Background Report Reference

AP-42 Section Number: 9.10.1.2

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Title: Results of the December 1&2, 1992, State Air Emission Compliance Testing on the Pulp Dryers at the American Crystal Sugar Drayton Plant

Interpoll Laboratories, Inc.

Interpoll Laboratories, Inc.

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AP-42 Section 9.10.1.2
Reference
Report Sect. 4
Reference 18

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

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

RESULTS OF THE DECEMBER 1 & 2, 1992 STATE AIR EMISSION COMPLIANCE TESTING ON THE PULP DRYERS AT THE AMERICAN CRYSTAL SUGAR DRAYTON PLANT

Submitted to:

AMERICAN CRYSTAL SUGAR COMPANY
101 North Third Street
Moorhead, Minnesota 56560

Attention:

Annette Cederberg
Environmental Coordinator

Approved by:

Daniel Despen
Manager
Field Testing Support Group

Report Number 2-7629
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SP/slp

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ABBREVIATIONS

ACFM	actual cubic feet per minute
cc (ml)	cubic centimeter (milliliter)
DSCFM	standard cubic foot of dry gas per minute
DSML	dry standard milliliter
DEG-F (^{0}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
<	$\leq$ (when following a number)

Standard conditions are defined as 68 ^{0}F (20 ^{0}C) and 29.92 IN. of mercury pressure.

1 INTRODUCTION

On December 1 & 2, 1992 Interpoll Laboratories Personnel conducted a State Particulate Emission Compliance Test on the Pulp Dryers at the American Crystal Sugar Drayton Plant in Drayton, North Dakota. Duane Van Hoever, Gary Hove, Jeff Bergstrom, and Randy Madison performed the on-site portion of the test. Coordination between testing activities and plant operation was provided by Butch Altenbernd of American Crystal Sugar. Gary Kline and Craig Thorfenson of the North Dakota State Department of Health witnessed the test.

The pulp dryers tested are rotary drum dryers manufactured by Stearns & Rogers. The dryer furnace is coal-fired and is equipped with a traveling grate. Wet sugar beet pulp is gravity fed into the rotary drum dryer where hot combustion gases from the furnace evaporate the moisture. Particulate emission from the dryer are controlled by cyclones which were manufactured by Crookston manufacturing. Collected particulate material is discharged from the multicyclone hoppers by means of rotary valve air locks. Cleaned flue gas from the No. 1 (or South) dryer is exhausted to the atmosphere via five identical stacks, and cleaned flue gas from the No. 2 (or North) dryer is exhausted to the atmosphere via four identical stacks.

Particulate evaluations were performed in accordance with EPA Methods 1 - 5, CFR Title 40, Part 60, Appendix A (revised July 1, 1992). 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.

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 2.9 diameters downstream and 1.6 diameters upstream of the nearest flow disturbances. A 24-point traverse was used to collect representative particulate samples. Each traverse point was sampled 2.5 minutes to give a total sampling time of 60 minutes per run.

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

2 SUMMARY AND DISCUSSION

The results of the particulate emission test are summarized in Tables 1 - 4. The table below summarizes the particulate concentrations and emission rates for all sources.

Source	Concentration (GR/DSCF)	Emission Rate (LB/HR)
(SOUTH DRYER)		
No. 1 West Dryer	0.0746	7.28
No. 1 East Dryer	0.0739	6.25
(NORTH DRYER)		
No. 2 West Dryer	0.0529	3.51
No. 2 East Dryer	0.0568	4.46

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 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 December 1, 1992 State Particulate Emission Compliance Test on the No. 1 West Dryer Stack at the American Crystal Sugar Drayton Plant.

(SOUTH DRYER)

ITEM	Run 1	Run 2	Run 3
Date of test	12-01-92	12-01-92	12-01-92
Time runs were done (HRS)	918/1015	754/ 856	925/1029
Volumetric flow			
actual (ACFM)	19529	21669	21382
standard (DSCFM)	10652	11533	11901
Gas temperature (DEG-F)	206	207	210
Moisture content (%V/V)	27.89	30.79	27.38
Gas composition (%V/V,dry)			
carbon dioxide	3.90	4.30	3.70
oxygen	16.40	16.00	16.60
nitrogen	79.70	79.70	79.70
Isokinetic variation (%)	103.0	103.4	96.8
Particulate concentration			
actual (GR/ACF)	.0381	.0414	.0424
standard (GR/DSCF)	.0699	.0779	.0761
Part. emission rate (LB/HR)	6.38	7.70	7.77

Note: Dry Catch Only

Table 2. Summary of the Results of the December 1, 1992 State Particulate Emission Compliance Test on the No. 1 East Dryer Stack at the American Crystal Sugar Drayton Plant.

(SOUTH DRYER)

ITEM		Run 1	Run 2	Run 3
Date of test		12-01-92	12-01-92	12-01-92
Time runs were done	(HRS)	913/1015	754/ 855	927/1029
Volumetric flow				
actual	(ACFM)	17627	19021	18731
standard	(DSCFM)	9464	9773	10344
Gas temperature	(DEG-F)	206	207	210
Moisture content	(%V/V)	28.87	31.97	27.94
Gas composition	(%V/V,dry)			
carbon dioxide		3.70	4.30	3.80
oxygen		16.60	16.00	16.60
nitrogen		79.70	79.70	79.60
Isokinetic variation	(%)	104.0	104.0	97.4
Particulate concentration				
actual	(GR/ACF)	.0377	.0415	.0391
standard	(GR/DSCF)	.0703	.0807	.0708
Part. emission rate	(LB/HR)	5.71	6.76	6.27

Note: Dry Catch Only

Table 3. Summary of the Results of the December 2, 1992 State Particulate Emission Compliance Test on the No. 2 West Dryer Stack at the American Crystal Sugar Drayton Plant.

(NORTH DRYER)

ITEM	Run 1	Run 2	Run 3
Date of test	12-02-92	12-02-92	12-02-92
Time runs were done (HRS)	1140/1242	1315/1418	1450/1556
Volumetric flow			
actual (ACFM)	13048	13325	13434
standard (DSCFM)	7961	7657	7579
Gas temperature (DEG-F)	215	212	211
Moisture content (%V/V)	19.72	24.76	26.25
Gas composition (%V/V,dry)			
carbon dioxide	2.60	3.40	3.70
oxygen	18.00	17.00	16.80
nitrogen	79.40	79.60	79.50
Isokinetic variation (%)	93.8	104.8	103.4
Particulate concentration			
actual (GR/ACF)	.0310	.0311	.0304
standard (GR/DSCF)	.0508	.0541	.0539
Part. emission rate (LB/HR)	3.47	3.55	3.50

Note: Dry Catch Only

Table 4. Summary of the Results of the December 2, 1992 State Particulate Emission Compliance Test on the No. 2 East Dryer Stack at the American Crystal Sugar Drayton Plant.

(NORTH DRYER)

ITEM	Run 1	Run 2	Run 3
Date of test	12-02-92	12-02-92	12-02-92
Time runs were done (HRS)	1140/1244	1314/1418	1450/1555
Volumetric flow			
actual (ACFM)	15803	15723	15738
standard (DSCFM)	9639	9016	8939
Gas temperature (DEG-F)	215	211	211
Moisture content (%V/V)	19.74	24.97	25.78
Gas composition (%V/V,dry)			
carbon dioxide	2.60	3.20	3.60
oxygen	18.00	17.30	16.80
nitrogen	79.40	79.50	79.60
Isokinetic variation (%)	94.1	105.1	102.8
Particulate concentration			
actual (GR/ACF)	.0280	.0309	.0401
standard (GR/DSCF)	.0459	.0540	.0706
Part. emission rate (LB/HR)	3.79	4.17	5.41

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
No. 1 West Dryer Stack
(South Dryer)

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

	Run 1	Run 2	Run 3
Date of run	12-01-92	12-01-92	12-01-92
Dry basis (orsat)			
carbon dioxide.....	3.90	4.30	3.70
oxygen.....	16.40	16.00	16.60
nitrogen.....	79.70	79.70	79.70
Wet basis (orsat)			
carbon dioxide.....	2.81	2.98	2.69
oxygen.....	11.83	11.07	12.06
nitrogen.....	57.47	55.16	57.88
water vapor.....	27.89	30.79	27.38
Dry molecular weight.....	29.28	29.33	29.26
Wet molecular weight.....	26.13	25.84	26.17
Specific gravity.....	0.903	0.893	0.904
Water mass flow.....(LB/HR)	11576	14411	12601
FO	1.154	1.140	1.162

Test No. 1
No. 1 East Dryer Stack
(South Dryer)

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

	Run 1	Run 2	Run 3
Date of run	12-01-92	12-01-92	12-01-92
Dry basis (orsat)			
carbon dioxide.....	3.70	4.30	3.80
oxygen.....	16.60	16.00	16.60
nitrogen.....	79.70	79.70	79.60
Wet basis (orsat)			
carbon dioxide.....	2.63	2.93	2.74
oxygen.....	11.81	10.88	11.96
nitrogen.....	56.69	54.22	57.36
water vapor.....	28.87	31.97	27.94
Dry molecular weight.....	29.26	29.33	29.27
Wet molecular weight.....	26.01	25.71	26.12
Specific gravity.....	0.898	0.888	0.902
Water mass flow.....(LB/HR)	10789	12901	11263
FO	1.162	1.140	1.132

Test No. 2
No. 2 West Dryer Stack

(North Dryer)

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

	Run 1	Run 2	Run 3
Date of run	12-02-92	12-02-92	12-02-92
Dry basis (orsat)			
carbon dioxide.....	2.60	3.40	3.70
oxygen.....	18.00	17.00	16.80
nitrogen.....	79.40	79.60	79.50
Wet basis (orsat)			
carbon dioxide.....	2.09	2.56	2.73
oxygen.....	14.45	12.79	12.39
nitrogen.....	63.74	59.89	58.63
water vapor.....	19.72	24.76	26.25
Dry molecular weight.....	29.14	29.22	29.26
Wet molecular weight.....	26.94	26.44	26.31
Specific gravity.....	0.931	0.913	0.909
Water mass flow.....(LB/HR)	5493	7078	7578
FO	1.115	1.147	1.108

Test No. 2
No. 2 East Dryer Stack
(North Dryer)

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

	Run 1	Run 2	Run 3
Date of run	12-02-92	12-02-92	12-02-92
Dry basis (orsat)			
carbon dioxide.....	2.60	3.20	3.60
oxygen.....	18.00	17.30	16.80
nitrogen.....	79.40	79.50	79.60
Wet basis (orsat)			
carbon dioxide.....	2.09	2.40	2.67
oxygen.....	14.45	12.98	12.47
nitrogen.....	63.73	59.65	59.08
water vapor.....	19.74	24.97	25.78
Dry molecular weight.....	29.14	29.20	29.25
Wet molecular weight.....	26.94	26.41	26.35
Specific gravity.....	0.931	0.912	0.910
Water mass flow.....(LB/HR)	6656	8425	8721
FO	1.115	1.125	1.139

3.2 Results of Particulate Loading Determinations

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Drayton, North Dakota

Test No. 1
No. 1 West Dryer Stack

(South Dryer)

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

	Run 1	Run 2	Run 3
Date of run	12-01-92	12-01-92	12-01-92
Time run start/end.....(HRS)	918/1015	754/ 856	925/1029
Static pressure.....(IN.WC)	-0.05	-0.05	-0.05
Cross sectional area (SQ.FT)	12.31	12.31	12.31
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	288.0	340.0	282.0
impingers.....(GRAMS)	0.0	0.0	0.0
desiccant.....(GRAMS)	47.0	79.0	61.0
total.....(GRAMS)	335.0	419.0	343.0
Total particulate material..			
.....collected(grams)	0.1847	0.2238	0.2114
Gas meter coefficient.....	0.9945	0.9945	0.9945
Barometric pressure..(IN.HG)	28.57	29.08	29.08
Avg. orif.pres.drop..(IN.WC)	1.61	1.84	1.72
Avg. gas meter temp..(DEF-F)	85.0	77.5	80.8
Volume through gas meter....			
at meter conditions...(CF)	44.15	46.51	45.22
standard conditions.(DSCF)	40.77	44.35	42.84
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.374	.374	.374
Avg.stack gas temp ..(DEG-F)	206	207	210
Volumetric flow rate.....			
actual.....(ACFM)	19529	21669	21382
dry standard.....(DSCFM)	10652	11533	11901
Isokinetic variation.....(%)	103.0	103.4	96.8
Particulate concentration...			
actual.....(GR/ACF)	0.03811	0.04143	0.04236
dry standard.....(GR/DSCF)	0.06990	0.07787	0.07614
Particle mass rate...(LB/HR)	6.382	7.697	7.766

Test No. 1
No. 1 East Dryer Stack
(South Dryer)

