Background Report Reference

AP-42 Section Number: 10.6.1

Background Report Section: 4

Reference Number: 68

Title: Result Of The June 2 & 3, 1994 Particulate Emission Enginering Testing at the Louisiana Pacific Plant In Hayward, Wisconsin

Interpoll Laboratories, Inc.

July 1994

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ENGINEERING

**RESULT OF THE JUNE 2 & 3, 1994
PARTICULATE EMISSION ENGINEERING
TESTING AT THE LOUISIANA PACIFIC PLANT
IN HAYWARD, WISCONSIN**

Submitted to:

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

Attention:

Sue Somers

Approved by:

Daniel Despen
Manager
Stationary Source Testing Department

Report Number 4-3068
July 8, 1994
SP/slp

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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 June 2 & 3, 1994 Interpoll Laboratories Personnel conducted a Particulate Emission Engineering Test on the Line 2 RTO Outlet, Surface Cyclone Exhaust, Core Cyclone Outlet, and RTO Outlet Duct at the Louisiana Pacific Plant in Hayward, Wisconsin. Gary Hove and Ed Trowbridge performed the on-site portion of the test. Coordination between testing activities and plant operation was provided by Sue Somers of Louisiana Pacific. A member of the Wisconsin Department of Natural Resources did not witness the test.

Particulate evaluations were performed in accordance with EPA Methods 1 - 5, CFR Title 40, Part 60, Appendix A (revised July 1, 1994). A preliminary determination of the gas linear velocity profile was made before the first particulate determination to allow selection of the appropriate nozzle diameter required for isokinetic sample withdrawal. An Interpoll Labs sampling train which meets or exceeds specifications in the above-cited reference was used to extract particulate samples by means of a heated glass-lined probe. Wet catch samples were collected in the back half of the Method 5 sampling train and analyzed as per Wisconsin DNR Protocol.

An integrated flue gas sample was extracted simultaneously with each particulate sample using a specially designed gas sampling system. Integrated flue gas samples were collected in 44-liter Tedlar bags housed in a protective aluminum container. After sampling was complete, the bags were returned to the laboratory for Orsat analysis. Prior to sampling, the Tedlar bags are leak checked at 15 IN.HG. vacuum with an in-line rotameter. Bags with any detectable inleakage are discarded.

Testing was conducted from 2 test ports oriented at 90 degrees on the stack. The test ports are located diameters downstream and diameters upstream of the nearest flow disturbances. A -point traverse was used to collect representative particulate samples. Each traverse point was sampled minutes to give a total sampling time of minutes per run.

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

2 SUMMARY AND DISCUSSION

The results of the particulate emission tests are summarized in Tables 1 - 4. An overview of the results is presented in the table below.

Source	Concentration (GR/DSCF)	Emission Rate (LB/HR)
Line 2 RTO Outlet Stack	0.0376	20
Surface Cyclone Exhaust	0.175	46
Core Cyclone Outlet	0.146	36
RTO Inlet Duct	0.147	79

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

Table 1. Summary of the Results of the June 2, 1994 Particulate Emission Engineering Test of the Line 2 RTO Outlet at the Louisiana Pacific Plant Located in Hayward, Wisconsin.

ITEM		Run 1
Date of test		06-02-94
Time runs were done	(HRS)	1604/1710
Volumetric flow		
actual	(ACFM)	127244
standard	(DSCFM)	63468
Gas temperature	(DEG-F)	329
Moisture content	(%V/V)	22.91
Gas composition	(%V/V,dry)	
carbon dioxide		3.90
oxygen		16.80
nitrogen		79.30
Isokinetic variation	(%)	100.1
Particulate concentration		
actual	(GR/ACF)	.0187
standard	(GR/DSCF)	.0376
Part. emission rate	(LB/HR)	20.44

Note: Dry + Organic/Inorganic Wet Catch

Table 2. Summary of the Results of the June 2, 1994 Particulate Emission Engineering Test of the Line 2 RTO Outlet at the Louisiana Pacific Plant Located in Hayward, Wisconsin.

ITEM		Run 1
Date of test		06-02-94
Time runs were done	(HRS)	1604/1710
Volumetric flow		
actual	(ACFM)	127244
standard	(DSCFM)	63468
Gas temperature	(DEG-F)	329
Moisture content	(%V/V)	22.91
Gas composition	(%V/V,dry)	
carbon dioxide		3.90
oxygen		16.80
nitrogen		79.30
Isokinetic variation	(%)	100.1
Particulate concentration		
actual	(GR/ACF)	.00834
standard	(GR/DSCF)	.0167
Part. emission rate	(LB/HR)	9.10

Note: Dry Catch Only

Table 3. Summary of the Results of the June 2, 1994 Particulate Emission Engineering Test of the Surface Cyclone Exhaust at the Louisiana Pacific Plant in Hayward, Wisconsin.

ITEM		Run 1
Date of test		06-02-94
Time runs were done	(HRS)	1844/2000
Volumetric flow		
actual	(ACFM)	52239
standard	(DSCFM)	31034
Gas temperature	(DEG-F)	214
Moisture content	(%V/V)	18.86
Gas composition	(%V/V,dry)	
carbon dioxide		3.20
oxygen		17.80
nitrogen		79.00
Isokinetic variation	(%)	92.2
Particulate concentration		
actual	(GR/ACF)	0.104
standard	(GR/DSCF)	0.175
Part. emission rate	(LB/HR)	46.42

Note: Dry + Organic/Inorganic Wet Catch

Table 4. Summary of the Results of the June 2, 1994 Particulate Emission Engineering Test of the Surface Cyclone Exhaust at the Louisiana Pacific Plant in Hayward, Wisconsin.

ITEM		Run 1
Date of test		06-02-94
Time runs were done	(HRS)	1844/2000
Volumetric flow		
actual	(ACFM)	52239
standard	(DSCFM)	31034
Gas temperature	(DEG-F)	214
Moisture content	(%V/V)	18.86
Gas composition	(%V/V,dry)	
carbon dioxide		3.20
oxygen		17.80
nitrogen		79.00
Isokinetic variation	(%)	92.2
Particulate concentration		
actual	(GR/ACF)	.0802
standard	(GR/DSCF)	0.135
Part. emission rate	(LB/HR)	35.92

Note: Dry Catch Only

Table 5. Summary of the Results of the June 2, 1994 Particulate Emission Engineering Test of the Core Cyclone Outlet at the Lousiana Pacific Plant Located in Hayward, Wisconsin.

ITEM		Run 1
Date of test		06-02-94
Time runs were done	(HRS)	2130/2235
Volumetric flow		
actual	(ACFM)	47047
standard	(DSCFM)	28981
Gas temperature	(DEG-F)	219
Moisture content	(%V/V)	15.28
Gas composition	(%V/V,dry)	
carbon dioxide		2.10
oxygen		18.80
nitrogen		79.10
Isokinetic variation	(%)	96.1
Particulate concentration		
actual	(GR/ACF)	.0897
standard	(GR/DSCF)	0.146
Part. emission rate	(LB/HR)	36.17

Note: Dry + Organic/Inorganic Wet Catch

Table 6. Summary of the Results of the June 2, 1994 Particulate Emission Engineering Test of the Core Cyclone Outlet at the Lousiana Pacific Plant Located in Hayward, Wisconsin.

ITEM		Run 1
Date of test		06-02-94
Time runs were done	(HRS)	2130/2235
Volumetric flow		
actual	(ACFM)	47047
standard	(DSCFM)	28981
Gas temperature	(DEG-F)	219
Moisture content	(%V/V)	15.28
Gas composition	(%V/V,dry)	
carbon dioxide		2.10
oxygen		18.80
nitrogen		79.10
Isokinetic variation	(%)	96.1
Particulate concentration		
actual	(GR/ACF)	.0786
standard	(GR/DSCF)	0.128
Part. emission rate	(LB/HR)	31.71

Note: Dry Catch Only

Table 7. Summary of the Results of the June 2, 1994 Particulate Emission Engineering Test of the RTO Inlet Duct at the Louisiana Pacific Plant Located in Hayward, Wisconsin.

