Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

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Interpoll Laboratories, Inc.

June 1996

Interpoll Laboratories, Inc.
4500 Ball Road N.E.
Circle Pines, Minnesota 55014-1819

TEL: (612) 786-6020
FAX: (612) 786-7854

4-79

RESULTS OF THE MAY 21 & 22, 1996 AIR EMISSION ENGINEERING TESTING AT THE LOUISIANA PACIFIC OSB PLANT IN TWO HARBORS, MINNESOTA

NO PROCESS DATA

Submitted to:

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

Attention:

Sue Somers

Reviewed by:

Daniel J. Despen
Manager
Stationary Source Testing Department

Report Number 6-7712E
June 18, 1996
SL/sll

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ABBREVIATIONS

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

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

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1 INTRODUCTION

On May 21 & 22, 1996, Interpoll Laboratories conducted Air Emission Engineering tests at the Louisiana Pacific OSB Plant in Two Harbors, Minnesota on the following sources:

Source	Parameters
Primary Cyclone Outlet	PM,CO,NO_x,CH_2O
E-Tube Outlet	PM,CH_2O
RTO Inlet	PM,CO,NO_x

On-site testing was performed by Duane Van Hoever, Mark Kaehler, Bob Aschenbach, Steve Kelker, Mark Petersen, Jamie Bainville, Dan Hulleman, and Ken Nuessmeier. Coordination between testing activities and plant operation was provided by Sue Somers of Louisiana-Pacific. The tests were not witnessed by a member of the Minnesota Pollution Control Agency.

A summary and discussion of all of the important results are presented in the following section. More detailed results of the various samplings are presented in Section 3, together with pertinent sampling parameters. Supplemental information such as field data sheets and laboratory results are presented in the appendices.

2 SUMMARY AND DISCUSSION

The results of the air emission engineering tests are presented in Tables 1 - 6. An overview of the results is presented in the table below:

PARAMETER		MEASURED
PRIMARY CYCLONE OUTLET		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.351
	(LB/HR)	80.3
DRY CATCH ONLY	(GR/DSCF)	0.339
	(LB/HR)	77.6
Oxides of Nitrogen		
	(ppm,d)	18
	(LB/HR)	3.5
Carbon Monoxide		
	(ppm,d)	242
	(LB/HR)	28
Formaldehyde		
	(ppm,d)	8.2
	(LB/HR)	1.0
E-TUBE OUTLET		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.012
	(LB/HR)	3.8
DRY CATCH ONLY	(GR/DSCF)	0.0089
	(LB/HR)	2.8
Formaldehyde		
	(ppm,d)	28
	(LB/HR)	3.8
RTO INLET		
Particulate		
DRY + WET CATCH	(GR/DSCF)	0.010
	(LB/HR)	3.8
DRY CATCH ONLY	(GR/DSCF)	0.0062
	(LB/HR)	2.3
Oxides of Nitrogen		
	(ppm,d)	16
	(LB/HR)	4.8
Carbon Monoxide		
	(ppm,d)	244
	(LB/HR)	45

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

Table 1a Summary of the Results of the May 21, 1996 Particulate Emission Engineering Test of the Primary Cyclone Outlet at the Louisiana Pacific Plant in Two Harbors, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-21-96	05-21-96	05-21-96
Time runs were done (HRS)	945/1050	1155/1345	1535/1637
Volumetric flow			
actual (ACFM)	50532	50926	51003
standard (DSCFM)	27136	25565	27454
Gas temperature (DEG-F)	230	228	231
Moisture content (%V/V)	25.34	30.42	25.05
Gas composition (%V/V,dry)			
carbon dioxide	3.90	4.40	3.80
oxygen	16.00	15.30	16.00
nitrogen	80.10	80.30	80.20
Isokinetic variation (%)	97.2	105.4	94.3
Particulate concentration			
actual (GR/ACF)	0.193	0.183	0.176
standard (GR/DSCF)	0.360	0.365	0.327
Part. emission rate (LB/HR)	83.72	79.99	77.06

Note: Dry + Organic Wet Catch

Table 1b Summary of the Results of the May 21, 1996 Particulate Emission Engineering Test of the Primary Cyclone Outlet at the Louisiana Pacific Plant in Two Harbors, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-21-96	05-21-96	05-21-96
Time runs were done (HRS)	945/1050	1155/1345	1535/1637
Volumetric flow			
actual (ACFM)	50532	50926	51003
standard (DSCFM)	27136	25565	27454
Gas temperature (DEG-F)	230	228	231
Moisture content (%V/V)	25.34	30.42	25.05
Gas composition (%V/V,dry)			
carbon dioxide	3.90	4.40	3.80
oxygen	16.00	15.30	16.00
nitrogen	80.10	80.30	80.20
Isokinetic variation (%)	97.2	105.4	94.3
Particulate concentration			
actual (GR/ACF)	0.189	0.177	0.169
standard (GR/DSCF)	0.351	0.353	0.314
Part. emission rate (LB/HR)	81.74	77.29	73.91

Note: Dry Catch Only

Table 2a Summary of the Results of the May 21, 1996 Particulate Emission Engineering Test of the RTO Inlet at the Louisiana Pacific Plant in Two Harbors, Minnesota.

ITEM		Run 1	Run 2
Date of test		05-21-96	05-21-96
Time runs were done	(HRS)	945/1049	1155/1344
Volumetric flow			
actual	(ACFM)	65731	65582
standard	(DSCFM)	43986	41704
Gas temperature	(DEG-F)	163	167
Moisture content	(%V/V)	17.80	21.37
Gas composition	(%V/V,dry)		
carbon dioxide		2.20	2.90
oxygen		17.60	17.00
nitrogen		80.20	80.10
Isokinetic variation	(%)	97.5	103.6
Particulate concentration			
actual	(GR/ACF)	.00708	.00624
standard	(GR/DSCF)	.0106	.00981
Part. emission rate	(LB/HR)	3.99	3.51

Note: Dry + Organic Wet Catch

Table 2b Summary of the Results of the May 21, 1996 Particulate Emission Engineering Test of the RTO Inlet at the Louisiana Pacific Plant in Two Harbors, Minnesota.

ITEM		Run 1	Run 2
Date of test		05-21-96	05-21-96
Time runs were done	(HRS)	945/1049	1155/1344
Volumetric flow			
actual	(ACFM)	65731	65582
standard	(DSCFM)	43986	41704
Gas temperature	(DEG-F)	163	167
Moisture content	(%V/V)	17.80	21.37
Gas composition	(%V/V,dry)		
carbon dioxide		2.20	2.90
oxygen		17.60	17.00
nitrogen		80.20	80.10
Isokinetic variation	(%)	97.5	103.6
Particulate concentration			
actual	(GR/ACF)	.00461	.00355
standard	(GR/DSCF)	.00689	.00559
Part. emission rate	(LB/HR)	2.60	2.00

Note: Dry Catch Only

Table 3a Summary of the Results of the May 21, 1996 Particulate Emission Engineering Test of the E-Tube Outlet at the Louisiana Pacific Plant in Two Harbors, Minnesota.

ITEM		Run 1
Date of test		05-21-96
Time runs were done	(HRS)	1535/1637
Volumetric flow		
actual	(ACFM)	60529
standard	(DSCFM)	36933
Gas temperature	(DEG-F)	162
Moisture content	(%V/V)	25.19
Gas composition	(%V/V,dry)	
carbon dioxide		3.50
oxygen		16.40
nitrogen		80.10
Isokinetic variation	(%)	104.5
Particulate concentration		
actual	(GR/ACF)	.00733
standard	(GR/DSCF)	.0120
Part. emission rate	(LB/HR)	3.80

Note: Dry + Organic Wet Catch

Table 3b Summary of the Results of the May 21, 1996 Particulate Emission Engineering Test of the E-Tube Outlet at the Louisiana Pacific Plant in Two Harbors, Minnesota.

ITEM		Run 1
Date of test		05-21-96
Time runs were done	(HRS)	1535/1637
Volumetric flow		
actual	(ACFM)	60529
standard	(DSCFM)	36933
Gas temperature	(DEG-F)	162
Moisture content	(%V/V)	25.19
Gas composition	(%V/V,dry)	
carbon dioxide		3.50
oxygen		16.40
nitrogen		80.10
Isokinetic variation	(%)	104.5
Particulate concentration		
actual	(GR/ACF)	.00541
standard	(GR/DSCF)	.00887
Part. emission rate	(LB/HR)	2.81

Note: Dry Catch Only

Table 4. Summary of the Results of the May 21 & 22, 1996 **Oxides of Nitrogen Determinations** at the Louisiana Pacific Plant in Two Harbors, Minnesota.

Date	Time	Concentration (ppm,d)	Emission Rate (LB/HR)
(Primary Cyclone Outlet)			
5-21-96	0948-1048	20	4.0
5-21-96	1155-1344	17	3.2
5-21-96	1535-1700	16	3.2
Avg		18	3.5
(RTO Inlet)			
5-21-96	0945-1045	17	5.5
5-21-96	1156-1344	16	4.8
5-21-96	1600-1700	14	4.2
Avg		16	4.8

Table 5. Summary of the Results of the May 21 & 22, 1996 **Carbon Monoxide Determinations** at the Louisiana Pacific Plant in Two Harbors, Minnesota.

Date	Time	Concentration (ppm,d)	Emission Rate (LB/HR)
(Primary Cyclone Outlet)			
5-21-96	0948-1048	178	21
5-21-96	1155-1344	338	38
5-21-96	1535-1700	211	25
Avg		242	28
(RTO Inlet)			
5-21-96	0945-1045	180	35
5-21-96	1156-1344	340	62
5-21-96	1600-1700	213	39
Avg		244	45

Table 6. Summary of the Results of the May 21 & 22, 1996 **Formaldehyde Determinations** at the Louisiana Pacific Plant in Two Harbors, Minnesota.

Date	Time	Concentration (ppm,d)	Emission Rate (LB/HR)
(Primary Cyclone Outlet)			
5-22-96	0910-1037	6.8	0.86
5-22-96	1135-1346	8.0	0.95
5-22-96	1500-1618	9.9	1.20
Avg		8.2	1.00
(E-Tube Outlet)			
5-22-96	0910-1026	28	3.9
5-22-96	1135-1346	28	3.8
5-22-96	1500-1616	27	3.6
Avg		28	3.8

3 RESULTS

The results of all field and laboratory evaluations are presented in this section. Gas composition results (Orsat and moisture) are presented first followed by the computer printout of the gas composition, particulate, oxides of nitrogen, carbon monoxide, and formaldehyde determinations. 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 program. Emission rates have been calculated using the product of the concentration times flow method.

3.1 Results of Orsat and Moisture Analyses

Test No. 7
Primary Cyclone Outlet

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

	Run 1	Run 2	Run 3
Date of run	05-21-96	05-21-96	05-21-96
Dry basis (orsat)			
carbon dioxide.....	3.90	4.40	3.80
oxygen.....	16.00	15.30	16.00
nitrogen.....	80.10	80.30	80.20
Wet basis (orsat)			
carbon dioxide.....	2.91	3.06	2.85
oxygen.....	11.95	10.65	11.99
nitrogen.....	59.80	55.87	60.11
water vapor.....	25.34	30.42	25.05
Dry molecular weight.....	29.26	29.32	29.25
Wet molecular weight.....	26.41	25.87	26.43
Specific gravity.....	0.912	0.894	0.913
Water mass flow.....(LB/HR)	25833	31355	25742
FO	1.256	1.273	1.289

Test No. 8
Primary Cyclone Outlet

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

	Run 1	Run 2	Run 3
Date of run	05-22-96	05-22-96	05-22-96
Dry basis (orsat)			
carbon dioxide.....	4.10	4.10	4.00
oxygen.....	15.60	15.70	15.80
nitrogen.....	80.30	80.20	80.20
Wet basis (orsat)			
carbon dioxide.....	2.97	2.86	2.91
oxygen.....	11.30	10.96	11.49
nitrogen.....	58.18	56.00	58.33
water vapor.....	27.54	30.18	27.27
Dry molecular weight.....	29.28	29.28	29.27
Wet molecular weight.....	26.17	25.88	26.20
Specific gravity.....	0.904	0.894	0.905
Water mass flow.....(LB/HR)	0.00	0.00	0.00
FO	1.293	1.268	1.275

Test No. 9
RTO Inlet

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

	Run 1	Run 2
Date of run	05-21-96	05-21-96
Dry basis (orsat)		
carbon dioxide.....	2.20	2.90
oxygen.....	17.60	17.00
carbon monoxide.....	0.00	0.00
nitrogen.....	80.20	80.10
Wet basis (orsat)		
carbon dioxide.....	1.81	2.28
oxygen.....	14.47	13.37
carbon monoxide.....	0.00	0.00
nitrogen.....	65.93	62.98
water vapor.....	17.80	21.37
Dry molecular weight.....	29.06	29.14
Wet molecular weight.....	27.09	26.76
Specific gravity.....	0.936	0.924
Water mass flow.....(LB/HR)	26712	31798
FO	1.500	1.345

Test No. 9
E - Tube Outlet

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

	Run 1
Date of run	05-21-96
Dry basis (orsat)	
carbon dioxide.....	3.50
oxygen.....	16.40
carbon monoxide.....	0.00
nitrogen.....	80.10
Wet basis (orsat)	
carbon dioxide.....	2.62
oxygen.....	12.27
carbon monoxide.....	0.00
nitrogen.....	59.93
water vapor.....	25.19
Dry molecular weight.....	29.22
Wet molecular weight.....	26.39
Specific gravity.....	0.912
Water mass flow.....(LB/HR)	34874

FO 1.286

Test No. 10
E - Tube Outlet

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

	Run 1	Run 2	Run 3
Date of run	05-22-96	05-22-96	05-22-96
Dry basis (orsat)			
carbon dioxide.....	3.60	3.40	3.40
oxygen.....	16.20	16.40	16.50
nitrogen.....	80.20	80.20	80.10
Wet basis (orsat)			
carbon dioxide.....	2.66	2.54	2.54
oxygen.....	11.99	12.23	12.31
nitrogen.....	59.37	59.80	59.74
water vapor.....	25.97	25.43	25.42
Dry molecular weight.....	29.22	29.20	29.20
Wet molecular weight.....	26.31	26.35	26.36
Specific gravity.....	0.909	0.910	0.910
Water mass flow.....(LB/HR)	0.00	0.00	0.00
FO	1.306	1.324	1.294