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

	Run 1	Run 2	Run 3
Date of run	12-01-92	12-01-92	12-01-92
Time run start/end.....(HRS)	913/1015	754/ 855	927/1029
Static pressure.....(IN.WC)	-0.08	-0.08	-0.08
Cross sectional area (SQ.FT)	12.31	12.31	12.31
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	266.0	302.0	250.0
impingers.....(GRAMS)	0.0	0.0	0.0
desiccant.....(GRAMS)	46.0	71.0	55.0
total.....(GRAMS)	312.0	373.0	305.0
Total particulate material..			
.....collected(grams)	0.1650	0.1955	0.1699
Gas meter coefficient.....	1.0007	1.0007	1.0007
Barometric pressure..(IN.HG)	28.51	28.57	29.08
Avg. orif.pres.drop..(IN.WC)	1.33	1.42	1.37
Avg. gas meter temp..(DEF-F)	92.2	84.8	93.7
Volume through gas meter....			
at meter conditions...(CF)	39.58	40.22	39.82
standard conditions.(DSCF)	36.20	37.37	37.04
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.372	.372	.372
Avg.stack gas temp ..(DEG-F)	206	207	210
Volumetric flow rate.....			
actual.....(ACFM)	17627	19021	18731
dry standard.....(DSCFM)	9464	9773	10344
Isokinetic variation.....(%)	104.0	104.0	97.4
Particulate concentration...			
actual.....(GR/ACF)	0.03775	0.04146	0.03906
dry standard.....(GR/DSCF)	0.07034	0.08073	0.07077
Particle mass rate...(LB/HR)	5.706	6.762	6.274

Test No. 2
No. 2 West Dryer Stack

(North Dryer)

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

	Run 1	Run 2	Run 3
Date of run	12-02-92	12-02-92	12-02-92
Time run start/end.....(HRS)	1140/1242	1315/1418	1450/1556
Static pressure.....(IN.WC)	-0.03	-0.03	-0.03
Cross sectional area (SQ.FT)	12.31	12.31	12.31
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	159.0	222.0	238.0
impingers.....(GRAMS)	0.0	0.0	0.0
desiccant.....(GRAMS)	37.0	60.0	60.0
total.....(GRAMS)	196.0	282.0	298.0
Total particulate material..			
.....collected(grams)	0.1237	0.1416	0.1376
Gas meter coefficient.....	0.9945	0.9945	0.9945
Barometric pressure..(IN.HG)	29.08	29.08	29.08
Avg. orif.pres.drop..(IN.WC)	1.41	1.62	1.53
Avg. gas meter temp..(DEF-F)	85.4	84.5	86.3
Volume through gas meter....			
at meter conditions...(CF)	40.02	42.89	42.05
standard conditions.(DSCF)	37.57	40.35	39.42
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.435	.435	.435
Avg.stack gas temp ..(DEG-F)	215	212	211
Volumetric flow rate.....			
actual.....(ACFM)	13048	13325	13434
dry standard.....(DSCFM)	7961	7657	7579
Isokinetic variation.....(%)	93.8	104.8	103.4
Particulate concentration...			
actual.....(GR/ACF)	0.03099	0.03111	0.03037
dry standard.....(GR/DSCF)	0.05081	0.05415	0.05386
Particle mass rate...(LB/HR)	3.467	3.554	3.499

Test No. 2
No. 2 East Dryer Stack
(North Dryer)

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

	Run 1	Run 2	Run 3
Date of run	12-02-92	12-02-92	12-02-92
Time run start/end.....(HRS)	1140/1244	1314/1418	1450/1555
Static pressure.....(IN.WC)	-0.05	-0.05	-0.05
Cross sectional area (SQ.FT)	12.31	12.31	12.31
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	134.0	192.0	202.0
impingers.....(GRAMS)	0.0	0.0	0.0
desiccant.....(GRAMS)	42.0	57.0	50.0
total.....(GRAMS)	176.0	249.0	252.0
Total particulate material..			
.....collected(grams)	0.1002	0.1233	0.1563
Gas meter coefficient.....	1.0007	1.0007	1.0007
Barometric pressure..(IN.HG)	29.08	29.08	29.08
Avg. orif.pres.drop..(IN.WC)	1.12	1.20	1.23
Avg. gas meter temp..(DEF-F)	95.3	96.9	96.9
Volume through gas meter....			
at meter conditions...(CF)	36.36	38.12	36.95
standard conditions.(DSCF)	33.71	35.24	34.17
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.374	.374	.374
Avg.stack gas temp ..(DEG-F)	215	211	211
Volumetric flow rate.....			
actual.....(ACFM)	15803	15723	15738
dry standard.....(DSCFM)	9639	9016	8939
Isokinetic variation.....(%)	94.1	105.1	102.8
Particulate concentration...			
actual.....(GR/ACF)	0.02796	0.03095	0.04008
dry standard.....(GR/DSCF)	0.04587	0.05399	0.07059
Particle mass rate...(LB/HR)	3.790	4.172	5.409

APPENDIX A

VOLUMETRIC FLOW RATE DETERMINATION

Test No. 1
No. 1 West Dryer Stack
(South Dryer)

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

Date of Determination.....	12-01-92
Time of Determination.....(HRS)	845
Barometric pressure.....(IN.HG)	28.57
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	47.5
Duct area.....(SQ.FT)	12.31
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.05
Avg. gas temp.....(DEG-F)	209
Moisture content.....(% V/V)	27.89
Avg. linear velocity.....(FT/SEC)	26.2
Gas density.....(LB/ACF)	.05114
Molecular weight.....(LB/LBMOLE)	29.28
Mass flow of gas.....(LB/HR)	59291
Volumetric flow rate.....	
actual.....(ACFM)	19324
dry standard.....(DSCFM)	10499

Test No. 1
No. 1 East Dryer Stack
(South Dryer)

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

Date of Determination.....	12-01-92
Time of Determination.....(HRS)	840
Barometric pressure.....(IN.HG)	28.57
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	47.5
Duct area.....(SQ.FT)	12.31
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.08
Avg. gas temp.....(DEG-F)	190
Moisture content.....(% V/V)	28.87
Avg. linear velocity.....(FT/SEC)	23.1
Gas density.....(LB/ACF)	.05237
Molecular weight.....(LB/LBMOLE)	29.26
Mass flow of gas.....(LB/HR)	53527
Volumetric flow rate.....	
actual.....(ACFM)	17034
dry standard.....(DSCFM)	9396

Test No. 2
No. 2 West Dryer Stack

(North Dryer)

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

Date of Determination.....	12-02-92
Time of Determination.....(HRS)	1100
Barometric pressure.....(IN.HG)	29.08
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	47.5
Duct area.....(SQ.FT)	12.31
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.03
Avg. gas temp.....(DEG-F)	213
Moisture content.....(% V/V)	19.72
Avg. linear velocity.....(FT/SEC)	17.6
Gas density.....(LB/ACF)	.05334
Molecular weight.....(LB/LBMOLE)	29.14
Mass flow of gas.....(LB/HR)	41607
Volumetric flow rate.....	
actual.....(ACFM)	13000
dry standard.....(DSCFM)	7958

Test No. 2
No. 2 East Dryer Stack
(North Dryer)

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

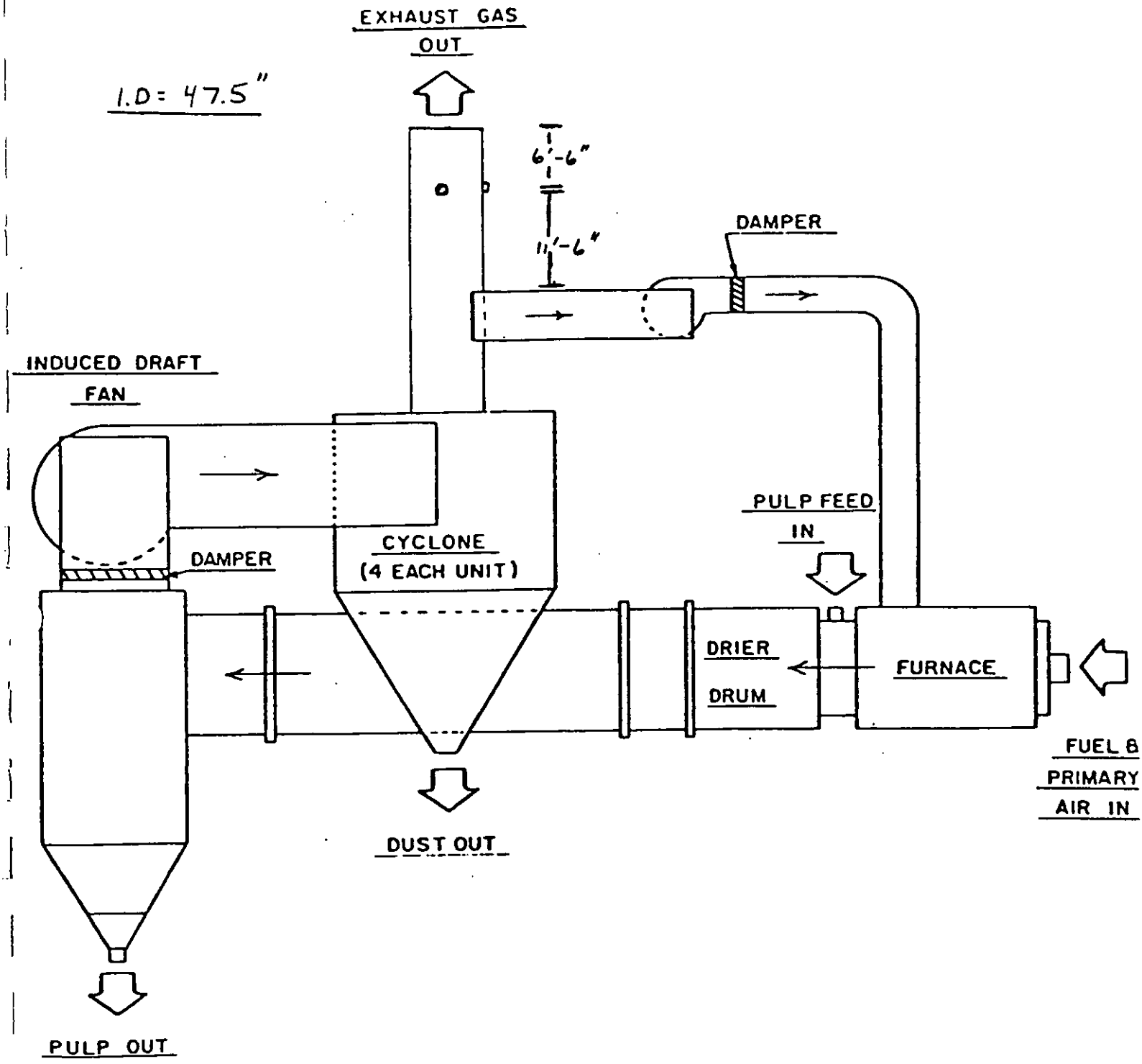
Date of Determination.....	12-02-92
Time of Determination.....(HRS)	1115
Barometric pressure.....(IN.HG)	29.08
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	47.5
Duct area.....(SQ.FT)	12.31
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.05
Avg. gas temp.....(DEG-F)	213
Moisture content.....(% V/V)	19.74
Avg. linear velocity.....(FT/SEC)	20.3
Gas density.....(LB/ACF)	.05334
Molecular weight.....(LB/LBMOLE)	29.14
Mass flow of gas.....(LB/HR)	48004
Volumetric flow rate.....	
actual.....(ACFM)	15001
dry standard.....(DSCFM)	9180

APPENDIX B

LOCATION OF TEST PORTS

AMERICAN CRYSTAL SUGAR

DRAYTON N.D.