ITEM		Run 1
Date of test		06-03-94
Time runs were done	(HRS)	45/ 147
Volumetric flow		
actual	(ACFM)	104418
standard	(DSCFM)	62766
Gas temperature	(DEG-F)	209
Moisture content	(%V/V)	20.24
Gas composition	(%V/V,dry)	
carbon dioxide		3.40
oxygen		17.50
nitrogen		79.10
Isokinetic variation	(%)	105.6
Particulate concentration		
actual	(GR/ACF)	.0880
standard	(GR/DSCF)	0.147
Part. emission rate	(LB/HR)	78.82

Note: Dry + Organic/Inorganic Wet Catch

Table 8. Summary of the Results of the June 2, 1994 Particulate Emission Engineering Test of the RTO Inlet Duct at the Louisiana Pacific Plant Located in Hayward, Wisconsin.

ITEM		Run 1
Date of test		06-03-94
Time runs were done	(HRS)	45/ 147
Volumetric flow		
actual	(ACFM)	104418
standard	(DSCFM)	62766
Gas temperature	(DEG-F)	209
Moisture content	(%V/V)	20.24
Gas composition	(%V/V,dry)	
carbon dioxide		3.40
oxygen		17.50
nitrogen		79.10
Isokinetic variation	(%)	105.6
Particulate concentration		
actual	(GR/ACF)	.0749
standard	(GR/DSCF)	0.125
Part. emission rate	(LB/HR)	67.09

Note: Dry Catch Only

3 RESULTS

The results of all field and laboratory evaluations are presented in this section. Gas composition (Orsat and moisture) are presented first followed by the computer printout of the particulate results. Preliminary measurements including test port locations are given in the appendices.

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

3.1 Results of Orsat & Moisture Analyses

Test No. 1
Line 2 RTO Outlet Stack

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

	Run 1
Date of run	06-02-94
Dry basis (orsat)	
carbon dioxide.....	3.90
oxygen.....	16.80
carbon monoxide.....	0.00
nitrogen.....	79.30
Wet basis (orsat)	
carbon dioxide.....	3.01
oxygen.....	12.95
carbon monoxide.....	0.00
nitrogen.....	61.13
water vapor.....	22.91
Dry molecular weight.....	29.30
Wet molecular weight.....	26.71
Specific gravity.....	0.923
Water mass flow.....(LB/HR)	52915

FO 1.051

Test No. 2
Surface Cyclone Exhaust

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

	Run 1
Date of run	06-02-94
Dry basis (orsat)	
carbon dioxide.....	3.20
oxygen.....	17.80
carbon monoxide.....	0.00
nitrogen.....	79.00
Wet basis (orsat)	
carbon dioxide.....	2.60
oxygen.....	14.44
carbon monoxide.....	0.00
nitrogen.....	64.10
water vapor.....	18.86
Dry molecular weight.....	29.22
Wet molecular weight.....	27.11
Specific gravity.....	0.936
Water mass flow.....(LB/HR)	20230

FO 0.969

Test No. 3
Core Cyclone Outlet

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

	Run 1
Date of run	06-02-94
Dry basis (orsat)	
carbon dioxide.....	2.10
oxygen.....	18.80
carbon monoxide.....	0.00
nitrogen.....	79.10
Wet basis (orsat)	
carbon dioxide.....	1.78
oxygen.....	15.93
carbon monoxide.....	0.00
nitrogen.....	67.01
water vapor.....	15.28
Dry molecular weight.....	29.09
Wet molecular weight.....	27.39
Specific gravity.....	0.946
Water mass flow.....(LB/HR)	14666
FO	1.000

Test No. 4
RTO Inlet Duct

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

	Run 1
Date of run	06-03-94
Dry basis (orsat)	
carbon dioxide.....	3.40
oxygen.....	17.50
carbon monoxide.....	0.00
nitrogen.....	79.10
Wet basis (orsat)	
carbon dioxide.....	2.71
oxygen.....	13.96
carbon monoxide.....	0.00
nitrogen.....	63.09
water vapor.....	20.24
Dry molecular weight.....	29.24
Wet molecular weight.....	26.97
Specific gravity.....	0.932
Water mass flow.....(LB/HR)	44675

FO 1.000

3.2 Results of Particulate Determinations

Test No. 1
Line 2 RTO Outlet Stack

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

	Run 1
Date of run	06-02-94
Time run start/end.....(HRS)	1604/1710
Static pressure.....(IN.WC)	-0.67
Cross sectional area (SQ.FT)	36.23
Pitot tube coefficient.....	.840
Water in sample gas	
condenser.....(ML)	0.0
impingers.....(GRAMS)	227.0
desiccant.....(GRAMS)	12.0
total.....(GRAMS)	239.0
Total particulate material..	
.....collected(grams)	0.0923
Gas meter coefficient.....	0.9961
Barometric pressure..(IN.HG)	28.99
Avg. orif.pres.drop..(IN.WC)	1.18
Avg. gas meter temp..(DEF-F)	85.5
Volume through gas meter....	
at meter conditions...(CF)	40.48
standard conditions.(DSCF)	37.91
Total sampling time....(MIN)	64.00
Nozzle diameter.....(IN)	.249
Avg.stack gas temp ..(DEG-F)	329
Volumetric flow rate.....	
actual.....(ACFM)	127244
dry standard.....(DSCFM)	63468
Isokinetic variation.....(%)	100.1
Particulate concentration...	
actual.....(GR/ACF)	0.01873
dry standard.....(GR/DSCF)	0.03756
Particle mass rate...(LB/HR)	20.44

Test No. 2
Surface Cyclone Exhaust

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

	Run 1
Date of run	06-02-94
Time run start/end.....(HRS)	1844/2000
Static pressure.....(IN.WC)	-14.00
Cross sectional area (SQ.FT)	9.62
Pitot tube coefficient.....	.840
Water in sample gas	
condenser.....(ML)	0.0
impingers.....(GRAMS)	118.0
desiccant.....(GRAMS)	46.0
total.....(GRAMS)	164.0
Total particulate material..	
.....collected(grams)	0.3763
Gas meter coefficient.....	0.9961
Barometric pressure..(IN.HG)	28.99
Avg. orif.pres.drop..(IN.WC)	1.03
Avg. gas meter temp..(DEF-F)	80.3
Volume through gas meter....	
at meter conditions...(CF)	35.20
standard conditions.(DSCF)	33.27
Total sampling time....(MIN)	60.00
Nozzle diameter.....(IN)	.185
Avg.stack gas temp ..(DEG-F)	214
Volumetric flow rate.....	
actual.....(ACFM)	52239
dry standard.....(DSCFM)	31034
Isokinetic variation.....(%)	92.2
Particulate concentration...	
actual.....(GR/ACF)	0.10363
dry standard.....(GR/DSCF)	0.17451
Particle mass rate...(LB/HR)	46.42

Test No. 3
Core Cyclone Outlet

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

	Run 1
Date of run	06-02-94
Time run start/end.....(HRS)	2130/2235
Static pressure.....(IN.WC)	-14.00
Cross sectional area (SQ.FT)	9.62
Pitot tube coefficient.....	.840
Water in sample gas	
condenser.....(ML)	0.0
impingers.....(GRAMS)	115.0
desiccant.....(GRAMS)	9.0
total.....(GRAMS)	124.0
Total particulate material..	
.....collected(grams)	0.3058
Gas meter coefficient.....	0.9961
Barometric pressure..(IN.HG)	28.99
Avg. orif.pres.drop..(IN.WC)	0.95
Avg. gas meter temp..(DEF-F)	71.0
Volume through gas meter....	
at meter conditions...(CF)	33.70
standard conditions.(DSCF)	32.41
Total sampling time....(MIN)	60.00
Nozzle diameter.....(IN)	.185
Avg.stack gas temp ..(DEG-F)	219
Volumetric flow rate.....	
actual.....(ACFM)	47047
dry standard.....(DSCFM)	28981
Isokinetic variation.....(%)	96.1
Particulate concentration...	
actual.....(GR/ACF)	0.08966
dry standard.....(GR/DSCF)	0.14560
Particle mass rate...(LB/HR)	36.17