3.2 Results of Particulate Loading Determinations

Test No. 7
Primary Cyclone Outlet

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

	Run 1	Run 2	Run 3
Date of run	05-21-96	05-21-96	05-21-96
Time run start/end.....(HRS)	945/1050	1155/1345	1535/1637
Static pressure.....(IN.WC)	-9.80	-9.80	-9.80
Cross sectional area (SQ.FT)	9.62	9.62	9.62
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	221.0	297.0	216.0
desiccant.....(GRAMS)	17.0	16.0	14.0
total.....(GRAMS)	238.0	313.0	230.0
Total particulate material..			
.....collected(grams)	0.7713	0.7985	0.6885
Gas meter coefficient.....	1.0019	1.0019	1.0019
Barometric pressure..(IN.HG)	28.84	28.84	28.84
Avg. orif.pres.drop..(IN.WC)	0.99	1.05	0.98
Avg. gas meter temp..(DEF-F)	70.4	79.5	82.6
Volume through gas meter....			
at meter conditions...(CF)	34.32	35.63	34.45
standard conditions.(DSCF)	33.06	33.75	32.44
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.192	.192	.192
Avg.stack gas temp ..(DEG-F)	230	228	231
Volumetric flow rate.....			
actual.....(ACFM)	50532	50926	51003
dry standard.....(DSCFM)	27136	25565	27454
Isokinetic variation.....(%)	97.2	105.4	94.3
Particulate concentration...			
actual.....(GR/ACF)	0.19321	0.18318	0.17620
dry standard.....(GR/DSCF)	0.35994	0.36504	0.32746
Particle mass rate...(LB/HR)	83.720	79.991	77.057

Test No. 9
RTO Inlet

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

	Run 1	Run 2
Date of run	05-21-96	05-21-96
Time run start/end.....(HRS)	945/1049	1155/1344
Static pressure.....(IN.WC)	-1.35	-1.35
Cross sectional area (SQ.FT)	15.90	15.90
Pitot tube coefficient.....	.840	.840
Water in sample gas		
condenser.....(ML)	0.0	0.0
impingers.....(GRAMS)	232.0	301.0
desiccant.....(GRAMS)	21.0	19.0
total.....(GRAMS)	253.0	320.0
Total particulate material..		
.....collected (grams)	0.0378	0.0353
Gas meter coefficient.....	1.0051	1.0051
Barometric pressure..(IN.HG)	28.84	28.84
Avg. orif.pres.drop..(IN.WC)	2.90	2.96
Avg. gas meter temp..(DEF-F)	85.5	89.2
Volume through gas meter....		
at meter conditions...(CF)	58.35	59.17
standard conditions.(DSCF)	55.10	55.51
Total sampling time....(MIN)	60.00	60.00
Nozzle diameter.....(IN)	.250	.250
Avg.stack gas temp ..(DEG-F)	163	167
Volumetric flow rate.....		
actual.....(ACFM)	65731	65582
dry standard.....(DSCFM)	43986	41704
Isokinetic variation.....(%)	97.5	103.6
Particulate concentration...		
actual.....(GR/ACF)	0.00708	0.00624
dry standard.....(GR/DSCF)	0.01059	0.00981
Particle mass rate...(LB/HR)	3.99	3.51

Test No. 9
E - Tube Outlet

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

	Run 1
Date of run	05-21-96
Time run start/end.....(HRS)	1535/1637
Static pressure.....(IN.WC)	-1.35
Cross sectional area (SQ.FT)	15.90
Pitot tube coefficient.....	.840
Water in sample gas	
condenser.....(ML)	0.0
impingers.....(GRAMS)	338.0
desiccant.....(GRAMS)	16.0
total.....(GRAMS)	354.0
Total particulate material..	
.....collected(grams)	0.0386
Gas meter coefficient.....	1.0051
Barometric pressure..(IN.HG)	28.84
Avg. orif.pres.drop..(IN.WC)	2.37
Avg. gas meter temp..(DEF-F)	90.5
Volume through gas meter....	
at meter conditions...(CF)	53.06
standard conditions.(DSCF)	49.58
Total sampling time....(MIN)	60.00
Nozzle diameter.....(IN)	.250
Avg.stack gas temp ..(DEG-F)	162
Volumetric flow rate.....	
actual.....(ACFM)	60529
dry standard.....(DSCFM)	36933
Isokinetic variation.....(%)	104.5
Particulate concentration...	
actual.....(GR/ACF)	0.00733
dry standard.....(GR/DSCF)	0.01201
Particle mass rate...(LB/HR)	3.80

3.3 Results of Oxides of Nitrogen Determinations

Test No. 4
Primary Cyclone Outlet

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

	Run 1	Run 2	Run 3
Date of run	5-20-96	5-20-96	5-20-96
Time run start/end (HRS)	0948-1048	1155-1344	1535-1700
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	25.3	30.4	25.1
Oxygen content (%V/V)	16.0	15.3	16.0
Volumetric flow rate (DSCFM)	27140	25565	27455
NO_x concentration (ppm,d)	20.4	17.4	16.4
NO_x emission rate (LB/HR)	4.0	3.2	3.2

Test No. 4
RTO Inlet

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

	Run 1	Run 2	Run 3
Date of run	5-21-96	5-21-96	5-21-96
Time run start/end (HRS)	0945-1045	1232-1333	1425-1543
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	17.8	21.4	21.4
Oxygen content (%V/V)	17.6	17.0	17.0
Volumetric flow rate (DSCFM)	43990	41700	41700
NO_x concentration (ppm,d)	17.4	15.9	13.9
NO_x emission rate (LB/HR)	5.5	4.8	4.2

3.4 Results of Carbon Monoxide Determinations

Test No. 4
Primary Cyclone Outlet

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

	Run 1	Run 2	Run 3
Date of run	5-20-96	5-20-96	5-20-96
Time run start/end (HRS)	0948-1048	1155-1344	1535-1700
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	25.3	30.4	25.1
Oxygen content (%V/V)	16.0	15.3	16.0
Volumetric flow rate (DSCFM)	27140	25565	27455
CO concentration (ppm,d)	178	338	211
CO emission rate (LB/HR)	21.1	37.7	25.3

Test No. 4
RTO Inlet

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

	Run 1	Run 2	Run 3
Date of run	5-21-96	5-21-96	5-21-96
Time run start/end (HRS)	0945-1045	1232-1333	1425-1543
Total sampling time (MIN)	60	60	60
Moisture content (%V/V)	17.8	21.4	21.4
Oxygen content (%V/V)	17.6	17.0	17.0
Volumetric flow rate (DSCFM)	43990	41700	41700
CO concentration (ppm,d)	180	340	213
CO emission rate (LB/HR)	34.5	61.8	38.7

3.5 Results of Formaldehyde Determinations

Test No. 8
Primary Cyclone Outlet

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

	Run 1	Run 2	Run 3
Date of run	05-22-96	05-22-96	05-22-96
Time run start/end.....(HRS)	910/1037	1135/1346	1500/1618
Static pressure.....(IN.WC)	-10.10	-10.10	-10.10
Cross sectional area (SQ.FT)	9.62	9.62	9.62
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	412.0	399.0	385.0
desiccant.....(GRAMS)	30.0	88.0	29.0
total.....(GRAMS)	442.0	487.0	414.0
Formaldehyde in sample..(uG)	13000	15000	18000
Gas meter coefficient.....	1.0019	1.0019	1.0019
Barometric pressure..(IN.HG)	28.95	28.95	28.95
Avg. orif.pres.drop..(IN.WC)	2.72	2.58	2.51
Avg. gas meter temp..(DEF-F)	68.7	71.1	76.2
Volume through gas meter....			
at meter conditions...(CF)	56.26	54.79	54.20
standard conditions.(DSCF)	54.82	53.13	52.05
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.245	.245	.245
Avg.stack gas temp ..(DEG-F)	229	228	226
Volumetric flow rate.....			
actual.....(ACFM)	51792	50296	49550
dry standard.....(DSCFM)	27115	25405	26142
Isokinetic variation.....(%)	99.1	102.5	97.6
CH2O concentration.....			
(GR/DSCF).....	0.0037	0.0044	0.0054
(MG/DSCM).....	8.43	10.04	12.29
(PPM-DRY).....	6.76	8.04	9.85
(PPM-WET).....	4.90	5.61	7.16
CH2O emission rate...(LB/HR)	0.85593	0.95447	1.20286

CH2O = Formaldehyde

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

Test No. 10
E - Tube Outlet

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

	Run 1	Run 2	Run 3
Date of run	05-22-96	05-22-96	05-22-96
Time run start/end.....(HRS)	910/1026	1135/1346	1500/1616
Static pressure.....(IN.WC)	-1.35	-1.35	-1.35
Cross sectional area (SQ.FT)	12.18	12.18	12.18
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	370.0	336.0	334.0
desiccant.....(GRAMS)	14.0	11.0	14.0
total.....(GRAMS)	384.0	347.0	348.0
Formaldehyde in sample..(uG)	51000	48000	45000
Gas meter coefficient.....	1.0051	1.0051	1.0051
Barometric pressure..(IN.HG)	28.95	28.95	28.95
Avg. orif.pres.drop..(IN.WC)	2.49	2.18	2.26
Avg. gas meter temp..(DEF-F)	76.5	81.2	85.8
Volume through gas meter....			
at meter conditions...(CF)	53.60	50.30	50.90
standard conditions.(DSCF)	51.60	47.97	48.14
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.250	.250	.250
Avg.stack gas temp ..(DEG-F)	162	164	162
Volumetric flow rate.....			
actual.....(ACFM)	49127	47181	47044
dry standard.....(DSCFM)	29748	28690	28709
Isokinetic variation.....(%)	103.3	99.6	99.9
CH2O concentration.....			
(GR/DSCF).....	0.0153	0.0155	0.0145
(MG/DSCM).....	35.13	35.54	33.21
(PPM-DRY).....	28.14	28.47	26.60
(PPM-WET).....	20.82	21.35	19.95
CH2O emission rate...(LB/HR)	3.91132	3.81638	3.56822

CH2O = Formaldehyde

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

APPENDIX A

RESULTS OF VOLUMETRIC FLOW RATE DETERMINATIONS

Test No. 7
Primary Cyclone Outlet

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

Date of Determination.....	05-21-96
Time of Determination.....(HRS)	900
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)	42
Duct area.....(SQ.FT)	9.62
Direction of flow.....	UP
Static pressure.....(IN.WC)	-9.8
Avg. gas temp.....(DEG-F)	226
Moisture content.....(% V/V)	25.34
Avg. linear velocity.....(FT/SEC)	82.5
Gas density.....(LB/ACF)	.04961
Molecular weight.....(LB/LBMOLE)	29.26
Mass flow of gas.....(LB/HR)	141747
Volumetric flow rate.....	
actual.....(ACFM)	47620
dry standard.....(DSCFM)	25718

Test No. 8
Primary Cyclone Outlet

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

Date of Determination.....	05-22-96
Time of Determination.....(HRS)	850
Barometric pressure.....(IN.HG)	28.95
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	12
Shape of duct.....	Round
Stack diameter.....(IN)	42
Duct area.....(SQ.FT)	9.62
Direction of flow.....	UP
Static pressure.....(IN.WC)	-10.1
Avg. gas temp.....(DEG-F)	230
Moisture content.....(% V/V)	27.54
Avg. linear velocity.....(FT/SEC)	88.2
Gas density.....(LB/ACF)	.04903
Molecular weight.....(LB/LBMOLE)	29.28
Mass flow of gas.....(LB/HR)	149859
Volumetric flow rate.....	
actual.....(ACFM)	50938
dry standard.....(DSCFM)	26626

Test No. 9
RTO Inlet

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

Date of Determination.....	05-21-96
Time of Determination.....(HRS)	903
Barometric pressure.....(IN.HG)	28.84
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	54
Duct area.....(SQ.FT)	15.90
Direction of flow.....	UP
Static pressure.....(IN.WC)	-1.35
Avg. gas temp.....(DEG-F)	164
Moisture content.....(% V/V)	17.80
Avg. linear velocity.....(FT/SEC)	62.5
Gas density.....(LB/ACF)	.05718
Molecular weight.....(LB/LBMOLE)	29.06
Mass flow of gas.....(LB/HR)	204571
Volumetric flow rate.....	
actual.....(ACFM)	59631
dry standard.....(DSCFM)	39843

APPENDIX B

FIELD DATA SHEETS

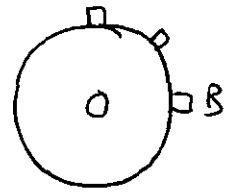
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: LP1 Two Harbors
Source: Primary Cyclone Outlet
Test: 7 Run 0 Date 5-21-96
Stack Dimen.: 42 IN.
Dry Bulb: 226 °F Wet bulb 154 °F
Manometer: ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.84 IN.HG
Static Pressure: -9.8 IN.WC
Operators: B Aschenbach S Kelker
Pitot No.: 40v-6 C_p .84

* Particulate *

Drawing of Test Site

Cross-section View	Elevation View
Top A 	

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas
		Port Length: 9.0 IN.		Time Start:	HRS
A - 1	.044	1.85	10.85	.89	
2	.146	6.13	15.13	1.35	
3	.296	12.43	21.43	1.65	
4	.704	29.57	38.57	1.95	
5	.854	35.87	44.87	1.70	
6	.956	40.15	49.15	.85	
B - 1				1.20	
2				1.50	
3				1.70	
4				1.70	
5				1.65	
6				1.25	
				Avg 1.45	
				FT/SEC	82.66
				ACFM	47718
				DSCFM	25002

Temp. Meas. Device & S/N: Time End: HRS

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CP/ Two Harbors Date 5-21-96 Test 7 Run 1
Source Primary Cyclone Outlet No. of traverse points
Method 5 Filter holder: Teflon Filter type: 4" GFF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: 0.0 cfm at 14 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: (1) 7686

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	694	483	211
Impinger No. 2	310	300	10
Impinger No. 3			
Condenser			
Desiccant	1492	1475	17
Total			238

Integrated Gas Sampling Data:

Bag Pump No. TR Box No. 1 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0.0 cc/min at 22 IN.HG
Time start: 0945 (HRS) Time end: 1050 (HRS)
Sampling rate: 400 cc/min Operator: BA

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

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INTERFACE LABORATORIES, INC.