PULP DRIER - 2 UNITS

CAPACITY 3,500 TON BEETS / UNIT

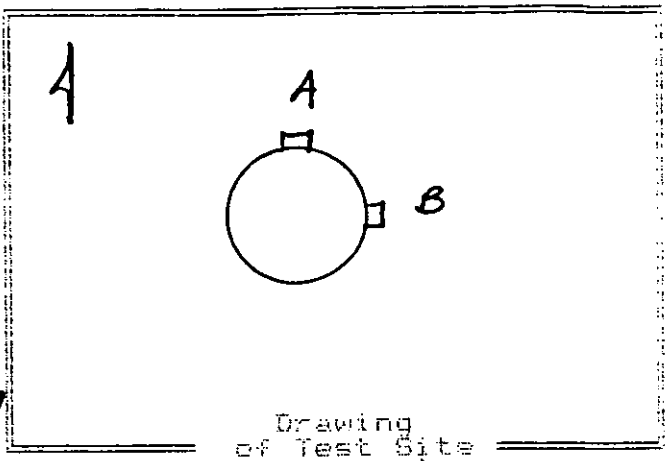
PULP DRYING

APPENDIX C

FIELD DATA SHEETS

INTERFOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job ACS DRAYTON
Source NO 1 E DRYER STACK
Test 1 Run 0 Date 12-1-92
Stack dimen. 47.5 IN.
Dry bulb 206 °F Wet bulb 152 °F
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.
Barometric pressure 28.57 in Hg
Static pressure -.08 in WC
Operators C HOVE, J BERGSTROM
Pitot No. 23V-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 Pressure (in WC)	Temperature of gas (°F)
		Port length: 4.5 in.		Time start: 0840 hrs	
A 1	.021	1.0	5.5	.09	190
2	.069	3.18	7.68	.11	
3	.118	5.605	10.1	.14	
4	.177	8.41	12.91	.14	
5	.250	11.88	16.38	.15	
6	.356	16.91	21.41	.14	
7	.644	30.59	35.09	.11	
8	.750	35.63	40.13	.10	
9	.823	39.09	43.59	.10	
10	.882	42.00	46.5	.10	
11	.933	44.32	48.82	.10	
12	.979	46.50	51	.11	
B 1				.06	
2				.06	
3				.09	
4				.10	
5				.11	
6				.11	
7				.12	
8				.14	
9				.15	
10				.17	
11				.19	
12				.20	
Temp. meas. device & S/N: NO 24				Time end: 0850 hrs	

R or nothing = reg. manometer; S= expanded; E=electronic S-3921

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job ACS ORAYTON Date 12-1-92 Test 1 Run 1
Source NO 1 E DRYER STACK No. of traverse points 24
Method 5 Filter holder: GLASS Filter type: GLASS FIBER

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: .00 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 4847

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			266
Desiccant	1240	1194	46
Total			312

Integrated Gas Sampling Data:

Bag Pump No. 23A Box No. 18 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: .00 cc/min at 15 in. Hg.
Time start: 0913 (HRS) Time end: 1015 (HRS)
Sampling rate: 400 cc/min Operator: GH
S/N of O_2 Analyzer used to monitor train outlet: 4

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job ACS ORAYTON
Source INC E DRYER STACK
Date 12-1-92 Test 1 Run 1
Operators CHOVE JB
Meter Box No. 3 ΔH 1.87 IN WC
Cosmeter coeff. 1.0007
Pitot No. 23W4 Cp .84
Bar. Press. 28.51 inHg H2O .35 X
Nozzle No. 23-5 Nozzle Dia .372 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dep. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (xv/v)
	0913	919.90											
B- 12	2.5	921.90	.18	1.86	1.84	5	200	228	251	39	86	79	16.3
11	5	923.80	.18	1.90	3.80	6	202				96	84	16.1
10	7.5	925.72	.17	1.80	5.73	6	204				94	82	16.2
9	10	927.52	.15	1.58	7.55	6	209	267	255	40	95	83	16.5
8	12.5	929.28	.14	1.48	9.28	6	208				96	84	16.2
7	15	931.03	.14	1.48	1.03	6	209				96	85	16.4
6	17.5	932.59	.11	1.17	2.59	5	208	253	256	42	96	85	16.4
5	20	934.14	.11	1.17	4.14	5	208				97	85	16.3
4	22.5	935.62	.10	1.06	5.62	5	209				97	91	16.5
3	25	937.12	.10	1.07	7.12	5	207	263	259	44	97	86	16.4
2	27.5	938.61	.10	1.07	8.61	5	206				98	87	16.6
1	30	940.10	.10	1.07	0.10	5	206				98	87	16.5
A 12	32.5	941.59	.10	1.07	1.59	5	207	262	255	42	96	84	16.3
11	35.0	943.09	.10	1.07	3.08	5	206				98	88	16.5
10	37.5	944.57	.10	1.07	4.57	5	206				99	89	16.1
9	40	946.07	.10	1.07	6.07	5	204	261	258	43	100	89	16.3
8	42.5	947.55	.10	1.07	7.56	5	208				100	89	16.4
7	45	948.97	.09	.94	8.98	5	208				99	84	16.5
6	47.5	950.38	.09	.96	0.39	5	208	262	259	44	100	90	16.4
5	50	952.20	.15	1.61	2.22	5	207				100	89	16.6
4	52.5	954.11	.16	1.72	4.11	7	206				101	90	16.5
3	55	955.94	.15	1.62	5.94	7	204	263	261	45	101	90	16.3
2	57.5	957.72	.14	1.51	7.72	7	204				101	91	16.4
1	60	959.48	.13	1.40	9.43	7	204				101	91	16.6
	(1015)												
	θ = 60	Vm = 39.58		ΔH 1.33							Avg. =	92.2	

C-3

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job ACS, BRAYTON Date 12-1-92 Test 1 Run 2
Source NO 1 E DRYER STACK No. of traverse points 24
Method 5 Filter holder: GLASS Filter type: GLASS FIBER

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: 4773

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			302
Desiccant	1379	1308	71
Total			373

Integrated Gas Sampling Data:

Bag Pump No. 23A Box No. 18 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: .00 cc/min at 15 in. Hg.
Time start: 0754 (HRS) Time end: 0855 (HRS)
Sampling rate: 400 cc/min Operator: G HOLE
S/N of O_2 Analyzer used to monitor train outlet: 4

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job ACS, ORAXTON
Source NO 2 DRYER STACK
Date 12-1-92 Test 1 Run 2

Operators CH JB
Meter Box No. 3 ΔH 2.04 IN WC
Meter coeff. 1.0007

Pitot No. 234 Cp .84
Bar. Press. 28.57 inHg H2O .25 x
Nozzle No. 23-6 Nozzle Dia. .372 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)
	(0754)	960.00											
A-12	2.5	961.47	.11	1.08	1.47	2	209	238	251	39	78	72	16.3
11	5	962.91	.11	1.06	2.92	2	208				81	73	15.6
10	7.5	964.31	.10	.97	4.31	2	208				83	74	15.7
9	10	965.70	.10	.97	5.70	2	208	253	255	40	85	75	15.7
8	12.5	967.10	.10	.97	7.10	2	208				84	76	15.7
7	15	968.49	.10	.97	8.49	2	208				86	76	16.0
6	17.5	970.14	.14	1.37	0.14	3	209	255	257	41	87	76	15.5
5	20	972.01	.18	1.76	2.01	4	208				91	77	15.1
4	22.5	973.95	.19	1.87	3.95	5	208				91	78	16.2
3	25	975.68	.15	1.48	5.68	4	209	256	259	42	91	78	16.2
2	27.5	977.22	.12	1.19	7.22	3	204				91	79	16.2
1	30	978.64	.10	.99	8.64	3	204				92	81	15.9
B-12	32.5	980.68	.21	2.07	0.68	5	208	257	260	44	91	81	16.1
11	35	982.72	.21	2.08	2.72	5	206				92	81	15.9
10	37.5	984.72	.20	1.98	4.72	5	207				93	82	16.0
9	40	986.71	.20	1.98	6.71	5	207	259	261	45	94	82	16.1
8	42.5	988.66	.19	1.88	8.66	5	208				95	84	16.1
7	45	990.51	.17	1.68	0.51	5	209				94	83	15.8
6	47.5	992.24	.15	1.48	2.24	5	209	260	263	39	94	83	16.0
5	50	993.92	.14	1.38	3.92	5	210				94	84	16.3
4	52.5	995.59	.14	1.39	5.59	5	209				95	84	15.8
3	55	997.21	.13	1.29	7.21	5	208	262	263	40	94	84	16.1
2	57.5	998.77	.12	1.20	8.77	4	205				94	84	16.3
1	60	1000.25	.10	1.00	0.19	4	206				95	85	16.2
	(855)												
	θ = 60	Vm = 40.27		ΔH = 1.42							Avg. = 84.8		

C-5

S-0037R

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job ACS DRAYTON Date 12-1-92 Test 1 Run 3
Source NO 1 EAST DRYER STACK No. of traverse points 24
Method 5 Filter holder: GLASS Filter type: GLASS FIBER

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: 4774

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			250
Desiccant	1354	1299	55
Total			305

Integrated Gas Sampling Data:

Bag Pump No. 23A Box No. 18 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: .00 cc/min at 15 in. Hg.
Time start: 0927 (HRS) Time end: 1029 (HRS)
Sampling rate: 400 cc/min Operator: G HOVE
S/N of O_2 Analyzer used to monitor train outlet: 4

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job ACS ORAYTON
Source NO 1 E DRYER STACK
Date 12-1-92 Test 1 Run 3

Operators G ROVE
Meter Box No. 3 ΔH 1.87 IN WC
Cosmeter coeff. 3 1.0007 1.87

Pitot No. 2214 Cp .84
Bar. Press. 29.08 inHg H2O 28 X
Nozzle No. 23-6 Nozzle Dia .372 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)
	(0927)	0.50											
B 12	2.5	2.53	.22	2.06	2.53	5	209	262	255	39	90	83	16.4
11	5	4.57	.22	2.07	4.57	5	209				95	86	16.8
10	7.5	6.62	.22	2.08	6.62	5	210				95	87	16.8
9	10	8.62	.21	1.98	8.62	5	210	263	257	40	95	85	16.8
8	12.5	10.53	.19	1.79	10.53	5	210				96	85	16.6
7	15	12.28	.16	1.51	12.28	5	209				97	86	16.6
6	17.5	13.98	.15	1.42	13.98	4	211	265	255	42	97	86	16.6
5	20	15.56	.13	1.23	15.56	4	211				98	86	16.3
4	22.5	17.15	.13	1.23	17.15	4	211				99	87	16.3
3	25	18.74	.13	1.23	18.74	4	210	266	254	44	99	87	16.7
2	27.5	20.26	.12	1.14	20.26	4	210				99	88	16.7
1	30	21.66	.10	.96	21.66	3	206				99	89	16.3
A 12	32.5	23.06	.10	.95	23.06	3	210	265	256	40	96	88	16.3
11	35	24.45	.10	.95	24.45	3	210				99	90	16.6
10	37.5	25.85	.10	.95	25.85	3	208				100	90	16.5
9	40	27.25	.10	.95	27.25	3	210	262	259	42	100	90	16.5
8	42.5	28.65	.10	.95	28.65	3	211				100	91	16.7
7	45	30.05	.10	.95	30.05	3	211				101	91	16.8
6	47.5	31.70	.14	1.33	31.70	3	211	261	258	44	102	91	16.5
5	50	33.63	.19	1.81	33.63	5	211				102	92	16.4
4	52.5	35.51	.18	1.72	35.51	6	209				109	95	16.5
3	55	37.25	.15	1.45	37.25	5	208	263	259	45	101	91	16.3
2	57.5	38.78	.12	1.15	38.78	5	207				102	93	16.5
1	60	40.32	.11	1.06	40.32	4	207				102	93	16.6
	(1029)												
	θ = 60	Vm = 39.87		ΔH 1.37							Avg. =	93.7	

C-7

INTERPOLL LABORATORIES – EPA METHOD 2 FIELD DATA SHEET

Job A.C.S. / DRAYTON

Source No.1 WEST Dryer Stack

Test 1 Run ___ Date 12/1/92

Stack dimen. 47 1/2 IN.

Dry bulb ___ °F Wet bulb ___ °F

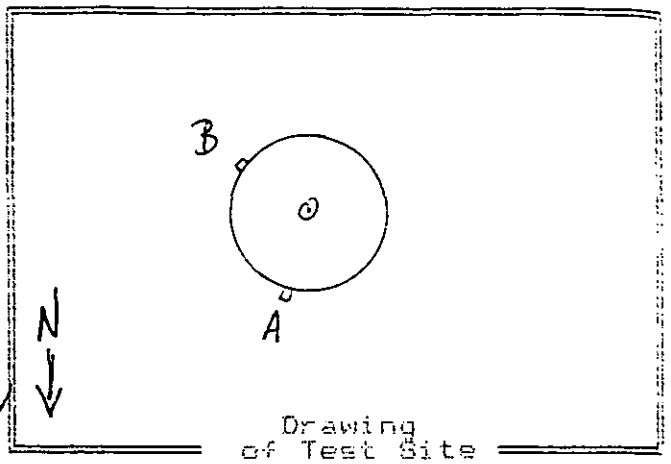
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 28.57 in Hg

Static pressure -.05 in WC

Operators J VanHoever & R. MADISON

Pitot No. V27-1 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 Pressure (in WC)	Temperature of gas (°F)
		Port length: 4.5 in.		Time start: 0845 hrs	
A 1		1	5.5	.15	
2		3.18	7.68	.19	
3		5.61	10.11	.21	
4		8.41	12.91	.20	
5		11.88	16.38	.18	
6		16.91	21.41	.15	
7		30.59	35.09	.13	
8		35.63	40.13	.12	
9		39.09	43.59	.13	209
10		42	46.5	.14	
11		44.32	48.82	.15	
12		46.5	51	.15	
B 1				.09	
2				.12	
3				.14	
4				.14	
5				.13	
6				.12	
7				.12	
8				.14	
9				.16	
10				.17	
11				.18	
12				.18	
Temp. meas. device & S/N: PDT #18				Time end:	hrs

R or nothing = reg. manometer; S= expanded; E=electronic S-3921

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job A.C.S. / DRAYTON Date 12/1/92 Test 1 Run 1
Source No 1 WEST DRYER STACK No. of traverse points 24
Method 5 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: 4771

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	288	0	288
Desiccant	1310	1263	47
Total			335

Integrated Gas Sampling Data:

Bag Pump No. 233 Box No. 14 Bag No. 1

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

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

Time start: 0923 (HRS) Time end: 1015 (HRS)

Sampling rate: 400 cc/min Operator: DNH

S/N of O_2 Analyzer used to monitor train outlet: 7

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job A.C.S. / DRAYTON
Source NO. 1 WEST DRYER STACK
Date 12/1/92 Test 1 Run 1