Test No. 4
RTO Inlet Duct

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

	Run 1
Date of run	06-03-94
Time run start/end.....(HRS)	45/ 147
Static pressure.....(IN.WC)	-6.00
Cross sectional area (SQ.FT)	23.76
Pitot tube coefficient.....	.840
Water in sample gas	
condenser.....(ML)	0.0
impingers.....(GRAMS)	153.0
desiccant.....(GRAMS)	15.0
total.....(GRAMS)	168.0
Total particulate material..	
.....collected(grams)	0.2964
Gas meter coefficient.....	0.9961
Barometric pressure..(IN.HG)	28.99
Avg. orif.pres.drop..(IN.WC)	0.88
Avg. gas meter temp..(DEF-F)	70.7
Volume through gas meter....	
at meter conditions...(CF)	32.45
standard conditions.(DSCF)	31.22
Total sampling time....(MIN)	60.00
Nozzle diameter.....(IN)	.185
Avg.stack gas temp ..(DEG-F)	209
Volumetric flow rate.....	
actual.....(ACFM)	104418
dry standard.....(DSCFM)	62766
Isokinetic variation.....(%)	105.6
Particulate concentration...	
actual.....(GR/ACF)	0.08803
dry standard.....(GR/DSCF)	0.14651
Particle mass rate...(LB/HR)	78.82

APPENDIX A

VOLUMETRIC FLOW RATE DETERMINATIONS

Test No. 1
Line 2 RTO Outlet Stack

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

Date of Determination.....	06-02-94
Time of Determination.....(HRS)	1520
Barometric pressure.....(IN.HG)	28.99
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	16
Shape of duct.....	Round
Stack diameter.....(IN)	81.5
Duct area.....(SQ.FT)	36.23
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.67
Avg. gas temp.....(DEG-F)	326
Moisture content.....(% V/V)	22.91
Avg. linear velocity.....(FT/SEC)	59.9
Gas density.....(LB/ACF)	.04507
Molecular weight.....(LB/LBMOLE)	29.30
Mass flow of gas.....(LB/HR)	352131
Volumetric flow rate.....	
actual.....(ACFM)	130227
dry standard.....(DSCFM)	65230

Test No. 2
Surface Cyclone Exhaust

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

Date of Determination.....	06-02-94
Time of Determination.....(HRS)	1815
Barometric pressure.....(IN.HG)	29.22
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	42
Duct area.....(SQ.FT)	9.62
Direction of flow.....	DOWN
Static pressure.....(IN.WC)	-14
Avg. gas temp.....(DEG-F)	209
Moisture content.....(% V/V)	18.86
Avg. linear velocity.....(FT/SEC)	91.6
Gas density.....(LB/ACF)	.05235
Molecular weight.....(LB/LBMOLE)	29.22
Mass flow of gas.....(LB/HR)	165995
Volumetric flow rate.....	
actual.....(ACFM)	52851
dry standard.....(DSCFM)	31890

Test No. 3
Core Cyclone Outlet

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

Date of Determination.....	06-02-94
Time of Determination.....(HRS)	2000
Barometric pressure.....(IN.HG)	28.99
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	42
Duct area.....(SQ.FT)	9.62
Direction of flow.....	UP
Static pressure.....(IN.WC)	-14
Avg. gas temp.....(DEG-F)	220
Moisture content.....(% V/V)	15.28
Avg. linear velocity.....(FT/SEC)	81.5
Gas density.....(LB/ACF)	.05162
Molecular weight.....(LB/LBMOLE)	29.09
Mass flow of gas.....(LB/HR)	145731
Volumetric flow rate.....	
actual.....(ACFM)	47054
dry standard.....(DSCFM)	28925

Test No. 4
RTO Inlet Duct

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

Date of Determination.....	06-03-94
Time of Determination.....(HRS)	10
Barometric pressure.....(IN.HG)	29.22
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	66
Duct area.....(SQ.FT)	23.76
Direction of flow.....	HORIZONTAL
Static pressure.....(IN.WC)	-6
Avg. gas temp.....(DEG-F)	199
Moisture content.....(% V/V)	20.24
Avg. linear velocity.....(FT/SEC)	72.6
Gas density.....(LB/ACF)	.05397
Molecular weight.....(LB/LBMOLE)	29.24
Mass flow of gas.....(LB/HR)	335119
Volumetric flow rate.....	
actual.....(ACFM)	103486
dry standard.....(DSCFM)	63611

APPENDIX B

FIELD DATA SHEETS

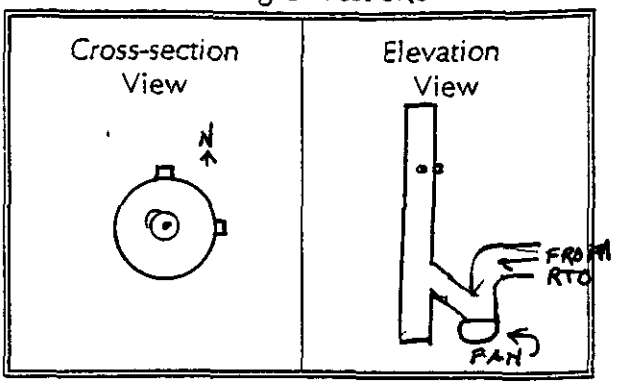
INTERPOLL LABORATORIES, INC.
(612) 786-6020

LINE 2

EPA Method 2 Field Data Sheet

Job WHEELABRATOR CLEAN AIR
Source DRYER RTO OUTLET (STACK)
Test 1 Run Date 6-2-94
Stack Dimen. 81.5 IN.
Dry Bulb °F Wet bulb °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.22 IN.HG
Static Pressure IN.WC
Operators QH
Pitot No. C_p

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 6.25 IN.		Time Start:	HRS
1	.022	2.608	8.85		
2	.105	8.58	14.8		
3	.194	15.81	22.06		
4	.323	26.32	32.51		
5	.677	55.17	61.42		
6	.806	65.68	71.93		
7	.895	72.94	79.19		
8	.968	78.89	85.14		
1					
2	A = 40" x 12" = 480" / 81.5 = 5.89				
3	B = 45° x 12" x 540 / 81.5 = 6.62				
4					
5					
6					
7					
8					
Temp. Meas. Device & S/N:				Time End:	HRS

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

INTERPOLL LABORATORIES, INC.
(612) 786-6020

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EPA Method 2 Field Data Sheet

Job LP / HAYWARD
Source LINE 2 RTO OUTLET STACK
Test 1 Run 1 Date 6-2-94
Stack Dimen. 84.5 IN.
Dry Bulb ____ °F Wet bulb ____ °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.99 IN.HG
Static Pressure -.67 IN.WC
Operators ET - DM
Pitot No. 29V-8 C_p .840

Drawing of Test Site

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 6.25 IN.		Time Start: 1520 HRS	
A 1	.072	2.608	8.85	~~1.80~~ .58	
2	.105	8.58	14.8	~~1.80~~ .72	
3	.194	15.81	22.06	~~1.80~~ .72	
4	.323	26.32	32.51	~~1.75~~ .71	326
5	.677	55.17	61.42	~~1.75~~ .71	
6	.806	65.68	71.93	.74	
7	.926	72.94	79.19	.72	
8	.968	78.89	85.14	.65	
B 1				.52	
2				.59	
3				.65	
4				.78	326
5				.70	
6				.72	
7				.75	
8				.72	
			Ft/sec 54.2		
			ACFM 12659		
			DSCFM 73999		

Temp. Meas. Device & S/N: PYT-54
Time End: 1550 HRS

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

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

Job CP/HAYWARD
Source LINE 2 ESP outlet duct
Method 5 Filter holder: 4" GLASS
Date 6-2-94 Test 1 Run 1
No. of traverse points 16
Filter type: 4" PALLFLEX

Sample Train Leak Check:

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

Particulate Catch Data:

No. of filters used: 4002

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		100	
Impinger No. 2	427	100	227
Impinger No. 3		0	
Condenser			
Desiccant	1406	1394	12
Total			239

Integrated Gas Sampling Data:

Bag Pump No. 294
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1605
Sampling rate: 400

Box No. 29 Bag No. 1
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1709 (HRS)
cc/min Operator: ET

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

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP/Hayward
Source Line 3 RTO outlet stack
Date 6-7-94 Test 1 Run 1