(612) 86-6020

EPA Method 5 Field Data Sheet

Job: CPI Two Harbors
Source: Primary Cyclone Outlet
Date: 5-21-96 Test 2 Run 1

Operators: SA
Meter Box No. 8 ΔH@ 1.77 in.WC
Gasmeter Coeff. 1.0019

Nozzle No. 9-3
Nozzle Dia. .152 in.
Bar. Press. 28.84 in.Hg

Pitot No. 100-6
C_p .84
H_2O 28 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(0945)	(791.70)											
B - 1	5	794.40	1.40	.85	4.34	3	230	230	235	35	62	58	16.0
2	10	797.23	1.70	1.03	7.22	4	227	232	240	36	67	58	15.7
3	15	800.10	1.75	1.06	0.16	5	230	230	235	37	72	59	16.4
4	20	803.02	1.80	1.10	3.16	6	229	245	260	39	75	59	15.7
5	25	805.88	1.60	.98	6.00	6	230	253	262	38	78	61	16.4
6	30	808.65	1.30	.80	8.57	7	229	253	261	40	79	63	16.1
A - 1	35	811.34	1.35	.83	1.19	6	230	255	258	39	78	65	17.0
2	40	814.01	1.70	1.05	4.14	7	229	237	265	42	82	66	16.7
3	45	817.12	1.85	1.14	7.22	5	232	236	268	45	85	66	17.3
4	50	820.26	1.65	1.02	0.14	10	233	240	265	43	85	67	17.0
5	55	823.18	1.65	1.03	3.06	10	230	255	259	45	84	68	17.2
6	60	826.02	1.50	.93	5.85	10	230	248	255	45	85	68	17.2
	(1050)												
	0-60	V_m - 34.32		ΔH - 99							Avg. - 70.4		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / Two Harbors
Date 5-21-96 Test 7 Run 2
Source Primary Cyclone Outlet
No. of traverse points 12
Method 5 Filter holder: Teflon
Filter type: 4" GFF

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☑
Post test: 0.0 cfm at 15 IN. HG (vac) ☑

Particulate Catch Data:

No. of filters used: (3) 7687, 7688, 8372

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	694	490	204
Impinger No. 2	389	296	93
Impinger No. 3			
Condenser			
Desiccant	1360	1344	16
Total			313

Integrated Gas Sampling Data:

Bag Pump No. TR
Box No. 1 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar
Size: 44 L
Pretest leak check: 0.0 cc/min at 22 IN.HG
Time start: 1155 (HRS) Time end: 1345 (HRS)
Sampling rate: 400 cc/min Operator: SA

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

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INTERPOINT LABORATORIES, INC.
(612) 5-6020

EPA Method 5 Field Data Sheet

Job: LP/Two Harbors
Source: Primary Cyclone Outlet
Date: 5-21-96 Test 7 Run 2

Operators: GA SK
Meter Box No. 8 ΔH@ 1.77 in.WC
Gasmeter Coeff. 1.0019

Nozzle No. 9-3
Nozzle Dia. .192 in.
Bar. Press. 28.84 in.Hg

Pitot No. 40-6
C_p .84
H_2O 26 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1155)	(827.40)											
A-1	5	830.22	1.40	.90	0.13	3	230	247	255	41	70	69	17.0
2	10	833.05	1.25	1.13	3.17	4	230	231	250	37	76	69	15.5
3	15	836.16	1.26	1.10	6.19	8.5	230	235	251	38	82	69	15.7
4	20	839.12	1.70	1.11	9.23	4	228	231	230	37	78	71	16.8
5	25	842.01	1.65	1.08	2.23	4.5	227	235	227	40	86	71	16.4
6	30	844.95	1.30	.85	4.90	4	230	240	265	40	81	72	16.1
B-1	35	847.77	1.40	.91	7.66	3.5	229	238	270	43	85	73	16.2
2	40	850.63	1.60	1.06	0.64	4	224	240	268	41	92	74	15.7
3	45	853.72	1.20	1.13	3.73	5	224	238	271	39	95	75	15.9
4	50	856.89	1.25	1.17	6.88	5	227	240	268	40	97	75	16.1
5	55	860.00	1.70	1.13	9.98	6	227	237	268	37	97	77	16.5
6	60	863.03	1.55	1.04	2.95	6	227	240	270	37	98	77	16.1
	(1345)												
	0-60	V_m - 35.63		ΔH - 1.05							Avg. 79.5		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LPI Two Harbors
Date 5-21-96 Test 7 Run 3
Source Primary Cyclone Outlet
No. of traverse points 12
Method 5 Filter holder: Glass
Filter type: 4" GFP

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: 0.0 cfm at 10 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: (1)

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	712		216
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1506	1492	14
Total			230

Integrated Gas Sampling Data:

Bag Pump No. TR
Box No. 1 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar
Size: 44 L
Pretest leak check: 0.0 cc/min at 22 IN.HG
Time start: 1535 (HRS) Time end: (HRS)
Sampling rate: 400 cc/min Operator: GA

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

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EPA Method 5 Field Data Sheet

Job: CP/Two Harbors
Source: Primary Cyclone Outlet
Date: 5-21-96 Test: 2 Run: 3
Operators: GA
Meter Box No.: 8 ΔH@ 1.77 in.WC
Gasmeter Coeff.: 1.0019
Nozzle No.: 9-3
Nozzle Dia.: .192 in.
Bar. Press.: 28.84 in.Hg
Pitot No.: 40-6
C_p: .84
H_2O: 30 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1535)	(864.00)											
B-1	5	866.80	1.50	.90	6.74	3	230	235	268	46	74	74	17.1
2	10	869.66	1.70	1.01	9.63	3	229	237	263	44	82	74	16.9
3	15	872.68	1.80	1.07	2.63	4	230	234	263	44	87	74	17.1
4	20	875.67	1.75	1.04	5.59	4	232	241	267	42	90	75	16.3
5	25	878.69	1.80	1.08	8.61	4	232	240	263	42	92	75	17.4
6	30	881.42	1.50	.90	1.37	4	232	235	259	41	93	76	17.0
A-1	35	884.36	1.65	.99	4.27	4.5	230	242	264	43	92	76	17.2
2	40	887.45	1.90	1.14	7.38	5.5	230	241	263	41	92	76	16.6
3	45	890.51	2.00	1.20	0.57	6	232	250	270	39	94	76	16.2
4	50	893.40	1.75	1.05	3.56	6	232	247	265	39	94	76	17.2
5	55	896.14	1.45	.87	6.28	6	232	251	267	38	94	76	16.4
6	60	898.45	.90	.54	8.43	6	230	247	261	39	93	77	16.2
	(1637)												
	θ - 60	V_m - 34.45		ΔH - .98							Avg. - 82.6		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: LP/Two Harbors
Source: Primary Cyclone Outlet
Test: 8 Run Date: 5-22-96
Stack Dimen.: 42 IN.
Dry Bulb: °F Wet bulb: °F
Manometer: ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.95 IN.HG
Static Pressure: -10.1 IN.WC
Operators: B Aschenbach S Kelker
Pitot No.: 400-6 glass C_p .84
* Formaldehyde *

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas
		Port Length:	IN.	Time Start:	HRS
A - 1				1.25	
2				1.55	
3				1.75	
4				2.00	
5				1.90	
6				1.70	
B 1				1.25	
2				1.65	
3				1.80	
4				1.70	
5				1.70	
6				1.25	

Temp. Meas. Device & S/N: Time End: HRS

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / Two Harbors Date 5-22-96 Test 8 Run 1
Source Primary Cyclone Outlet No. of traverse points 12
Method 0011 Filter holder: — Filter type: —

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: 0-0 cfm at 10 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)
☐ acetone
☒ other(s) MECL, DI

No. of probe wash bottles:
Sample recovered by:

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	858	550	308
Impinger No. 2	445	345	104
Impinger No. 3			
Condenser			
Desiccant	1409	1379	30
Total			442

Integrated Gas Sampling Data:

Bag Pump No. TR Box No. 37 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0-0 cc/min at 22 IN.HG
Time start: 0940 (HRS) Time end: 1037 (HRS)
Sampling rate: 400 cc/min Operator: SA

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Field Data Sheet

Job: LP/Two Harbors
Source: Primary Cyclone Outlet
Date: 5-22-96 Test: 8 Run: 1

Operators: BA SK
Meter Box No.: 8 ΔH@ 1.77 in.WC
Gasmeter Coeff.: 1.0019

Nozzle No.: Glass
Nozzle Dia.: .245 in.
Bar. Press.: 28.95 in.Hg

Pitot No.: 40-6
C_p: .84
H_2O: 28 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(0910)	(901.10)											
B - 1	5	905.40	1.45	2.36	5.44	3	218	237	—	47	56	56	16.7
2	10	910.00	1.80	2.84	6.19	4	232	235	—	45	67	55	16.4
3	15	915.10	1.85	2.95	5.06	5	232	241	—	45	72	58	16.4
4	20	920.15	1.90	3.09	6.05	5	225	239	—	43	77	58	16.8
5	25	924.51	1.50	2.45	4.51	4.5	226	242	—	43	79	59	16.4
6	30	929.06	1.60	2.61	9.12	4.5	227	237	—	40	80	60	16.4
A - 1	35	933.74	1.70	2.77	3.87	4.5	230	241	—	42	77	62	16.3
2	40	938.82	1.95	2.17	8.95	5	230	239	—	42	80	62	16.2
3	45	943.81	1.95	3.17	4.04	5	232	242	—	39	84	63	16.0
4	50	948.73	1.65	2.70	8.74	5	232	237	—	41	84	63	16.3
5	55	953.22	1.50	2.45	3.23	4.5	233	241	—	39	85	64	16.0
6	60	957.36	1.30	2.14	7.42	4	230	239	—	40	84	65	16.3
	(1037)												
	θ - 60	V_m - 56.26		ΔH - 2.72							Avg. - 68.7		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP / Two Harbors Date 5-22-96 Test 8 Run 2
Source Primary Cyclone Outlet No. of traverse points 12
Method 0011 Filter holder: — Filter type: —

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: 0.0 cfm at 8 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: 4

Recovery solvent(s)

☐ acetone
☒ other(s) MeCl, DI

No. of probe wash bottles:
Sample recovered by:

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	840	551	289
Impinger No. 2	455	345	110
Impinger No. 3			
Condenser			
Desiccant	1580	1492	88
Total			487

Integrated Gas Sampling Data:

Bag Pump No. TR Box No. 27 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0.0 cc/min at 22 IN.HG
Time start: 1335 (HRS) Time end: 1346 (HRS)
Sampling rate: 400 cc/min Operator: SA

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Field Data Sheet

Job: LP / Two Harbors
Source: Primary Cyclone OUTLET
Date: 5-22-96 Test: 8 Run: 2

Operators: BA SK
Meter Box No.: 8 ΔH@ 1.77 in.WC
Gasmeter Coeff.: 1.0019

Nozzle No.: Glass
Nozzle Dia.: .245 in.
Bar. Press.: 28.95 in.Hg

Pitot No.: 40v-6
C_p: .84
H_2O: 28 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1435)	(958.50)											
A-1	5	962.77	1.60	2.60	3.10	3	230	251	–	45	61	61	14.7
2	10	967.75	1.90	3.05	8.04	5	227	248	–	45	74	62	15.5
3	15	973.00	2.00	3.25	3.18	5	228	247	–	43	79	63	15.8
4	20	977.90	1.70	2.78	7.94	5	229	251	–	42	82	63	15.6
5	25	982.30	1.45	2.37	2.35	4	230	250	–	44	83	64	15.8
6	30	986.11	1.100	1.80	6.21	3	231	247	–	44	65	64	16.0
B-1	35	990.10	1.70	1.94	6.17	3	229	251	–	42	73	64	16.7
2	40	994.87	1.75	2.84	4.97	5	230	247	–	40	80	65	16.7
3	45	999.86	1.85	3.05	9.97	5	225	251	–	43	83	65	16.5
4	50	1004.87	1.90	3.14	5.04	5	225	248	–	41	85	66	16.4
5	55	1009.51	1.50	2.48	9.57	5	226	253	–	41	86	67	16.7
6	60	1013.29	1.00	1.66	3.27	4	227	250	–	39	85	67	16.7
	(1346)												
	0-60	V_m - 54.79		ΔH - 2.58							Avg. - 71.1		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/TWC Harbors Date 5-22-94 Test 8 Run 3
Source Primary Cyclone Outlet No. of traverse points 12
Method 0011 Filter holder: — Filter type: —

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☑
Post test: 0.0 cfm at 10 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)
☐ acetone
☒ other(s) Hexane, DI

No. of probe wash bottles:
Sample recovered by:

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	774	477	297
Impinger No. 2	433	345	88
Impinger No. 3			
Condenser			
Desiccant	1420	1391	29
Total			414

Integrated Gas Sampling Data:

Bag Pump No. TR Box No. 27 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0.0 cc/min at 22 IN.HG
Time start: (HRS) Time end: (HRS)
Sampling rate: 400 cc/min Operator: BA

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Field Data Sheet

Job: LP/ Two Harbors
Source: Primary Cyclone Outlet
Date: _____ Test 8 Run 3

Operators: BA SK
Meter Box No. 8 ΔH@ 1.77 in.WC
Gasmeter Coeff. 1.0018

Nozzle No. Glass
Nozzle Dia. .245 in.
Bar. Press. 28.95 in.Hg

Pitot No. 400-6
C_p .84
H_2O 25 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	(1500)	(1014.40)											
B-1	5	1018.15	1.35	2.14	8.60	3	227	237	–	45	64	64	14.7
2	10	1023.10	1.80	2.83	3.38	5	231	241	–	43	80	66	16.2
3	15	1028.79	1.85	2.98	8.32	5.5	225	245	–	43	84	66	16.6
4	20	1032.89	1.80	2.90	3.26	4	227	247	–	41	86	67	16.6
5	25	1037.08	1.55	2.52	2.77	4	224	245	–	43	87	68	16.2
6	30	1042.87	1.40	2.27	2.10	4	227	247	–	42	88	69	16.5
A-1	35	1046.62	1.50	2.44	6.60	4	225	251	–	41	75	69	16.3
2	40	1051.40	1.80	2.89	1.47	5	226	249	–	41	85	69	16.1
3	45	1056.32	1.85	3.00	6.44	5	225	254	–	43	88	70	16.5
4	50	1061.10	1.70	2.76	1.23	5	227	254	–	41	91	70	16.5
5	55	1065.08	1.15	1.88	5.19	4	225	253	–	39	91	71	16.7
6	60	1068.60	.96	1.47	8.70	3.5	225	251	–	42	91	71	16.4
	(1618)												
	θ = 60	V_m = 54.20		ΔH = 2.51							Avg. = 76.2		

INTERPOLL LABORATORIES, INC.
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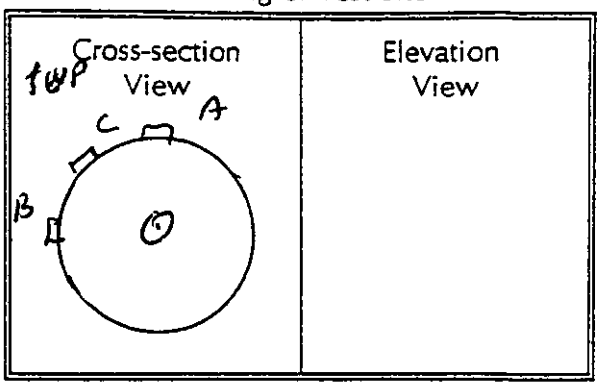
EPA Method 2 Field Data Sheet

Job: L.P. / Two Harbors, MN
Source: RTO / Inlet
Test: 9 Run: 0 Date: 5-22-96
Stack Dimen.: 54 IN.
Dry Bulb: 164 °F Wet bulb: 140 °F
Manometer: ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.94 IN.HG
Static Pressure: -1.35 IN.WC
Operators: M. Kuehler + K. Nussmeier
Pitot No.: 31V-6 C_p: .84
* Particulate *

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: * 9 IN.		Time Start: 0903 HRS	
A-1	.021	1.13	10.13	.84	
2	.067	3.62	12.62	.96	
3	.119	6.37	15.37	.88	
4	.177	9.56	18.56	.90	
5	.250	13.50	22.50	.96	
6	.356	19.22	28.22	1.02	
7	.644	34.79	43.79	1.17	
8	.750	40.50	49.50	1.20	
9	.823	44.44	53.44	1.03	
10	.882	47.63	56.63	.97	↑
11	.933	50.39	59.38	.91	
12	.979	52.87	61.87	.85	164
				.61	↓
				.91	
				.90	
				1.03	
		61.98 ft/sec		1.04	
		59153 ACFM		1.20	
		29463 DSCFM		1.15	
				1.03	
				.98	
				.96	
				.77	
				.65	

Temp. Meas. Device & S/N: PDT-31 / TC
Time End: 0909 HRS

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

* Includes Vertical Portclamp

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

Job L.P. / Two Harbors, MN
Date 5-21-96 Test 9 Run 1
Source RTO / Inlet
No. of traverse points 24
Method 5 Filter holder: Glass
Filter type: 4" G.F.