Operators DVH & R.M
Meter Box No. 9 ΔH 1.84 IN WC
Coeff. .9945

Pitot No. V27-4 Cp .84
Bar. Press. 29.57 inHg H2O 25 x
Nozzle No. 1-6 Nozzle Dia .370 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 (xx/v)
	0918	439.90											
B 12	2.5	441.90	.18	1.82	1.81	3	201				74	74	16.0
11	5	443.82	.18	1.87	3.78	3	202	271	256	—	81	75	15.9
10	7.5	445.77	.18	1.87	5.75	3	208				84	76	15.9
9	10	447.70	.17	1.77	7.68	3	208				86	77	16.0
8	12.5	449.63	.16	1.67	9.55	3	208				86	77	16.3
7	15	451.45	.13	1.35	1.24	3	209	260	262	—	87	78	16.0
6	17.5	452.98	.13	1.36	2.94	3	208				88	79	16.0
5	20	454.70	.14	1.47	4.70	3	208				88	79	16.1
4	22.5	456.50	.15	1.57	6.52	3	209	254	263	—	88	80	16.0
3	25	458.40	.15	1.57	8.34	3	207				89	80	16.2
2	27.5	460.15	.14	1.47	0.11	3	207				90	81	16.1
1	30	461.80	.12	1.26	1.74	3	207				90	81	16.1
A 12	32.5	463.63	.14	1.47	3.51	3	207	257	264	—	89	82	16.1
11	35	465.38	.14	1.49	5.29	3	202				91	83	16.3
10	37.5	467.17	.15	1.59	7.12	3	206				91	83	15.9
9	40	468.88	.13	1.37	8.83	3	207				92	83	16.0
8	42.5	470.53	.12	1.27	0.47	3	208	261	263	—	92	83	16.0
7	45	472.11	.11	1.16	2.05	3	208				92	84	16.3
6	47.5	473.88	.14	1.48	3.82	3	208				92	84	16.3
5	50	475.84	.17	1.80	5.78	4	207				93	84	16.1
4	52.5	477.80	.19	2.01	7.85	4.5	206				93	84	15.9
3	55	479.99	.20	2.13	9.97	4.5	204				94	85	16.0
2	57.5	482.05	.18	1.92	1.99	4.5	204				94	85	16.0
1	60	484.05	.17	1.81	3.96		204				94	85	16.1
	(1015)												
	θ = 60	Vm = 44.15		ΔH = 1.61							Avg. = 85		

C-10

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job A.C.S./DRAYTON Date 12/2/9 Test 1 Run 2
Source NO 1 WEST DRYER STACK No. of traverse points 24
Method 5 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: 4849

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	340	0	340
Desiccant	1365	1286	79
Total			419

Integrated Gas Sampling Data:

Bag Pump No. 233 Box No. 14 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 14 in. Hg.
Time start: 0800 (HRS) Time end: 0856 (HRS)
Sampling rate: 400 cc/min Operator: DAH
S/N of O_2 Analyzer used to monitor train outlet: 7

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job A.C.S./DRAYTON
Source NO. 1 WEST DRYER STACK
Date 12/2/92 Test 1 Run 2

Operators DLH & R.M
Meter Box No. 9 ΔH@ 1.81 IN WC
Coeaster coeff. .9945

Pitot No. V27-1 Cp .84
Bar. Press. 29.08 inHg H2O 2y x
Nozzle No. T-6 Nozzle Dia .377 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)
	0754	484.55											
A 12	2.5	486.46	.18	1.69	6.37	3	209	239	245	—	70	70	16.1
11	5	488.22	.17	1.63	8.19	3	208				72	70	16.1
10	7.5	490.03	.16	1.53	9.95	3	208				74	71	16.0
9	10	491.71	.15	1.44	1.67	3	208	241	252	—	76	72	16.0
8	12.5	493.34	.14	1.35	3.32	3	208				77	72	16.1
7	15	494.94	.13	1.25	4.93	3	208				77	72	15.9
6	17.5	496.86	.18	1.74	6.81	3.5	208	254	256	—	78	72	15.9
5	20	498.90	.22	2.12	8.89	4	208				79	73	15.3
4	22.5	501.03	.23	2.22	1.02	4.5	208				80	73	16.0
3	25	503.25	.24	2.34	3.20	5	204	255	257	—	81	73	16.4
2	27.5	505.35	.22	2.14	5.30	5	204				82	74	16.5
1	30	507.39	.20	1.95	7.30	5	204				83	75	16.0
B 12	32.5	509.30	.19	1.86	9.25	5	204	263	264	—	82	75	16.2
11	35	511.35	.22	2.14	1.35	5.5	206				83	76	16.3
10	37.5	513.44	.22	2.14	3.45	5	207				84	76	16.4
9	40	515.54	.22	2.15	5.55	5.5	207	260	263	—	85	76	16.3
8	42.5	517.45	.19	1.85	7.51	5	209				86	77	15.9
7	45	519.39	.17	1.66	9.36	5	209				45	77	16.2
6	47.5	521.17	.16	1.56	1.15	5	209				85	77	16.1
5	50	523.14	.19	1.85	3.11	5.5	210	262	261		81	73	16.1
4	52.5	525.24	.20	1.94	5.10	6	209				84	76	16.1
3	55	527.05	.20	1.95	7.10	6	209				85	77	16.2
2	57.5	529.18	.18	1.77	9.01	6	205				85	77	16.4
1	60	531.06	.18	1.77	0.97	6	205				85	77	16.0
	(0856)												
	θ = 60	Vm = 46.51		ΔH = 1.84							Avg. = 77.5		

C-12

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job A.C.S./DRAYTON Date 12/2/92 Test 1 Run 3
Source No 1 WEST DRYER STACK No. of traverse points 24
Method 5 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: 4919

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	282	0	282
Desiccant	1295	1234	61
Total			343

Integrated Gas Sampling Data:

Bag Pump No. 233 Box No. 14 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 14 in. Hg.
Time start: 0930 (HRS) Time end: 1029 (HRS)
Sampling rate: 400 cc/min Operator: DLH
S/N of O_2 Analyzer used to monitor train outlet: 7

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S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job A.C.S./DRAYTON Operators Dirk & R.M Pitot No. V27-1 Cp .84
Source NO. 1 WEST DRYER STACK Meter Box No. 4 ΔH 1.84 IN WC Bar. Press. 29.08 inHg H2O 30 x
Date 12/2/92 Test 1 Run 3 Counter coeff. .9945 Nozzle No. T-6 Nozzle Dia .312 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 (xx/v)
	0925	531.40											
B 12	2.5	533.47	.22	2.03	3.43	4	209	241	236	—	72	71	16.9
11	5	535.54	.21	1.92	5.40	4	210				70	67	16.9
10	7.5	537.46	.21	1.90	7.36	4	210				73	69	16.9
9	10	539.40	.20	1.82	9.28	3.5	210	248	251	—	78	72	17.2
8	12.5	541.29	.19	1.74	1.17	3.5	210				78	71	17.2
7	15	542.98	.16	1.47	2.90	3	211				79	72	17.1
6	17.5	544.65	.15	1.38	4.58	3	211	254	258	—	80	73	17.0
5	20	546.44	.18	1.66	6.42	4	211				81	74	16.9
4	22.5	548.34	.19	1.75	8.32	4	211				84	75	16.9
3	25	550.30	.18	1.67	0.17	4	210	257	260	—	84	75	16.7
2	27.5	552.09	.18	1.68	2.03	4	206				85	76	17.1
1	30	553.94	.17	1.59	3.84	4	206				86	77	16.9
A 12	32.5	555.66	.17	1.59	5.65	4	206	261	258	—	86	79	16.9
11	35	557.48	.17	1.58	7.46	4	210				89	81	17.1
10	37.5	559.20	.17	1.60	9.28	4	208				91	82	17.0
9	40	561.05	.17	1.59	1.10	4	210	263	259	—	91	83	17.0
8	42.5	562.85	.16	1.50	2.87	4	211				92	83	17.2
7	45	564.51	.14	1.31	4.53	4	211				92	84	17.3
6	47.5	566.19	.14	1.31	6.19	4	211	264	260	—	92	84	16.9
5	50	568.15	.20	1.88	8.17	5	211				93	84	17.0
4	52.5	570.31	.23	2.16	0.30	6	211				91	83	17.0
3	55	572.44	.23	2.15	2.42	6	211	263	261	—	87	78	16.9
2	57.5	574.54	.23	2.15	4.52	6	207				87	79	16.9
1	60	576.62	.21	1.97	6.54	6	207				87	79	16.9
	(1029)												
	θ = 60	Vm = 45.22		ΔH = 1.72							Avg. = 82.8		

C-14

INTERPOLL LABORATORIES – EPA METHOD 2 FIELD DATA SHEET

Co. ACS DRAYTON

Source NO 2 E DRYER STACK

Test 2 Run 0 Date 12-2-92

Stack dimen. 47.5 IN.

Dry bulb 211 °F Wet bulb 155 °F

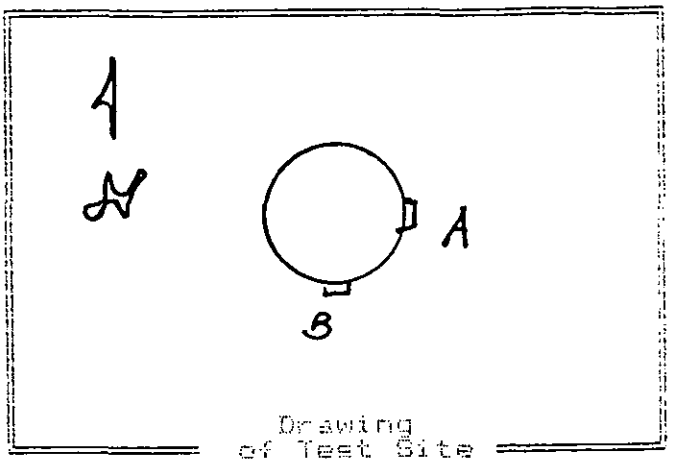
Manometer: X Reg. ☐ Exp. ☐ Elec.

Barometric pressure 29.08 in Hg

Static pressure -.05 in WC

Operators C HOVE, J BERGSTROM

Pitot No. 23-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 Pressure (in WC)	Temperature of gas (°F)
		Port length: 4.5 in.		Time start: 1115 hrs	
B 1	.021	1.0	5.5	.08	213
2	.067	3.18	7.68	.1	
3	.118	5.605	10.1	.11	
4	.177	8.41	12.91	.11	
5	.250	11.88	16.38	.11	
6	.356	1691	21.41	.10	
7	.644	30.59	35.09	.08	
8	.750	35.63	40.13	.07	
9	.823	39.09	43.59	.07	
10	.882	42.00	46.5	.08	
11	.933	44.32	48.82	.08	
12	.979	4650	51	.09	
A 1				.08	
2				.11	
3				.12	
4				.12	
5				.11	
6				.10	
7				.09	
8				.08	
9				.08	
10				.09	
11				.09	
12				.1	
Temp. meas. device & S/N: NO 24				Time end: 1120 hrs	

R or nothing = reg. manometer; S= expanded; E=electronic S-3921

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job ACS DRAYTON Date 12-2-92 Test 2 Run 1
Source NO 2 E DRYER STACK No. of traverse points 24
Method 5 Filter holder: GLASS Filter type: GLASS FIBER

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: .00 cfm at 5 in. Hg. (vac) ☐

Particulate Catch Data:

No.s of filters used: 4775

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			134
Desiccant	1442	1400	42
Total			176

Integrated Gas Sampling Data:

Bag Pump No. 231 Box No. 15 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: .00 cc/min at 15 in. Hg.
Time start: 1140 (HRS) Time end: 1244 (HRS)
Sampling rate: 400 cc/min Operator: GH
S/N of O_2 Analyzer used to monitor train outlet: 4

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CF-D11

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job ACS DRAYTON
Source NO 2 E DRYER STACK
Date 12-2-92 Test 2 Run 1

Operators C HOVE J BERG
Meter Box No. 3 ^H@ 1.84 IN WC
Gasmeter coeff. 1.0007

Pitot No. 23 V-4 Cp .84
Bar. Press. 29. inHg H2O 2.5 %
Nozzle No. 7-6 Nozzle Dia. .374 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Obs. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1140)	41.42											
A- 12	2.5	43.03	.12	1.29	3.03	3	216	259	255	37	95	88	18.2
11	5	44.66	.12	1.30	4.66	2	214				97	90	18.2
10	7.5	46.22	.11	1.19	6.22	2	215				98	90	18.2
9	10	47.71	.10	1.08	7.71	2	216	260	256	40	98	90	18.1
8	12.5	49.20	.10	1.08	9.20	2	216				98	90	18.1
7	15	50.65	.095	1.03	0.65	2	216				99	90	18.2
6	17.5	52.14	.10	1.08	2.14	2	216	262	258	42	99	90	18.2
5	20	53.63	.10	1.08	3.63	2	216				99	91	18.3
4	22.5	55.19	.11	1.19	5.19	3	214				100	91	18.3
3	25	56.83	.12	1.30	6.83	3	216	265	259	44	100	91	18.3
2	27.5	58.46	.12	1.31	8.46	3	214				100	91	18.3
1	30	60.03	.11	1.20	0.03	3	214				100	91	18.2
B- 12	32.5	61.53	.10	1.08	1.53	2	216	266	262	44	100	91	18.2
11	35	62.90	.085	.92	2.90	2	214				99	91	18.1
10	37.5	64.28	.085	.92	4.28	2	216				100	91	18.2
9	40	65.62	.08	.87	5.62	2	216	265	263	44	101	91	18.2
8	42.5	66.96	.08	.87	6.95	2	215				101	91	18.2
7	45	68.30	.08	.87	8.29	2	216				101	91	18.3
6	47.5	69.71	.09	.98	9.71	2	215	262	265	39	101	92	18.4
5	50	71.28	.11	1.20	1.28	2	215				101	91	18.4
4	52.5	72.92	.12	1.31	2.92	2	214				102	92	18.4
3	55	74.56	.12	1.31	4.56	2	215	263	259	41	102	93	18.5
2	57.5	76.20	.12	1.31	6.20	3	214				102	92	18.3
1	60	77.78	.11	1.20	7.77		215				103	92	18.2
	(1244)												
	θ = 60	Vm = 36.36		^H = 1.12							Avg. = 95.3		

