovery shall be the same as that for Container Number 2 in Method 5, Section 4.2.

4.2.6 Container Number 4 (Silica Gel). The recovery shall be the same as that for Container Number 3 in Method 5, Section 4.2.

4.2.7 Impinger Water. Same as in Method 5, Section 4.2, under "Impinger Water."

4.3 Analysis. Same as in Method 5, Section 4.3, except handle Method 201A Container Number 1 like Container Number 1, Method 201A Container Numbers 2 and 3 like Container Number 2, and Method 201A Container Number 4 like Container Number 3. Use Figure 7 to record the weights of PM collected. Use Figure 5-3 in Method 5, Section 4.3, to record the volume of water collected.

4.4 Quality Control Procedures. Same as in Method 5, Section 4.4.

4.5 PM_{10} Emission Calculation and Acceptability of Results. Use the procedures in Section 6 to calculate PM_{10} emissions and the criteria in Section 6.3.5 to determine the acceptability of the results.

5. Calibration

Maintain an accurate laboratory log of all calibrations.

5.1 Probe Nozzle, Pitot Tube, Metering System, Probe Heater Calibration, Temperature Gauges, Leak-check of Metering System, and Barometer. Same as in Method 5, Section 5.1 through 5.7, respectively.

6. Calculations

Calculations are as specified in Method 5, Sections 6.3 through 6.7, and 6.9 through 6.11, with the addition of the following:

6.1 Nomenclature.

- B_{ws} = Moisture fraction of stack, by volume, dimensionless.
- C_1 = Viscosity constant, 51.12 micropoise for °K (51.05 micropoise for °R).
- C_2 = Viscosity constant, 0.372 micropoise/°K (0.207 micropoise/°R).
- C_3 = Viscosity constant, 1.05×10^{-4} micropoise/°K² (3.24×10^{-5} micropoise/°R²).
- C_4 = Viscosity constant, 53.147 micropoise/fraction O₂.
- C_5 = Viscosity constant, 74.143 micropoise/fraction H₂O.
- D_{50} = Diameter of particles having a 50 percent probability of penetration, μm .
- f_o = Stack gas fraction O₂, by volume, dry basis.
- K_1 = 0.3858 °K/mm Hg (17.64 °R/in. Hg).
- M_w = Wet molecular weight of the stack gas, g/g-mole (lb/lb-mole).
- M_d = Dry molecular weight of stack gas, g/g-mole (lb/lb-mole).
- P_{bar} = Barometric pressure at sampling site, mm Hg (in. Hg).
- P_s = Absolute stack pressure, mm Hg (in. Hg).
- Q_s = Total cyclone flow rate at wet cyclone conditions, m³/min (ft³/min). YES!
- $Q_{s(std)}$ = Total cyclone flow rate at ^{dry} standard conditions. dscm/min (dscf/min). DSCFM YES!
- T_m = Average absolute temperature of dry meter, °K (°R).
- T_s = Average absolute stack gas temperature, °K (°R).

$V_{m(std)}$ = Volume of gas measured by the dry gas meter, corrected to standard conditions, dscm (dscf).

$V_{w(std)}$ = Volume of water vapor in gas sample (standard conditions), scm (scf).

θ = Total sampling time, min.

μ_s = Viscosity of stack gas, micropoise.

6.2 Analysis of Cascade Impactor Data. Use the manufacturer's recommended procedures to analyze data from cascade impactors.

6.3 Analysis of Cyclone Data. Use the following procedures to analyze data from a single stage cyclone.

6.3.1 PM_{10} Weight. Determine the PM catch in the PM_{10} range from the sum of the weights obtained from Container Numbers 1 and 3 less the acetone blank.

6.3.2 Total PM Weight (optional). Determine the PM catch for greater than PM_{10} from the weight obtained from Container Number 2 less the acetone blank, and add it to the PM_{10} weight.

6.3.3 PM_{10} Fraction. Determine the PM_{10} fraction of the total particulate weight by dividing the PM_{10} particulate weight by the total particulate weight.

6.3.4 Aerodynamic Cut Size. Calculate the stack gas viscosity as follows:

$$\mu_s = C_1 + C_2 T_s + C_3 T_s^2 + C_4 f_{O_2} - C_5 B_{ws}$$

No! Use equation on page 24

6.3.4.1 The PM_{10} flow rate, at actual cyclone conditions, is calculated as follows:

$$Q_s = \frac{T_s}{K_1 P_s} \left[Q_{s(std)} + \frac{V_{w(std)}}{\theta} \right]$$

$$V_{w(std)} = .04707 (V_f - V_i)$$

$$T_s = \bar{T}_s + 466$$

$$\text{but } Q_{s(std)} = \frac{V_{m(std)}}{\theta}$$

$$K_1 = 17.64$$

Substituting gives:

$$Q_s = \frac{5.669 \times 10^{-2} (\bar{T}_s + 466)}{\theta P_s} [V_{m(std)} + .04707 (V_f - V_i)]$$

6.3.4.2 Calculate the molecular weight on a wet basis of the stack gas as follows:

$$M_w = M_d (1 - B_{ws}) + 18.0 (B_{ws})$$

6.3.4.3 Calculate the actual D_{50} of the cyclone for the given conditions as follows:

$$D_{50} = \beta_1 \left(\frac{T_s}{M_w P_s} \right)^{0.2091} \left(\frac{\mu_s}{Q_s} \right)^{0.7091}$$

actual cutpoint
achieved during
run

where $\beta_1 = 0.027754$ for metric units (0.15625 for English units).

6.3.5 Acceptable Results. The results are acceptable if two conditions are met. The first is that $9.0 \mu m \leq D_{50} \leq 11.0 \mu m$. The second is that no sampling points are outside Δp_{min} and Δp_{max} , or that $80 \text{ percent} \leq I \leq 120 \text{ percent}$ and no more than one sampling point is outside Δp_{min} and Δp_{max} . If D_{50} is less than $9.0 \mu m$, reject the results and repeat the test.

7. Bibliography

1. Same as Bibliography in Method 5.
2. McCain, J.D., J.W. Ragland, and A.D. Williamson. Recommended Methodology for the Determination of Particle Size Distributions in Ducted Sources, Final Report. Prepared for the California Air Resources Board by Southern Research Institute. May 1986.
3. Farthing, W.E., S.S. Dawes, A.D. Williamson, J.D. McCain, R.S. Martin, and J.W. Ragland. Development of Sampling Methods for Source PM₁₀ Emissions. Southern Research Institute for the Environmental Protection Agency. April 1989. NTIS PB 89 190375, EPA/600/3-88-056.
4. Application Guide for Source PM₁₀ Measurement with Constant Sampling Rate, EPA/600/3-88-057.

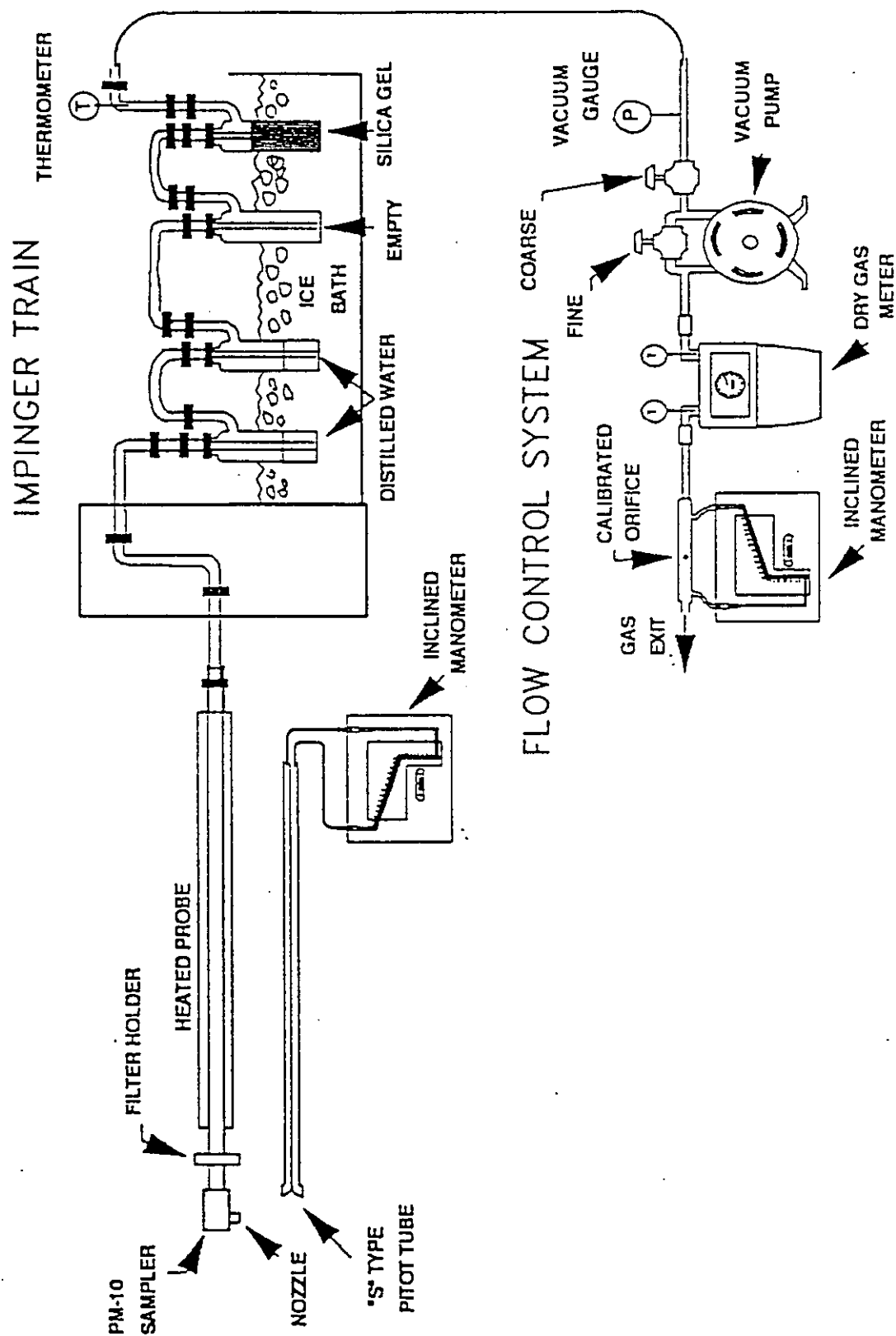
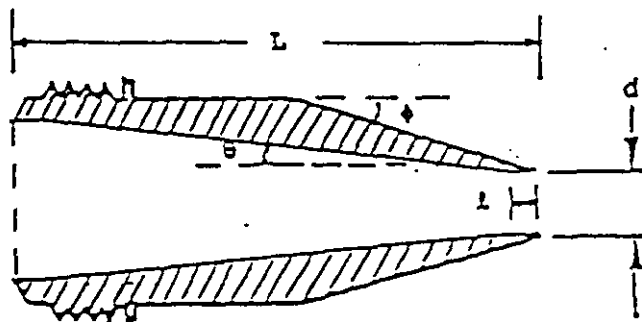