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☑
Post test: <0.02 cfm at 10 IN. HG (vac) ☑

Particulate Catch Data:

No. of filters used: 8357

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	726	494	232
Impinger No. 3			
Condenser			
Desiccant	1376	1357	21
Total			253

Integrated Gas Sampling Data:

Bag Pump No. 31B
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: 0945 (HRS) Time end: 1049 (HRS)
Sampling rate: 400 cc/min Operator: M. Kuehler

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

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EPA Method 5 Field Data Sheet

Job L.P. / Two Harbors, MN
Source RTO / Inlet
Date 5-22-96 Test 9 Run 1

Operators M. Kuehler & K. Nuessmeier
Meter Box No. 18 ΔH@ 1.81 in.WC
Gasmeter Coeff. 1.0051

Nozzle No. 1-4
Nozzle Dia. .250 in.
Bar. Press. 28.84 in.Hg

Pitot No. 31V-6
C_p .84
H_2O 20 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	0945	963.30											
B-12	2.5	965.80	1.28	3.11	5.79	6	160	233	240	40	78	74	17.9
11	5	968.99	1.20	2.97	8.24	6	163	240	232	39	79	75	18.2
10	7.5	970.70	1.20	2.98	0.68	6	163	239	237	43	83	73	18.2
9	10	973.10	1.15	2.85	3.08	6	165	241	240	43	83	74	17.8
8	12.5	975.61	1.23	3.05	5.56	6	165	243	244	44	87	74	18.0
7	15	977.95	1.10	2.74	7.92	6.5	165	240	245	44	89	74	18.0
6	17.5	980.44	1.17	2.93	0.36	6	162	237	247	45	90	75	18.3
5	20	982.76	1.11	2.76	2.73	6	167	241	243	43	91	75	18.1
4	22.5	985.07	1.15	2.87	5.15	6.5	167	245	240	42	92	76	18.2
3	25	987.47	1.15	2.88	7.57	6.5	166	240	245	42	92	76	18.0
2	27.5	990.03	1.23	3.07	0.07	7	166	237	245	43	94	77	18.1
1	30	992.55	1.27	3.19	2.63	7.5	164	244	240	43	95	78	18.1
4-12	32.5	995.03	1.17	2.95	5.09	7.5	164	240	243	44	93	79	17.5
11	35	997.65	1.30	3.27	7.67	8	165	237	248	44	95	79	17.7
10	37.5	1000.19	1.31	3.31	0.28	8	163	240	244	42	96	80	18.1
9	40	1002.55	1.10	2.79	2.67	7	162	239	247	42	96	81	18.2
8	42.5	1005.10	1.29	3.28	5.27	8	161	237	244	45	97	81	18.4
7	45	1007.60	1.20	3.05	7.77	7.5	161	240	249	45	98	82	18.5
6	47.5	1010.07	1.08	2.75	0.16	7	161	242	250	45	98	83	18.7
5	50	1012.50	1.09	2.78	2.55	7	161	245	246	45	98	83	18.8
4	52.5	1014.87	1.06	2.71	4.92	7	161	241	249	46	99	83	19.0
3	55	1017.25	1.05	2.68	7.27	7	161	240	252	46	99	84	19.0
2	57.5	1019.47	.87	2.23	9.42	6	160	237	255	46	99	84	19.2
1	60	1021.65	.90	2.31	1.61	6	160	235	251	46	99	85	19.2
	(1049)												
	θ - 60	V_m - 58.35		2.90 ΔH -							Avg. - 85.5		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Two Harbors, MN
Date 5-28-96 Test 9 Run 2
Source RTO / Inlet
No. of traverse points 24
Method 5 Filter holder: Glass
Filter type: 4" G/F

Sample Train Leak Check:

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

Particulate Catch Data:

No. of filters used: 8358

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

No. of probe wash bottles: 1
Sample recovered by: M. Kuehler + K. Nessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	796	495	301
Impinger No. 3			
Condenser			
Desiccant	1490	1471	19
Total			320

Integrated Gas Sampling Data:

Bag Pump No. 31B
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: 1155 (HRS) Time end: 1344 (HRS)
Sampling rate: 400 cc/min Operator: M. Kuehler

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

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EPA Method 5 Field Data Sheet

Job: L.P. / Two Harbors, MN
Source: RTO / Inlet
Date: 5-21-96 Test: 9 Run: 2

Operators: M. Knehler + K. Nussmeier
Meter Box No.: 18 ΔH@ 1.81 in.WC
Gasmeter Coeff.: 1.00051

Nozzle No.: 1-4
Nozzle Dia.: .250 in.
Bar. Press.: 28.84 in.Hg

Pitot No.: 31V-6
C_p: .84
H_2O: 17.8 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1155	23.30											
A-12	2.5	25.84	1.20	3.16	5.84	7	163	238	237	45	82	82	16.9
11	5	28.13	1.18	3.09	0.34	7	163	241	249	47	86	82	17.0
10	7.5	30.78	1.11	2.91	0.78	6.5	164	245	243	47	88	82	16.7
9	10	33.07	.98	2.50	3.04	6	165	249	245	47	91	82	17.1
8	12.5	35.61	1.20	3.15	5.58	7	166	244	241	48	93	83	17.7
7	15	38.10	1.20	3.17	8.13	7	165	240	244	48	82	82	17.2
6	17.5	40.61	1.10	2.89	0.55	6.5	162	237	248	45	86	82	17.5
5	20	43.11	1.18	3.10	3.07	7	164	240	240	45	92	83	17.6
4	22.5	45.52	1.04	2.74	5.44	6	167	247	244	43	92	83	17.8
3	25	47.98	1.15	3.02	7.93	7	167	240	238	43	92	83	17.7
2	27.5	50.41	1.07	2.81	0.33	6.5	167	237	241	43	95	83	17.5
1	30	52.77	1.10	2.91	2.78	6.5	166	241	237	44	96	83	17.4
B-12	32.5	55.25	1.07	2.83	5.19	6.5	165	240	243	45	98	84	17.2
11	35	57.77	1.20	3.15	7.23	7	166	245	240	44	94	84	17.8
10	37.5	60.29	1.16	3.04	0.24	7	170	243	247	45	96	85	17.8
9	40	62.71	1.19	3.12	2.77	7	171	240	249	45	97	85	17.4
8	42.5	65.17	1.20	3.15	5.33	7	171	237	244	44	98	85	17.5
7	45	67.73	1.12	2.95	7.79	7	171	234	241	44	100	86	17.4
6	47.5	70.35	1.15	3.03	0.30	7	171	240	235	46	101	86	17.3
5	50	72.75	1.21	3.19	2.86	8	171	247	241	46	102	87	17.3
4	52.5	75.30	1.10	2.91	5.34	7.5	170	243	245	46	102	87	17.2
3	55	77.85	1.10	2.91	7.80	7.5	170	240	248	45	103	87	17.1
2	57.5	80.20	1.05	2.79	0.21	7	169	239	244	45	102	88	17.1
1	60	82.47	.93	2.48	2.48	6.5	167	235	244	45	102	89	16.9
	(1344)												
	0 - 60	V_m - 59.17		2.96 ΔH -							Avg. - 89.2		

down 207 restart 1235

down 249 restart 1308

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: L.P. / Twin Harbors, MN
Source: RTO / Inlet
Test: 9 ~~MCS4~~ Run 3 Date 5-21-96
Stack Dimen.: 54 IN.
Dry Bulb: 160 °F Wet bulb: 147 °F
Manometer: ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.81 IN.HG
Static Pressure: -1.35 IN.WC
Operators: M. Kaehler + R. Weessmeier
Pitot No.: 31V-6 C_p .84

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 9 IN.		Time Start: 1547 HRS	
A-1				1.10	
2				1.05	
3				1.15	
4				1.12	
5		Refer to Run #2		1.21	
6				1.09	
7		for pts used		1.20	
8				1.23	
9				1.05	↑
10				1.21	
11				1.25	160
12				1.15	
B-1				1.07	↓
2				1.13	
3		MC ≈ 23		1.12	
4				1.12	
5		69.33 ft/sec		1.17	
6		66,163 ACFM		1.16	
7		41,675 DSCFM		1.11	
8				1.21	
9				1.17	
10				1.18	
11				1.20	
12				1.17	
Temp. Meas. Device & S/N: PDT-31 / TC				Time End: 1553 HRS	

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Two Harbors, MN
Date 5-21-96 Test 9 Run 3
Source E-Tube/Outlet
No. of traverse points 24
Method 5 Filter holder: Glass
Filter type: 4" G.F.

Dia. = 54"
Pb = 28.84
Pg = 1.35

Sample Train Leak Check:

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

Particulate Catch Data:

No. of filters used: 0360

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	673	498	175
Impinger No. 2	355	192	163
Impinger No. 3			
Condenser			
Desiccant	1392	1376	16
Total			354

Integrated Gas Sampling Data:

Bag Pump No. 31 B
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: 1535 (HRS) Time end: 1637 (HRS)
Sampling rate: 400 cc/min Operator: M. Koehler

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

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WATERFOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 5 Field Data Sheet

Job: LP / Twin Harbors, MN
Source: E-Tube / Outlet
Date: 5-21-96 Test: 9 Run: 3

Operators: M. Kuehler + K. Nussmeier
Meter Box No.: 18 ΔH@: 1.61 in.WC
Gasmeter Coeff.: 1.0051

Nozzle No.: 1-4
Nozzle Dia.: .250 in.
Bar. Press.: 28.84 in.Hg

Pitot No.: 31V-6
C_p: .84
H_2O: 21.3 %

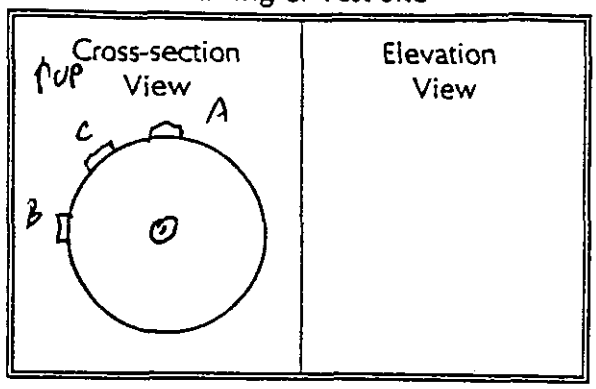
Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1535	93.30											
B-12	2.5	95.55	.98	2.41	5.52	5	167	237	244	47	83	83	17.6
11	5	87.70	.93	2.26	7.67	5	167	241	248	46	86	83	17.4
10	7.5	89.80	.93	2.27	9.83	5	165	243	253	46	88	83	17.5
9	10	92.11	.98	2.39	2.04	5	166	247	250	45	89	83	17.6
8	12.5	94.23	.97	2.38	4.25	5	164	240	257	44	90	84	17.6
7	15	96.34	.97	2.39	6.47	5	162	241	250	41	92	84	17.4
6	17.5	98.57	.98	2.43	8.70	6	160	237	247	42	93	84	17.1
5	20	100.84	.96	2.37	0.91	5	162	244	242	41	94	84	17.3
4	22.5	103.22	.94	2.33	3.11	5	161	241	248	41	95	85	17.5
3	25	105.40	.95	2.36	5.31	5	161	237	248	40	96	85	17.4
2	27.5	107.53	.90	2.24	7.47	5	161	234	253	42	96	85	17.7
1	30	109.66	.91	2.26	9.63	5	161	233	251	42	97	85	17.2
A-12	32.5	112.32	1.29	3.20	2.20	7	161	237	250	43	95	86	17.2
11	35	114.85	1.31	3.25	4.79	7	161	240	245	43	98	86	17.0
10	37.5	117.21	1.05	2.61	7.11	6	163	241	241	44	99	87	16.9
9	40	119.58	1.13	2.82	9.53	6.5	161	235	240	44	100	87	16.9
8	42.5	121.92	1.05	2.63	1.87	6	160	240	244	45	100	86	16.7
7	45	124.27	1.04	2.60	4.19	6	159	247	241	45	100	87	17.3
6	47.5	126.49	.92	2.30	6.38	6	161	245	237	45	100	87	17.6
5	50	128.53	.79	1.97	8.41	5	161	241	243	46	100	88	17.1
4	52.5	130.47	.77	1.93	0.41	5	161	240	241	46	100	87	17.0
3	55	132.48	.75	1.88	2.39	5	160	237	245	46	100	88	16.8
2	57.5	134.51	.80	2.00	4.43	5	160	234	240	47	101	88	16.8
1	60	136.36	.67	1.68	6.31	5	160	231	240	47	101	89	16.5
	1637												
	θ - 60	V_m - 53.06		2.37 ΔH -							Avg. -	90.5	

INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: L.P. / Twin Harbors, MN
Source: E-Tube / Outlet
Test: 10 Run: 0 Date: 5-22-96
Stack Dimen.: 47.25 IN.
Dry Bulb: 159 °F Wet bulb: 146 °F
Manometer: ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.95 IN.HG
Static Pressure: -1.35 IN.WC
Operators: M. Buehler + K. Nuessmeier
Pitot No.: 31V-5 C_p: .84
* Formaldehyde *

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: * 9 IN.		Time Start:	HRS
A					
		Refer to	Test 4		
		Run 3	for		
		Pts and	Flows		

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

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

* Includes Vertical Portclamp

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Two Harbors, MN
Date 5-22-96 Test 10 Run 1
Source E-Tube / Outlet
No. of traverse points 24
Method 0011 Filter holder: NA
Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☒
Post test: <0.02 cfm at 11 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: NA

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

No. of probe wash bottles: 0
Sample recovered by: M. Koehler & K. Niessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	635	475	160
Impinger No. 2	473	263	210
Impinger No. 3			
Condenser			
Desiccant	1504	1490	14
Total			384

Integrated Gas Sampling Data:

Bag Pump No. 31 B
Box No. 5 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar
Size: 44 L
Pretest leak check: 0 cc/min at 15 IN.HG
Time start: 0910 (HRS) Time end: 1026 (HRS)
Sampling rate: 400 cc/min Operator: M. Koehler

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

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EPA Method 5 ..eld Data Sheet

Job L.P. / Two Harbors, MN
Source E-Tube / Outlet
Date 5-22-96 Test 10 Run 1

Operators M. Loehlert K. Wessmeier
Meter Box No. 18 ΔH@ 1.81 in.WC
Gasmeter Coeff. 1.0051