S-0037R

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job ACS DRAYTON Date 12-2-92 Test 2 Run 2
Source NO 2 EAST OUTER STACK No. of traverse points 24
Method 5 Filter holder: GLASS Filter type: GLASS FIBER
411

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: 4776

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			192
Desiccant	1371	1314	57
Total			249

Integrated Gas Sampling Data:

Bag Pump No. 23A Box No. 15 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: .00 cc/min at 15 in. Hg.
Time start: 1314 (HRS) Time end: 1418 (HRS)
Sampling rate: 400 cc/min Operator: GH
S/N of O_2 Analyzer used to monitor train outlet: 4

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job ACS DRAYTON
Source NO 2 E DRYER STACK
Date 12-2-92 Test 2 Run 3

Operators GH & TB
Meter Box No. 3 ΔH 1.84 IN WC
Coeffic. coeff. 1.0007

Pitot No. 230-4 Cp .84
Bar. Press 29.08 inHg H2O 20 x
Nozzle No. 7-6 Nozzle Dia .374 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 (xv/v)
	(1314)	78.025											
B 12	26	79.60	.1	1.21	9.60		214	255	256	39	97	96	18
11	5	81.16	.095	1.16	1.14		213				99	96	17.7
10	7.5	82.65	.09	1.10	2.65		212				100	90	17.4
9	10	84.06	.08	.97	4.06		213	257	259	40	101	90	17.4
8	12.5	85.47	.08	.97	5.47		213				101	90	17.4
7	15	87.05	.1	1.21	7.05	2	213				100	90	17.4
6	17.5	88.70	.11	1.33	8.70	2	213	256	256	41	102	91	17.5
5	20	90.43	.12	1.46	0.43	3	213				102	92	17.5
4	22.5	92.16	.12	1.46	2.16	4	211				102	93	17.5
3	25	93.90	.12	1.47	3.90	4	210	258	259	42	102	92	17.5
2	27.5	95.49	.10	1.23	5.49	4	208				103	92	17.3
1	30	97.23	.12	1.47	7.23	4	208				101	92	17.0
A 12	32.5	98.82	.10	1.23	8.82	4	208	260	260	44	101	92	17.0
11	35	100.24	.08	.98	0.24	4	208				101	92	16.7
10	37.5	101.82	.10	1.23	1.82	5	208				101	92	16.8
9	40	103.33	.09	1.09	3.33	4	213	257	263	45	101	92	16.8
8	42.5	104.82	.09	1.09	4.82	4	214				103	93	16.8
7	45	106.33	.09	1.10	6.33	4	214				103	93	16.8
6	47.5	107.75	.08	.97	7.75	4	214	262	258	39	103	93	16.9
5	50	109.33	.10	1.22	9.33	5	213				103	93	16.8
4	52.5	110.99	.11	1.34	0.99	4	213				103	93	17.1
3	55	112.73	.12	1.46	2.73	5	213	263	254	40	103	93	17.1
2	57.5	114.47	.12	1.47	4.47	5	208				104	93	17.2
1	60	116.14	.11	1.35	6.14	5	207				104	93	17.2
	(1418)												
	θ = 60	Vm = 38.11		ΔH 1.5							Avg. = 96.9		

C-19

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job ACS DRAYTON Date 12-2-92 Test 2 Run 3
Source NO 2 EAST DRYER STACK No. of traverse points 24
Method 5 Filter holder: GLASS Filter type: GLASS FIBER 4"

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: 4773

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser			202
Desiccant	1386	1336	50
Total			252

Integrated Gas Sampling Data:

Bag Pump No. 231 Box No. 15 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: .00 cc/min at 15 in. Hg.
Time start: 1450 (HRS) Time end: 1555 (HRS)
Sampling rate: 400 cc/min Operator: GH
S/N of O_2 Analyzer used to monitor train outlet: 4

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job ACS DRAYTON
Source NO 2 E DRYER STACK
Date 12-2-92 Test 2 Run 3
Operators CH & SB
Meter Box No. 3 ΔH 1.84 IN WC
Coeffic. coeff. 1.0007
Pitot No. 2304 Cp .84
Bar. Press. 29.08 inHg H2O 23 x
Nozzle No. T-6 Nozzle Dia .374 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)
	(1450)	116.40											
12	2.5	118.07	.12	1.37	8.07	3	212	243	265	39	93	90	17.1
11	5	119.74	.12	1.36	9.74	2	212				101	91	16.8
10	7.5	121.35	.11	1.26	1.35	2	211				101	91	16.8
9	10	122.88	.10	1.14	2.88	2	211	245	261	40	101	91	16.8
8	12.5	124.33	.09	1.03	4.33	2	212				101	91	16.7
7	15	125.79	.09	1.03	5.79	2	212				102	93	16.7
6	17.5	127.24	.09	1.03	7.24	2	213	250	267	42	102	93	16.7
5	20	128.78	.10	1.14	8.78	2	213				102	92	16.8
4	22.5	130.46	.12	1.37	0.46	2	212				103	93	16.9
3	25	132.21	.13	1.50	2.21	4	209	251	258	44	102	91	17.0
2	27.5	133.90	.12	1.38	3.90	4	208				102	91	16.9
1	30	135.58	.12	1.38	5.58	4	208				102	91	16.9
12	32.5	137.04	.09	1.03	7.04	3	208	255	257	44	103	92	16.9
11	35	138.50	.09	1.09	8.50	3	210				103	91	16.8
10	37.5	139.97	.08	.91	9.97	4	210				100	91	16.9
9	40	141.24	.08	.91	1.24	4	211	256	262	39	101	91	16.7
8	42.5	142.62	.08	.91	2.62	2	211				100	91	16.7
7	45	143.99	.08	.91	3.99	2	211				100	90	16.5
6	47.5	145.44	.09	1.03	5.44	2	210	257	261	40	100	90	16.5
5	50	146.94	.10	1.14	6.94	2	210				100	90	16.6
4	52.5	148.65	.12	1.37	8.65	2	210				101	91	16.6
3	55	150.26	.11	1.26	0.26	4	210	258	262	39	101	91	16.6
2	57.5	151.79	.10	1.14	1.79	4	210				101	91	16.8
1	60	153.35	.10	1.15	3.33	4	208				101	92	16.8
	(1555)												
	θ = 60	Vm = 36.95		ΔH 1.23							Avg.	= 96.9	

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S-0037R

INTERPOLL LABORATORIES – EPA METHOD 2 FIELD DATA SHEET

Job A.C.S. / DRAYTON

Source No. 2 WEST DRYER STACK

Test 2 Run ___ Date 12/2/92

Stack dimen. 47.5 IN.

Dry bulb ___ °F Wet bulb ___ °F

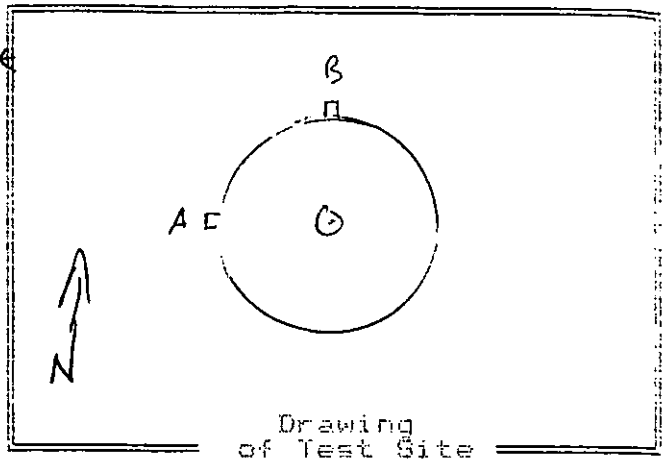
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 29.08 in Hg

Static pressure -.03 in WC

Operators D. Van Hoever & R. Madison

Pitot No. V27-4 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 Pressure (in WC)	Temperature of gas (°F)
		Port length: 4.5 in.		Time start: 1100 hrs	
A 1		1	5.5	.03	
2		3.18	7.68	.03	
3		5.61	10.11	.03	
4		8.41	12.91	.04	
5		11.88	16.38	.04	
6		16.91	21.41	.04	213
7		30.59	35.09	.06	
8		35.63	40.13	.08	
9		39.09	43.59	.09	
10		42	46.5	.10	
11		44.32	48.82	.12	
12		46.50	51.00	.12	
B 1				.08	
2				.12	
3				.12	
4				.12	
5				.12	
6				.10	
7				.08	
8				.06	
9				.05	
10				.05	
11				.05	
12				.05	
Temp. meas. device & S/N: PDT #18				Time end: 1115 hrs	

R or nothing = (reg.) manometer; S= expanded; E=electronic S-3921

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job A.C.S. / DRAYTON Date 12/2/92 Test 2 Run 1
Source No. 2 WEST DRYER STACK No. of traverse points 24
Method 5 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: 4920

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	159	0	159
Desiccant 1410	1373		37
Total			196

Integrated Gas Sampling Data:

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

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

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

Time start: 1145 (HRS) Time end: 1242 (HRS)

Sampling rate: 400 cc/min Operator: DHH

S/N of O_2 Analyzer used to monitor train outlet: 7

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S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job A.C.S. / DRALTON — Operators D.W.N & R.M — Pitot No. V27.4 — Cp .80
Source NO2 WEST DRYER STACK — Meter Box No. 9 — ΔH 1.81 IN WC — Bar. Press. 29.08 inHg — H2O .25 x
Date 12/2/92 — Test 2 — Run 1 — Coeff. .9945 — Nozzle No. 1-7 — Nozzle Dia .432 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 (v/v)
	1140	576.90											
B 12	2.5	578.75	.080	1.52	8.66	2.5	215	253	261	—	79	79	18.3
11	5	580.51	.080	1.51	0.43	2.5	214				81	80	18.3
10	7.5	582.10	.070	1.32	2.08	2	216				82	80	18.3
9	10	583.47	.050	.95	3.48	2	216	257	260	—	85	81	18.3
8	12.5	584.86	.050	.95	4.89	2	216				85	81	18.3
7	15	586.26	.044	.83	6.20	2	217				85	81	18.4
6	17.5	587.91	.071	1.35	7.88	3	216	258	261	—	87	82	18.4
5	20	589.90	.106	2.02	9.92	3.5	216				88	82	18.5
4	22.5	592.11	.12	2.29	2.10	4	216				89	82	18.5
3	25	594.31	.125	2.38	4.32	4	216	261	257	—	89	83	18.5
2	27.5	596.51	.123	2.35	6.54	4	214				90	83	18.4
1	30	598.70	.113	2.16	8.66	4	214				90	84	18.4
A 12	32.5	600.65	.095	1.83	0.61	3.5	214	260	258	—	89	83	18.4
11	35	602.62	.10	1.91	2.61	4	214				90	83	18.3
10	37.5	604.65	.110	1.92	4.60	4	214				91	84	18.3
9	40	606.55	.093	1.78	6.53	4	216	261	257	—	91	84	18.3
8	42.5	608.38	.077	1.47	8.29	3	216				91	84	18.4
7	45	609.98	.065	1.25	9.91	3	216				91	84	18.5
6	47.5	611.40	.044	.84	1.24	2	215	264	261		91	84	18.5
5	50	612.49	.036	.69	2.45	2	215				90	84	18.5
4	52.5	613.67	.035	.67	3.63	2	215				90	84	18.5
3	55	614.93	.032	.61	4.77	2	215	260	263		89	84	18.7
2	57.5	615.99	.032	.61	5.90	2	214				89	84	18.5
1	60	616.92	.03	.57	7.00	2	214				89	84	18.4
	1242												
	θ = 60	Vm = 40.02		ΔH = 1.41							Avg. = 85.4		

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job A.C.S. / DRAYTON Date 12/2/92 Test 2 Run 2
Source NO 2 WEST DRYER STACK No. of traverse points 24
Method 5 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: 4921

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	222	0	222
Desiccant	1305	1245	60
Total			282

Integrated Gas Sampling Data:

Bag Pump No. 23B Box No. 28 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 14 in. Hg.
Time start: 1320 (HRS) Time end: 1418 (HRS)
Sampling rate: 400 cc/min Operator: DHH
S/N of O_2 Analyzer used to monitor train outlet: I