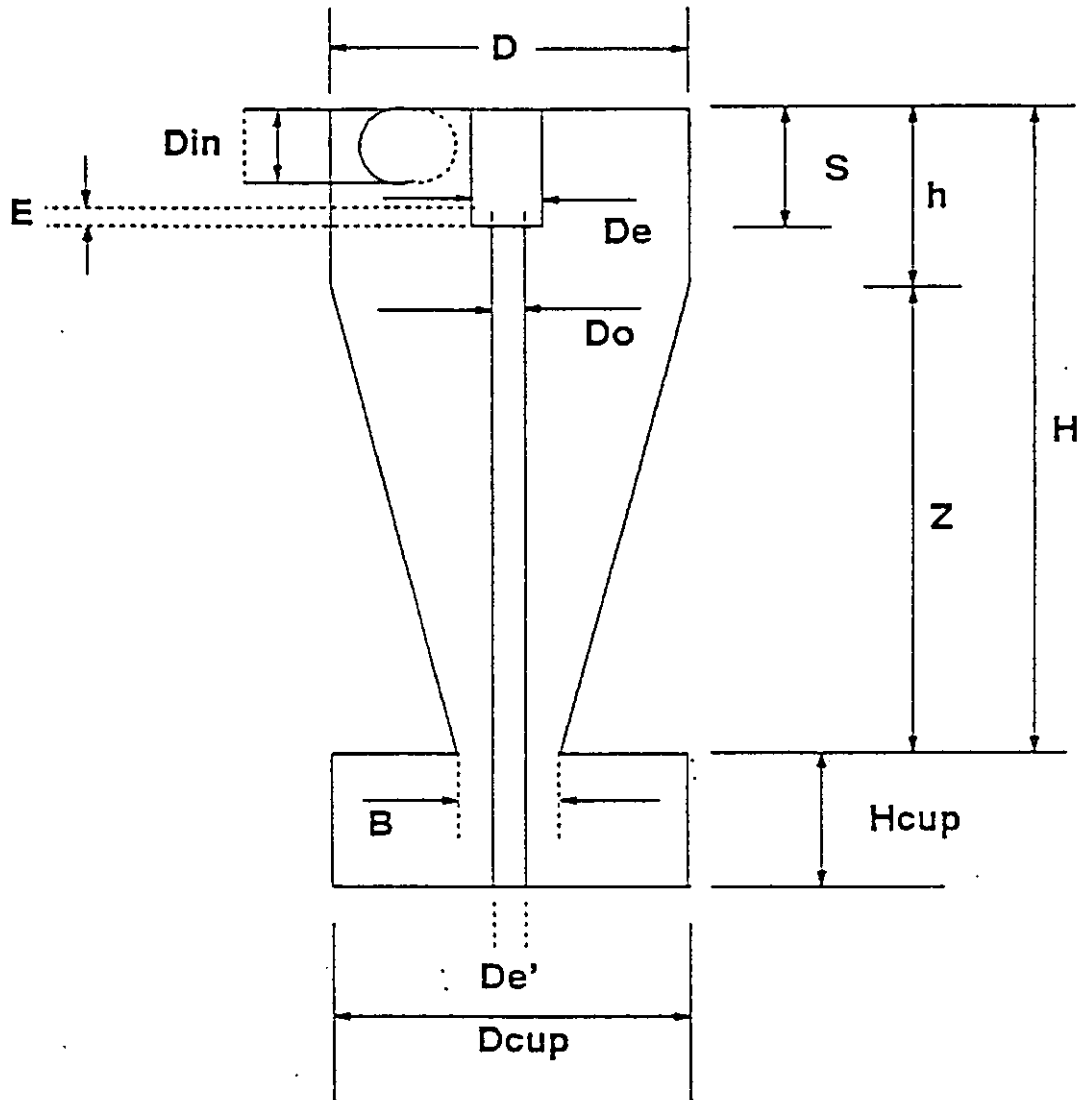
Figure 1. CSR Sampling Train



Nozzle Diameter (inches)	Cone Angle, θ (degrees)	Outside taper, ϕ (degrees)	Straight inlet length, l (inches)	Total Length L (inches)
0.136	4	15	<0.05	2.653 ± 0.05
0.150	4	15	<0.05	2.553 ± 0.05
0.164	5	15	<0.05	1.970 ± 0.05
0.180	6	15	<0.05	1.572 ± 0.05
0.197	6	15	<0.05	1.491 ± 0.05
0.215	6	15	<0.05	1.45 ± 0.05
0.233	6	15	<0.05	1.45 ± 0.05
0.264	5	15	<0.05	1.45 ± 0.05
0.300	4	15	<0.05	1.48 ± 0.05
0.342	4	15	<0.05	1.45 ± 0.05
0.390	3	15	<0.05	1.45 ± 0.05

Figure 2. Nozzle design specifications.

Cyclone Interior Dimensions



Dimensions (+0.02 cm, +0.01 in.)													
	Din	D	De	B	H	h	Z	S	Hcup	Dcup	De'	Do	E
cm	1.27	4.47	1.50	1.88	6.95	2.24	4.71	1.57	2.25	4.45	1.02	1.24	0.25
in.	0.50	1.76	0.59	0.74	2.74	0.88	1.85	0.62	0.89	1.75	0.40	0.49	0.10

Figure 3. Cyclone design specifications.

Barometric pressure, P_{bar} , in. Hg = _____
 Stack static pressure, P_s , in. H₂O = _____
 Average stack temperature, t_s , °F = _____
 Meter temperature, t_m , °F = _____
 Orifice ΔH_s , in. H₂O = _____

Gas analysis:

%CO₂ = _____
 %O₂ = _____
 %N₂ + %CO = _____
 Fraction moisture content, B_{ws} = _____

Molecular weight of stack gas, dry basis:

$$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO) = \text{_____ lb/lb mole}$$

Molecular weight of stack gas, wet basis:

$$M_w = M_d(1 - B_{ws}) + 18(B_{ws}) = \text{_____ lb/lb mole}$$

Absolute stack pressure:

$$P_s = P_{\text{bar}} + \frac{P_g}{13.6} = \text{_____ in. Hg}$$

Viscosity of stack gas:

$$\mu_s = 152.418 + 0.2552 t_s + 3.2355 \times 10^{-5} t_s^2 + 0.53147 (\%O_2) - 74.143 B_{ws} = \text{_____ micropoise}$$

Cyclone flow rate:

$$Q_s = 0.002837 \mu_s \left(\frac{t_s + 460}{M_w P_s} \right)^{0.2949} = \text{_____ ft}^3/\text{min}$$

Figure 4. Example worksheet 1 (Page 1 of 2), cyclone flow rate and ΔH .

Orifice pressure head (ΔH) needed for cyclone flow rate: note

$$\Delta H = \left[\frac{Q_s (1 - B_{ws}) P_s}{t_s + 460} \right]^2 \frac{(t_m + 460) M_d (1.083) \Delta H_a}{P_{bar}} = \text{_____ in. H}_2\text{O}$$

Calculate ΔH for three temperatures:

$t_s, ^\circ\text{F}$			
$\Delta H, \text{in. H}_2\text{O}$			

Figure 4. Example worksheet 1 (Page 2 of 2), cyclone flow rate and ΔH .

Stack viscosity, μ_s , micropoise = _____
 Absolute stack pressure, P_s , in. Hg = _____
 Average stack temperature, t_s , °F = _____
 Meter temperature, t_m , °F = _____
 Method 201A pitot coefficient, C_p = _____
 Cyclone flow rate, Q_s , ft³/min, Q_s = _____
 Method 2 pitot coefficient, C_p = _____
 Molecular weight of stack gas, wet basis, M_w = _____
 Nozzle diameter, D_n , in. = _____

Nozzle velocity

$$v_n = \frac{3.056 Q_s}{D_n^2} = \text{_____ ft/sec}$$

Maximum and minimum velocities:

Calculate R_{min} .

$$R_{min} = 0.2457 + \sqrt{0.3072 - \frac{0.2603 (\sqrt{Q_s}) \mu_s}{v_n^{1.5}}} = \text{_____}$$

If R_{min} is less than 0.5, or if an imaginary number occurs when calculating R_{min} , use Equation 1 to calculate v_{min} . Otherwise, use Equation 2.

Eq. 1 $v_{min} = v_n (0.5) = \text{_____ ft/sec}$

Eq. 2 $v_{min} = v_n R_{min} = \text{_____ ft/sec}$

Calculate R_{max} .

$$R_{max} = 0.4457 + \sqrt{0.5690 + \frac{0.2603 (\sqrt{Q_s}) \mu_s}{v_n^{1.5}}} = \text{_____}$$

Figure 5. Example worksheet 2 (page 1 of 2), nozzle selection.

If $R_{\max}$ is greater than 1.5, use Equation 3 to calculate $v_{\max}$. Otherwise, use Equation 4.

Eq. 3 $v_{\max} = v_n (1.5) = \underline{\hspace{2cm}} \text{ ft/sec}$

Eq. 4 $v_{\max} = v_n R_{\max} = \underline{\hspace{2cm}} \text{ ft/sec}$

Maximum and minimum velocity head values:

$$\Delta p_{\min} = 1.3686 \times 10^{-4} \frac{P_s M_w (v_{\min})^2}{(t_s + 460) C_p^2} = \underline{\hspace{2cm}} \text{ in. H}_2\text{O}$$

$$\Delta p_{\max} = 1.3686 \times 10^{-4} \frac{P_s M_w (v_{\max})^2}{(t_s + 460) C_p^2} = \underline{\hspace{2cm}} \text{ in. H}_2\text{O}$$

Nozzle Number				
D_n , in.				
v_n , ft/sec				
$v_{\min}$, ft/sec				
$v_{\max}$, ft/sec				
$\Delta p_{\min}$, in. H ₂ O				
$\Delta p_{\max}$, in. H ₂ O				

Velocity traverse data:

incorrect

$$\Delta p(\text{Method 201A}) = \Delta p(\text{Method 2}) \left(\frac{C_p}{C_p'} \right)^2 = \Delta p^{H2} \left(\frac{C_p^{H2}}{C_p^{201A}} \right)^2$$

Figure 5. Example worksheet 2 (page 2 of 2), nozzle selection.

4-11-91 PL

Total run time, minutes = _____
 Number of traverse points = _____

$$t_1 = \left[\frac{\Delta p'_1}{\Delta p'_{avg}} \left(\frac{\text{Total run time}}{\text{Number of points}} \right) \right]$$

where:

t_1 = dwell time at first traverse point, minutes.

$\Delta p'_1$ = the velocity head at the first traverse point (from a previous traverse), in. H_2O .

$\Delta p'_{avg}$ = the square of the average square root of the Δp 's (from a previous velocity traverse), in. H_2O .

At subsequent traverse points, measure the velocity Δp and calculate the dwell time by using the following equation:

$$t_n = \frac{t_1}{\sqrt{\Delta p_1}} \sqrt{\Delta p_n}, \text{ where } n = 2, 3, \dots \text{total number of sampling points}$$

where:

t_n = dwell time at traverse point n , minutes.

Δp_n = measured velocity head at point n , in. H_2O .

Δp_1 = measured velocity head at point 1, in. H_2O .

Figure 6. Example worksheet 3 (page 1 of 2), dwell time.

Port No _____ Port No _____ Port No _____ Port No _____

Point Number	Δp	t	Δp	t	Δp	t	Δp	t
1								
2								
3								
4								
5								
6								

Figure 6. Example worksheet 3 (page 2 of 2), dwell time.

Plant _____
 Date _____
 Run no. _____
 Filter no. _____
 Amount of liquid lost during transport _____
 Acetone blank volume, ml _____
 Acetone wash volume, ml (4) _____ (5) _____
 Acetone blank conc., mg/mg (Equation 5-4, Method 5) _____
 Acetone wash blank, mg (Equation 5-5, Method 5) _____

Container number	Weight of PM ₁₀ (mg)		
	Final weight	Tare weight	Weight gain
1			
3			
Total.....			
Less acetone blank.....			
Weight of PM ₁₀			

Figure 7. Method 201A analysis sheet.