Nozzle No. G-4
Nozzle Dia. .250 in.
Bar. Press. 28.95 in.Hg

Pitot No. 31V-5
C_p .84
H_2O 23 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	0910	144.60											
B-12	2.5	147.10	1.50	3.40	7.18	9	164	249	237	43	66	66	17.3
11	5	149.67	1.45	3.30	9.72	10	163	253	241	42	69	66	17.4
10	7.5	152.13	1.31	3.01	2.16	9	160	261	248	42	71	66	17.5
9	10	154.43	1.17	2.68	4.46	8.5	163	255	250	42	74	66	17.0
8	12.5	156.66	1.03	2.37	6.63	8	163	248	245	43	76	67	17.3
7	15	158.87	1.05	2.42	8.82	8	162	253	237	45	79	67	17.4
6	17.5	161.10	1.05	2.44	1.03	8	161	260	243	44	79	67	17.4
5	20	163.35	1.04	2.41	3.22	8	161	261	248	42	81	68	17.3
4	22.5	165.53	1.05	2.45	5.44	8	158	263	251	44	83	68	17.3
3	25	167.79	1.07	2.50	7.67	8	160	251	253	43	84	69	17.1
2	27.5	169.85	1.02	2.38	9.86	8	161	254	250	43	85	69	17.5
1	30	171.94	.91	2.13	1.93	7.5	161	258	246	43	86	70	17.3
A-12	32.5	174.20	1.04	2.43	4.14	8	161	251	247	43	71	71	17.2
11	35	176.47	1.15	2.64	6.43	9.5	164	253	248	44	80	71	17.2
10	37.5	178.78	1.11	2.57	8.70	8.5	164	247	259	44	83	72	17.0
9	40	180.81	.87	2.03	0.72	8	164	258	253	45	85	72	17.0
8	42.5	182.93	.99	2.31	2.88	8	165	255	250	45	88	73	17.2
7	45	185.15	1.08	2.52	5.14	8.5	165	256	255	44	89	74	17.2
6	47.5	187.23	1.04	2.44	7.36	8.5	164	259	247	45	90	74	17.0
5	50	189.66	1.02	2.39	9.56	8	164	247	258	46	91	74	17.0
4	52.5	191.79	.98	2.31	1.73	8	163	248	253	46	92	76	17.2
3	55	193.99	1.03	2.43	3.95	8	163	253	255	47	92	75	17.0
2	57.5	196.08	.95	2.24	6.09	8	163	250	254	47	93	76	17.3
1	60	198.20	.87	2.06	8.14	8	161	249	254	47	93	77	17.2
	(1026)												
	θ -60	V_m - 53.60		2.49 ΔH -							Avg. - 76.5		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Two Harbors, MN
Date 5-21-96 Test 10 Run 2
Source E-Tube / Outlet
No. of traverse points 24
Method 0011 Filter holder: NA
Filter type: NA

Sample Train Leak Check:

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

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)

☐ acetone
☒ other(s) MeCl

No. of probe wash bottles: 0
Sample recovered by: M. Kuehler + K. Niessmeier

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	610	476	134
Impinger No. 2	467	265	202
Impinger No. 3			
Condenser			
Desiccant	1402	1391	11
Total			347

Integrated Gas Sampling Data:

Bag Pump No. 31 B
Box No. 5 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar
Size: 44 L
Pretest leak check: 0 cc/min at 15 IN.HG
Time start: 1135 (HRS) Time end: 1346 (HRS)
Sampling rate: 400 cc/min Operator: M. Kuehler

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

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. 12) . 602

EPA Method 5 . eld Data Sheet

Job L.P. / Two Harbors, MN
Source E-Tube / Outlet
Date 5-22-96 Test 10 Run 2

Operators M. Kuehlert K. Wessmer
Meter Box No. 18 ΔH@ 1.81 in.WC
Gasmeter Coeff. 1.0051

Nozzle No. G-4
Nozzle Dia. .250 in.
Bar. Press. 28.95 in.Hg

Pitot No. 31-5
C_p .84
H_2O 25.9 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1135	198.50											
A 12	2.5	200.60	1.17	2.54	0.75	7	166	253	233	41	74	74	16.6
11	5	202.71	1.03	2.23	2.86	7	166	258	237	41	77	73	16.8
10	7.5	204.72	.90	1.95	4.84	7	166	260	240	41	80	74	16.9
9	10	206.77	.89	1.93	6.81	7	167	255	247	42	84	74	16.9
8	12.5	208.83	.93	2.02	8.83	7	168	251	253	42	86	74	17.0
7	15	210.91	.98	2.14	0.91	7	167	248	250	42	87	75	17.0
6	17.5	212.99	.97	2.12	2.99	7	167	245	256	42	89	75	16.9
5	20	215.10	.95	2.08	5.05	7	166	253	251	42	90	75	17.0
4	22.5	217.06	.99	2.17	7.15	7	166	256	250	42	91	76	17.0
3	25	219.30	1.01	2.22	9.27	7.5	166	254	250	43	92	76	17.5
2	27.5	221.25	.89	1.97	1.28	7	164	256	253	44	77	75	16.8
1	30	223.16	.72	1.57	3.06	6.5	162	251	255	44	82	76	16.8
B -12	32.5	225.66	1.53	3.34	5.64	9	164	250	257	44	77	76	17.3
11	35	228.10	1.31	2.85	9.03	9	164	247	260	44	81	76	17.3
10	37.5	230.24	1.07	2.34	0.21	8	163	258	254	45	85	76	17.3
9	40	232.45	1.07	2.36	2.39	8	161	255	259	45	86	76	17.3
8	42.5	MK ~~24~~ 234.60	1.05	2.31	4.55	8	163	251	262	44	88	76	17.1
7	45	236.85	1.19	2.62	6.86	8	163	258	255	45	90	77	17.2
6	47.5	239.13	1.04	2.30	9.02	8	162	255	258	45	92	77	17.4
5	50	241.28	1.07	2.37	1.22	8	162	250	253	47	93	78	17.4
4	52.5	243.41	1.03	2.29	3.38	8	163	247	256	47	93	78	17.4
3	55	245.51	.97	2.15	5.48	7	163	253	251	45	95	78	17.3
2	57.5	247.22	.61	1.36	7.15	6	163	250	248	45	95	79	17.5
1	60	248.80	.52	1.16	8.69	4	162	243	245	45	95	79	17.5
	(1346)												
	θ - 60	V_m - 50.30		2.18 ΔH -							Avg. - 81.2		

Down 1159
LeStone 1250

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job L.P. / Two Harbors, MN
Date 5-12-90 Test 10 Run 3
Source E-Tube / Outlet
No. of traverse points 24
Method 0011 Filter holder: NA
Filter type: NA

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 IN.HG (vac) ☑
Post test: <0.02 cfm at 10 IN. HG (vac) ☒

Particulate Catch Data:

No. of filters used: NA

Recovery solvent(s)

☐ acetone
☒ other(s) MeCl2

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	622	475	147
Impinger No. 2	453	266	187
Impinger No. 3			
Condenser			
Desiccant	1518	1504	14
Total			348

Integrated Gas Sampling Data:

Bag Pump No. 31B
Box No. 5 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar
Size: 44 L
Pretest leak check: 0 cc/min at 15 IN.HG
Time start: 1500 (HRS) Time end: 1616 (HRS)
Sampling rate: 400 cc/min Operator: M. Kuehler

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

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(612) -6020

EPA Method 5 Field Data Sheet

Job L.P. / Two Harbors, MN
Source E-Tube / Outlet
Date 5-22-96 Test 10 Run 3

Operators M. Kaehler + K. Nessmeier
Meter Box No. 18 ΔH@ 1.81 in.WC
Gasmeter Coeff. 1.0051

Nozzle No. G-4
Nozzle Dia. .250 in.
Bar. Press. 28.95 in.Hg

Pitot No. 31V-5
C_p .84
H_2O 25.4 %

Traverse Point No.	Sampling Time (min)	Sample Vol. (cf)	Velocity Head (in.WC)	Orifice Meter (in.WC)	Des. Vol. (cf)	VAC. (in.Hg)	Temperatures (°F) Stack	Probe	Oven	Imp.	Gas/In	Gas/Out	Oxygen (% v/v)
	1500	249.10											
B-12	2.5	251.71	1.55	3.45	1.74	9	161	253	250	44	77	77	17.0
11	5	254.24	1.51	3.34	4.32	9	161	247	248	42	80	76	17.2
10	7.5	256.67	1.30	2.88	6.73	9	161	250	244	41	83	77	17.2
9	10	259.01	1.22	2.71	9.07	9	162	249	245	41	85	77	17.4
8	12.5	261.27	1.19	2.66	1.39	9	161	245	251	42	88	77	17.2
7	15	263.59	1.08	2.42	3.60	8	161	241	253	42	89	77	17.4
6	17.5	265.93	1.12	2.51	5.86	8	161	249	250	44	91	78	17.4
5	20	268.25	1.18	2.65	8.18	8	161	245	247	44	93	78	17.2
4	22.5	270.21	.75	1.69	0.04	6	160	248	244	45	93	78	17.4
3	25	271.69	.53	1.19	1.61	5	163	253	245	45	94	79	17.4
2	27.5	273.20	.47	1.06	3.08	4	163	258	249	45	94	79	17.4
1	30	274.49	.32	.72	4.30	3	162	255	241	45	95	80	17.3
A-12	32.5	276.60	1.10	2.48	6.56	8	162	250	240	45	83	80	16.7
11	35	278.79	1.05	2.36	8.74	8	159	245	247	43	88	81	16.7
10	37.5	280.95	.93	2.10	0.81	7	159	246	243	43	91	81	16.9
9	40	282.98	.92	2.07	2.87	7	161	246	245	43	93	81	17.0
8	42.5	284.99	.97	2.19	4.99	7	161	249	241	45	94	81	17.1
7	45	287.20	1.02	2.29	7.16	7	164	255	240	45	95	86	17.1
6	47.5	289.41	1.04	2.35	9.35	8	165	258	247	46	96	92	17.2
5	50	291.44	.96	2.16	1.46	7	165	253	250	46	98	83	17.3
4	52.5	293.61	.98	2.21	3.60	8	166	250	253	46	98	83	16.9
3	55	295.68	.97	2.19	5.72	8	165	258	247	46	99	93	16.9
2	57.5	297.84	1.00	2.26	7.88	8	165	255	241	46	100	84	17.1
1	60	300.00	.97	2.20	0.01	8	165	251	244	46	100	84	17.2
	(1616)												
	0 - 60	V_m - 50.90		2.26 ΔH -							Avg. - 85.8		

APPENDIX C

INTERPOLL LABORATORIES ANALYTICAL DATA

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job: CP TWO HARBORS
Team Leader: BA
Date Submitted: 5-21-96
est No.: 7
Date of Analysis: 6-4-96

Source: PRIMARY CYCLONE
Test Site: OUTLET
Date of Test: 5-21-96
No. of Runs Completed: 3
Technician: SB

Test/ Run	Sample Log No. and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_0
7/1	7712	1	0	3.9	19.9	3.9	16.0	1.26
	32	2	0	3.9	19.9	3.9	16.0	1.26
	☐B☐F	Avg				3.9	16.0	
7/2	7712	1	0	4.4	19.7	4.4	15.3	1.27
	33	2	0	4.4	19.7	4.4	15.3	1.27
	☐B☐F	Avg				4.4	15.3	
7/3	7712	1	0	3.8	19.8	3.8	16.0	1.29
	34	2	0	3.8	19.8	3.8	16.0	1.29
	☐B☐F	Avg				3.8	16.0	
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						

☐ Ambient Air QA Check
☐ Orsat Analyzer System Leak Check
☐ F_0 Within EPA M-3 Guidelines for fuel type.

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

- Flask (250 cc all glass)

B - Tedlar Bag (5 layer)

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job: LP TWO HARBORS
Team Leader: DA
Date Submitted: 5-22-96
Test No.: 8
Date of Analysis: 6-4-96

Source: PRIMARY CYCLONE
Test Site: OUTLET
Date of Test: 5-22-96
No. of Runs Completed: 3
Technician: SB

Test/ Run	Sample Log No. and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_0
8/1	7712	1	0	4.1	19.7	4.1	15.6	1.29
	40	2	0	4.1	19.7	4.1	15.6	1.29
	☐B☐F	Avg				4.1	15.6	
8/2	7712	1	0	4.1	19.8	4.1	15.7	1.27
	41	2	0	4.1	19.8	4.1	15.7	1.27
	☐B☐F	Avg				4.1	15.7	
8/3	7712	1	0	4.0	19.8	4.0	15.8	1.28
	42	2	0	4.0	19.8	4.0	15.8	1.28
	☐B☐F	Avg				4.0	15.8	
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						

☐ Ambient Air QA Check
☐ Orsat Analyzer System Leak Check
☐ F_0 Within EPA M-3 Guidelines for fuel type.

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

F = Flask (250 cc all glass)

B = Tedlar Bag (5 layer)

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job: LP Two Harbors
Team Leader: MK
Date Submitted: 5-28-96
Test No.: 9
Date of Analysis: 6-4-96

Source: RTO
Test Site: INLET
Date of Test: 5-21-96
No. of Runs Completed: 3
Technician: SB

Test/ Run	Sample Log No. and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_0
9/1	7712	1	0	2.2	19.8	2.2	17.6	1.5
	47	2	0	2.2	19.8	2.2	17.6	1.5
	☐B☐F	Avg				2.2	17.6	
9/2	7712	1	0	2.9	19.9	2.9	17.0	1.34
	48	2	0	2.9	19.9	2.9	17.0	1.34
	☐B☐F	Avg				2.9	17.0	
9/3	7712	1	0	3.4	19.9	3.4	16.5	1.29
	49	2	0	3.4	19.9	3.4	16.5	1.29
	☐B☐F	Avg				3.4	16.5	
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						

☐ Ambient Air QA Check
☐ Orsat Analyzer System Leak Check
☐ F_0 Within EPA M-3 Guidelines for fuel type.

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

☐ - Flask (250 cc all glass)

B - Tedlar Bag (5 layer)

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 3 Data Reporting Sheet - Orsat Analysis

Job: LP TWO HARBORS
Team Leader: M K
Date Submitted: 5-22-96
Test No.: 10
Date of Analysis: 6-4-96

Source: E-TUBE
Test Site: OUTLET
Date of Test: 5-22-96
No. of Runs Completed: 3
Technician: JB

Test/ Run	Sample Log No. and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_0
10/1	7712	1	0	3.6	19.8	3.6	16.2	1.31
		2	0	3.6	19.8	3.6	16.2	1.31
	☐B☐F	Avg				3.6	16.2	
10/2	7712	1	0	3.4	19.8	3.4	16.4	1.32
		2	0	3.4	19.8	3.4	16.4	1.32
	☐B☐F	Avg				3.4	16.4	
10/3	7712	1	0	3.4	19.9	3.4	16.5	1.29
		2	0	3.4	19.9	3.4	16.5	1.29
	☐B☐F	Avg				3.4	16.5	
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						
		1						
		2						
	☐B☐F	Avg						

☐ Ambient Air QA Check
☐ Orsat Analyzer System Leak Check
☐ F_0 Within EPA M-3 Guidelines for fuel type.

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

F = Flask (250 cc all glass)

B = Tedlar Bag (5 layer)

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

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INTERPOLL LABORATORIES, INC.
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Impinger Catch Data Reporting Sheet

Protocol: ☑Minnesota ☐Wisconsin ☐Iowa ☐EPA Method 202 ☐Other

Job: LP/Two Harbors
Date Submitted: 5-23-96
Date of Analysis: 5-31-96
Source/Site: Primary Cyclone Outlet
Test No.: 7
Technician: A.D.