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INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job A.C.S. / DRAYTON Operators DVH + R.M Pitot No. V27-1 Cp .84
Source No 2 WEST DRYER STACK Meter Box No. 9 ΔH@ 2.81 IN WC Bar. Press. 29.08 inHg H2O 20 X
Date 12/2/92 Test 2 Run 2 Counter coeff. .9945 Nozzle No. 7-7 Nozzle Dia .435 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 (xv/v)
	1315	617.21											
A 12	2.5	619.50	.118	2.51	9.49	4.5	214	237	240	—	79	74	17.9
11	5	621.90	.115	2.42	1.72	4.5	213				82	79	17.9
10	7.5	623.99	.11	2.32	3.90	4.5	213				84	79	17.5
9	10	625.96	.091	1.93	5.90	4	213	244	248	—	85	80	17.7
8	12.5	627.88	.080	1.70	7.77	3	213				86	80	17.5
7	15	629.50	.065	1.38	9.47	3	213				87	80	17.5
6	17.5	630.82	.040	.85	0.80	3	213	255	260	—	87	81	17.5
5	20	632.14	.035	.74	2.04	3	213				88	81	17.7
4	22.5	633.40	.035	.75	3.29	2	212				87	81	17.7
3	25	634.63	.036	.77	4.56	2	211				87	81	17.5
2	27.5	635.85	.032	.68	5.75	2	211	260	262	—	87	81	17.7
1	30	636.90	.032	.68	6.95	2	208				87	81	17.5
B 12	32.5	638.77	.072	1.54	8.74	4	208				82	80	17.4
11	35	640.60	.076	1.62	0.57	4	210	262	261	—	84	82	17.0
10	37.5	642.40	.07	1.49	2.33	3.5	213				90	82	16.7
9	40	644.06	.063	1.35	4.01	3	213				90	82	16.9
8	42.5	645.76	.054	1.15	5.56	3	214	260	261	—	90	82	17.0
7	45	646.99	.045	.96	6.97	2	214				89	83	16.9
6	47.5	648.77	.075	8.80	8.80	4	213				89	83	17.0
5	50	650.90	.103	2.20	0.94	5	213	261	262	—	91	84	17.1
4	52.5	653.15	.118	2.53	3.23	6	213				91	84	17.1
3	55	655.43	.120	2.57	5.55	6	212				92	84	17.3
2	57.5	657.78	.120	2.59	7.87	6	208				92	84	17.3
1	60	660.10	.117	2.53	0.17		207				92	84	17.2
	(1418)												
	θ = 60	Vm = 42.89		ΔH = 1.62							Avg. = 84.5		

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job A.G.S./DRAYTON Date 12/2/92 Test 2 Run 3
Source NO 2 WEST DRYER STACK No. of traverse points 24
Method 5 Filter holder: GLASS Filter type: glass fiber

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: 4922

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	238	0	238
Desiccant	1398	1338	60
Total			298

Integrated Gas Sampling Data:

Bag Pump No. 23B Box No. 28 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 14 in. Hg.
Time start: 1455 (HRS) Time end: 1556 (HRS)
Sampling rate: 400 cc/min Operator: DWH
S/N of O_2 Analyzer used to monitor train outlet: 7

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S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job A.C.S. / DRAYTON
Source NO. 2 WEST DRYER STACK
Date 12/2/92 Test 2 Run 3
Operators Duke R.M
Meter Box No. 7 ΔH 1.81 IN WC
Coeaster coeff. .1994
Pitot No. V-27-1 Cp .84
Bar. Press. 29.08 inHg H2O .25 X
Nozzle No. 7-7 Nozzle Dia .435 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)
	1450	660.40											
B 12	2.5	662.25	.081	1.62	2.23	2.5	212	241	238		81	81	17.0
11	5	664.08	.076	1.51	4.00	2.5	212				84	81	17.0
10	7.5	665.82	.078	1.56	5.79	2.5	211				85	82	17.2
9	10	667.51	.065	1.30	7.44	2	211	253	251		86	82	17.0
8	12.5	668.93	.051	1.02	8.90	2	212				88	82	17.0
7	15	670.43	.046	.92	0.28	2	212				88	83	16.9
6	17.5	671.94	.064	1.28	1.92	2.5	213	254	257		88	83	17.1
5	20	673.95	.10	2.00	3.96	5	213				89	83	17.3
4	22.5	676.20	.13	2.60	6.28	5	213				90	83	17.2
3	25	678.53	.13	2.62	8.62	5	209	257	260		90	83	17.4
2	27.5	680.76	.12	2.42	0.86	5	208				91	84	17.4
1	30	682.01	.11	2.23	3.01	4.5	208				92	84	17.4
A 12	32.5	685.08	.10	2.03	5.07	4	208	260	257		92	84	17.3
11	35	687.11	.10	2.02	7.13	4	210				90	84	17.3
10	37.5	689.06	.09	1.81	9.07	4	210				91	84	17.3
9	40	691.19	.09	1.82	1.02	3.5	210	263	258		91	85	17.1
8	42.5	692.90	.08	1.62	2.86	3	210				91	85	17.1
7	45	694.47	.06	1.21	4.45	3.5	211				91	85	17.1
6	47.5	696.34	.08	1.61	6.29	3	211				91	85	17.0
5	50	697.71	.04	.81	7.59	2	211	260	259		91	85	17.1
4	52.5	698.94	.04	.81	8.89	2	211				90	84	17.1
3	55	700.14	.035	.70	0.11	2	211				90	84	17.0
2	57.5	701.30	.035	.70	1.32		211	261	263		90	84	17.0
1	60	702.45	.03	.60	2.45		211				90	84	17.0
	(1556)												
	Θ = 60	Vm = 42.05		ΔH = 1.53							Avg. = 86.3		

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APPENDIX D

INTERPOLL LABORATORIES ANALYTICAL DATA

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job ACS Drayton
Team Leader DUH
Date Submitted 12-3-92
Test No. 1
Date of Analysis 12-3-92

Source #1 West Dryer
Test Site stack
Date of Test 12-1-92
No. of Runs Completed 3
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		1	0.00	3.90	20.30	3.90	16.40	1.15
	7629-14	2	0.00	3.90	20.30	3.90	16.40	1.15
	☒ B ☐ F	Avg				3.90	16.40	
1/2		1	0.00	4.30	20.30	4.30	16.00	1.14
	-17	2	0.00	4.30	20.30	4.30	16.00	1.14
	☒ B ☐ F	Avg				4.30	16.00	
1/3		1	0.00	3.70	20.30	3.70	16.60	1.16
	-20	2	0.00	3.70	20.30	3.70	16.60	1.16
	☒ B ☐ F	Avg				3.70	16.60	
		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-04-8R

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job ACS Drayton
Team Leader GH
Date Submitted 12-3-92
Test No. 1
Date of Analysis 12-3-92

Source #1 East Dryer
Test Site Stack
Date of Test 12-1-92
No. of Runs Completed 3
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	7629-03	1	0.00	3.70	20.30	3.70	16.60	1.16
		2	0.00	3.70	20.30	3.70	16.60	1.16
	☑ B ☐ F	Avg				3.70	16.60	
1/2	-06	1	0.00	4.30	20.30	4.30	16.00	1.14
		2	0.00	4.30	20.30	4.30	16.00	1.14
	☑ B ☐ F	Avg				4.30	16.00	
1/3	-09	1	0.00	3.80	20.40	3.80	16.60	1.13
		2	0.00	3.80	20.40	3.80	16.60	1.13
	☑ B ☐ F	Avg				3.80	16.60	
		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-BR

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job ACS Dayton DUH
Team Leader
Date Submitted 12-3-92
Test No. 2
Date of Analysis 12-3-92

Source #2 West Dryer
Test Site stack
Date of Test 12-2-92
No. of Runs Completed 3
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
2/1	7629-32	1	0.00	2.60	20.60	2.60	18.00	1.12
		2	0.00	2.60	20.60	2.60	18.00	1.12
	☒ B ☐ F	Avg				2.60	18.00	
2/2	-35	1	0.00	3.40	20.40	3.40	17.00	1.15
		2	0.00	3.40	20.40	3.40	17.00	1.15
	☒ B ☐ F	Avg				3.40	17.00	
2/3	-38	1	0.00	3.70	20.50	3.70	16.80	1.11
		2	0.00	3.70	20.50	3.70	16.80	1.11
	☒ B ☐ F	Avg				3.70	16.80	
		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						

☒ 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-BR

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job: ACS Drayton
Team Leader: GH
Date Submitted: 12-3-92
Test No.: 2
Date of Analysis: 12-3-92

Source: #2 East Dryer
Test Site: Stack
Date of Test: 12-2-92
No. of Runs Completed: 3
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
2/1		1	0.00	2.60	20.60	2.60	18.00	1.12
	7629-23	2	0.00	2.60	20.60	2.60	18.00	1.12
	☑ B ☐ F	Avg				2.60	18.00	
2/2		1	0.00	3.20	20.50	3.20	17.30	1.13
	-26	2	0.00	3.20	20.50	3.20	17.30	1.13
	☑ B ☐ F	Avg				3.20	17.30	
2/3		1	0.00	3.60	20.40	3.60	16.80	1.14
	-29	2	0.00	3.60	20.40	3.60	16.80	1.14
	☑ B ☐ F	Avg				3.60	16.80	
		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						

☑ 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-RR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job ACS Drayton N.D.
Team Leader DVH
Date Submitted 12-3-92
Test No. 1
Date of Analysis 12-3-92
Transport Leakage ☒ None ☐ _____ ml

Source #1 West Dryer
Test Site Stack
Date of Test 12-1-92
No. of Runs Completed 3
Technician C. Helgeson
Solvent Acetone

0	Test 1 Run 0 Field Blank Log Number 7629-10 Vol. of Solvent 120 ml *Solvent Residue 2.5 ug/ml	Dish No. 3 Dish Tare Wt. 52.1213 g Dish+Sample Wt. 52.1216 g Sample Wt. 0.0003 g
1	Test 1 Run 1 Vol. of Solvent 155 ml Log Number -12 Comments	Dish No. 57 Dish Tare Wt. 50.0202 g Dish+Sample Wt. 50.0845 g Sample Wt. 0.0643 g
2	Test 1 Run 2 Vol. of Solvent 175 ml Log Number -15 Comments	Dish No. 61 Dish Tare Wt. 44.5902 g Dish+Sample Wt. 44.6530 g Sample Wt. 0.0628 g
3	Test 1 Run 3 Vol. of Solvent 170 ml Log Number -18 Comments	Dish No. 407 Dish Tare Wt. 47.9940 g Dish+Sample Wt. 48.0725 g Sample Wt. 0.0785 g
4	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
5	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g

*Solvent Residue ___ ug/ml = [(Sample Wt. 0.0003 g)(10^6)]/Vol. of Sol. 120 ml
EPA-M5 Acetone Residue Blank Spec. ≤ 7.3 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0639	0.0624 D-5	0.0781		- -

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job ACS Dayton
Team Leader DUH
Date Submitted
Test No. 1
Date of Analysis 12-9-92

Source #1 West Dryer
Test Site Stack
Date of Test 12-1-92
No. of Runs Completed 3
Technician C. Nelson

0	Test 1 Run 0 Field Blank Log Number 7629-11 Comments	Filter No. 4778 Filter Type 4"GF Filter Tare Wt. .9050 g Filter+Sample Wt. .9052 g Sample Wt. 0.0002 g
1	Test 1 Run 1 Log Number -13 Comments	Filter No. 4771 Filter Type 4"GF Filter Tare Wt. .8958 g Filter+Sample Wt. 1.0166 g Sample Wt. 0.1208 g
2	Test 1 Run 2 Log Number -16 Comments	Filter No. 4849 Filter Type 4"GF Filter Tare Wt. .9277 g Filter+Sample Wt. 1.0891 g Sample Wt. 0.1614 g
3	Test 1 Run 3 Log Number -19 Comments	Filter No. 4919 Filter Type 4"GF Filter Tare Wt. .9335 g Filter+Sample Wt. 1.0668 g Sample Wt. 0.1333 g
4	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g
5	Test Run Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1208	0.1614	0.1333		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1847	0.2238	0.2114		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job ACS Drayton — Source #1 East Dryer
Team Leader GH — Test Site Stack
Date Submitted 12-3-92 — Date of Test 12-1-92
Test No. 1 — No. of Runs Completed 3
Date of Analysis 12-3-92 — Technician C. H Eglesson
Transport Leakage ☒ None ☐ _____ ml — Solvent Acetone

0	Test ____ Run 0 ____ Field Blank Log Number _____ Vol. of Solvent _____ ml *Solvent Residue 2.5 ug/ml	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test 1 Run 1 Vol. of Solvent 170 ml Log Number 7629-01 Comments _____	Dish No. 30 Dish Tare Wt. 47.2618 g Dish+Sample Wt. 47.3100 g Sample Wt. 0.0482 g
2	Test 1 Run 2 Vol. of Solvent 140 ml Log Number -04 Comments _____	Dish No. 37 Dish Tare Wt. 48.8534 g Dish+Sample Wt. 48.8970 g Sample Wt. 0.0436 g
3	Test 1 Run 3 Vol. of Solvent 175 ml Log Number -07 Comments _____	Dish No. 66 Dish Tare Wt. 48.3091 g Dish+Sample Wt. 48.3523 g Sample Wt. 0.0432 g
4	Test ____ Run ____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test ____ Run ____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue ___ ug/ml = [(Sample Wt. _____ g)(10⁶)]/Vol. of Sol. _____ ml
EPA-MS Acetone Residue Blank Spec. ≤ 7.8 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0478	0.0432 D-7	0.0428		