Operators E.Trowbridge, DAC
Meter Box No. 9 ΔH@ 1.78 IN WC
Gasmeter coeff. .9961

Pitot No. 29V-8 Cp .840
Bar. Press. 28.89 inHg H2O ____ %
Nozzle No. 10-4 Nozzle Dia .249 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Stack (°F)	Probe (°F)	Oven (°F)	Impg. (°F)	Gas/In (°F)	Gas/Out (°F)	Oxygen (%v/v)
	1604	842.80											
B 8	4	845.47	.64	1.17	5.41	5	325	236	240	44	79	78	16.8
7	8	848.10	.68	1.22	7.91	5	326				82	79	17.0
6	12	850.68	.70	1.25	0.57	5	328	240	242	44	84	80	16.8
5	16	853.26	.70	1.25	3.17	5	331				86	80	16.8
4	20	855.75	.64	1.15	5.66	5	332	242	245	47	86	81	16.8
3	24	858.21	.64	1.15	8.15	5	332				87	81	16.7
2	28	860.62	.60	1.08	0.57	4.5	331	240	243	48	88	82	16.9
1	32	862.95	.57	1.03	2.93	4.0	328				89	82	16.8
A 8	36	865.40	.60	1.08	5.36	4.0	330	243	246	46	90	83	17.0
7	40	867.94	.64	1.16	7.87	4.5	331				91	83	17.0
6	44	870.46	.69	1.25	0.47	5.0	329	245	247	48	92	84	17.1
5	48	873.07	.67	1.21	3.05	5.0	330				92	84	17.3
4	52	875.62	.65	1.18	5.58	5.0	332	242	248	48	92	85	17.3
3	56	878.25	.68	1.24	8.18	5.0	329				93	85	17.3
2	60	880.80	.68	1.24	0.78	5.0	329	244	251	48	93	86	17.5
1	64	883.38	.64	1.17	3.31	4.8	326				93	86	17.6
	(1710)												
	θ = 64	Vm = 40.48		ΔH = 1.18							Avg. = 85.5		

S-0037R

INTERPOLL LABORATORIES, INC.
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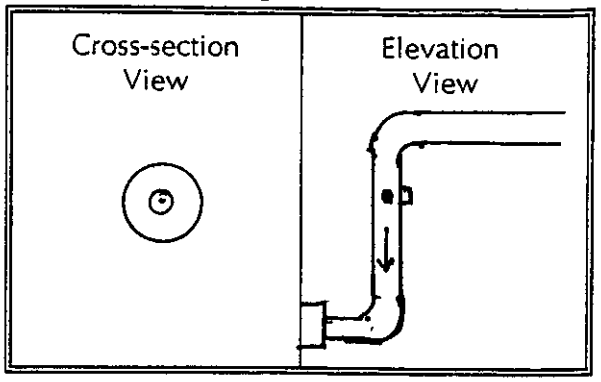
Line 2

EPA Method 2 Field Data Sheet

Job LP/HOWARD
Source SURFACE CYCLONE EXHAUST
Test 2 Run 2 Date 6-2-94
Stack Dimen. 42" IN.
Dry Bulb 215 °F Wet bulb 164 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.52 IN.HG
Static Pressure -1.40 IN.WC
Operators GH ET
Pitot No. 29 V 4 C_p .84

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 4 IN.		Time Start: 1815 HRS	
A 1	.021	.882	4.882	1.5	208°F
2	.067	2.814	6.814	2.1	
3	.118	4.956	8.956	1.8	
4	.177	7.434	11.434	2.1	
5	.250	10.5	14.5	1.9	
6	.356	14.95	18.95	1.9	
7	.644	27.048	31.048	1.8	
8	.750	31.5	35.5	1.8	
9	.823	34.56	38.56	1.7	
10	.882	37.04	41.04	1.9	
11	.933	39.19	43.19	2.0	
12	.979	41.12	45.12	1.7	
B 1	in			1.0	210°
2				2.0	
3				1.5	
4				1.0	
5				1.9	
6				2.1	
7				2.2	
8				2.3	
9				2.4	
10				2.2	
11				2.1	
12				2.1	
Temp. Meas. Device & S/N:		VDT-34		1825 Time End:	HRS

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

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job LP/HAYWARD Date 6-2-94 Test 2 Run 1
Source SURFACE CYCLONE EXHAUST No. of traverse points 24
Method 5 Filter holder: 4" GLASS Filter type: 4" PALLFLEX

Sample Train Leak Check:

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

Particulate Catch Data:

No. of filters used:
4004

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		100	
Impinger No. 2	318	100	118
Impinger No. 3		0	
Condenser			
Desiccant	1454	1410	46
Total			164

Integrated Gas Sampling Data:

Bag Pump No. 29A
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start:
Sampling rate: 400 cc/min

Box No. 29 Bag No. 2
Size: 44 L
cc/min at ✓ in. Hg.
(HRS) Time end: (HRS)
cc/min Operator: ET

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

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job WHEELABRATOR CLEAN AIR — Operators ET-DK — Pitot No. 29V-4 — Cp .84
Source Surface Cyclone Exhaust — Meter Box No. 9 — ΔH 1.77 IN WC — Bar. Press. 28.99 inHg — H2O x
Date 6-2-94 — Test 2 — Run 1 — Counter coeff. .9961 — Nozzle No. 10-3 — Nozzle Dia .185 IN.

Traverse Point No.	[illegible]	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dec. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (x v/v)
	1844	887.30											
A 12	375	888.91	2.10	1.22	9.91	6.0	214	348	239	39	78	76	17.9
11	5	890.49	2.10	1.19	0.49	6	214				79	77	17.9
10	7.5	892.20	2.2	1.25	2.11	6	214	250	242	42	80	77	17.9
9	10	893.72	2.10	1.20	3.70	6	214	2			77	75	17.9
8	12.5	895.30	2.20	1.25	5.32	6.5	214	256	243	42	79	75	18.1
7	15	896.80	2.00	1.13	6.86	7.0	215				80	75	18.1
6	17.5	898.35	1.60	.91	8.25	6.0	214	252	245	44	81	75	18.1
5	20	899.65	1.50	.85	9.59	6.0	214				81	76	18.1
4	22.5	900.99	1.50	.85	0.93	6.0	214	248	247	46	82	76	18.3
3	25	902.25	1.30	.74	2.18	5.0	214				82	77	18.1
2	27.5	903.48	1.30	.74	3.43	5.0	214	245	242	45	83	77	18.5
1	30	904.60	1.00	.57	4.54	4.0	212				83	77	18.8
B 12	32.5	906.05	1.70	.97	5.91	6.0	214	248	244	45	83	77	18.1
11	35	907.50	1.70	.97	7.40	6.0	214				84	77	17.5
10	37.5	908.88	1.80	1.03	8.88	7.5	214	245	247	47	85	78	16.8
9	40	910.38	1.90	1.09	0.40	8.0	215				85	78	16.8
8	42.5	911.82	1.80	1.03	1.87	8.0	215	246	245	47	86	79	16.8
7	45	913.30	1.80	1.03	3.35	8.0	215				86	79	16.9
6	47.5	914.82	1.90	1.09	4.88	9.0	214	249	248	48	86	80	17.3
5	50	916.30	1.70	.98	6.32	8.5	214				87	80	17.2
4	52.5	917.80	2.00	1.15	7.88	9.5	214	250	246	48	87	80	17.5
3	55	919.34	2.00	1.15	9.44	10	213				87	80	17.7
2	57.5	921.00	2.00	1.15	1.01	10	213	252	248	45	87	80	17.5
1	60	922.59	2.00	1.15	2.57	10	213				87	80	17.7
	(2.00)												
	θ = 60	Vm = 35.20		ΔH = 1.03							Avg. = 80.3		

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job LP/HAYWARD
Line 2
Source Coke Cyclone Outlet
Test 3 Run 0 Date 6-2-94
Stack dimen. 42 IN.
Dry bulb ___ °F Wet bulb ___ °F
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.
Barometric pressure 28.99 in Hg
Static pressure -14.0 in WC
Operators ET
Pitot No. 294-4 C_p .84

Cross-section View	Elevation View

Drawing of Test Site

Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length: in.		Time start: 2000 hrs	
A 1				.90	
2				1.10	
3				1.18	
4				1.15	220
5				1.30	
6				1.30	
7				1.50	
8				1.60	
9				1.60	
10				1.65	
11				2.00	
12				2.00	
B 1				1.50	
2				1.4	
3				1.3	
4				1.4	
5				1.4	220
6				1.35	
7				1.30	
8				1.40	
9				1.50	
10				1.60	
11				1.80	
12				2.00	
Temp. meas. device & S/N: PDI-34				Time end:	hrs

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

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job LP/HARVARD Date 6-2-94 Test 3 Run 1
Source Coke Cyclone outlet No. of traverse points 24
Method 5 Filter holder: 4"GLASS Filter type: 4" Pall Flex