	Solvent Phase	Aqueous Phase
Test: 7 Run: 0	Dish No: 314	Dish No:
Log No: 7712-28I	Dish + Sample Wt: 44.0345 g	Dish + Sample Wt: g
Color & Appearance:	Dish Tare Wt: 44.0345 g	Dish Tare Wt: g
	Fraction Wt: 0.0000 g	Fraction Wt: g
Comments:	Smpl Vol: 200 ml, Alqt: 200 ml, Factor: 1.000	Smpl Vol: ml, Alqt: ml, Factor:
	Sample Wt: 0.0000 g	Sample Wt: g
Test: 7 Run: 1	Dish No: 700	Dish No:
Log No: -29I	Dish + Sample Wt: 43.0743 g	Dish + Sample Wt: g
Color & Appearance:	Dish Tare Wt: 43.0561 g	Dish Tare Wt: g
	Fraction Wt: 0.0182 g	Fraction Wt: g
Comments:	Smpl Vol: 500 ml, Alqt: 500 ml, Factor 1.000	Smpl Vol: ml, Alqt: ml, Factor
	Sample Wt: 0.0182 g	Sample Wt: g
Test: 7 Run: 2	Dish No: 783	Dish No:
Log No: -30I	Dish + Sample Wt: 43.1158 g	Dish + Sample Wt: g
Color & Appearance:	Dish Tare Wt: 43.0888 g	Dish Tare Wt: g
	Fraction Wt: 0.0270 g	Fraction Wt: g
Comments:	Smpl Vol: 590 ml, Alqt: 590 ml, Factor 1.000	Smpl Vol: ml, Alqt: ml, Factor
	Sample Wt: 0.0270 g	Sample Wt: g
Test: 7 Run: 3	Dish No: 789	Dish No:
Log No: -31I	Dish + Sample Wt: 44.7146 g	Dish + Sample Wt: g
Color & Appearance:	Dish Tare Wt: 44.6865 g	Dish Tare Wt: g
	Fraction Wt: 0.0281 g	Fraction Wt: g
Comments:	Smpl Vol: 500 ml, Alqt: 500 ml, Factor 1.000	Smpl Vol: ml, Alqt: ml, Factor
	Sample Wt: 0.0281 g	Sample Wt: g

Note: Factor = Sample Volume/Aliquot Volume

Blank Solvent Wt. 0.0000 g

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Phase g	0.0000	0.0182	0.0270	0.0281
Results of Aqueous Phase g	C-5			

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Solvent Rinse Data Reporting Sheet

☒ EPA Method 5 Probe Wash ☐ EPA Method 29 Probe Wash ☐ EPA Method 202 Cup & Tube Wash

Job	LP - TWO HARBORS	Source/Site	PRIMARY CYCLONE OUTLET
Date Submitted		Test No.	7
Date of Analysis	6-3-96	Technician	SLD
Transport Leakage ☐	None ☒ ml	Solvent	ACETONE

Test: 7	Run: 0	Dish No: 895	
Log No: 7712-2RP		Dish + Sample Wt: 44.0206	g
Volume of Solvent	100 ml	Dish Tare Wt: 44.0203	g
*Solvent Residue	ug/ml	Sample Wt: .0003	g
Test: 7	Run: 1	Dish No: 57	
Vol. of Solvent	260 ml	Dish + Sample Wt: 38.7150	g
Log Number - 29P		Dish Tare Wt: 38.5853	g
Comments		Sample Wt: .1297	g
Test: 7	Run: 2	Dish No: 504	
Vol. of Solvent	130 ml	Dish + Sample Wt: 50.1028	g
Log Number - 30P		Dish Tare Wt: 50.0218	g
Comments		Sample Wt: .0810	g
Test: 7	Run: 3	Dish No: 855	
Vol. of Solvent	170 ml	Dish + Sample Wt: 44.3897	g
Log Number - 31P		Dish Tare Wt: 44.2682	g
Comments		Sample Wt: .1215	g

*Solvent Residue ~~100~~ 3.00 ug/ml = [(Sample Wt. .0003 g) (10^6)]/Vol. of Sol. 100 ml

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

√SLD

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Rinse g	.0003	.1287	.0806	.1210

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Filter Gravimetrics Reporting Sheet

Fiter Type: ☑ EPA Method 5 ☐ EPA Method 29 ☐ EPA Method 202 ☐ Other_____

Job	LP-TWO HARBORS	Source/Site	PRIMARY CYCLONE OUTLET
Date Submitted		Test No.	7
Date of Analysis	6-3-96	Technician	SUB

Test: 7 Run: 0	Filter No: 8374
Field Blank:	Filter Type: 4" G.F.
Log No: 7712-28F	Filter + Sample Wt: .9361 g
Color: WHITE	Filter Tare Wt: .9358 g
	Sample Wt: .0003 g
Test: 7 Run: 1	Filter No: 7686
Log No: -29F	Filter Type: 4" G.F.
Color: BROWN DRK.	Filter + Sample Wt: 1.5645 g
	Filter Tare Wt: .9403 SLL g
	Sample Wt: ~~.6245~~ .6242 g
Test: 7 Run: 2	Filter No: 7687
Log No: -30F	Filter Type: 4" G.F.
Color: DRK BRN	Filter + Sample Wt: 1.0879 g
	Filter Tare Wt: .9245 g
1 of 3	Sample Wt: .1634 g
Test: 7 Run: 2	Filter No: 7688
Log No: -30P	Filter Type: 4" G.F.
Color: DRK BRN	Filter + Sample Wt: 1.0737 g
	Filter Tare Wt: .9305 g
2 of 3	Sample Wt: .1432 g

√gy

	RUN 0	RUN 1	RUN 2	RUN 2
Results of Filter Analysis g	.0003	.6242 ~~.6245~~	.1634	.1432

	RUN	RUN	RUN	RUN
Total Mass g				

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Filter Gravimetrics Reporting Sheet

Fiter Type: ☒ EPA Method 5 ☐ EPA Method 29 ☐ EPA Method 202 ☐ Other_____

Job	LP-TWO HARBORS	Source/Site	Primary Cyclone Outlet
Date Submitted		Test No.	7
Date of Analysis	6-3-96	Technician	SWB

Test: 7 Run: 2	Filter No: 8372
Field Blank:	Filter Type: 4" G.F.
Log No: 7/2-30 F	Filter + Sample Wt: 1.3110 g
Color: DRK BRN	Filter Tare Wt: .9267 g
3-43	Sample Wt: .3843 g
Test: 7 Run: 3	Filter No: 8373
Log No: -31 F	Filter Type: 4" G.F.
Color: DRK BRN	Filter + Sample Wt: 1.4699 g
	Filter Tare Wt: .9305 g
	Sample Wt: .5394 g
Test: Run:	Filter No:
Log No:	Filter Type:
Color:	Filter + Sample Wt: g
	Filter Tare Wt: g
	Sample Wt: g
Test: Run:	Filter No:
Log No:	Filter Type:
Color:	Filter + Sample Wt: g
	Filter Tare Wt: g
	Sample Wt: g

VSW

	RUN 2	RUN 3	RUN	RUN
Results of Filter Analysis g	.3843	.5394		

	RUN	RUN	RUN	RUN
Total Mass g				

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Impinger Catch Data Reporting Sheet

Protocol: ☒Minnesota ☐Wisconsin ☐Iowa ☐EPA Method 202 ☐Other

Job: LP/Two Harbors
Source/Site: RTO / Inlet / E-tube outlet (Run 3)
Date Submitted: 5-23-96
Test No.: 9
Date of Analysis: 5-31-96
Technician: B.D.

	Solvent Phase	Aqueous Phase
Test: 9 Run: 0	Dish No: 58	Dish No:
Log No: 7712-43I	Dish + Sample Wt: 40.7142 g	Dish + Sample Wt: g
Color & Appearance:	Dish Tare Wt: 40.7142 g	Dish Tare Wt: g
	Fraction Wt: 0.0000 g	Fraction Wt: g
Comments:	Smpl Vol: 200 ml, Alqt: 200 ml, Factor: 1.000	Smpl Vol: ml, Alqt: ml, Factor:
	Sample Wt: 0.0000 g	Sample Wt: g
Test: 9 Run: 1	Dish No: 62	Dish No:
Log No: -44I	Dish + Sample Wt: 50.9030 g	Dish + Sample Wt: g
Color & Appearance:	Dish Tare Wt: 50.8898 g	Dish Tare Wt: g
	Fraction Wt: 0.0132 g	Fraction Wt: g
Comments:	Smpl Vol: 450 ml, Alqt: 450 ml, Factor 1.000	Smpl Vol: ml, Alqt: ml, Factor
	Sample Wt: 0.0132 g	Sample Wt: g
Test: 9 Run: 2	Dish No: 65	Dish No:
Log No: -45I	Dish + Sample Wt: 44.6736 g	Dish + Sample Wt: g
Color & Appearance:	Dish Tare Wt: 44.6584 g	Dish Tare Wt: g
	Fraction Wt: 0.0152 g	Fraction Wt: g
Comments:	Smpl Vol: 500 ml, Alqt: 500 ml, Factor 1.000	Smpl Vol: ml, Alqt: ml, Factor
	Sample Wt: 0.0152 g	Sample Wt: g
Test: 9 Run: 3	Dish No: 68	Dish No:
Log No: -46I	Dish + Sample Wt: 43.1677 g	Dish + Sample Wt: g
Color & Appearance:	Dish Tare Wt: 43.1576 g	Dish Tare Wt: g
	Fraction Wt: 0.0101 g	Fraction Wt: g
Comments:	Smpl Vol: 540 ml, Alqt: 540 ml, Factor 1.000	Smpl Vol: ml, Alqt: ml, Factor
	Sample Wt: 0.0101 g	Sample Wt: g

Note: Factor = Sample Volume/Aliquot Volume

Blank Solvent Wt. 0.0000 g

	RUN 0	RUN 1	RUN 2	RUN 3
Results of Solvent Phase g	0.0000	0.0132	0.0152	0.0101
Results of Aqueous Phase g				

C-9

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Solvent Rinse Data Reporting Sheet

☒ EPA Method 5 Probe Wash ☐ EPA Method 29 Probe Wash ☐ EPA Method 202 Cup & Tube Wash

Job	LP- Two Harbors	Source/Site	RTO INLET
Date Submitted		Test No.	9
Date of Analysis	6-4-90	Technician	SCB
Transport Leakage ☐	None ☑ ____ ml	Solvent	Acetone

Test: 9	Run: 0	Dish No: 39	
Log No: 7212-43P		Dish + Sample Wt: 49.4408	g
Volume of Solvent	110 ml	Dish Tare Wt: 49.4406	g
*Solvent Residue	ug/ml	Sample Wt: .0002	g
Test: 9	Run: 1	Dish No: 20	
Vol. of Solvent	40 ml	Dish + Sample Wt: 48.8385	g
Log Number -44P		Dish Tare Wt: 48.8154	g
Comments		Sample Wt: .0231	g
Test: 9	Run: 2	Dish No: 61	
Vol. of Solvent	50 ml	Dish + Sample Wt: 36.0025	g
Log Number -45P		Dish Tare Wt: 35.9891	g
Comments		Sample Wt: .0134	g
Test: 9	Run: 3	Dish No: 33	
Vol. of Solvent	50 ml	Dish + Sample Wt:	g
Log Number -46P		Dish Tare Wt: 47.9539	g
Comments		Sample Wt:	g

*Solvent Residue 1.82 ug/ml = [(Sample Wt. .0002 g) (10^6)]/Vol. of Sol. 110 ml

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

	RUN 0	RUN 1	RUN 2	RUN
Results of Solvent Rinse g	.0002	.0230	.0133	

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Filter Gravimetrics Reporting Sheet

Fiter Type: ☒ EPA Method 5 ☐ EPA Method 29 ☐ EPA Method 202 ☐ Other_____

Job	LD-TWO HARBORS	Source/Site	RTO INLET
Date Submitted		Test No.	5
Date of Analysis	6-4-96	Technician	SLB

Test: 7 Run: 0	Filter No: 8363
Field Blank:	Filter Type: 4" G.F.
Log No: 7712-43F	Filter + Sample Wt: .9323 g
Color: WHITE	Filter Tare Wt: .9321 g
	Sample Wt: .0002 g
Test: 9 Run: 1	Filter No: 8357
Log No: -44F	Filter Type: 4" G.F.
Color: LT BROWN	Filter + Sample Wt: .9410 g
	Filter Tare Wt: .9374 g
	Sample Wt: .0016 g
Test: 9 Run: 2	Filter No: 8358
Log No: -45F	Filter Type: 4" G.F.
Color: BROWN	Filter + Sample Wt: .9482 g
	Filter Tare Wt: .9414 g
	Sample Wt: .0068 g
Test: Run:	Filter No:
Log No:	Filter Type:
Color:	Filter + Sample Wt: g
	Filter Tare Wt: g
	Sample Wt: g

√ SLB

	RUN 0	RUN 1	RUN 2	RUN
Results of Filter Analysis g	.0002	.0016	.0068	

	RUN	RUN	RUN	RUN
Total Mass g				

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Solvent Rinse Data Reporting Sheet

☑ EPA Method 5 Probe Wash ☐ EPA Method 29 Probe Wash ☐ EPA Method 202 Cup & Tube Wash

Job	LP - TWO HARBORS	Source/Site	[redacted], E-TUBE OUTLET
Date Submitted		Test No.	9
Date of Analysis	6-4-96	Technician	S.B

Transport Leakage ☐ None ☑ ____ ml Solvent ACETONE

Test: 9	Run: 3	Dish No: 33	
Log No: 7712-462		Dish + Sample Wt: 47.9511	g
Volume of Solvent	80 ml	Dish Tare Wt: 47.9439	g
*Solvent Residue	ug/ml	Sample Wt: .0072	g
Test:	Run:	Dish No:	
Vol. of Solvent	ml	Dish + Sample Wt:	g
Log Number		Dish Tare Wt:	g
Comments		Sample Wt:	g
Test:	Run:	Dish No:	
Vol. of Solvent	ml	Dish + Sample Wt:	g
Log Number		Dish Tare Wt:	g
Comments		Sample Wt:	g
Test:	Run:	Dish No:	
Vol. of Solvent		Dish + Sample Wt:	g
Log Number		Dish Tare Wt:	g
Comments		Sample Wt:	g

*Solvent Residue_____ug/ml = [(Sample Wt._____g) (10^6)]/Vol. of Sol. _____ml

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

√SLV

	RUN 3	RUN	RUN	RUN
Results of Solvent Rinse g	.0071	C-12		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Filter Gravimetrics Reporting Sheet

Fiter Type: ☑ EPA Method 5 ☐ EPA Method 29 ☐ EPA Method 202 ☐ Other_____

Job	LP-TWO HARBORS	Source/Site	E-TUBE OUTLET
Date Submitted		Test No.	9
Date of Analysis	6-4-96	Technician	SLB

Test: 9 Run: 3	Filter No: 8360
Field Blank:	Filter Type: 4" G.F.
Log No: 772-46F	Filter + Sample Wt: .9506 g
Color: Red	Filter Tare Wt: .7292 g
	Sample Wt: .0214 g
Test: Run:	Filter No:
Log No:	Filter Type:
Color:	Filter + Sample Wt: g
	Filter Tare Wt: g
	Sample Wt: g
Test: Run:	Filter No:
Log No:	Filter Type:
Color:	Filter + Sample Wt: g
	Filter Tare Wt: g
	Sample Wt: g
Test: Run:	Filter No:
Log No:	Filter Type:
Color:	Filter + Sample Wt: g
	Filter Tare Wt: g
	Sample Wt: g

VSLW

		RUN 3	RUN	RUN	RUN
Results of Filter Analysis	g	.0214			

		RUN	RUN	RUN	RUN
Total Mass	g				

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INTERPOLL LABORATORIES INC.