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job ACS Drayton
Team Leader GH
Date Submitted 12-3-92
Test No. 1
Date of Analysis 12-9-92

Source #1 East Dryer
Test Site Stack
Date of Test 12-1-92
No. of Runs Completed 3
Technician C. Halgerson

0
Test ____ Run 0
Field Blank
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

1
Test 1 Run 1
Log Number 7629-02
Comments ____
Filter No. 4847
Filter Type 4"GF
Filter Tare Wt. .9466 g
Filter+Sample Wt. 1.0638 g
Sample Wt. 0.1172 g

2
Test 1 Run 2
Log Number -05
Comments ____
Filter No. 4772
Filter Type 4"GF
Filter Tare Wt. .8858 g
Filter+Sample Wt. 1.0381 g
Sample Wt. 0.1523 g

3
Test 1 Run 3
Log Number -08
Comments ____
Filter No. 4774
Filter Type 4"GF
Filter Tare Wt. .9040 g
Filter+Sample Wt. 1.0311 g
Sample Wt. 0.1271 g

4
Test ____ Run ____
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

5
Test ____ Run ____
Log Number ____
Comments ____
Filter No. ____
Filter Type ____
Filter Tare Wt. ____ g
Filter+Sample Wt. ____ g
Sample Wt. ____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1172	0.1523	0.1271		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1650	0.1955	0.1699		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job ACS Drayton
Team Leader DUH
Date Submitted 12-3-92
Test No. 2
Date of Analysis 12-3-92
Transport Leakage ☐ None ☐ _____ ml

Source #2 West Dryer
Test Site Stack
Date of Test 12-2-92
No. of Runs Completed 3
Technician C. Hebgeson
Solvent Acetone

0	Test ____ Run 0 Field Blank Log Number ____ Vol. of Solvent ____ ml *Solvent Residue 2.5 ug/ml	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g	
1	Test 2 Run 1 Vol. of Solvent 175 ml Log Number 7629-30 Comments ____	Dish No. 69 Dish Tare Wt. 47.9891 g Dish+Sample Wt. 48.0307 g Sample Wt. 0.0416 g	
2	Test 2 Run 2 Vol. of Solvent 210 ml Log Number -33 Comments ____	Dish No. 502 Dish Tare Wt. 46.9004 g Dish+Sample Wt. 46.9359 g Sample Wt. 0.0355 g	
3	Test 2 Run 3 Vol. of Solvent 180 ml Log Number -36 Comments ____	Dish No. 506 Dish Tare Wt. 48.6401 g Dish+Sample Wt. 48.6698 g Sample Wt. 0.0297 g	
4	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g	
5	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g	

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

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0412	0.0350 D-9	0.0292		

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job ACS Drayton
Team Leader DVH
Date Submitted
Test No. 2
Date of Analysis 12-9-92

Source #2 West Dryer
Test Site Stack
Date of Test 12-2-92
No. of Runs Completed 3
Technician C. Helseson

0	Test ___ Run 0 Field Blank Log Number ___ Comments ___	Filter No. ___ Filter Type ___ Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g
1	Test 2 Run 1 Log Number 7629-31 Comments ___	Filter No. 4920 Filter Type 4" GF Filter Tare Wt. .9340 g Filter+Sample Wt. 1.0165 g Sample Wt. 0.0825 g
2	Test 2 Run 2 Log Number -34 Comments ___	Filter No. 4921 Filter Type 4" GF Filter Tare Wt. .9313 g Filter+Sample Wt. 1.0379 g Sample Wt. 0.1066 g
3	Test 2 Run 3 Log Number -37 Comments ___	Filter No. 4922 Filter Type 4" GF Filter Tare Wt. .9413 g Filter+Sample Wt. 1.0497 g Sample Wt. 0.1084 g
4	Test ___ Run ___ Log Number ___ Comments ___	Filter No. ___ Filter Type ___ Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g
5	Test ___ Run ___ Log Number ___ Comments ___	Filter No. ___ Filter Type ___ Filter Tare Wt. ___ g Filter+Sample Wt. ___ g Sample Wt. ___ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0825	0.1066	0.1084		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1237	0.1416	0.1376		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job ACS Drayton
Team Leader GH
Date Submitted 12-3-92
Test No. 2
Date of Analysis 12-3-92
Transport Leakage [X] None [ ] _____ ml

Source #2 East Dryer
Test Site Stack
Date of Test 12-2-92
No. of Runs Completed 3
Technician C. Helgeson
Solvent Acetone

0	Test _____ Run 0 Field Blank Log Number _____ Vol. of Solvent _____ ml *Solvent Residue 2.5 ug/ml	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test 2 Run 1 Vol. of Solvent 150 ml Log Number 7629-21 Comments _____	Dish No. 105 Dish Tare Wt. 47.8634 g Dish+Sample Wt. 47.8857 g Sample Wt. 0.0223 g
2	Test 2 Run 2 Vol. of Solvent 165 ml Log Number -24 Comments _____	Dish No. 612 Dish Tare Wt. 49.6240 g Dish+Sample Wt. 49.6465 g Sample Wt. 0.0225 g
3	Test 2 Run 3 Vol. of Solvent 180 ml Log Number -27 Comments _____	Dish No. 617 Dish Tare Wt. 47.2936 g Dish+Sample Wt 47.3515 g Sample Wt. 0.0579 g
4	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

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

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0219	0.0221 D-1	0.0574		

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job ACS Drayton
Team Leader GH
Date Submitted 12-3-92
Test No. 2
Date of Analysis 12-9-92

Source #2 East Dryer
Test Site Stack
Date of Test 12-2-92
No. of Runs Completed 3
Technician C. Helgesen

0	Test ____ Run 0 Field Blank Log Number ____ Comments ____	Filter No. ____ Filter Type ____ Filter Tare Wt. ____ g Filter+Sample Wt. ____ g Sample Wt. ____ g
1	Test 2 Run 1 Log Number 7629-22 Comments ____	Filter No. 4775 Filter Type 4"GF Filter Tare Wt. .8992 g Filter+Sample Wt. .9775 g Sample Wt. 0.0783 g
2	Test 2 Run 2 Log Number -25 Comments ____	Filter No. 4776 Filter Type 4"GF Filter Tare Wt. .9027 g Filter+Sample Wt. 1.0039 g Sample Wt. 0.1012 g
3	Test 2 Run 3 Log Number -28 Comments ____	Filter No. 4773 Filter Type 4"GF Filter Tare Wt. .8766 g Filter+Sample Wt. .9755 g Sample Wt. 0.0989 g
4	Test ____ Run ____ Log Number ____ Comments ____	Filter No. ____ Filter Type ____ Filter Tare Wt. ____ g Filter+Sample Wt. ____ g Sample Wt. ____ g
5	Test ____ Run ____ Log Number ____ Comments ____	Filter No. ____ Filter Type ____ Filter Tare Wt. ____ g Filter+Sample Wt. ____ g Sample Wt. ____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0783	0.1012	0.0989		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1002	0.1233	0.1563		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job A.C.S. / DRAYTON
Team Leader DVH
Date Submitted 12/2/92
Test No. 1

Source No 1 DRYER
Test Site STACK
Date of Test 12/1/91
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
4	Probe Wash: ☒ Acetone ☐ D.I. Water	☒ As per EPA M-5 ☐ Other _____	
4	Filter: ☒ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☒ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
	Impinger Catch: ☐ D.I. Water ☐ 3% H_2O_2 ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ☐ Other _____	☐ MN Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☐ Other _____	NO WET CATCH REQUIRED by North DAKOTA
3	Integrated Gas sample	☒ As per EPA M-3 ☐ As per EPA M-10 ☐ Other _____	
	Oxides of Nitrogen (NO_w)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

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

S-278RRRR

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job ACS DRAYTON
Team Leader C HOVE
Date Submitted 12-3-92
Test No. 1

Source NO 1 E DRYER
Test Site STACK
Date of Test 12-1-92
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
4	Probe Wash: ☒ Acetone ☐ D.I. Water	☐ As per EPA M-5 ☐ Other _____	
4	Filter: ☒ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☐ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
0	Impinger Catch: ☐ D.I. Water ☐ 3% H_2O_2 ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ☐ Other _____	☐ MN Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☒ Other NORTH DAKOTA	IMP CATCH NOT SAVED
3	Integrated Gas sample	☒ As per EPA M-3 ☐ As per EPA M-10 ☐ Other _____	
0	Oxides of Nitrogen (NO_x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
0	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
0	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

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

S-279RRRR

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job A.C.S./DRAYTON
Team Leader DUH
Date Submitted 12/2/92
Test No. 2

Source No 2 DRYER
Test Site STACK
Date of Test 12/2/92
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
3	Probe Wash: ☒ Acetone ☐ D.I. Water	☒ As per EPA M-5 ☐ Other _____	
3	Filter: ☒ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☒ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
	Impinger Catch: ☐ D.I. Water ☐ 3% H_2O_2 ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ☐ Other _____	☐ MN Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☐ Other _____	
3	Integrated Gas sample	☒ As per EPA M-3 ☐ As per EPA M-10 ☐ Other _____	
	Oxides of Nitrogen (NO_x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

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

S-278RRRR

Interpoll Laboratories
(612) 786-6020

Chain of Custody
Sample Deposition Sheet

Job ACS ORAYTON
Team Leader C HOVE
Date Submitted 12-3-92
Test No. 2

Source NO 2 E DRYER
Test Site STACK
Date of Test 12-2-92
No. of Runs Completed 3

No. of Samples	Type of Sample	Analysis Required	Comments
3	Probe Wash: ☒ Acetone ☐ D.I. Water	☐ As per EPA M-5 ☐ Other _____	
3	Filter: ☒ 4" G.F. ☐ S.S. Thimble ☐ 2.5" G.F. ☐ 47 mm G.F.	☐ As per EPA M-5 ☐ As per EPA M-17 ☐ Other _____	
0	Impinger Catch: ☐ D.I. Water ☐ 3% H_2O_2 ☐ 4M5 Hg Only ☐ 4M5 Metals ☐ 1.0 N NaOH ☐ Other _____	☐ MN Protocol ☐ WI Protocol ☐ EPA M-6 or 8 ☐ Acid Gases ☐ Formaldehyde ☐ Metals ☒ Other N DAKOTA	NOT SAVED
3	Integrated Gas sample	☒ As per EPA M-3 ☐ As per EPA M-10 ☐ Other _____	
0	Oxides of Nitrogen (NO_x)	☐ As per EPA M-7A ☐ Other _____	Date _____ Time (HRS) _____
	☐ Fuel Sample ☐ Aggregate	☐ Attached fuel Form #S-0163RRR	
0	Particle Size	☐ X-Ray Sedigraph ☐ Bahco Method ☐ Other _____	
0	Audit Samples ☐ Sulfur Dioxide ☐ Oxides of Nit. ☐ Other _____	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other _____	

Source Information

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

S-279RRRR

APPENDIX E

PROCESS INFORMATION

12-01-92

OUT #1 6:00 PM

	PRESS PULP	DRY PULP
8:20 am	10	10
	26.8527	56.2181
	15.3104	30.6353
	18.5758	54.1282
	71.7	8.2
8:30 am	11	11
	26.9262	62.6892
	14.8764	35.2615
	18.3221	60.7087
	71.4	7.2
9:00	2	2
	27.2961	58.6839
	15.0209	35.7402
	18.5149	56.9367
	71.5	7.6
9:30	7	7
	25.9601	61.3345
	14.9493	35.5815
	18.1288	59.5238
	71.1	7.0
10:00	3	3
	28.1787	63.8468
	15.6956	35.9357
	19.3400	61.8135
	70.8	7.3

	OUT AT 6:00	
	PRESS	DRY
10:30	8	8
	26.7781	55.7940
	1562246	30.7896
	18.1883	54.1986
	14.3	6.4

12-2-92

YOUR COPY

12-2-92

Pulp
Moisture analysis

	pan	Dry
2:00	2	2
	25.6953	52.5340
	15.0200	35.7375
	10.4753	16.7965
	18.0069	51.1627
	72.0	8.2
	3	3
2:30	25.3477	57.0984
	15.6947	35.9345
	9.6530	21.3940
	18.3989	55.9016
	72.0	5.6
	7	7
3:00	24.7822	49.7548
	14.9488	35.5800
	9.8334	14.1748
	17.6554	48.6864
	72.5	7.5
	8	8
3:30	26.7660	52.3597
	15.2486	30.7894
	11.5174	21.5703
	18.1704	51.6012
	74.6	6.3

RECEIVED
DEC 03 1992
INTERPOLL LABORATORIES

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To Duane Van Hoever	From Everett Aasand
Co. Interpoll	Co. American Crystal Sugar
Dept.	Phone # 701 454-3326
Fax # 612-786-7854	Fax # 701 454 3261