Sample Train Leak Check:

Pretest: ☒ 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: 00 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 4001

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		(100.)	
Impinger No. 2		100	115
Impinger No. 3		0	
Condenser			
Desiccant	1415	1406	9
Total			124

Integrated Gas Sampling Data:

Bag Pump No. 294 Box No. 29 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 15 in. Hg.
Time start: 2131 (HRS) Time end: 2234 (HRS)
Sampling rate: 400 cc/min Operator: ET
S/N of O_2 Analyzer used to monitor train outlet: 9

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP/HAYWALD
Source COLD CYCLONE OUTLET
Date 6-2-94 Test 3 Run 1

Operators ET
Meter Box No. 4 ΔH 1.77 IN WC
Counter coeff. .9961

Pitot No. 29V-6 Cp .84
Bar. Press. 29.99 inHg H2O x
Nozzle No. 10-3 Nozzle Dia .185 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dec. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (x v/v)
	2430	922.80											
A 12	2.5	924.24	1.60	1.06	1.28	5	216	245	251	40	66	62	18.5
11	5	925.70	1.60	1.03	5.74	5	216				66	62	18.5
10	7.5	927.37	2.00	1.29	7.36	6	217	248	255	43	67	63	18.5
9	10	928.90	1.80	1.16	8.91	6	217				68	65	18.0
8	12.5	930.40	1.50	.97	0.32	5.5	216	251	253	44	69	65	18.5
7	15	931.42	1.20	.77	1.59	4	219				69	65	18.6
6	17.5	932.90	1.20	.77	2.85	4	219	250	255	44	69	65	18.6
5	20	934.06	1.00	.65	4.01	4	218				69	65	18.6
4	22.5	935.25	1.05	.68	5.19	4	218	247	252	45	72	66	18.6
3	25	936.50	1.10	.71	6.41	4	218				73	66	18.6
2	27.5	937.80	1.40	.91	7.78	5	219	251	250	45	72	68	18.8
1	30	939.13	1.30	.85	9.11	5	217				74	68	19.0
B 12	32.5	940.69	1.70	1.11	0.63	6	219	253	255	46	75	69	17.9
11	35	942.08	1.40	.91	2.01	6	219				76	70	18.1
10	37.5	943.40	1.30	.85	3.34	5	219	251	256	46	76	70	18.4
9	40	944.90	1.60	1.05	4.82	6	219				78	70	18.4
8	42.5	946.15	1.20	.78	6.10	5	220	250	254	48	79	70	18.4
7	45	947.45	1.60	1.05	7.58	6	220				78	70	18.7
6	47.5	949.10	1.50	.98	9.01	6	220	248	255	48	79	71	18.7
5	50	950.60	1.60	1.05	0.49	6	219				79	71	18.7
4	52.5	952.05	1.70	1.11	2.02	6.5	219	249	252	50	80	72	18.5
3	55	953.54	1.60	1.05	3.50	6.5	221				80	72	18.5
2	57.5	954.98	1.50	.98	4.94	6	221	247	251	50	81	73	18.5
1	60	956.50	1.70	1.12	6.47	6.5	220				81	73	18.7
	(2235)												
	θ = 60	Vm = 33.70		ΔH = .95							Avg. = 71.0		

INTERPOLL LABORATORIES, INC.
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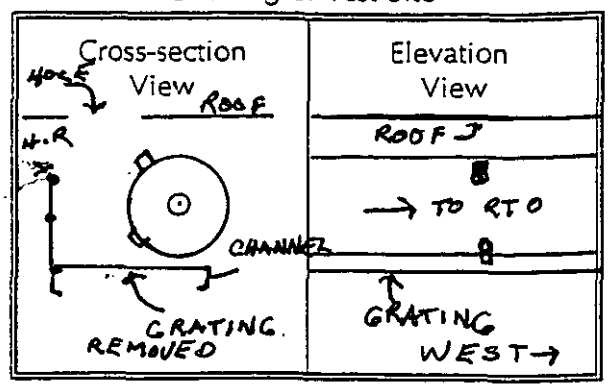
Line 2 EPA Method 2 Field Data Sheet

Job EPI / HAYWARD
Source DRYER RTO INLET
Test 4 Run Date 6-3-97
Stack Dimen. 66" IN.
Dry Bulb °F Wet bulb °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.22 IN.HG
Static Pressure -6.0 IN.WC
Operators ET - GH
Pitot No. 24 V 6 C_p .84

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 5.25 IN.		Time Start: 0010 HRS	
A 1	.021	1.386	7.136	1,05	
2	.067	4.42	10.17	1,20	
3	.118	7.79	13.54	1,00	
4	.177	11.69	17.54	1,30	
5	.250	16.5	22.25	1,30	
6	.356	23.5	29.25	1,10	1519
7	.644	42.5	48.25	1,20	
8	.750	49.5	55.25	1,20	
9	.823	54.38	60.13	1,10	
10	.882	58.212	63.87	1,30	
11	.933	61.58	67.33	1,20	
12	.979	64.614	69.89	1.50	
B 1					
2					
3		A = 24' x 12" = 288"/66" = 4.36			
4		B = 20 x 12"	240/66" = 3.63		
5					
6					
7					
8					
9					
10					
11					
12					
Temp. Meas. Device & S/N:		PDT 34		Time End: 0020 HRS	

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

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job 28/HAYWARD
Source RTO Inlet
Method 5 Filter holder: 4" GLASS
Date 6-3-94 Test 4 Run 1
No. of traverse points 24
Filter type: 4" PALLFLEX

Sample Train Leak Check:

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

Particulate Catch Data:

No. of filters used:

4003

Recovery solvent(s)

☒ Acetone
☐ other(s)

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		100	
Impinger No. 2	353	200	153
Impinger No. 3		0	
Condenser			
Desiccant	1417	1402	15
Total			168

Integrated Gas Sampling Data:

Bag Pump No. 29A
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 400
Sampling rate: 400

Box No. 23 Bag No. 1
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: (HRS)
cc/min Operator: ET

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

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CF-011

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job LP/HAYWARD
Source KTO INLET
Date 6-3-94 Test 4 Run 1

Operators ET
Meter Box No. 2 ΔH 1.22 IN WC
Cosmeter coeff. .9961

Pitot No. 29V-6 Cp .840
Bar. Press. 28.99 inHg H2O x
Nozzle No. W-3 Nozzle Dia .185 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dgs. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (x v/v)
	0845	957.30											
12	2.5	958.70	1.20	.80	8.67	4	199	251	248	42	66	65	17.7
11	5	960.10	1.25	.92	0.04	4	199				67	66	17.5
10	7.5	961.40	1.20	.88	1.39	4	202	248	250	42	68	66	17.5
9	10	962.84	1.30	.96	2.80	4	202				69	66	17.3
8	12.5	964.10	1.10	.81	4.09	4	201	251	249	44	69	66	17.3
7	15	965.48	1.20	.88	5.44	4	202				70	66	17.3
6	17.5	966.79	1.10	.81	6.74	4	202	249	252	44	70	66	17.5
5	20	968.18	1.30	.94	8.14	5	211				71	67	17.7
4	22.5	969.60	1.30	.95	9.54	5	212	247	250	45	72	68	17.2
3	25	970.85	1.10	.80	0.83	4	212				73	68	17.4
2	27.5	972.21	1.20	.87	2.17	4	212	245	251	45	73	68	17.2
1	30	973.46	1.05	.77	3.44	4	210				74	68	17.4
12	32.5	974.77	1.20	.88	4.79	4	212	250	248	44	74	68	17.1
11	35	976.23	1.25	.91	6.17	4	212				75	68	17.0
10	32.5	977.52	1.30	.95	7.57	5	212	248	245	45	75	68	16.8
9	40	979.05	1.30	.95	8.85	5	212				75	69	16.8
8	42.5	980.30	1.10	.80	0.27	4	212	251	249	45	76	70	16.8
7	45	981.70	1.25	.92	1.66	5.5	212				77	71	17.1
6	47.5	983.02	1.10	.81	2.96	5	212	248	253	46	77	71	17.0
5	50	984.35	1.30	.95	4.37	6	212				77	71	17.3
4	52.5	985.80	1.30	.95	5.76	6	212	247	250	46	77	71	17.0
3	55	987.20	1.20	.88	7.14	6	211				77	71	17.0
2	57.5	988.45	1.20	.88	8.50	7	211	245	249	46	77	71	17.2
1	60	989.75	1.00	.74	9.74		210				77	71	17.4
	(0147)												
	θ = 60	Vm = 32.40		ΔH = .88							Avg. =	70.7	