Formaldehyde Results Using EPA Method 0011
For Dept. 20/LP Two Harbors
Collected 5/22/96

	Field Spike #2			Test: 8			Source: Primary Cyclone Outlet
	Actual	Found	% Recovery	Run 0	Run 1	Run 2	Run 3
Log #		(7712-36)		(7712-35)	(7712-37)	(7712-38)	(7712-39)
Mass (ug)*	**750**	**490**	**65.3**	**4.8**	**13000**	**15000**	**18000**

	Field Spike #3			Test: 10			Source: E-Tube Outlet
	Actual	Found	% Recovery	Run 0	Run 1	Run 2	Run 3
Log #		(7712-51)		(7712-50)	(7712-52)	(7712-53)	(7712-54)
Mass (ug)*	**750**	**620**	**82.7**	**7.3**	**51000**	**48000**	**45000**

* = Total Mass of formaldehyde in the sample in ug.

Reviewed by:

David J. Schneider, Manager
Chemistry Department

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: LP / Two Harbors Source: Primary Cyclone Site: OUTLET Log No.: 7712
Field Engineer: BOS Date of Test: 5-21-96 Test No.: 7 No. of Runs:

No. Items	Sample Type		Analysis		Sequence No.	Comments
4	**Probe Wash:** ☒ Acetone ☐ $MeCl_2$	☐ DI Water ☐ _____	☒ EPA M-5 ☐ EPA M-29	☐ EPA M-201A ☐ _____		
6	**Filter:** ☒ 4" Glass ☐ SS Thimble	☐ Pallflex ☐ 2.5" Glass	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17		
6	**Impingers:** ☒ DI Water ☐ 3% H_2O_2 ☐ 1N NaOH ☐ 2,4-DNPH	☐ H_2SO_4 ☐ HNO_3/H_2O_2 ☐ $KMnO_4/H_2SO_4$ ☐ _____	☒ MN Protocol ☐ WI Protocol ☐ EPA M-202 ☐ EPA M6,8 ☐ Acid Gases	☐ IA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ _____		
3	**Integrated Gas:** ☒ Tedlar Bag	☐ _____	☒ EPA M-3 ☐ _____	☒ EPA M-10		CO, METHANE
—	**Oxides of Nitrogen:**		☐ EPA M-7A ☐ _____			
—	**Fuel Lab:** ☐ Fuel Sample	☐ Aggregate	☐ Per S-0163			
—	**Particle Sizing:**		☐ X-Ray Sdgraph ☐ _____	☐ Cascade Imp		
—	**Miscellaneous:**	☐ _____	☐ _____			

Fuel Type:
Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
Wood: ☒ Wood Waste ☐ Dust ☐ Bark
Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
Misc: ☐ Natural Gas ☐ RDF ☐ _____

Relinquished by/Affiliation	Accepted by/Affiliation	Date
[illegible] Interpoll	[illegible] / Interpoll	5/23/96 0830

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: CP/ Two Harbors Source: Primary Cyclone Site: Outlet Log No.: 2712
Field Engineer: Bob Date of Test: 5-22-96 Test No.: 8 No. of Runs: 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
3	**Probe Wash:** ☐ Acetone ☒ $MeCl_2$	☒ DI Water ☐ _____	☐ EPA M-5 ☐ EPA M-29	☐ EPA M-201A ☒ 0011		
—	**Filter:** ☐ 4" Glass ☐ SS Thimble	☐ Palliflex ☐ 2.5" Glass	☐ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17		
8	**Impingers:** ☐ DI Water ☐ 3% H_2O_2 ☐ 1N NaOH ☒ 2,4-DNPH	☐ H_2SO_4 ☐ HNO_3/H_2O_2 ☐ $KMnO_4/H_2SO_4$ ☐ _____	☐ MN Protocol ☐ WI Protocol ☐ EPA M-202 ☐ EPA M6,8 ☐ Acid Gases	☐ IA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ _____		* See Dan
3	**Integrated Gas:** ☐ Tedlar Bag	☐ _____	☐ EPA M-3 ☐ _____	☐ EPA M-10		
—	**Oxides of Nitrogen:**		☐ EPA M-7A ☐ _____			
—	**Fuel Lab:** ☐ Fuel Sample	☐ Aggregate	☐ Per S-0163			
—	**Particle Sizing:**		☐ X-Ray Sdgraph ☐ _____	☐ Cascade Imp		
—	**Miscellaneous:**	☐ _____	☐ _____			

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite Wood: ☒ Wood Waste ☐ Dust ☐ Bark Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6 Misc: ☐ Natural Gas ☐ RDF ☐ _____

Relinquished by/Affiliation	Accepted by/Affiliation	Date
[illegible] Interpoll	[illegible] / Interpoll	5/23/96 0830

033094-G:\STACK\WP\FORMS\S-278.2

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: L.P. / Two Harbors, MN Source: RTO Site: Inlet Log No.: 7712
Field Engineer: M. Koehler Date of Test: 5-22-96 Test No.: 9 No. of Runs: 3

No. Items	Sample Type	Analysis	Sequence No.	Comments
3+1	**Probe Wash:** ☒ Acetone ☐ DI Water ☐ $MeCl_2$ ☐ _____	☒ EPA M-5 ☐ EPA M-201A ☐ EPA M-29 ☐ _____		
3+1	**Filter:** ☒ 4" Glass ☐ Pallflex ☐ SS Thimble ☐ 2.5" Glass	☒ EPA M-5 ☐ EPA M-17 ☐ EPA M-29 ☐ EPA M-201A		
4+1	**Impingers:** ☒ DI Water ☐ H_2SO_4 ☐ 3% H_2O_2 ☐ HNO_3/H_2O_2 ☐ 1N NaOH ☐ $KMnO_4/H_2SO_4$ ☐ 2,4-DNPH ☐ _____	☒ IN Protocol ☐ IA Protocol ☐ WI Protocol ☐ Formaldehyde ☐ EPA M-202 ☐ EPA M-29 ☐ EPA M6,8 ☐ EPA M-26 ☐ Acid Gases ☐ _____		
3	**Integrated Gas:** ☒ Tedlar Bag ☐ _____	☒ EPA M-3 ☒ EPA M-10 ☒ methane		
—	**Oxides of Nitrogen:**	☐ EPA M-7A ☐ _____		
—	**Fuel Lab:** ☐ Fuel Sample ☐ Aggregate	☐ Per S-0163		
—	**Particle Sizing:**	☐ X-Ray Sdgraph ☐ Cascade Imp ☐ _____		
—	**Miscellaneous:** ☐ _____	☐ _____		

Fuel Type:
Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
Wood: ☒ Wood Waste ☐ Dust ☐ Bark
Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
Misc: ☐ Natural Gas ☐ RDF ☐ _____

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Mark Koehler / Interpoll Labs		

033094-G:\STACK\WP\FORMS\S-278.2

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: L.P. / Two Harbors, MN Source: E-Tube Site: Outlet Log No. 2712
Field Engineer: M. Buehler Date of Test: 5-22-96 Test No. 10 No. of Runs 3

No. Items	Sample Type		Analysis		Sequence No.	Comments
—	Probe Wash: ☐ Acetone ☐ $MeCl_2$	☐DI Water ☐_____	☐EPA M-5 ☐EPA M-29	☐EPA M-201A ☐_____		Added to Imp.
—	Filter: ☐ 4" Glass ☐ SS Thimble	☐Pallflex ☐2.5" Glass	☐EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17		
6 + 2	Impingers: ☐DI Water ☐3% H_2O_2 ☐1N NaOH ☒2,4-DNPH	☐H_2SO_4 ☐HNO_3/H_2O_2 ☐$KMnO_4/H_2SO_4$ ☐_____	☐MN Protocol ☐WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases	☐IA Protocol ☒Formaldehyde ☐EPA M-29 ☐EPA M-26 ☐_____		
3	Integrated Gas: ☒Tedlar Bag	☐_____	☒EPA M-3 ☐_____	☐EPA M-10		
—	Oxides of Nitrogen:		☐EPA M-7A ☐_____			
—	Fuel Lab: ☐Fuel Sample	☐Aggregate	☐Per S-0163			
—	Particle Sizing:		☐X-Ray Sdgraph ☐_____	☐Cascade Imp		
—	Miscellaneous:	☐_____	☐_____			

Fuel Type: Coal: ☐Bituminous ☐Anthracite ☐Lignite Wood: ☒Wood Waste ☐Dust ☐Bark Oil: ☐Waste Oil ☐No. 2 ☐No. 6 Misc: ☐Natural Gas ☐RDF ☐_____

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Mark Buehler / Interpoll Labs		

033094-G:\STACK\WP\FORMS\S-278.2

APPENDIX D

COMPUTER DATALOGGER PRINTOUTS/STRIPCHART

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. MOBILE
- 1996 -

File Name: LPT7R1
Job Number: 6-7712
Client: Louisiana - Pacific
Location: Two Harbors, Minnesota

Primary Cyclone Outlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)
142	09:49:00	17.2	658
142	09:50:00	17.2	665
142	09:51:00	17.0	561
142	09:52:00	18.2	416
142	09:53:00	18.6	300
142	09:54:00	20.4	190
142	09:55:00	19.4	233
142	09:56:00	17.7	326
142	09:57:00	17.2	452
142	09:58:00	17.2	631
142	09:59:00	16.6	643
142	10:00:00	16.6	565
142	10:01:00	17.1	530
142	10:02:00	17.1	402
142	10:03:00	17.8	276
142	10:04:00	18.2	273
142	10:05:00	18.6	226
142	10:06:00	18.2	253
142	10:07:00	19.2	250
142	10:08:00	18.5	320
142	10:09:00	18.4	329
142	10:10:00	17.3	376
142	10:11:00	17.2	396
142	10:12:00	16.6	399
142	10:13:00	16.9	327
142	10:14:00	18.5	175
142	10:15:00	21.3	99.5
142	10:16:00	23.0	83.9
142	10:17:00	22.6	94.8
142	10:18:00	22.0	114
142	10:19:00	19.3	199
142	10:20:00	19.0	203
142	10:21:00	18.3	270
142	10:22:00	18.4	253

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. MOBILE
- 1996 -

File Name: LPT7R1
Job Number: 6-7712
Client: Louisiana - Pacific
Location: Two Harbors, Minnesota

Primary Cyclone Outlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)
142	10:23:00	18.6	227
142	10:24:00	20.1	175
142	10:25:00	20.2	161
142	10:26:00	21.3	111
142	10:27:00	22.3	84.8
142	10:28:00	23.1	70.2
142	10:29:00	22.8	65.3
142	10:30:00	22.2	77.0
142	10:31:00	23.1	69.6
142	10:32:00	23.2	70.4
142	10:33:00	22.0	97.4
142	10:34:00	23.0	73.3
142	10:35:00	21.4	97.1
142	10:36:00	21.3	88.4
142	10:37:00	22.3	67.8
142	10:38:00	23.4	59.9
142	10:39:00	23.8	58.0
142	10:40:00	25.2	44.4
142	10:41:00	25.1	47.1
142	10:42:00	24.4	60.3
142	10:43:00	23.5	69.1
142	10:44:00	23.4	71.1
142	10:45:00	22.5	95.0
142	10:46:00	23.2	70.6
142	10:47:00	23.2	73.5
142	10:48:00	23.3	82.8
	Run Average	20.2	229

Interpoll Laboratories, Inc.

(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. MOBILE
- 1996 -

File Name: LPT7R2
Job Number: 6-7712
Client: Louisiana - Pacific
Location: Two Harbors, Minnesota

Primary Cyclone Outlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)
142	11:56:00	24.0	77.2
142	11:57:00	22.2	220
142	11:58:00	21.9	197
142	11:59:00	21.0	418
142	12:00:00	19.5	508
142	12:01:00	19.7	553
142	12:02:00	19.8	624
142	12:03:00	19.6	580
142	12:04:00	20.1	566
142	12:05:00	19.4	644
142	12:06:00	20.1	416
142	12:36:00	18.6	602
142	12:37:00	18.3	583
142	12:38:00	18.4	525
142	12:39:00	17.9	372
142	12:40:00	18.1	262
142	12:41:00	18.6	241
142	12:42:00	18.4	242
142	12:43:00	19.1	208
142	12:44:00	18.9	260
142	12:45:00	18.5	308
142	12:46:00	18.5	358
142	12:47:00	18.2	398
142	12:48:00	18.0	462
142	13:09:00	17.7	472
142	13:10:00	17.7	472
142	13:11:00	17.5	358
142	13:12:00	17.3	442
142	13:13:00	17.1	430
142	13:14:00	17.0	520
142	13:15:00	17.2	526
142	13:16:00	17.6	671
142	13:17:00	17.5	784
142	13:18:00	17.4	661

Interpoll Laboratories, Inc.