TABLE 1. PERFORMANCE SPECIFICATIONS FOR SOURCE PM₁₀ CYCLONES
AND NOZZLE COMBINATIONS

Parameter	Units	Specification
1. Collection efficiency	Percent	Such that collection efficiency falls within envelope specified by Section 5.2.6 and Figure 8.
2. Cyclone cut size (D ₅₀)	μm	10 ± 1 μm aerodynamic diameter

TABLE 2. PARTICLE SIZES AND NOMINAL GAS VELOCITIES FOR EFFICIENCY

Particle size (μm) ^a	Target gas velocities (m/sec)		
	7 ± 1.0	15 ± 1.5	25 ± 2.5
5 ± 0.5			
7 ± 0.5			
10 ± 0.5			
14 ± 1.0			
20 ± 1.0			

(a) Mass median aerodynamic diameter.

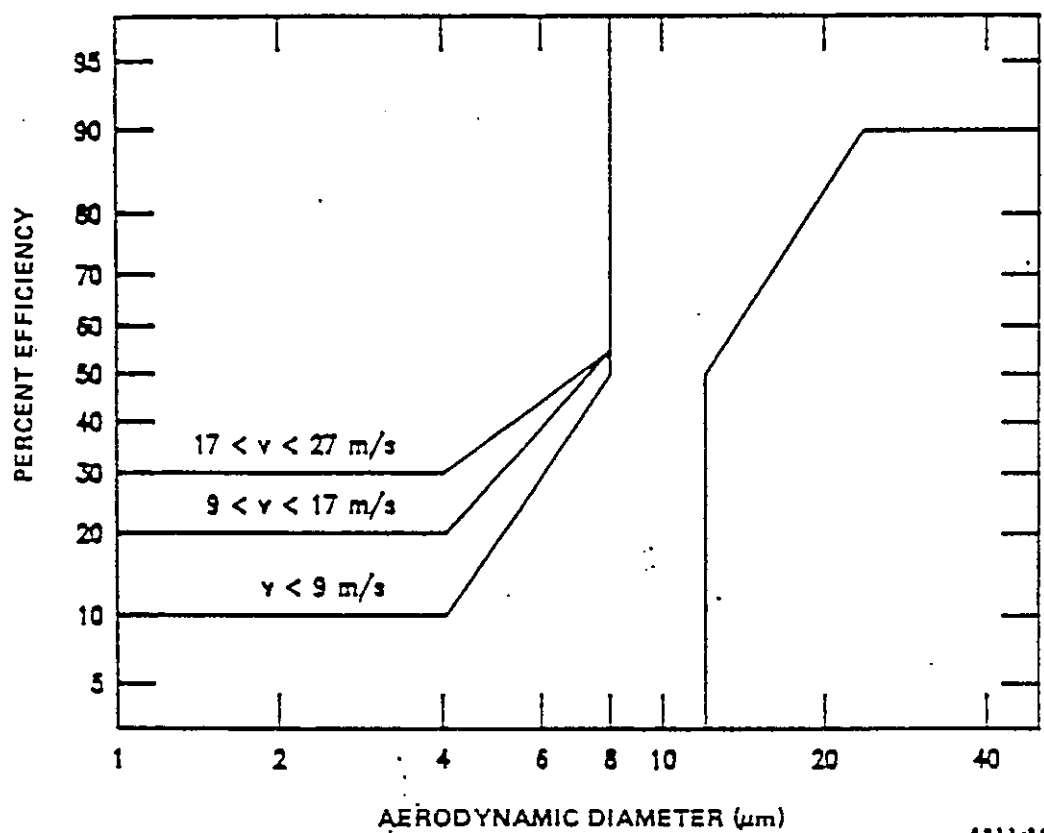
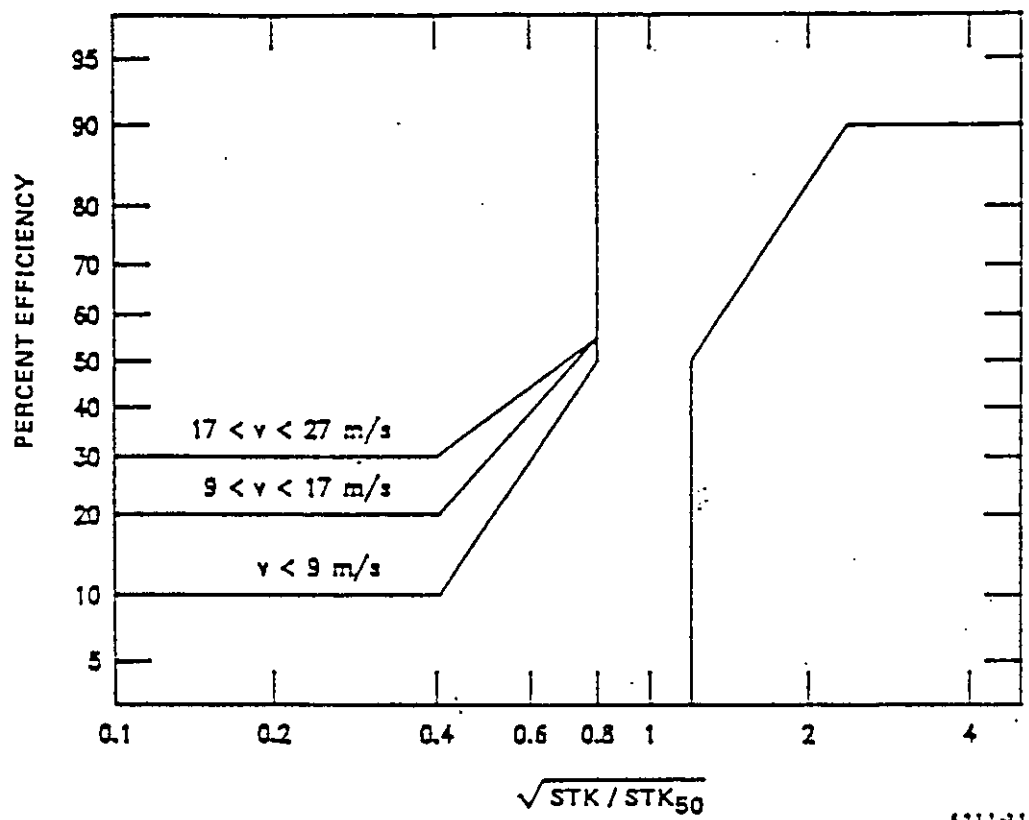


Figure 8. Efficiency envelope for the PM₁₀ cyclone.



6311-31

Figure 9. Efficiency envelope for first calibration stage.

DETERMINATION OF CARBON MONOXIDE EMISSIONS
FROM STATIONARY SOURCES

Carbon monoxide concentrations were determined in accordance with CFR Title 40, Part 60, Appendix A (revised July 1, 1990), EPA Method 10 using the integrated sampling technique. An integrated gas sample is extracted from a three-point sampling traverse and analyzed for carbon monoxide content using a ACS Model 3300 nondispersive infrared analyzer (NDIR). This analyzer has a measuring range of 0-500 and 0-1000 ppm. The measuring method is single beam. Linearity is better than $\pm 2\%$ full scale and the noise is less than 0.5 fs. The minimum detectable concentration is 5 ppm. Zero drift is rated at $\pm 1\%$ fs per 24 hours and the span drift is less than 1% in a 24-hour period. Response time is less than 15 seconds to 90% of final reading. Precision is rated at better than $\pm 0.5\%$ fs on low range and $\pm 1\%$ fs on high range. The flow rate through the analyzer is 1.0 ± 0.5 LPM..

Integrated flue gas samples are collected over a 21-minute period using a three or more point traverse. The flue gas samples are collected at a flow rate of 400-1000 cc per minute. The flue gas is dried using a desiccant column filled with silica gel or Drierite. Integrated gas samples are collected in 44-liter Tedlar bags. The bags are leak-checked immediately before initiation of sampling. The integrated bags are housed in aluminum housings to eliminate any contact with sharp objects which might cause puncture and leakage.

After sampling is complete, the bags are transported to the laboratory for analysis. The bags are analyzed using a flow system whereby any residual moisture and carbon dioxide are quantitatively removed prior to introduction into the NDIR. This is accomplished using two cartridges in series immersed in an ice bath. The first cartridge contains silica gel or Drierite and the second cartridge Ascarite as prescribed in EPA Method 10. The analyzer is then zeroed and calibrated

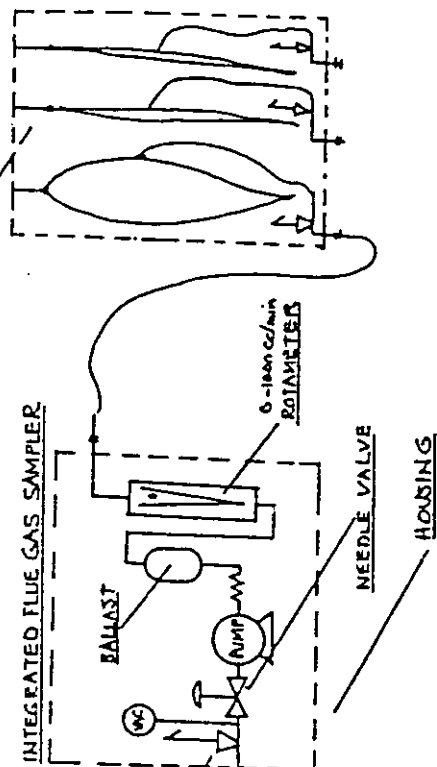
using NBS traceable standard gases (Scott Specialty Gases). These gases are introduced directly into the system and passed through the two adsorbent cartridges. A high purity nitrogen zero gas is used to zero the analyzer. Several concentrations of carbon monoxide in air standards are used to calibrate the analyzer and to quality assure intermittently the analysis of the individual flue gas samples.

The integrated bag samples are also analyzed for carbon dioxide and oxygen by means of a standard Orsat analyzer equipped with a 100 cc buret using standard commercially available absorption reagents in accordance with EPA Method 3. The moisture content of the flue gas is determined independently in accordance with EPA Method 4 (large impinger version) to allow mathematical conversion of the dry, CO₂-free concentrations to actual flue gas conditions.

The reported carbon monoxide concentrations, unless otherwise noted, have been mathematically corrected for both carbon dioxide and moisture content in accordance with the equations given in EPA Method 10.

SAMPLING SYSTEM TO COLLECT INTEGRATED FLUE GAS SAMPLES FOR CO AND ORSAT

ALUMINUM PROTECTIVE
HOUSING FOR 5-LAYER TEFLAR
BAGS (44 L)



SAMPLING RATE ~ 400 CC/MIN FOR CO MIN

TOSGLE VALVE

CONDENSER ASSEMBLY

PROBE

DUCT CROSS SECTION

REVISIONS		EPA METHOD 3 & 10 SAMPLING TRAIN			
NO.	DATE	BY			
1					
2					
3			DRAWN BY	LP	SCALE N/A
4	1		CHE'D		DATE 10/95
5			TRACED		APP'D
			MATERIAL		DRAWING NO.
			S-310		

EPA
METHOD 0011

RECEIVED

SAMPLING FOR FORMALDEHYDE EMISSIONS FROM STATIONARY SOURCES JUL 16 1990

INTERPOLL LABORATORIES

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

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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 $120 \pm 14^{\circ}\text{C}$ ($248 \pm 25^{\circ}\text{F}$).