B-13

S-0037R

APPENDIX C

INTERPOLL LABORATORIES ANALYTICAL DATA

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job: L.P. Hayward	Source: Liner RTO
Team Leader: CF	Test Site: outlet stack
Date Submitted: 6-3-94	Date of Test: 6-2-94
Test No.: 1	No. of Runs Completed: 1
Date of Analysis: 6-3-94	Technician: C. Helgeson

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
1/1	3068-06	1	0.00			3.90	16.80	
		2						
	☑ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

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

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

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

EPA Method 3 Guidelines

Fuel Type	F0 Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
C-1 Wood/Wood Bark	1.000-1.130

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job L.P. Hayward
Team Leader CT
Date Submitted 6-3-94
Test No. 2
Date of Analysis 6-3-94

Source Surface Cyclone
Test Site Exhaust
Date of Test 6-2-94
No. of Runs Completed 1
Technician C. Helgeson

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
			Zero Pt.	After CO_2	After O_2			
2/1	3068-07	1	0.00	3.20	21.00	3.20	17.80	
		2	0.00	3.20	21.00	3.20	17.80	
	☑ B ☐ F	Avg				3.20	17.80	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

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

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

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

EPA Method 3 Guidelines

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

LSC 04 RD

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job L.P. Hayward
Team Leader ET
Date Submitted 6-3-94
Test No. 3
Date of Analysis 6-3-94

Source Core Cyclone
Test Site Outlet
Date of Test 6-2-94
No. of Runs Completed 1
Technician C. Helgeson

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
3/1	3068-08	1	0.00	2.10	20.90	2.10	18.80	
		2	0.00	2.10	20.90	2.10	18.80	
	☑ B ☐ F	Avg				2.10	18.80	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

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

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

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

EPA Method 3 Guidelines

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

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Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job: L. P. Hayward
Team Leader: CT
Date Submitted: 6-3-94
Test No.: 4
Date of Analysis: 6-3-94

Source: RTO
Test Site: Inlet
Date of Test: 6-3-94
No. of Runs Completed: 1
Technician: C. Helgeson

Test/Run	Sample Log Number and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
4/1	3068-09	1	0.00			3.40	17.50	
		2						
	☒ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

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

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

EPA Method 3 Guidelines

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

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

LSC-04-RP

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Wisconsin Protocol

Job LP/Hayward — Source
Team Leader — Test Site
Date Submitted — Date of Test
Test No. — No. of Runs Completed
Date of Analysis 6/3/94 — Technician BBuso

		Solvent Phase (Organic)	Aqueous Phase (Inorganic)
0	Test 1 Run 0 Field Blank Log Number 3068-01I Comments	Dish No. 12 Dish Tare Wt. 48.1481 g Dish+Sample Wt. 48.1484 g Sample Wt. 0.0003 g	Dish No. 93 Dish Tare Wt. 53.9826 g Dish+Sample Wt. 53.9851 g Sample Wt. 0.0260 g
1	Test 1 Run 1 Log Number 3068-02I Comments	Dish No. 20 Dish Tare Wt. 48.8132 g Dish+Sample Wt. 48.8214 g Sample Wt. 0.0082 g	Dish No. 603 Dish Tare Wt. 46.3683 g Dish+Sample Wt. 46.3703 g Sample Wt. 0.0430 g
2	Test 2 Run 1 Log Number 3068-03I Comments	Dish No. 44 Dish Tare Wt. 47.6191 g Dish+Sample Wt. 47.6638 g Sample Wt. 0.0447 g	Dish No. 609 Dish Tare Wt. 45.5592 g Dish+Sample Wt. 45.5630 g Sample Wt. 0.0409 g
3	Test 3 Run 1 Log Number 3068-04I Comments	Dish No. 45 Dish Tare Wt. 48.1509 g Dish+Sample Wt. 48.1690 g Sample Wt. 0.0181 g	Dish No. 621 Dish Tare Wt. 49.9338 g Dish+Sample Wt. 49.9350 g Sample Wt. 0.0196 g
4	Test 4 Run 1 Log Number 3068-05I Comments	Dish No. 47 Dish Tare Wt. 48.4653 g Dish+Sample Wt. 48.4860 g Sample Wt. 0.0207 g	Dish No. 622 Dish Tare Wt. 48.9437 g Dish+Sample Wt. 48.9456 g Sample Wt. 0.0234 g
5	Test ____ Run ____ Log Number ____ Comments	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g

Results Solvent Phase: TEST1 TEST2 TEST3 TEST4 Blank Solvent Wt. ____ g

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	.0080	.0442	.0181	.0207	

Results Aqueous Phase:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	.0430	.0409	.0196	.0234	

LSC-03WYR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job LP/Hayward | Source
Team Leader Ed Trubridge | Test Site
Date Submitted 6/3/94 | Date of Test 6/2/94
Test No. 1-4 | No. of Runs Completed
Date of Analysis 6/3/94 | Technician
Transport Leakage [X] None [ ] ml | Solvent Acetone

	Test 1 Run 0	Dish No. 509	
	Field Blank	Dish Tare Wt. 47.6204	g
0	Log Number 3068-01-P	Dish+Sample Wt. 47.6209	g
	Vol. of Solvent 147 ml	Sample Wt. 0.0005	g
	*Solvent Residue 3.40 ug/ml		
	Test 1 Run 1	Dish No. 501	
1	Vol. of Solvent 95 ml	Dish Tare Wt. 47.2497	g
	Log Number 3068-02-P	Dish+Sample Wt. 47.2769	g
	Comments	Sample Wt. 0.0272	g
	Test 2 Run 1	Dish No. 306	
2	Vol. of Solvent 70 ml	Dish Tare Wt. 42.8339	g
	Log Number 3068-03-P	Dish+Sample Wt. 42.8956	g
	Comments	Sample Wt. 0.0617	g
	Test 3 Run 1	Dish No. 4	
3	Vol. of Solvent 168 ml	Dish Tare Wt. 47.3791	g
	Log Number 3068-04-P	Dish+Sample Wt. 47.5189	g
	Comments	Sample Wt. 0.1398	g
	Test 4 Run 1	Dish No. 5	
4	Vol. of Solvent 115 ml	Dish Tare Wt. 50.6816	g
	Log Number 3068-05-P	Dish+Sample Wt. 50.7135	g
	Comments	Sample Wt. 0.0319	g
	Test ____ Run ____	Dish No.	
5	Vol. of Solvent ____ ml	Dish Tare Wt.	g
	Log Number	Dish+Sample Wt.	g
	Comments	Sample Wt.	g

*Solvent Residue 3.40 ug/ml = [(Sample Wt. 0.0005 g)(10^6)]/Vol. of Sol. 147 ml
EPA-M5 Acetone Residue Blank Spec. ≤ 7.8 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0269	0.0615	0.1392	0.0315	C-6

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job LP/Hayward
Team Leader Ed Trobridge
Date Submitted 6/3/94
Test No. —
Date of Analysis 6/3/94

Source
Test Site
Date of Test
No. of Runs Completed
Technician

	Test 1 Run 0 Field Blank Log Number 3068-01-F Comments	Filter No. 4005 Filter Type 4" Pallflex Filter Tare Wt. 0.6220 g Filter+Sample Wt. 0.6227 g Sample Wt. 0.0007 g
1	Test 1 Run 1 Log Number 3068-02-F Comments	Filter No. 4002 Filter Type 4" Pallflex Filter Tare Wt. 0.6250 g Filter+Sample Wt. 0.6392 g Sample Wt. 0.0142 g
2	Test 2 Run 1 Log Number 3068-03-F Comments	Filter No. 4004 Filter Type 4" Pallflex Filter Tare Wt. 0.6201 g Filter+Sample Wt. 0.8498 g Sample Wt. 0.2297 g
3	Test 3 Run 1 Log Number 3068-04-F Comments	Filter No. 4001 Filter Type 4" Pallflex Filter Tare Wt. 0.6265 g Filter+Sample Wt. 0.7554 g Sample Wt. 0.1289 g
4	Test 4 Run 1 Log Number 3068-05-F Comments	Filter No. 4003 Filter Type 4" Pallflex Filter Tare Wt. 0.6290 g Filter+Sample Wt. 0.8498 g Sample Wt. 0.2208 g
5	Test ____ Run ____ Log Number ____ Comments	Filter No. ____ Filter Type ____ Filter Tare Wt. ____ g Filter+Sample Wt. ____ g Sample Wt. ____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0142	0.2297	0.1289	0.2208	