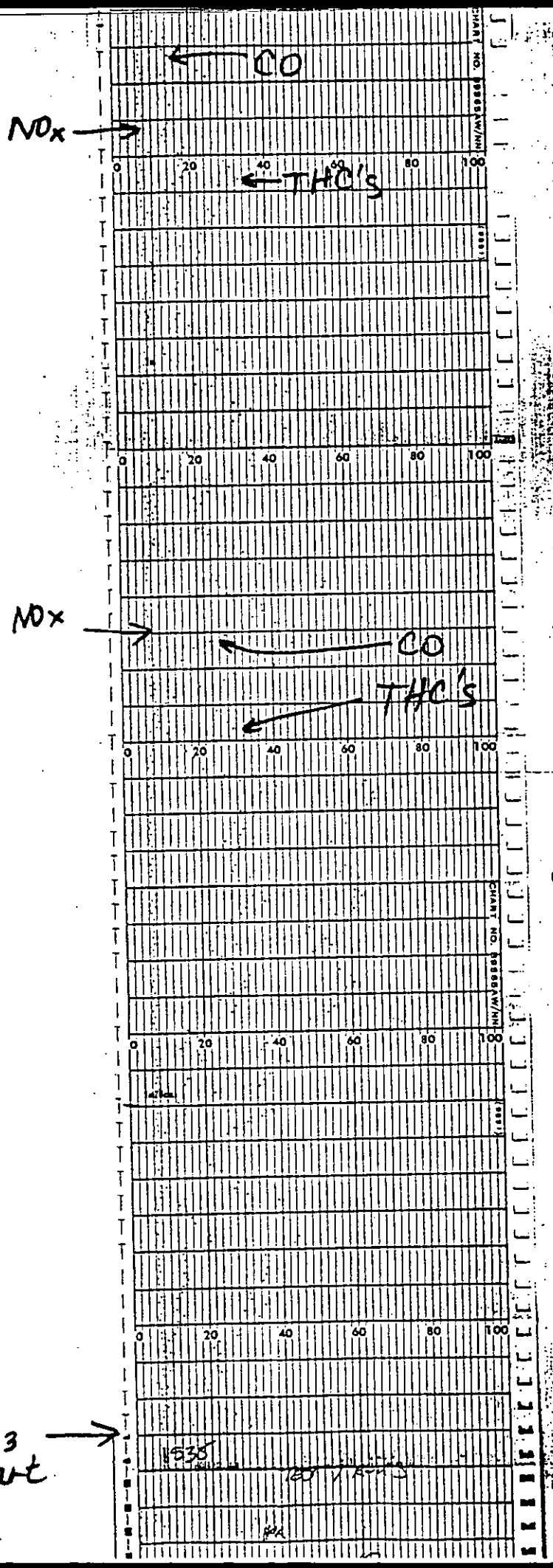
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. MOBILE
- 1996 -

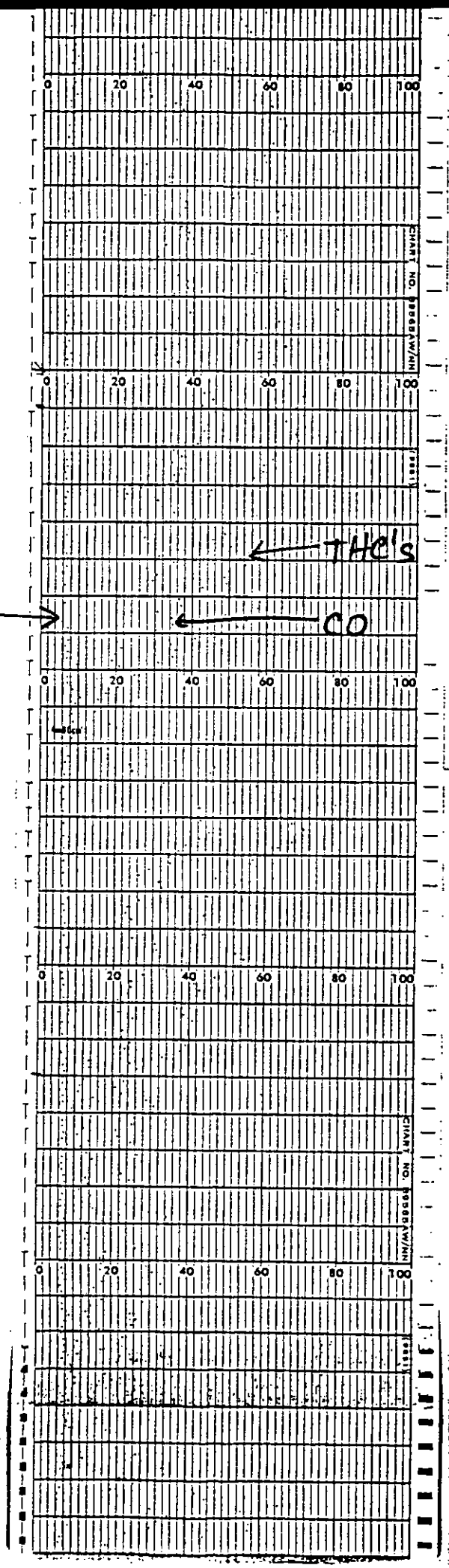
File Name: LPT7R2
Job Number: 6-7712
Client: Louisiana - Pacific
Location: Two Harbors, Minnesota

Primary Cyclone Outlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted) NOx (ppmv)	CO (ppmv)
142	13:19:00	17.3	756
142	13:20:00	17.4	480
142	13:21:00	17.1	384
142	13:22:00	16.9	365
142	13:23:00	16.3	468
142	13:24:00	16.3	604
142	13:25:00	16.6	748
142	13:26:00	16.0	698
142	13:27:00	15.9	560
142	13:28:00	15.2	497
142	13:29:00	16.6	596
142	13:30:00	15.8	550
142	13:31:00	16.4	428
142	13:32:00	16.3	471
142	13:33:00	15.8	449
142	13:34:00	15.2	464
142	13:35:00	15.1	588
142	13:36:00	15.7	588
142	13:37:00	15.6	575
142	13:38:00	15.9	481
142	13:39:00	16.0	451
142	13:40:00	16.4	296
142	13:41:00	16.6	310
142	13:42:00	16.4	377
142	13:43:00	15.5	459
142	13:44:00	16.0	412
	Run Average	17.7	467



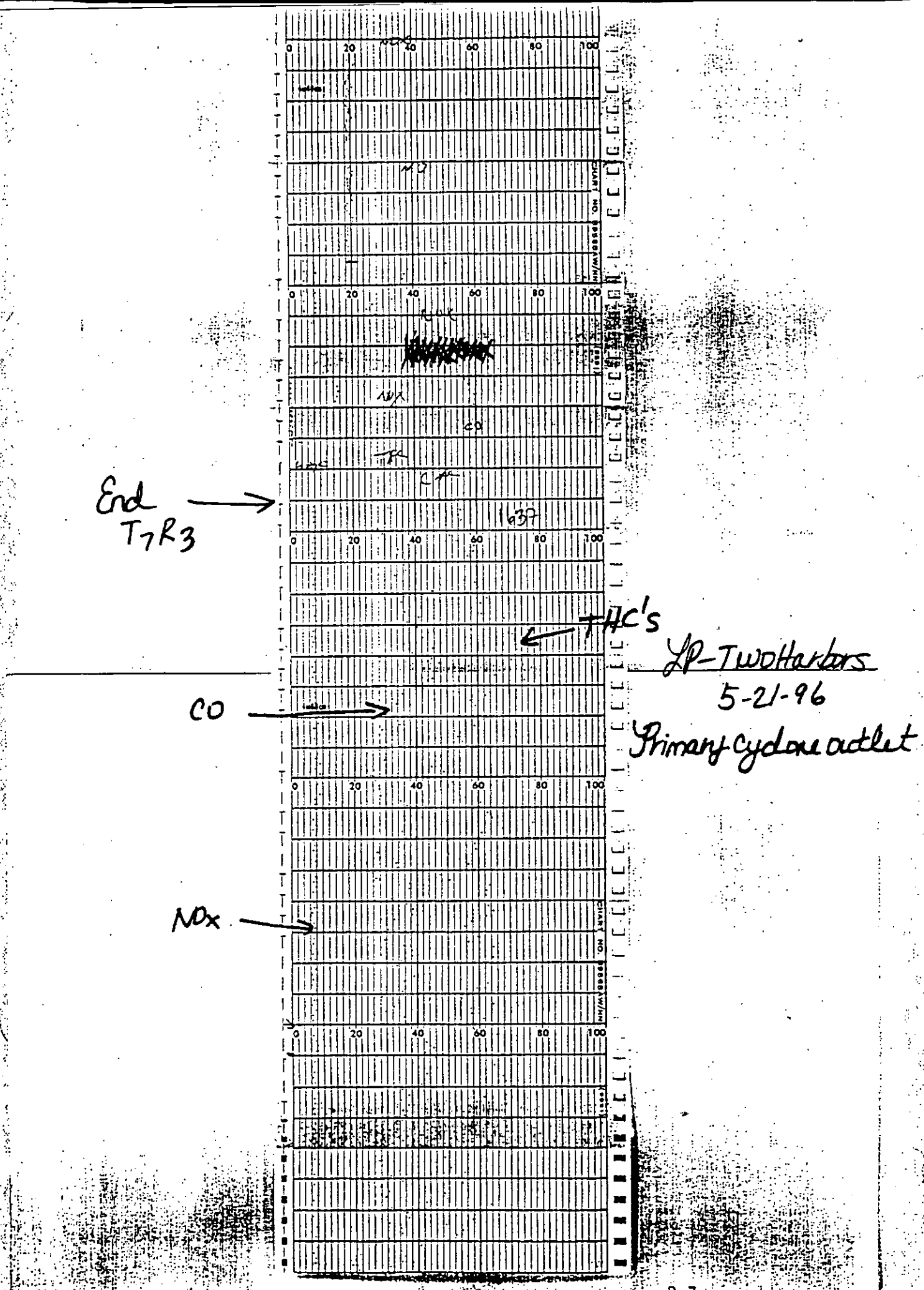
LP-Two Harbors
5-21-96
Primary cyclone outlet
THC's
Scale 0-100
CO
Scale 0-1000
NOx
Scale 0-250



LP-Two Harbors
5-21-96

Primary cyclone outlet

Test 7
(Cont.)


End
T7R3
THC's
CO
NOx
LP-TwoHarbors
5-21-96
Primary cyclone outlet
1637
0
20
40
60
80
100

LOUISIANA PACIFIC
TWO HARBORS, MN
TEST 4 / RUN 1
5/21/96

TIME		RTO INLET NOX PPM		RTO INLET CO PPM
946.29		16.479		460.482
947.29		16.153		476.189
948.29		15.991		414.991
949.29		16.52		325.473
950.29		16.886		249.626
951.29		17.903		160.759
952.29		17.089		170.85
953.29		15.829		233.35
954.29		15.665		306.592
955.29		15.868		420.382
956.29		15.543		471.143
957.29		16.072		423.943
958.29		16.397		394.076
959.29		16.113		338.819
1000.29		17.089		234.652
1001.29		16.58		221.143
1002.29		17.211		188.266
1003.29		17.13		194.695
1004.3		17.455		193.718
1005.29		16.804		237.826
1006.29		16.764		253.044
1007.29		16.316		276.889
1008.29		15.981		296.908
1009.29		15.868		303.093
1010.29		16.316		260.938
1011.29		17.984		170.382
1012.29		19.449		98.585
1013.29		19.734		79.542
1014.3		20.1		84.894
1015.29		17.984		88.982
1016.29		17.008		145.46
1017.29		16.926		157.586
1018.29		16.479		202.019
1019.3		16.764		201.937
1020.29		17.537		188.15
1021.29		18.106		146.843
1022.3		18.188		127.963
1023.29		19.49		114.881
1024.29		19.246		81.251
1025.29		20.873		74.577
1026.29		19.409		64.488
1027.29		19.856		73.682
1028.29		19.978		70.427
1029.3		20.06		72.462
1030.29		19.083		84.424
1031.29		19.937		80.03
1032.3		18.92		84.913
1033.29		19.042		88.249
1034.29		20.019		72.462
1035.29		20.182		63.673
1036.29		21.24		52.37
1037.3		21.585		51.465
1038.29		21.036		52.523
1039.3		20.995		60.987
1040.3		19.571		63.998
1041.3		19.868		72.482
1042.29		19.693		85.482
1043.29		20.1		73.357
1044.29		19.653		71.882
1045.29		19.978		77.67
		AVERAGE		AVERAGE
		18.1342		181.599

LOUISIANA PACIFIC
TWO HARBORS, MN
TEST 4 / RUN 2
5/21/98

		RTO INLET		RTO INLET
TIME		NOX PPM		CO PPM
1156.38		18.635		288.201
1157.38		18.554		360.782
1158.38		18.31		387.484
1159.38		18.757		433.22
1200.38		17.659		411.738
1201.37		18.961		391.065
1202.37		18.88		444.776
1203.37		18.961		318.393
1204.37		19.368		253.044
1205.38		18.473		210.971
1206.37		18.92		210.076
1236.37		19.042		306.918
1237.37		19.531		216.179
1238.37		19.571		197.706
1239.37		19.571		199.822
1240.37		20.304		178.581
1241.38		18.683		210.808
1242.37		19.246		246.046
1243.38		19.653		285.352
1244.38		19.653		318.881
1245.37		19.246		360.792
1246.37		19.693		388.244
1247.37		21.321		352.735
1248.38		19.856		365.268
109.38		17.537		299.919
110.38		17.498		308.889
111.38		17.496		355.421
112.37		17.7		371.048
113.38		18.926		429.385
114.38		17.293		488.559
115.38		17.333		446.648
116.37		17.498		477.185
117.38		17.7		348.668
118.38		17.822		272.413
119.38		17.333		288.226
120.38		17.496		332.064
121.38		17.984		407.992
122.38		17.455		490.583
123.38		16.764		473.015
124.38		16.357		395.48
125.38		16.479		357.211
126.38		16.845		395.378
127.38		16.357		396.029
128.38		17.577		307.408
129.38		17.498		334.018
130.38		18.764		321.16
131.38		18.52		329.135
132.37		16.479		392.367
133.38		17.333		413.282
134.37		16.967		400.088
135.38		17.089		349.154
136.38		17.293		328.891
137.38		17.7		239.047
138.38		17.822		218.865
139.38		17.211		267.53
140.38		18.804		315.137
141.38		17.252		304.802
142.38		17.171		337.354
143.38		18.845		370.069
144.38		17.252		239.047
		AVERAGE		AVERAGE
		18.0217		334.87755

LOUISIANA PACIFIC
TWO HARBORS, MN
TEST 4 / RUN 3
5/21/98

TIME		RTO INLET NOX PPM		RTO INLET CO PPM
401.28		14.77		128.288
402.28		15.828		112.012
403.28		14.973		111.524
404.28		15.299		101.514
405.28		14.882		107.374
406.28		15.34		112.989
407.28		15.055		104.2
408.28		14.2		148.529
409.28		13.915		177.768
410.28		14.444		183.201
411.28		13.142		210.157
412.28		14.322		225.212
413.28		15.014		177.686
414.28		14.485		184.451
415.28		13.956		217.074
416.28		14.18		257.357
417.28		12.888		300.408
418.28		13.386		292.595
419.28		15.584		207.797
420.28		17.333		93.702
421.28		17.496		70.59
422.28		17.455		70.671
423.28		15.136		104.832
424.28		14.973		140.902
425.28		14.526		204.135
426.28		14.851		245.15
427.28		13.915		233.35
428.28		15.299		217.807
429.28		14.729		203.881
430.28		15.136		224.48
431.28		13.875		218.539
432.28		13.834		252.29
433.28		14.566		284.457
434.28		14.811		288.41
435.28		14.241		251.417
436.28		14.77		232.455
437.28		14.973		229.77
438.28		34.382		287.831
439.28		82.6		355.746
440.28		15.502		220.889
441.28		15.665		248.406
442.28		16.031		242.058
443.28		16.275		209.75
444.28		15.584		225.458
445.28		16.886		269.564
446.28		16.58		237.175
447.28		16.072		188.184
448.28		15.868		174.105
449.28		15.746		203.158
450.28		16.58		208.387
451.28		16.031		224.643
452.38		16.52		275.888
453.38		15.624		292.539
454.38		16.072		287.722
455.38		17.171		263.949
456.38		16.888		281.284
457.38		16.642		247.022
458.38		15.624		208.367
459.38		15.746		292.539
500.38		16.52		174.105
		AVERAGE		AVERAGE
		16.7358167		206.749017