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, $\mu\text{g/mL}$) 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):

$$\text{AIL} = 0.1 \times [\text{EAL} \times \text{SVOL} \times \text{FW}/22.4 \times (\text{FW} + 180)/\text{FW}] / (\text{RVOL} \times 1000)$$

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 500 μL 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 ft³ of sample volume is required for the determination of the Destruction and Removal Efficiency (DRE) of formaldehyde from incineration systems (45ft³ is equivalent to one hour of sampling at 0.75 dscf). Additional sample volume shall be collected as necessitated by the capacity of the DNPH reagent and analytical detection limit constraints. To determine the minimum sample volume required, refer to sample calculations in Section 10.

6.3.5 Determine the total length of sampling time needed to obtain the identified minimum volume by comparing the anticipated average sampling rate with the volume requirement. Allocate the same time to all traverse points defined by EPA Method 1. To avoid timekeeping errors, the length of time sampled at each traverse point should be an integer or an integer plus 0.5 min.

6.3.6 In some circumstances (e.g., batch cycles) it may be necessary to sample for shorter times at the traverse points and to obtain smaller gas-volume samples. In these cases, careful documentation must be maintained in order to allow accurate calculation of concentrations.

6.4 Preparation of Collection Train:

6.4.1 During preparation and assembly of the sampling train, keep all openings where contamination can occur covered with Teflon® film or aluminum foil until just prior to assembly or until sampling is about to begin.

6.4.2 Place 100 mL of cleaned DNPH solution in each of the first two impingers, and leave the third impinger empty. If additional capacity is required for high expected concentrations of formaldehyde in the stack gas, 200 mL of DNPH per impinger may be used or additional impingers may be used for sampling. Transfer approximately 200 to 300 g of pre-weighed silica gel from its container to the fourth impinger. Care should be taken to ensure that the silica gel is not entrained and carried out from the impinger during sampling. Place the silica gel container in a clean place for later use in the sample recovery. Alternatively, the weight of the silica gel plus impinger may be determined to the nearest 0.5 g and recorded.

6.4.3 With a glass or quartz liner, install the selected nozzle using a Viton-A O-ring when stack temperatures are <260°C (500°F) and a woven glass-fiber gasket when temperatures are higher. See APTD-0576 (Rom, 1972) for details. Other connecting systems utilizing either 316 stainless steel or Teflon® ferrules may be used. Mark the probe with heat-resistant tape or by some other method to denote the proper distance into the stack or duct for each sampling point.

6.4.4 Assemble the train as shown in Figure 1. During assembly, do not use any silicone grease on ground-glass joints upstream of the impingers. Use Teflon® tape, if required. A very light coating of silicone grease may be used on ground-glass joints downstream of the impingers, but the silicone grease should be limited to the outer portion (see APTD-0576) of the ground-glass joints to

minimize silicone grease contamination. If necessary, Teflon® tape may be used to seal leaks. Connect all temperature sensors to an appropriate potentiometer/display unit. Check all temperature sensors at ambient temperature.

6.4.5 Place crushed ice all around the impingers.

6.4.6 Turn on and set the probe heating system at the desired operating temperature. Allow time for the temperature to stabilize.

6.5 Leak-Check Procedures:

6.5.1 Pre-test Leak Check:

6.5.1.1 After the sampling train has been assembled, turn on and set the probe heating system at the desired operating temperature. Allow time for the temperature to stabilize. If a Viton-A O-ring or other leak-free connection is used in assembling the probe nozzle to the probe liner, leak-check the train at the sampling site by plugging the nozzle and pulling a 381-mm Hg (15 in Hg) vacuum.

NOTE: A lower vacuum may be used, provided that the lower vacuum is not exceeded during the test.

6.5.1.2 If an asbestos string is used, do not connect the probe to the train during the leak check. Instead, leak-check the train by first attaching a carbon-filled leak check impinger to the inlet and then plugging the inlet and pulling a 381-mm Hg (15 in Hg) vacuum. (A lower vacuum may be used if this lower vacuum is not exceeded during the test.) Then connect the probe to the train and leak-check at about 25 mm Hg (1 in Hg) vacuum. Alternatively, leak-check the probe with the rest of the sampling train in one step at 381 mm Hg (15 in Hg) vacuum. Leakage rates in excess of 4% of the average sampling rate or $>0.00057 \text{ m}^3/\text{min}$ (0.02 cfm), whichever is less, are acceptable.

6.5.1.3 The following leak check instructions for the sampling train described in APTD-0576 and APTD-0581 may be helpful. Start the pump with the fine-adjust valve fully open and coarse-adjust valve completely closed. Partially open the coarse-adjust valve and slowly close the fine-adjust valve until the desired vacuum is reached. Do not reverse direction of the fine-adjust valve, as liquid will back up into the train. If the desired vacuum is exceeded, either perform the leak check at this higher vacuum or end the leak check, as shown below, and start over.

6.5.1.4 When the leak check is completed, first slowly remove the plug from the inlet to the probe. When the vacuum drops to 127 mm (5 in) Hg or less, immediately close the coarse-adjust valve. Switch off the pumping system and reopen the fine-adjust valve. Do not reopen the fine-adjust valve until the coarse-adjust valve has been closed to prevent the liquid in the impingers from being forced backward into the sampling line and silica gel from being entrained backward into the third impinger.

6.5.2 Leak Checks During Sampling Runs:

6.5.2.1 If, during the sampling run, a component change (i.e., impinger) becomes

necessary, a leak check shall be conducted immediately after the interruption of sampling and before the change is made. The leak check shall be done according to the procedure described in Section 6.5.1, except that it shall be done at a vacuum greater than or equal to the maximum value recorded up to that point in the test. If the leakage rate is found to be no greater than 0.00057 m³/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 m³/min (0.02 cfm) or 4% of the average sampling rate (whichever is less), the results are acceptable. If, however, a higher leakage rate is obtained, the tester shall record the leakage rate and void the sampling run.

6.6 Sampling Train Operation:

6.6.1 During the sampling run, maintain an isokinetic sampling rate to within 10% of true isokinetic, below 28 L/min (1.0 cfm). Maintain a temperature around the probe of 120° ± 14°C (248° ± 25°F).

6.6.2 For each run, record the data on a data sheet such as the one shown in Figure 2. Be sure to record the initial dry-gas meter reading. Record the dry-gas meter readings at the beginning and end of each sampling time increment, when changes in flow rates are made, before and after each leak check, and when sampling is halted. Take other readings required by Figure 2 at least once at each sample point during each time increment and additional readings when significant adjustments (20% variation in velocity head readings) necessitate additional adjustments in flow rate. Level and zero the manometer. Because the manometer level and zero may drift due to vibrations and temperature changes, make periodic checks during the traverse.

6.6.3 Clean the stack access ports prior to the test run to eliminate the chance of sampling deposited material. To begin sampling, remove the nozzle cap, verify that the filter and probe heating systems are at the specified temperature, and verify that the pitot tube and probe are properly positioned. Position the nozzle at the first traverse point, with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Nomographs, which aid in the rapid adjustment of the isokinetic sampling rate without excessive computations, are available. These nomographs are designed for use when the Type S pitot tube coefficient is 0.84 ± 0.02 and the stack gas equivalent density (dry molecular weight) is equal to 29 ± 4 . APTD-0576 details the procedure for using the nomographs. If the stack gas molecular weight and

the pitot tube coefficient are outside the above ranges, do not use the nomographs unless appropriate steps are taken to compensate for the deviations.

6.6.4 When the stack is under significant negative pressure (equivalent to the height of the impinger stem), take care to close the coarse-adjust valve before inserting the probe into the stack in order to prevent liquid from backing up through the train. If necessary, the pump may be turned on with the coarse-adjust valve closed.

6.6.5 When the probe is in position, block off the openings around the probe and stack access port to prevent unrepresentative dilution of the gas stream.

6.6.6 Traverse the stack cross section, as required by EPA Method 1, being careful not to bump the probe nozzle into the stack walls when sampling near the walls or when removing or inserting the probe through the access port, in order to minimize the chance of extracting deposited material.

6.6.7 During the test run, make periodic adjustments to keep the temperature around the probe at the proper levels. Add more ice and, if necessary, salt, to maintain a temperature of $<20^{\circ}\text{C}$ (68°F) at the silica gel outlet. Also, periodically check the level and zero of the manometer.

6.6.8 A single train shall be used for the entire sampling run, except in cases where simultaneous sampling is required in two or more separate ducts or at two or more different locations within the same duct, or in cases where equipment failure necessitates a change of trains. An additional train or additional trains may also be used for sampling when the capacity of a single train is exceeded.

6.6.9 When two or more trains are used, separate analyses of components from each train shall be performed. If multiple trains have been used because the capacity of a single train would be exceeded, first impingers from each train may be combined, and second impingers from each train may be combined.

6.6.10 At the end of the sampling run, turn off the coarse-adjust valve, remove the probe and nozzle from the stack, turn off the pump, record the final dry gas meter reading, and conduct a post-test leak check. Also, leak check the pitot lines as described in EPA Method 2. The lines must pass this leak check in order to validate the velocity-head data.

6.6.11 Calculate percent isokineticity (see Method 2) to determine whether the run was valid or another test should be made.

7.0 SAMPLE RECOVERY

7.1 Preparation:

7.1.1 Proper cleanup procedure begins as soon as the probe is removed from the stack at the end of the sampling period. Allow the probe to cool. When the probe can be handled safely, wipe off all external particulate matter near the tip of the probe nozzle and place a cap over the tip to prevent losing or gaining particulate matter. Do not cap the probe tip tightly while the sampling train is cooling because a vacuum will be created, drawing liquid from the impingers back through the sampling train.

7.1.2 Before moving the sampling train to the cleanup site, remove the probe from the sampling train and cap the open outlet, being careful not to lose any condensate that might be present. Remove the umbilical cord from the last impinger and cap the impinger. If a flexible line is used, let any condensed water or liquid drain into the impingers. Cap off any open impinger inlets and outlets. Ground glass stoppers, Teflon® caps, or caps of other inert materials may be used to seal all openings.

7.1.3 Transfer the probe and impinger assembly to an area that is clean and protected from wind so that the chances of contaminating or losing the sample are minimized.

7.1.4 Inspect the train before and during disassembly, and note any abnormal conditions.

7.1.5 Save a portion of all washing solutions (methylene chloride, water) used for cleanup as a blank. Transfer 200 mL of each solution directly from the wash bottle being used and place each in a separate, pre-labeled sample container.

7.2 Sample Containers:

7.2.1 Container 1: Probe and Impinger Catches. Using a graduated cylinder, measure to the nearest mL, and record the volume of the solution in the first three impingers. Alternatively, the solution may be weighed to the nearest 0.5 g. Include any condensate in the probe in this determination. Transfer the impinger solution from the graduated cylinder into the amber flint glass bottle. Taking care that dust on the outside of the probe or other exterior surfaces does not get into the sample, clean all surfaces to which the sample is exposed (including the probe nozzle, probe fitting, probe liner, first impinger, and impinger connector) with methylene chloride. Use less than 500 mL for the entire wash (250 mL would be better, if possible). Add the washings to the sample container.