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
(Dry ONLY) →	0.0411	0.2912	0.2681	0.2523	
(DRY + WET) →	0.0923	0.3763	0.3058	0.2964	

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job 2P/HAYWARD Source LINE 2 RTO Site OUTLET STACK Log No. 3068
Field Engineer E Tinsbeke Date of Test 6-2-94 Test No. 1 No. of Runs 1

No. Items	Sample Type		Analysis		Sequence No.	Comments
2	**Probe Wash:** ☒ Acetone ☐ $MeCl_2$	☐ DI Water ☐ _____	☒ EPA M-5 ☐ EPA M-29	☐ EPA M-201A ☐ _____	01,02	
2	**Filter:** ☐ 4" Glass ☐ SS Thimble	☒ Fallflex ☐ 2.5" Glass	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17	01,02	
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 ☐ _____	01,02	
1	**Integrated Gas:** ☒ Tedlar Bag	☐ _____	☒ EPA M-3 ☐ _____	☐ EPA M-10	06	
	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
E Tinsbeke / Interpoll Labs	Bob Say, In Compl C	6/3/94 0700

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C-8

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job C&I Hayward — Source Surface Cyclone — Site Exhaust — Log No. 3068
Field Engineer E Trustedge — Date of Test 6-2-94 — Test No. 2 — No. of Runs 1

No. Items	Sample Type		Analysis		Sequence No.	Comments
1	**Probe Wash:** ☒ Acetone ☐ $MeCl_2$	☐ DI Water ☐ _____	☒ EPA M-5 ☐ EPA M-29	☐ EPA M-201A ☐ _____	03	
1	**Filter:** ☐ 4" Glass ☐ SS Thimble	☒ Pallflex ☐ 2.5" Glass	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17	03	
1	**Impingers:** ☒ DI Water ☐ 3% H_2O_2 ☐ 1N NaOH ☐ 2,4-DNPH	☐ H_2SO_4 ☐ HNO_3/H_2O_2 ☐ $KMnO_4/H_2SO_4$ ☐ _____	☐ MN Protocol ☒ WI Protocol ☐ EPA M-202 ☐ EPA M6,8 ☐ Acid Gases	☐ IA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ _____	03	
1	**Integrated Gas:** ☒ Tedlar Bag	☐ _____	☒ EPA M-3 ☐ _____	☐ EPA M-10	07	
	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
E Trustedge / Interpoll	Bob Berg, InTerpoll	6/3/94 0700

Interpoll Laboratories
(612) 786-6020
SAMPLE CHAIN OF CUSTODY

3068

Job LP Hayward
Field Engineer [signature]
Source Cone cyclone
Site outlet
Date of Test 6-2-94
Test No. 3
No. of Runs 1

# ITEMS	SAMPLE TYPE	ANALYSIS	LOG NUMBER	COMMENTS
1	**Probe Wash:** ☒ Acetone ☐ MeCl$_2$ ☐ DI Water ☐ ______	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A ☐ ______	04	
1	**Filter:** ☐ 4" Glass ☐ SS Thimble ☒ Pallflex ☐ 2.5" Glass	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A ☐ EPA M-17	04	
1	**Impingers:** ☒ DI Water ☐ 3% H_2O_2 ☐ 1N NaOH ☐ 2,4-DNPH ☐ H_2SO_4 ☐ HNO_3/H_2O_2 ☐ $KMnO_4/H_2SO_4$ ☐ ______	☐ MN Protocol ☒ WI Protocol ☐ EPA M-202 ☐ EPA M6,8 ☐ Acid Gases ☐ IA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ ______	04	
1	**Integrated Gas:** ☒ Tedlar Bag ☐ ______	☒ EPA M-3 ☐ ______ ☐ EPA M-10	08	
	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
[signature] Interpoll Labs	[signature], Interpoll	6/3/94 0700

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S-278

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job C P / HOWARD Source RTO Site Vault Log No. 3065
Field Engineer E Swedberg Date of Test 6-3-94 Test No. 4 No. of Runs 1

No. Items	Sample Type		Analysis		Sequence No.	Comments
1	**Probe Wash:** ☒ Acetone ☐ $MeCl_2$	☐DI Water ☐_____	☒EPA M-5 ☐EPA M-29	☐EPA M-201A ☐_____	05	
1	**Filter:** ☐ 4" Glass ☐ SS Thimble	☒Pallflex ☐2.5" Glass	☒EPA M-5 ☐EPA M-29 ☐EPA M-201A	☐EPA M-17	05	
1	**Impingers:** ☒DI Water ☐3%H_2O_2 ☐1N NaOH ☐2,4-DNPH	☐H_2SO_4 ☐HNO_3/H_2O_2 ☐$KMnO_4/H_2SO_4$ ☐_____	☐MN Protocol ☒WI Protocol ☐EPA M-202 ☐EPA M6,8 ☐Acid Gases	☐IA Protocol ☐Formaldehyde ☐EPA M-29 ☐EPA M-26 ☐_____	05	
1	**Integrated Gas:** ☒Tedlar Bag	☐_____	☐EPA M-3 ☒_____	☐EPA M-10	09	
	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
E Swedberg / Interpoll	Bob Berg, Interpoll	6/3/94 0700

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APPENDIX D

SAMPLING TRAIN CALIBRATION DATA

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: June 3, 1994

Meter Box No. : 9 (Rockwell Dry Test Meter Serial No. 964549)

Date of Last Calibration: March 24, 1994
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
April 06, 1994	4-2597	261.00	391.84	130.84	130.84
April 12, 1994	4-2649	400.30	612.20	211.90	342.74
May 10, 1994	4-2837	624.20	1606.81	982.61	1325.35
May 17, 1994	4-2893	1615.60	1826.77	211.17	1536.52
June 02, 1994	4-3068	1842.90	1989.75	146.85	1683.37

* Total volume through meter since last calibration.

Date 3-24-94

Bar. Press. 29.00 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 6

Control Module No. 9
Serial No. DTM 964549
Wet Test Meter No. AL-20
Technician [signature]