7.2.1.1 Carefully remove the probe nozzle and rinse the inside surface with methylene chloride from a wash bottle. Brush with a Teflon® bristle brush, and rinse until the rinse shows no visible particles or yellow color, after which make a final rinse of the inside surface. Brush and rinse the inside parts of the Swagelok® fitting with methylene chloride in a similar way.

7.2.1.2 Rinse the probe liner with methylene chloride. While squirting the methylene chloride into the upper end of the probe, tilt and rotate the probe so that all inside surfaces will be wetted with methylene chloride. Let the methylene chloride drain from the lower end into the sample container. The tester may use a funnel (glass or polyethylene) to aid in transferring the liquid washes to the container. Follow the rinse with a Teflon® brush. Hold the probe in an inclined position, and squirt methylene chloride into the upper end as the probe brush is being pushed with a twisting action through the probe. Hold the sample container underneath the lower end of the probe, and catch any methylene chloride, water, and particulate matter that is brushed from the probe. Run the brush through the probe three times or more. With stainless steel or other metal probes, run the brush through in the above prescribed manner at least six times since there may be small crevices in which particulate matter can be entrapped. Rinse the brush with methylene chloride or water, and quantitatively collect these washings in the sample container. After the brushings, make a final rinse

of the probe as described above.

NOTE: Two people should clean the probe in order to minimize sample losses. Between sampling runs, brushes must be kept clean and free from contamination.

7.2.1.3 Rinse the inside surface of each of the first three impingers (and connecting tubing) three separate times. Use a small portion of methylene chloride for each rinse, and brush each surface to which sample is exposed with a Teflon® bristle brush to ensure recovery of fine particulate matter. Water will be required for the recovery of the impingers in addition to the specified quantity of methylene chloride. There will be at least two phases in the impingers. This two-phase mixture does not pour well, and a significant amount of the impinger catch will be left on the walls. The use of water as a rinse makes the recovery quantitative. Make a final rinse of each surface and of the brush, using both methylene chloride and water.

7.2.1.4 After all methylene chloride and water washings and particulate matter have been collected in the sample container, tighten the lid so that solvent, water, and DNPH reagent will not leak out when the container is shipped to the laboratory. Mark the height of the fluid level to determine whether leakage occurs during transport. Seal the container with Teflon® tape. Label the container clearly to identify its contents.

7.2.1.5 If the first two impingers are to be analyzed separately to check for breakthrough, separate the contents and rinses of the two impingers into individual containers. Care must be taken to avoid physical carryover from the first impinger to the second. The formaldehyde hydrazone is a solid which floats and froths on top of the impinger solution. Any physical carryover of collected moisture into the second impinger will invalidate a breakthrough assessment.

7.2.2 Container 2: Sample Blank. Prepare a blank by using an amber flint glass container and adding a volume of DNPH reagent and methylene chloride equal to the total volume in Container 1. Process the blank in the same manner as Container 1.

7.2.3 Container 3: Silica Gel. Note the color of the indicating silica gel to determine whether it has been completely spent and make a notation of its condition. The impinger containing the silica gel may be used as a sample transport container with both ends sealed with tightly fitting caps or plugs. Ground-glass stoppers or Teflon® caps may be used. The silica gel impinger should then be labeled, covered with aluminum foil, and packaged on ice for transport to the laboratory. If the silica gel is removed from the impinger, the tester may use a funnel to pour the silica gel and a rubber policeman to remove the silica gel from the impinger. It is not necessary to remove the small amount of dust particles that may adhere to the impinger wall and are difficult to remove. Since the gain in weight is to be used for moisture calculations, do not use water or other liquids to transfer the silica gel. If a balance is available in the field, the spent silica gel (or silica gel plus impinger) may be weighed to the nearest 0.5 g.

7.2.4 Sample containers should be placed in a cooler, cooled by although not in contact with ice. Sample containers must be placed vertically and, since they are glass, protected from breakage during shipment. Samples should be cooled during shipment so they will be received cold at the laboratory.

8.0 CALIBRATION

8.1 Probe Nozzle: Probe nozzles shall be calibrated before their initial use in the field. Using a micrometer, measure the inside diameter of the nozzle to the nearest 0.025 mm (0.001 in). Make measurements at three separate places across the diameter and obtain the average of the measurements. The difference between the high and low numbers shall not exceed 0.1 mm (0.004 in). When the nozzles become nicked or corroded, they shall be replaced and calibrated before use. Each nozzle must be permanently and uniquely identified.

8.2 Pitot tube: The Type S pitot tube assembly shall be calibrated according to the procedure outlined in Section 4 of EPA Method 2, or assigned a nominal coefficient of 0.84 if it is not visibly nicked or corroded and if it meets design and intercomponent spacing specifications.

8.3 Metering system:

8.3.1 Before its initial use in the field, the metering system shall be calibrated according to the procedure outlined in APTD-0576. Instead of physically adjusting the dry-gas meter dial readings to correspond to the wet-test meter readings, calibration factors may be used to correct the gas meter dial readings mathematically to the proper values. Before calibrating the metering system, it is suggested that a leak check be conducted. For metering systems having diaphragm pumps, the normal leak check procedure will not detect leakages within the pump. For these cases, the following leak check procedure will apply: make a ten-minute calibration run at 0.00057 m³/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 m³/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 $\pm 2^{\circ}\text{C}$ (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 $\pm 0.5\%$ 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:

Total mg formaldehyde = $C_d \times V \times DF \times$

$\{[g/mole \text{ aldehyde}]/[g/mole \text{ DNPH derivative}]\} \times$

$10^{-3} \text{ mg}/\mu\text{g}$

where:

C_d = measured concentration of DNPH-formaldehyde derivative, $\mu\text{g}/\text{mL}$.

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:

$C_f = K [\text{total formaldehyde, mg}] / V_{m(\text{std})}$

where:

$K = 35.31 \text{ ft}^3/\text{m}^3$ if $V_{m(\text{std})}$ is expressed in English units

$= 1.00 \text{ m}^3/\text{m}^3$ if $V_{m(\text{std})}$ is expressed in metric units

$V_{m(\text{std})}$ = 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 $V_{m(\text{std})}$ 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 FORM₁ Mass -

$$[(WF) (FORM_1 \text{ conc}) (100 - \%DRE)] / 100$$

where:

WF - mass flow rate of waste feed per h, g/h (lb/h)

FORM₁ - 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:

$$\text{Max FORM}_1 \text{ conc} = [\text{Max FORM}_1 \text{ Mass}] / DV_{\text{eff(Std)}}$$

where:

DV_{eff(Std)} - volumetric flow rate of exhaust gas, dscm (dscf)

FORM₁ 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.

$$[LDL_{\text{FORM}} \times 10] / [FORM_1 \text{ conc}] = V_{\text{Lbc}}$$

where:

LDL_{FORM} - detectable amount of FORM in entire sampling train

V_{Lbc} - 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 Analysis¹

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 μ L 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.

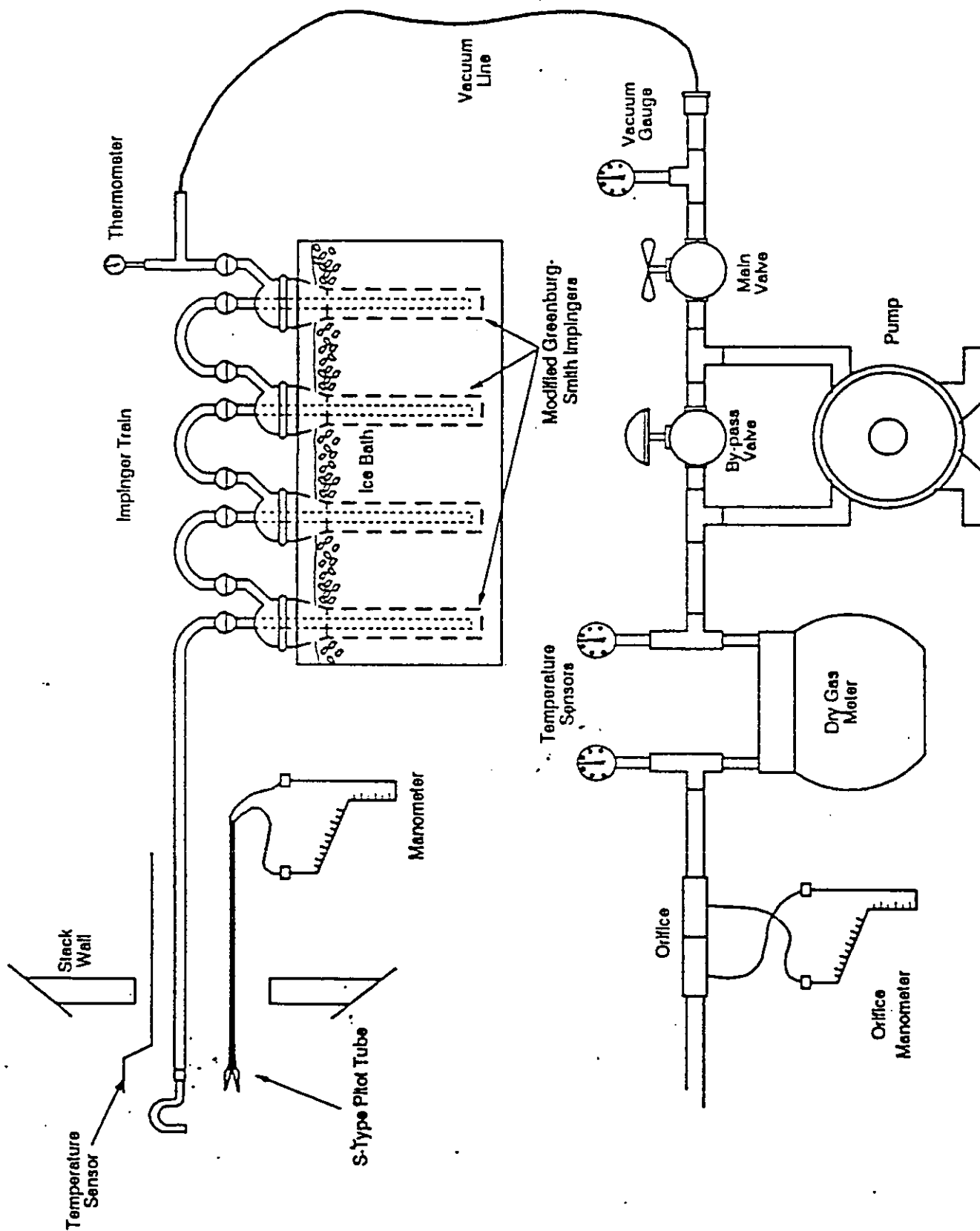
Table 3. Expected Method Performance for Formaldehyde

Parameter	Precision	¹ Accuracy ²	Detection Limit ³
Matrix: Dual trains	$\pm 15\%$ RPD	$\pm 20\%$	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

Pilot Tube Coefficient C_p _____

Stallo Pressure, mm Hg (in. Hg)

Filter No. _____

[illegible]

Figure 2. Field Data Sheet

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 System.** 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 mid-level 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:

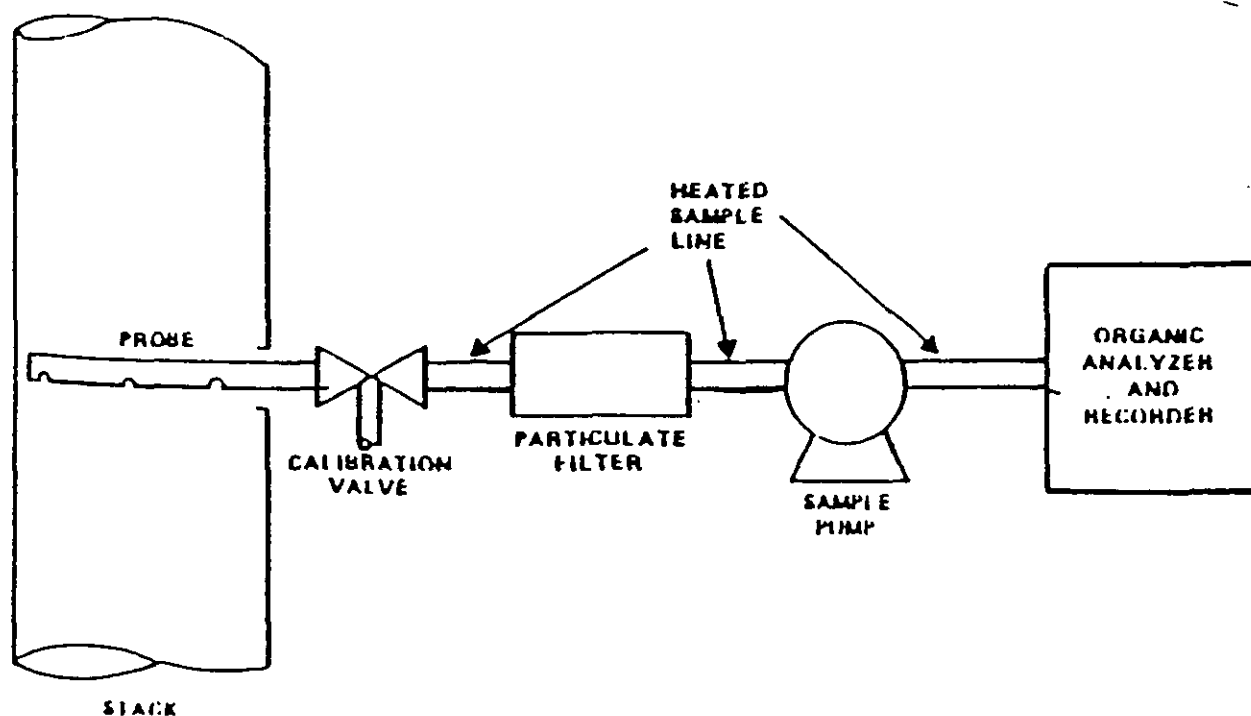


Figure 25A-1. Organic Concentration Measurement System.

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.

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 Reference 9.2. 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.

* Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

4.1 Fuel. A 40 percent H₂/60 percent He or 40 percent H₂/60 percent N₂ 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.

$$C_c = K C_{m,m} \quad \text{Eq. 25A-1}$$

Where:

C_c = Organic concentration as carbon, ppmv.

$C_{m,m}$ = 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

9.1 Measurement of Volatile Organic Compounds—Guideline Series. U.S. Environmental Protection Agency. Research Triangle Park, NC. Publication No. EPA-450/2-78-041. June 1978. p. 46-54.

9.2 Traceability Protocol for Establishing True Concentrations of Gases Used for Calibration and Audits of Continuous Source Emission Monitors (Protocol No. 1). U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory. Research Triangle Park, NC. June 1978.

9.3 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.

APPENDIX M

CALCULATION EQUATIONS

CALCULATION EQUATIONS

METHOD 2

$$\bar{V}_s = 35.48 C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{T_{s(avg)}}{P_s M_s}}$$

$$Q_{s,d} = 60(1 - B_{ws}) \bar{V}_s A \left(\frac{528}{T_{s(avg)}} \right) \left(\frac{P_s}{29.92} \right)$$

$$Q_a = 60 \bar{V}_s A$$

$$\dot{m}_g = \frac{4.995 Q_{s,d} G_d}{1 - B_{ws}}$$

$$RH^* = 100 (vp_{twb} 0.0003641 P_s (T_{db} - T_{wb})) / vp_{tdb}$$

$$B_{ws}^* = RH(vp_{tdb}) / P_s$$

$$= \frac{4.585 \times 10^{-2} P_s M_s}{T_s (avg)}$$

*Alternate equations for calculating moisture content from wet bulb and dry bulb data.

SYMBOLS

A	=	Cross sectional area of stack, SQ. FT.
A _n	=	Cross sectional area of nozzle, SQ. FT.
B _{ws}	=	Water vapor in gas stream, proportion by volume
C _p	=	Pitot tube coefficient, dimensionless
C _a	=	Concentration of particulate matter in stack gas, wet basis, GR/ACF
C _s	=	Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, GR/DSCF
EA	=	Excess air, percent by volume
Y	=	Dry test meter correction factor, dimensionless
G _d	=	Specific gravity (relative to air), dimensionless
I	=	Isokinetic variation, percent by volume
M _d	=	Molecular weight of stack gas, dry basis, g/g - mole.
$\dot{m}_g$	=	Mass flow of wet flue gas, LB/HR
$\dot{m}_p$	=	Particulate mass flow, LB/HR
M _s	=	Molecular weight of stack gas, wet basis, g/g, mole.
M _p	=	Total amount of particulate matter collected, g
P _{bar}	=	Atmospheric pressure, IN. HG. (uncompensated)
P _g	=	Stack static gas pressure, IN. WC.

P_s = Absolute pressure of stack gas, IN.HG.
 P_{std} = Standard absolute pressure, 29.92 IN. HG.
 A_a = Actual volumetric stack gas flow rate, ACFM
 $Q_{s,d}$ = Dry volumetric stack gas flow rate corrected to standard conditions, DSCFM
 RH = Relative humidity, %
 T_{db} = Dry bulb temperature of stack gas, °F
 T_{wb} = Wet bulb temperature of stack gas, °F
 $T_m(avg)$ = Absolute average dry gas meter temperature, °R
 $T_s(avg)$ = Absolute average stack temperature, °F
 T_{std} = Standard absolute temperature, 528 °F (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
 $v_{p_{tdb}}$ = Vapor pressure at T_{db} , IN. HG.

$v_{p_{twb}}$ = 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

CALCULATION EQUATIONS

METHOD 3

$$\%EA = \frac{100(\%O_2 -) .5\% CO}{0.264\% N_2 - \%O_2 + 0.5\% CO}$$

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

$$M_s = M_d (I - B_{ws}) + 0.18 B_{ws}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

CALCULATION EQUATIONS

METHOD 5

$$V_{m(std)} = 17.65 V_m \gamma \left(\frac{P_{bar} + \overline{\Delta H}/13.6}{T_{m(avg)}} \right)$$

$$V_{w(std)} = 0.0472 V_{Is}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

$$I = 0.0944 \left(\frac{T_{s(avg)} V_{m(std)}}{P_s V_s A_n \theta (1 - B_{ws})} \right)$$

$$C_s = \frac{15.43 M_p}{V_{m(std)}}$$

$$C_a = \frac{272.3 M_p P_s}{T_{s(avg)} (V_{w(std)} + V_{m(std)})}$$

$$(\dot{m}_p)_1 = 8.5714 \times 10^{-3} C_s Q_{s,d}$$

$$(\dot{m}_p)_2 = \frac{1.3228 \times 10^{-1} M_p A}{O A_n}$$

$$\dot{m}_p = \frac{(\dot{m}_p)_1 + (\dot{m}_p)_2}{2}$$

SYMBOLS

A	= Cross sectional area of stack, SQ. FT.
A _n	= Cross sectional area of nozzle, SQ. FT.
B _{ws}	= Water vapor in gas stream, proportion by volume
C _p	= Pitot tube coefficient, dimensionless
C _a	= Concentration of particulate matter in stack gas, wet basis, GR/ACF
C _s	= Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, GR/DSCF
EA	= Excess air, percent by volume
γ	= Dry test meter correction factor, dimensionless
G _d	= Specific gravity (relative to air), dimensionless
I	= Isokinetic variation, percent by volume
M _d	= Molecular weight of stack gas, dry basis, g/g - mole.
$\dot{m}_g$	= Mass flow of wet flue gas, LB/HR
$\dot{m}_p$	= Particulate mass flow, LB/HR
M _s	= Molecular weight of stack gas, wet basis, g/g, mole.
M _p	= Total amount of particulate matter collected, g
P _{bar}	= Atmospheric pressure, IN. HG. (uncompensated)
P _g	= Stack static gas pressure, IN. WC.

P_s = Absolute pressure of stack gas, IN.HG.
 P_{std} = Standard absolute pressure, 29.92 IN. HG.
 A_a = Actual volumetric stack gas flow rate, ACFM
 $Q_{s,d}$ = Dry volumetric stack gas flow rate corrected to standard conditions, DSCFM
 RH = Relative humidity, %
 T_{db} = Dry bulb temperature of stack gas, °F
 T_{wb} = Wet bulb temperature of stack gas, °F
 $T_{m(avg)}$ = Absolute average dry gas meter temperature, °R
 $T_s(avg)$ = Absolute average stack temperature, °F
 T_{std} = Standard absolute temperature, 528 °F (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
 v_{Ptdb} = Vapor pressure at T_{db} , IN. HG.

v_{ptwb} = 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

Interpoll Laboratories
PM-10 Equations

Preliminary Run Calculations:

$$M_d = 0.44 B_{CO_2} + 0.32 B_{O_2} + 0.28 (B_{N_2} + B_{CO})$$

$$M_s = M_d \left(1 - \frac{MC}{100} \right) + 0.18 (MC)$$

$$P_s = P_b + \frac{P_g}{13.6}$$

$$\begin{aligned} \mu = & 152.418 + 0.2552 t_s + 3.2355 \times 10^{-5} t_s^2 \\ & + 0.53147 (B_{O_2}) - 0.74143 MC \end{aligned}$$

$$Q_s = 2.837 \times 10^{-3} \mu \left[\frac{(t_s + 460)}{(M_s P_s)} \right]^{0.2949}$$

$$\Delta H = \frac{1.083 (t_m + 460) M_d \Delta H_g}{P_b} \left[\frac{Q_s \left(1 - \frac{MC}{100} \right) P_s}{t_s + 460} \right]^2$$

$$\Delta_P^{M201A} = \Delta_P^{M2} \left(\frac{C_P^{M2}}{C_P^{M201A}} \right)^2$$

Dwell Times:

$$\text{Firstpoint} \quad \Delta t_1 = \left[\frac{\sqrt{\Delta P_1}}{(\sqrt{\Delta P})_{AVG}} \right]$$

$$\text{OtherPoints} \quad \Delta t_n = \left(\frac{\Delta t_1}{\sqrt{\Delta P_1}} \right) \sqrt{\Delta P_n} \quad \text{where } n = 2, 3, \dots, 12$$