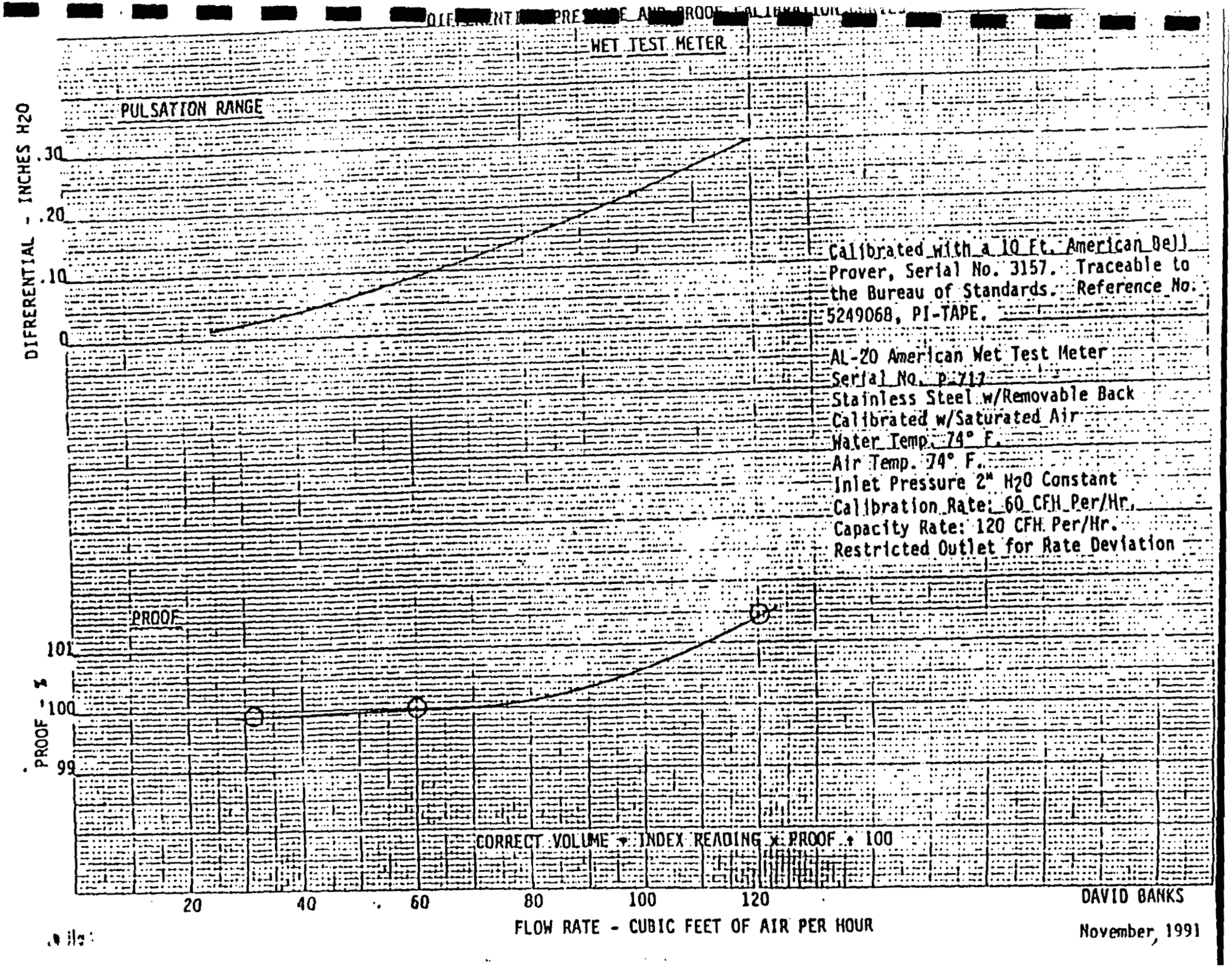
ΔH (in. WC)		Gas Volume Wet Test Meter (ft^3)	* Cal. Index θ (%)	* Diff. Wet Test Meter ΔP_w (in. WC)	Gas Volume Dry test meter (ft^3)		Gas temperatures			Time θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔH@	C_f
							Wet Test	Dry Test					
nominal	actual				V_{d1}	V_{df}	t_w (°F)	t_{d1} (°F)	t_{df} (°F)				
0.6	.5	2	99.85	0.01	108,000	110,028	66	77	72	5/00	.9993	1.77	
1.2	1.2	3	99.91	0.025	104,500	107,530	66	74	70	4/49	.9973	1.76	
2.0	2.0	3	99.93	0.055	110,500	113,552	66	80	73	3/46	.9966	1.78	
3.3	3.3	5	100.00	0.09	114,000	119,116	66	84	75	4/55	.9934	1.79	
4.7	4.7	5	100.02	0.12	119,500	124,627	66	88	76	4/07	.9939	1.78	
											.9961	1.78	
	1	2	3	4	5	6	7	8	9	10	11/12		

Positive leak check performed by [signature]
Meter was in tolerance ☒
Meter was not in tolerance ☐; readjusted linkage
Meter was not in tolerance ☐; changed dry test meters

Approved by [signature] Date 4/4/94

* Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

SOI02RR 11/91


WET TEST METER
PULSATION RANGE
DIFRERENTIAL - INCHES H20
.30
.20
.10
0
Calibrated with a 10 Ft. American Bell Prover, Serial No. 3157. Traceable to the Bureau of Standards. Reference No. 5249068, PI-TAPE.
AL-20 American Wet Test Meter
Serial No. P 717
Stainless Steel w/Removable Back
Calibrated w/Saturated Air
Water Temp. 74° F.
Air Temp. 74° F.
Inlet Pressure 2" H2O Constant
Calibration Rate: 60 CFH Per/Hr.
Capacity Rate: 120 CFH Per/Hr.
Restricted Outlet for Rate Deviation
PROOF
101
100
99
PROOF - %
CORRECT VOLUME = INDEX READING x PROOF ÷ 100
20
40
60
80
100
120
FLOW RATE - CUBIC FEET OF AIR PER HOUR
DAVID BANKS
November, 1991

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 06-02-94 Nozzle Number 10-3
Technician: Ed Trowbridge

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.185
2	.185
3	.185
Average:	.185

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 06-02-94 Nozzle Number 10-4
Technician: Ed Trowbridge

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.249
2	.249
3	.249
Average:	.249

Interdoll Laboratories, Inc.

Temperature Measurement Device Calibration Sheet

Unit under test:

Vendor OMEGA

Model HH21 Serial Number #2 J

Range ____ °F Thermocouple Type K

Date of Calibration 1/7/94 Technician D. VAN HOEVER

Method of Calibration:

☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.

☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is ± 0.1% of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation Δt (°F)	Deviation (%)
0	0	2	2	.43
100	100	98.1	2	.36
200	200	200	—	0
300	300	298.0	2	.26
400	400	398	2	.23
500	500	499	1	.10
600	600	601	1	.09
700	700	699	1	.09
800	800	801	1	.08
900	900	899.0	1	.07
1000	1000	1000	—	0
1100	1100	1099	1	.06
1200	1200	1202	2	.12
1300	1300	1299	1	.06
1400	1400	1402	2	.11
1500	1500	1499	1	.05
1600	1600	1601	1	.05
1700	1700	1699	1	.05
1800	1800	1800	—	0
1900	1900	1898	2	.08
2000	2000	2000	0	0
2100	2100	2098	2	.08
		Averages:		.11

OF = off scale response by unit under test (°F)

% dev = 100 Δt / (460 + t)

☒ Unit in tolerance

☐ Unit was not in tolerance: recalibrated - See new calibration sheet.

S-433

Interpoll Laboratories, Inc.

E.T.'s

Temperature Measurement Device Calibration Sheet

Unit under test: #34

Vendor Omega

Model HH81

Serial Number 74TX0343

Range 0 - 2000 °F

Thermocouple Type K

Date of Calibration 4-21-94

Technician E TRAUBRIDGE

Method of Calibration:

☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.

☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is ± 0.1% of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation Δt (°F)	Deviation (%)
0	0	-1.9	-1.9	.41
100	100	-97.5	-2.5	.45
200	200	199.7	-.3	.05
300	300	297.5	-2.5	.33
400	400	397	-3	.35
500	500	498	-2	.20
600	600	600	0	0
700	700	699	-1	.08
800	800	801	+1	.08
900	900	900	0	0
1000	1000	1001	+1	.07
1100	1100	1098	-2	.13
1200	1200	1201	+1	.06
1300	1300	1299	-1	.05
1400	1400	1402	+2	.11
1500	1500	1500	0	0
1600	1600	1603	+3	.14
1700	1700	1701	+1	.05
1800	1800	1804	+4	.18
1900	1900	1901	+1	.04
2000	2000	2001	+1	.04
2100	2100	2099	-1	
		Averages:	1.46	.128

OF = off scale response by unit under test (°F)

% dev = 100 Δt / (460 + t)

☒ Unit in tolerance

☐ Unit was not in tolerance; recalibrated - See new calibration sheet.

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 24-6

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .02
9. W <.0625" 0

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .750 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = _____

Date of Inspection: 4-8-94

Inspected by: [signature]

CFR Title 40 Part 60 Appenidix A Method 2

S-348

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 79-4

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .02
9. W <.0625" .02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = _____

Date of Inspection:

4-7-94

Inspected by:

CFR Title 40 Part 60 Appenidix A Method 2

S-348

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 29-8

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .01
9. W <.0625" .02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☐ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = _____

Date of Inspection: 1-7-94

Inspected by: [signature]

CFR Title 40 Part 60 Appenidix A Method 2

S-348

INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 1-4-93
Technician G HOULE
Mercury Column Barometer No. _____
Aneroid Barometer No. 636235

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
29.27	73	-.114	29.155	29.30	.185

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. NO

Has problem been alleviated? Yes/No. How? _____

I ADJUSTED THE ANEROID TO MATCH THE Hg

*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneriod barometer will be calibrated to the adjusted mercury barometer readings.

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INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

ET's

Date 5-31-94

Technician E Trombley

Mercury Column Barometer No. LAB 1

Aneroid Barometer No. ultimeter model 12 SN-01002008

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
29.230	72	.115	29.115	29.12	.005

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. no

Has problem been alleviated? Yes/No. How?

*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneriod barometer will be calibrated to the adjusted mercury barometer readings.

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