9-5-91/PL

Post Test Calculations:

$$V_{m(std)} = 17.64 \gamma V_m \left(\frac{P_b + \frac{\Delta \bar{H}}{13.6}}{(\bar{t}_m + 460)} \right)$$

$$Q_s = \frac{5.669 \times 10^{-2} (\bar{t}_s + 460)}{\theta P_s} [V_{m(std)} + 0.04707 (V_f - V_i)]$$

$$\mu = 152.418 + 0.2552 \bar{t}_s + 3.2355 \times 10^{-5} \bar{t}_s^2 + 0.53147 B_{O_2} - 0.74143 MC$$

$$M_s = M_d \left(1 - \frac{MC}{100} \right) + 0.18 MC$$

$$D_{50} = 0.15625 \left(\frac{\bar{t}_s + 460}{M_s P_s} \right)^{0.2091} \left(\frac{\mu}{Q_s} \right)^{0.7091}$$

where

- M_d = dry molecular weight of exhaust gas
- B_{CO_2} = percent volume of CO_2 in exhaust gas on a dry basis
- B_{O_2} = percent by volume of O_2 in exhaust gas on a dry basis
- B_{N_2} = percent by volume of N_2 in exhaust gas on a dry basis
- B_{CO} = percent by volume of CO in exhaust gas on a dry basis
- MC = percent by volume of water vapor in exhaust gas
- M_s = actual molecular weight of exhaust gas
- P_s = absolute pressure of exhaust gas, IN.HG
- P_g = static pressure of exhaust gas, IN.WC
- P_b = absolute barometric pressure, IN.HG
- t_s = average exhaust gas temperature from preliminary determination or point gas temperature, °F
- Q_s = cyclone flow rate at actual (or stack) conditions, ACFM

$Q_{s(std)}$ = cyclone flow rate at dry standard conditions, DSCFM
 ΔH = pressure drop across calibrated orifice, IN.WC
 ΔH_1 = orifice coefficient or pressure drop across calibrated orifice @ 0.75 DSCFM, IN.WC
 t_1 = temperature of dry test meter, °F
 Δp^{K201A} = velocity pressure of gas stream as measured with S-type pitot attached to cyclone, IN.WC
 Δp^{K2} = velocity pressure of gas stream as measured with S-type pitot tube as per EPA Method 2 (preliminary traverse), IN.WC
 C_p^{K201A} = pitot tube coefficient of S-type pitot tube attached to cyclone, dimensionless
 C_p^{K2} = pitot tube coefficient of S-type pitot tube used in preliminary traverse, dimensionless
 Δt_n = dwell time at traverse point n, where n = 2, 3, ..., 12, minutes
 Δt_1 = dwell time at the first sampling point, minutes
 $\bar{t}_g$ = average stack gas temperature during test run, °F
 θ = total run time, minutes
 $V_{s(std)}$ = total dry volume of gas sampled, DSCF
 V_f = final volume of water in sampling train condenser system, ml
 V_i = initial volume of water in sampling train condenser system, ml
 $\bar{t}_1$ = average temperature of dry test meter during run, °F
 γ = dry test meter coefficient, dimensionless
 $\overline{\Delta H}$ = average pressure drop across the calibrated orifice in the sampling train during the run, IN.WC
 V_1 = volume of dry gas sampled as measured by the dry test meter at meter conditions, CF
 D_{50} = actual or achieved 50% cutpoint for a given run of the device or cyclone used to remove or skim off those particles with aerodynamic equivalent diameters greater than or equal to 10 microns, microns

CALCULATION EQUATIONS

METHOD 10

$$\text{CO-PPM-DRY} = \text{CO}_{\text{CO}_2\text{-free,dry,avg}} (1 - \text{CO}_{2,d}/100)$$

$$\text{CO-PPM-WET} = \text{CO-PPM-DRY} (1 - \text{MC}/100)$$

$$\text{GR/DSCF} = 5.0885 \times 10^{-4} (\text{CO-PPM-DRY})$$

$$\text{mg/dscm} = 1.165 (\text{CO-PPM-DRY})$$

$$\dot{m} = 8.5714 \times 10^{-3} (\text{GR/DSCF})(Q_{s,d})$$

$$E = \frac{2.9857 \times 10^{-3} F_d (\text{GR/DSCF})}{20.9 - O_{2,d}}$$

Where

$\text{CO}_{\text{CO}_2\text{-free,dry,avg}}$ = average of two determinations of carbon monoxide on a dry, CO_2 -free integrated flue gas sample reported in ppm by volume

$\text{CO}_{2,d}$ = 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

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.)
$\dot{m}$	= emission or mass rate of carbon monoxide on a LB/HR basis
$Q_{s,d}$	= volumetric flow rate of flue gas in dry standard cubic feet per minute
E	= emission factor of carbon monoxide in pounds of carbon monoxide emitted per million BTU heat input (LB/MMBTU)
F_d	= F-Factor of respective fuel in dry standard cubic feet of exhaust gas at 0% oxygen per million BTU of heat input (DSCF/MMBTU)

CALCULATION EQUATIONS

Chromotropic Acid Method for Formaldehyde

$$m_t = \frac{m_a \times V_{\text{soln}}}{V_{\text{aliq}}}$$

where m_t = mass of formaldehyde in total sample in ug
 m_a = mass of formaldehyde in aliquot in ug
 V_{soln} = volume of total sample in cc (500 cc normally)
 V_{aliq} = volume of aliquot taken for analysis in cc

$$\text{PPM} \cdot \text{DRY} = \frac{.0283 m_t}{V_{\text{std}}}$$

$$\text{PPM} \cdot \text{WET} = \text{PPM DRY} (1 - \text{MC}/100)$$

$$\text{GR/DSCF} = 5.45 \times 10^{-4} (\text{PPM} \cdot \text{DRY})$$

$$\text{mg/dscm} = 1.249 (\text{PPM} \cdot \text{DRY})$$

$$\dot{m} = 8.5714 \times 10^{-3} (\text{GR/DSCF}) (Q_{s,d})$$

where $\text{PPM} \cdot \text{DRY}$ = concentration of formaldehyde in parts per million by volume on a dry basis
 $\text{PPM} \cdot \text{WET}$ = 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.)
 m = emission or mass rate of formaldehyde in pounds per hour (LB/HR)

Method 25A

Total Gaseous Organics Calculation Equations

$$\text{GR C/SCF} = 2.180 \times 10^{-4} (\text{ppm,w})$$

$$\text{GR C/DSCF} = 2.180 \times 10^{-4} (\text{ppm,w}) / (1 - \text{MC}/100)$$

$$\text{LB C/HR} = 8.5714 \times 10^{-3} (\text{GR/DSCF}) (\text{DSCFM})$$

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 RS55 Heated FID Analyzer as normally operated with a heated filter, heated sample line and heated detector oven gives ppm,w.

Note 2: ppm,C = ppm as carbon = ppm methane

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Calculation of (LB/KLB FLUE GAS)
Louisiana Pacific - Newberry Michigan
Dryer Particulate Emission Rate

Parameter	Run 1	Run 2	Run 3
$(Q_{s,d})$ DSCFM	37304	35983	36294
m_{fg} (LB/HR)	193981	187112	188729
m_{fg} (10^3 LB/HR)	194.0	187.1	188.7
m_p (LB/HR)	12.76	9.74	10.00
E (LB/KLB)	0.066	0.052	0.053

$$m_{fg} = 194612/37416 = (\text{LB/HR})/(\text{DSCFM}) = 5.20 Q_{s,d}$$

From Method 2 Determination

S-412

Interpoll Laboratories, Inc.
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Calculation of (LB/KLB FLUE GAS @50% EXCESS AIR)
Louisiana Pacific - Newberry Michigan
Thermal Oil Heater Particulate Emission Rate

Parameter	Run 1	Run 2	Run 3
($Q_{s,d}$) DSCFM	11798	12043	12001
m_{fg} (LB/HR)	57338	58529	58325
m_{fg} (10^3 LB/HR)	57.3	58.5	58.3
m_p (LB/HR)	1.44	1.87	1.81
E (LB/KLB)	0.025	0.032	0.031
B_{O_2} (% v/v)	14.90	14.70	14.40
E (LB/KLB flue gas adj. to 50% Excess Air)	0.044	0.054	0.050

$$m_{fg} = 58819/12106 = (\text{LB/HR})/(\text{DSCFM}) = 4.86 Q_{s,d}$$

From Method 2 Determination

APPENDIX N

SAMPLING TRAIN CALIBRATION DATA

EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job LP / New Body

Date 2-5-92

Operator E. [Signature]

Module No. 3

Instructions: Operate the control module at a flow rate equal to ΔH_0 for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.09 in. Hg. $\tau =$.9920 ΔH_0 1.89 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
~~1.5~~	(336.00)	~~65~~	~~60~~
2.5	337.88	65	60
5.0	339.75	68	61
7.5	341.62	69	62
10	343.50	71	63
~~15~~	$V_m = 7.50$	Avg (t_m) = <u>64.9</u> °F	

Calculate Y_{en} as follows:

$$Y_{en} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{en} = \frac{1.786}{(7.50)(.9920)} \left[\frac{(64.9) + 460}{(29.09)} \right]^{0.5} = 4.2475$$

$$Y_{en} = \underline{1.0187}$$

If Y_{en} 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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EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job LP / Newbury

Date 2-3-92

Operator E. Sawicki

Module No. 3

Instructions: Operate the control module at a flow rate equal to ΔH_e for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.84 in. Hg. $\tau = .9920$ ΔH_e 1.87 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	346.00		
2.5	347.90	69	66
5.0	349.84	71	67
7.5	351.70	73	67
10	353.64	74	68
	$V_m = 7.64$	Avg $(t_m) = 69.4$ °F	

Calculate Y_{en} as follows:

$$Y_{en} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{en} = \frac{1.786}{(.9920)(7.64)} \left[\frac{(69.4 + 460)}{(28.84)} \right]^{0.5} = 1.2844$$

$$Y_{en} = 1.0096$$

If Y_{en} 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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EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job LP/NEWBERRY

Date 2-1-92

Operator ET

Module No. 7

Instructions: Operate the control module at a flow rate equal to ΔH_0 for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.10 in. Hg. $\tau =$ 1.0083 ΔH_0 1.86 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(525.00)		
2.5	526.00	70	64
5.0	528.70	71	65
7.5	530.62	73	66
10	532.54	74	60
	$V_m = 7.54$	Avg (t_m) = 686 °F	

Calculate Y_{en} as follows:

$$Y_{en} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{en} = \frac{1.786}{(1.0086)(7.54)} \left[\frac{(686) + 460}{(29.10)} \right]^{0.5}$$

$$Y_{en} = \underline{1.0012}$$

If Y_{en} 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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EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job LP/Nowberry

Date 2-6-92

Operator E. T. [Signature]

Module No. 7

Instructions: Operate the control module at a flow rate equal to ΔH_0 for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.80 in. Hg. $\tau =$ 1.0083 ΔH_0 1.86 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(662.00)		
2.5	663.83	59	56
5.0	665.75	62	57
7.5	667.78	64	58
10	669.70	66	59
	$V_m = 7.70$	Avg $(t_m) = 61.1$ °F	

Calculate Y_{CO} as follows:

$$Y_{CO} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{CO} = \frac{1.786}{(1.0083)(7.70)} \left[\frac{(61.1 + 460)}{(28.80)} \right]^{0.5} 4.2496$$

$$Y_{CO} = \underline{.9175}$$

If Y_{CO} 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

EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job LP/NEWBERRY
Operator E. J. J. J.

Date 2-4-92
Module No. 8

Instructions: Operate the control module at a flow rate equal to ΔH_0 for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.10 in. Hg. $\tau =$.9993 ΔH_0 1.88 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(287.00)		
2.5	288.90	69	64
5.0	290.82	71	64
7.5	292.73	72	66
10	294.65	74	66
	$V_m = 7.65$	Avg (t_m) = 68.3 °F	

Calculate Y_{en} as follows:

$$Y_{en} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{en} = \frac{1.786}{(.9993)(7.65)} \left[\frac{(68.3) + 460}{(29.10)} \right]^{0.5} = 4.2608$$

$$Y_{en} = \underline{.9954}$$

If Y_{en} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job LP/New York

Date 2-6-92

Operator E. [Signature]

Module No. 8

Instructions: Operate the control module at a flow rate equal to ΔH_0 for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.80 in. Hg. $\uparrow =$.9993 ΔH_0 1.78 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	612.00		
2.5	613.95	67	64
5.0	615.90	69	65
7.5	617.80	70	66
10	619.15	71	67
	$V_m = 7.75$	Avg $(t_m) = 67.4$ °F	

Calculate Y_{en} as follows:

$$Y_{en} = \frac{1.786}{\uparrow V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{en} = \frac{1.786}{(.9993)(7.75)} \left[\frac{(67.4) + 460}{(28.80)} \right]^{0.5} = 4.2793$$

$$Y_{en} = \underline{.9868}$$

If Y_{en} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: February 10, 1992

Meter Box No. : 2 (Rockwell Dry Test Meter Serial No. 964549)

Date of Last Calibration: January 3, 1992

Calibration Technician: D. Brennan

Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter		Final Meter		Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
		Reading		Reading			
January 14, 1992	2-3484	682.00		1053.67		371.67	371.67
January 28, 1992	2-3493	1061.00		1401.80		340.80	712.47
February 4, 1992	2-3500	1413.10		1644.18		231.08	943.55

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: February 10, 1992

Meter Box No. : 3 (Rockwell Dry Test Meter Serial No. 35303)

Date of Last Calibration: December 7, 1991

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.)
December 10, 1991	1-3472	910.50	1054.68	144.18	144.18
December 11, 1991	1-3474	1060.60	1331.98	271.38	415.56
February 7, 1992	2-3500	1336.00	1451.88	115.88	531.44

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: February 10, 1992

Meter Box No. : 7 (Rockwell Dry Test Meter Serial No. 964551)

Date of Last Calibration: January 3, 1992

Calibration Technician: D. Brennan

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.)
January 16, 1992	2-3485	892.00	1024.76	132.76	132.76
January 21, 1992	2-3490	1033.06	1172.81	139.75	272.51
January 22, 1992	2-3489	1173.66	1278.51	104.85	377.36
January 31, 1992	2-3496	1281.40	1523.37	241.97	619.33
February 5, 1992	2-3500	1525.00	1773.96	248.96	868.29

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-620

Meter Box Calibration and Usage Status

Date of Report: February 10, 1992

Meter Box No. : 8 (Rockwell Dry Test Meter Serial No. 964553)

Date of Last Calibration: January 2, 1992

Calibration Technician: D. Brennan

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.)
January 16, 1992	2-3485	923.00	1122.81	199.81	199.81
January 31, 1992	2-3496	1129.00	1280.85	151.85	351.66
February 5, 1992	2-3500	1287.00	1833.96	546.96	898.62

* Total volume through meter since last calibration.

Date 1-3-92
Bar. Press. 29.02 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET

EPA METHOD 6

Control Module No. _____

Serial No. DTH 67549

Wet Test Water No. AL-20

Technician D. Brennan

[illegible]Positive leak check performed by D.B.

Water was in tolerance

Meter was not in tolerance ☐; readjusted linkage

Water was not in tolerance ☒: changed dry test meters

Approved by Daniel M. Dwyer Date 11/5/92

* Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

Date 12-7-91
Bar. Press. 28.75 in. Hg

Control Module No. _____
Serial No. DTH _____
Wet Test Meter No. _____
Technician _____

Bar. Press. 28.75 in. Hg

LEAKS HOUGHTON HEIR

9. CONCLUSION

Wet Test Meter No. AL-20

Technician

[illegible]

Positive leak check performed by ☒
 Water was in tolerance

Water was not in tolerance ☒; readjusted linkage

Water was not in tolerance ☒; changed dry test meters

Approved by Daniel R. Papp Date 12/9/91

* Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

S0102RR 11/91

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET

Bar. Press. 29.02 in: Hg

EPA METHOD 5

Serial No. DTN 965550

Hot Test Meter No. AL-20

Technician D. Brennan

[illegible]

Positive leak check performed by D. J.

Water was in tolerance

Water was not in tolerance ☐; readjusted linkage

Water was not in tolerance ☒; changed dry test meters

Approved by Daniel R. Dege Date 11/5/92

• Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

Date 11/2/92

Bar. Press. 29.11 in. Hg

INTERPOL LABORATORIES, INC.
METER CALIBRATION SHEET

EPA METHOD 8

 ∞

Serial No. DTH

Wet Test Meter No. AL-20

Technician

[illegible]

Positive leak check performed by: YUH

Water was in tolerance

Water was not in tolerance ☒; readjusted linkage

Water was not in tolerance ☒: changed dry test meters

Approved by Daniel R. Dye Date 11/2/91

* Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

S0102RR 11/91

DIFFERENTIAL PRESSURE AND PROOF CALIBRATION CURVES

DIFFERENTIAL - INCHES H₂O

N-15

PROOF %
100
95

PULSATION RANGE

WET TEST METER



Calibrated with a 10 Ft. American Bell
Prover, Serial No. 3157. Traceable to
the Bureau of Standards. Reference No.
5249068, PI-TAPE.

AL-20 American Wet Test Meter
Serial No. p-717

Stainless Steel w/Removable Back
Calibrated w/Saturated Air
Water Temp. 74° F.
Air Temp. 74° F.

Inlet Pressure 2" H₂O Constant
Calibration Rate: 60 CFH Per/Hr.
Capacity Rate: 120 CFH Per/Hr.
Restricted Outlet for Rate Deviation

CORRECT VOLUME * INDEX READING * PROOF * 100

DAVID BANKS

FLOW RATE - CUBIC FEET OF AIR PER HOUR

November, 1991

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 2-4-92

Nozzle Number 5-4

Technician: D. Van Hoever

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.246
2	.246
3	.246
Average:	.246

Interpoll Laboratories, Inc.

(612) 786-6020

Nozzle Calibration

Data Sheet

Date of Calibration: 2-5-92

Nozzle Number 5-8

Technician: D. Van Hoever

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	.501
2	.504
3	.502
Average:	.502

Interpoll Laboratories, Inc.

(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 2-6-92

Nozzle Number 5-3

Technician: D. Van Hoever

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	.189
2	.189
3	.189
Average:	.189

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 2-7-92

Nozzle: PM-10

Technician: E. Trowbridge

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	.182
2	.182
3	.181
Average:	.182

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

Unit under test:

Vendor FLUKEModel 51Range 0-2100 °FDate of Calibration 1-3-92Serial Number 5030375Thermocouple Type KTechnician E. TROWBRIDGE

Method of Calibration:

- ☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.
- ☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is $\pm 0.1\%$ of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	1.0	+1.0	.21
100	100	100.6	+0.6	.10
200	200	200.3	+0.3	.05
300	300	301.8	+1.8	.23
400	400	400.0	—	—
500	500	500.8	+0.8	.09
600	600	602.8	+2.8	.24
700	700	700.6	+0.6	.05
800	800	802.4	+2.4	.19
900	900	900.8	+0.8	.05
1000	1000	1002.2	+2.2	.15
1100	1100	1101.8	+1.8	.11
1200	1200	1203.6	+3.6	.21
1300	1300	1300.8	+0.8	.04
1400	1400	1404.0	+4.0	.21
1500	1500	1501.4	+1.4	.07
1600	1600	1602.4	+2.4	.11
1700	1700	1701.4	+1.4	.06
1800	1800	1802.4	+2.4	.10
1900	1900	1900.4	+0.4	.01
2000	2000	2001.6	+1.6	.06
2100	2100	2099.0	-1.0	.03
Averages:			1.67	.12

OF = off scale response by unit under test (°F)
 $\% \text{ dev} = 100 \Delta t / (460 + t)$



Unit in tolerance



Unit was not in tolerance; recalibrated - See new calibration sheet.

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

Unit under test:

Vendor Beckman Industrial
Model HD110 T Serial Number 10567095 (POT #18)
Range -4 to 1999 °F °F Thermocouple Type K
Date of Calibration 9/12/91 Technician D.V.H.

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 $\pm 0.1\%$ 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	96	4	.71
200	200	200	0	0
300	300	298	2	.39
400	400	395	5	.58
500	500	495	5	.32
600	600	598	2	.18
700	700	699	1	.08
800	800	804	4	.32
900	900	906	6	.44
1000	1000	1011	11	.75
1100	1100	1115	15	.96
1200	1200	1221	21	1.26
1300	1300	1322	22	1.25
1400	1400	1426	26	1.39
1500	1500	1524	24	1.22
1600	1600	1626	26	1.26
1700	1700	1721	21	.97
1800	1800	1819	19	.54
1900	1900	1912	12	.51
2000	—	—	—	—
2100	—	—	—	—
		Averages:		.68

OF = off scale response by unit under test (°F)
% dev = $100 \Delta t / (450 + t)$

- ☒ Unit in tolerance
☐ Unit was not in tolerance; recalibrated - See new calibration sheet.

S-Type Pitot Tube Inspection SheetPitot No. 23-5Pitot tube dimensions:

1. External tubing diameter (D_t) .313 IN.
2. Base to Side A opening plane (P_A) .457 IN.
3. Base to Side B opening plane (P_B) .458 IN.

Alignment:

4. $\alpha_1 < 10^\circ$ 0
5. $\alpha_2 < 10^\circ$ 0
6. $B_1 < 5^\circ$ 1
7. $B_2 < 5^\circ$ 2
8. $Z < .125"$.04
9. $W < .0625"$.03

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle 7.60 IN.
11. Pitot to probe sheath 3.00 IN.
12. Pitot to thermocouple (parallel to probe) 3.00 IN.
13. Pitot to thermocouple (perpendicular to probe) 7.62 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:

Inspected by:

2-14-91[Signature]

CFR Title 40 Part 60 Appendix A Method 2

S-Type Pitot Tube Inspection SheetPitot No. 23-6Pitot tube dimensions:

1. External tubing diameter (D_t) 313 IN.
2. Base to Side A opening plane (P_A) 464 IN.
3. Base to Side B opening plane (P_B) 465 IN.

Alignment:

4. $\alpha_1 < 10^\circ$ 0
5. $\alpha_2 < 10^\circ$ 0
6. $B_1 < 5^\circ$ 2
7. $B_2 < 5^\circ$ 2
8. $Z < .125"$.03
9. $W < .0625"$.03

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle 758 IN.
11. Pitot to probe sheath 3.00 IN.
12. Pitot to thermocouple (parallel to probe) 3.00 IN.
13. Pitot to thermocouple (perpendicular to probe) 762 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:

Inspected by:

2-14-91[Signature]

CFR Title 40 Part 60 Appendix A Method 2

INTERPOLL LABORATORIES

(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 1-6-92

Technician E. T. Miller

Mercury Column Barometer No. _____

Aneroid Barometer No. WITM-TOR MODEL 12 SN# 01002005

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (P _{ba} -P _{bm})
			29.06	29.06	0

Has this barometer shown any consistent problems with calibration? Yes/No No If yes, explain. _____

Has problem been alleviated? Yes/No. How? _____

*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

S-312

INTERPOLL LABORATORIES

(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration SheetDate 7/8/91Technician Duane Van HoeverMercury Column Barometer No. 1Aneroid Barometer No. Ultimeter series 1 # 8C1216

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (Pba-Pbm)
29.27	70	.11	29.16	29.17	-.01

Has this barometer shown any consistent problems with calibration? Yes/No. If
yes, explain. No

Has problem been alleviated? Yes/No. How? _____

*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

S-312