12-2-92 and 9:30

	Press	Dry	Press	Dry
1:00 AM	2	2	1:30 11	1:39 11
	23.8323	52.8365	25.9468	52.1794
	15.0210	35.7357	14.8766	35.2608
	17.4405	50.2331	17.9242	50.9684
	72.5	3.5	72.5	7.2
1:30 AM	3	3		
	24.2450	52.2492		
	15.6952	35.9324		
	17.9620	52.4382		
	74.1	6.3		
2:00 AM	7	7		
	24.3898	50.7875		
	14.9489	35.5778		
	17.5647	50.0006		
	72.3	5.2		
12:30	8	8		
	33.7324	51.1981		
	15.2230	30.7893		
	11.3873	50.1764		
	74.6	5.0		
1:00 -	10	10		
	24.7415	48.8814		
	15.3098	30.6364		
	17.9260	47.6452		
	72.3	6.8		

12-2-92 OUT 4:30

	PRESS	DRY	PRESS	DRY
8:00	2	2		
	25.5181	63.5710	10:30 11	11
	15.0211	35.7384	26.6420	58.2485
	17.8699	61.6961	14.8766	35.2606
	72.9	6.7	18.0937	56.0.62
			72.7	9.8
8:30	3	3		
	27.5310	59.7178		
	15.6957	35.9357		
	18.9625	57.4372		
	72.4	9.6		
9:00	7	7		
	26.2187	56.1926		
	14.9497	35.5811		
	18.0777	53.80 30		
	72.2	11.6		
9:30	8	8		
	27.1458	58.7917		
	15.2246	30.7904		
	18.6544	56.4185		
	71.7	8.5		
10:00	10	10		
	27.6920	53.9563		
	15.3103	30.6388		
	18.6969	51.8292		
	72.6	9.1		

OUT AT 6:00 pm

2-01-92

	PRESS PULP	DRY PULP
1:20 am	10	10
	26.8527	56.2181
	15.3104	30.6353
	18.5758	54.1282
	71.7	8.2
3:30 am	11	11
	26.9262	62.6892
	14.8764	35.2615
	18.3221	60.7077
	71.4	7.2
9:00	2	2
	27.2961	58.6839
	15.0209	35.7402
	18.5149	56.7367
	71.5	7.6
9:30	7	7
	25.9601	61.3345
	14.9493	35.5815
	18.1288	59.5238
	71.1	7.0
10:00	3	3
	28.1787	63.8468
	15.6956	35.9357
	19.3400	61.8135
	70.8	7.3

OUT AT 6:00

	PRESS	DRY
10:30	8	8
	26.7781	55.7940
	15.2246	30.7896
	18.1883	54.1986
	74.3	6.4

#1 Pulp Dryer 12-1-92

Pulp Drier Stack Test Log

Hour	* Slice Rate	Pulp Scale Reading	Grate Speed	Coal Depth	* Drum Temp In	* Drum Temp Out	ID Fan Damper %	ID Fan Damper Amps	* Outlet Draft	Moisture Press Pulp	Moisture Dry Pulp	Feed Gate #1 %	Feed Gate #2 %	* CaCl2 Feed GPH	PPM pH	FD Fan Damper %	FD Fan Damper Amps
8:00	250		10	4	696	105	35		120			32		25		20	50
8:30	250		38	4	722	104	35		115			32		25		40	55
9:00	250		41	4	718	104	35		110			32		25		25	51
9:30	11.5		42	4	708	105	35		105			32		25		26	52
10:00	0		36	4	709	101	35		122			32		25		28	51
10:30	0		40	4	685	101	35		113			32		25		36	54
11:00																	
12:00																	
1:00																	

8:20 AM

Coal Bunker Filled at _____ Coal Bunker Refilled at _____

Coal Scale Reading Start _____ Stop _____ Net _____

9:30 Down with Drum Red in the rear

10:55 #1 off line

* We will keep the strip charts on these values

8:20 - 89792.78
8:30 - 89794.82
9:00 - 89801.17
9:30 - 89807.86
10:00 - 89815.05
10:30 - 89820.95

Coal usage numbers are not available for Dec. 1, due to down time. Bunker was filled prior to testing and not filled again until approx. 6:00 p.m.

prior to testing and not fullest ... 11
6:00 p.m. [initials]

⊕ 11:00 am

Shaft Revolutions
3 1/2" Coal Bed

1 11:21
2 11:36
3 12:10
4 12:43
5 1:05
6 1:20
7 1:45
8 1:55
9 2:12
10 2:35
11 2:55
12 3:05
13 3:18
14 3:30
14 3/4 3:50

Drier #2 Dec 2

Coal Usage is calculated by counting shaft Revolutions

With 3.5 inch coal bed = 21.29 cubic ft.

21.29 cu ft X 40.238 (lb, cu ft) = 856.67 ÷ 2000 = .43 Tons burned

14.75 revolutions × .43 = 6.3

H, Dryer 12-2-92

FD Fan Damper 40 open

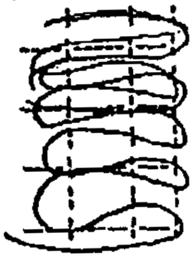
Pulp Drier Stack Test Log

Hour	FM * Slice Rate	AM Pulp Scale Reading	FM Grate Speed	FM Coal Depth	* Drum Temp * In	Out	ID Fan Damper %	* Amps	* Outlet Draft	Moistures Press Pulp	Dry Pulp	FM Feed Gate #1 %	FM #2 %	FM * CaCl2 Feed GPH	PPM	FM FD Fan Damper %	Amps
8:00	240		13	4	740	105	50		120			35		80		0	47
8:30	240		30	4	690	104	50		150			35		80		5	47
9:00	240		35	4	695	104	50		164			35		80		20	54
9:30	240		25	4	623	104	50		166			35		80		10	51
10:00	245		20		629	103	50		170			35		80		0	48
10:30	240		30		656	103	50		152			35		80		18	53
11:00																	
12:00																	
1:00																	

Test over 10:35

Coal Bunker Filled at ______ Coal Bunker Refilled at ______.

Coal Scale Reading Start ________ Stop ______ Net ____



* We will keep the strip charts on those values

8:00-89916.16
8:30-89923.35
9:00-89930.90
9:30-89938.14
10:00-89944.55
10:30-89950.68

Just under 10 ton During testing of Dryer #1

COAL Amount

13445.71 - 8:15A
13475.38 10:45

From 8:15am - 10:45am 9.67 Tons of coal were used in Drier #1

#2 DRYER / 12-2-92

First Test Start 11:
Testing Over at 3:5

Pulp Drier Stack Test Log

FD Fan Damper % | % Open

GRATE Revolution | Coal Depth

Hour	Slice Rate *	Pulp Scale Reading	Grate Speed	Coal Depth	Drum Temp * In	Drum Temp * Out	ID Fan Damper %	ID Fan Amps *	Outlet Draft *	Moistures Press Pulp	Moistures Dry Pulp	Feed Gate #1 %	Feed Gate #2 %	CaCl2 Feed GPH *	PPM pH	FD Fan Damper %	FD Fan Amps
[redacted] 11:00	250		10	3½	421	92			1.15				70	80		5	37
11:30	240		20	3½	408	92			1.20				70	80		10	38
[redacted] 12:00	240		22	3½	412	92			1.12				70	80		13	39
12:30	240		30	3½	398	91			1.11				70	80		20	40
[redacted] 1:00	245		25	3½	448	90			1.13				70	80		15	39
1:30	250		20	3½	478	90			1.16				70	80		10	38
[redacted] 2:00	240		15	3½	539	91			1.22				70	80		8	38
2:30	240		25	3½	529	90			1.11				70	80		15	39
[redacted] 3:00	245		35	3½	535	90			1.14				70	80		25	41
3:30	240		30	3½	531	90			1.09				70	80		20	40
[redacted] 4:00																	

Coal Bunker Filled at ____ Coal Bunker Refilled at ______

Coal Scale Reading Start ________ Stop ______ Net _____

1.2 lbs. of Dust Pi...
From Dust Collect...

* We will keep the strip charts on those values

11:00 - 8995653
11:30 - 8996242
12:00 - 8996810
12:30 8997385
1:00 8997985
1:30 8998605
2:00 8999286
2:30 9000001
3:00 9000669
3:30 9001464
[illegible]

DIFF

Day # 087
Date 12-2-96

Hour	Tons Sliced	Diffuser Amps	Diffuser kN	Diffuser Speed RPM	Mixer Amps	Mixer Speed RPM	Screen Pres. bot BAR	Screen Pres. top BAR	Press Pulp Water GPM	Fresh Water GPM	Raw Juice GPM	Circ. Juice GPM	Diffusion Juice GPM	Defoamed Juice GPM	Diffuser Deg C.	Mixer Deg C.	Press Water Deg C.	Fresh Water Deg C.	Raw Juice Deg C.	Circ. Juice Deg C.	Cossettes % Sugar	Raw Juice Brix	Press Pulp Water % Sug	Fresh Water Ph	Press Pulp Water pH	Coss. Scale Reading	
8	245	216	278	.09	40	.6	1.76	1.56	376	29	952	3008	598	596	68.3	69.3	58.8	62.3	23.5	74.5	18.1	18.4	.55	4.9	5.9	424	425
9	265	226	38.4	.09	45	.6	1.76	1.56	356	132	953	2992	600	602	68.3	69.7	57.8	62.8	23.1	73.2		19.0	.90	[illegible]	6.4	424	670
10	230	245	34.5	.09	42	.6	1.70	1.56	363	135	953	3011	597	599	67.9	69.3	60.1	62.4	22.8	74.1	18.0	19.0	1.45	3.0	5.6	424	935
11	240	261	38.2	.09	46	.6	1.61	1.41	122	225	1002	2994	603	597	67.5	69.5	57.6	62.4	21.8	73.1		19.6	1.85	3.6	5.3	425	165
12	250	283	44.1	.09	44	.6	1.59	1.34	119	451	1100	2992	596	598	66.5	69.5	57.5	62.2	24.6	72.8	18.5	18.9	1.90	6.9	5.3	425	405
1	255	280	49.0	.09	46	.6	1.64	1.44	363	410	1097	3008	597	613	66.3	69.5	58.9	64.8	25.1	72.9		18.9	1.65	8.3	5.4	425	655
2	255	277	42.4	.09	46	.6	1.63	1.42	371	393	1102	2987	610	602	[illegible]	69.5	62.1	63.8	25.0	72.5	18.5	19.1	1.35	8.5	5.4	425	910
3	246	268	41.0	.09	47	.6	1.68	1.49	358	286	1047	2985	597	600	[illegible]	69.4	62.0	63.0	23.6	72.4		19.3	1.25	8.3	5.5	426	165
4	250	265	40.6	.09	47	.6	1.67	1.44	358	232	976	3002	608	599	67.3	67.2	62.4	62.8	22.0	72.6	18.3	20.0	1.70	6.5	6.4	426	410
5	245	263	39.5	.09	49	.6	1.68	1.48	363	290	1003	3014	598	604	67.5	67.6	62.3	62.7	22.4	72.4		19.3	1.60	3	[illegible].0		660
6	245	262	39.3	.09	49	.6	1.66	1.47	369	300	1004	2999	602	601	67.6	69.4	62.3	63.1	22.1	73.3	18.2	19.3	1.50	3.[illegible]	5.2		905
7	245	258	38.0	.09	52	.7	1.72	1.53	372	333	984	2998	604	599	62.7	69.3	62.3	62.3	19.8	73.0		19.3	1.60	3.[illegible]	5.0	407	150
8	250	266	37.2	.09	46	.7	1.73	1.53	375	268	1000	2999	606	600	67.8	69.4	62.0	63.2	24.8	73.1	18.5	19.3	1.65	7.3	5.0		395
9	250	242	35.7	.08	51	.7	1.77	1.55	357	73	997	2963	591	618	67.9	69.5	62.7	63.6	24.0	74.4		19.2	1.75	6.3	5.0		64[illegible]
10	245	246	35.4	.08	52	.7	1.71	1.53	324	26	1001	2996	597	597	67.9	69.3	62.6	62.1	21.9	73.5	18.2	19.5	1.75	6.4	5.0		895
11	240	256	37.9	.08	51	.7	1.69	1.53	209	263	1002	2997	608	592	67.9	69.5	62.2	62.1	20.6	74.2		19.5	1.70	2.8	4.8	408	140
12	240	288	43.2	.09	45	.7	1.57	1.49	157	257	1003	2990	598	592	67.9	70.3	61.8	62.8	27.4	78.3	18.8	19.4	1.70	2.5	4.7		880
1	240	291	45.7	.10	44	.6	1.58	1.38	329	304	1062	3004	665	571	68.0	69.5	62.3	64.5	27.3	70.8		19.1	1.57	3.9	4.9		820
2	260	298	48.1	.11	44	.6	1.53	1.33	332	308	1025	2994	590	565	68.0	69.4	62.1	63.2	22.2	72.9	18.1	19.3	1.39	7.4	4.8		860
3	250	297	46.9	.12	44	.6	1.57	1.37	363	389	1046	3000	591	610	68.0	69.5	62.2	63.2	23.2	73.7		19.3	1.65	8.5	4.9	429	110
4	250	289	44.9	.12	[illegible]	.6	1.64	1.42	370	357	1049	3000	598	599	67.9	69.9	61.9	61.4	21.8	74.6	19.0	19.1	1.50	7.9	5.1	425	360
5	240	241	49.4	.12	44	.6	1.64	1.41	369	398	1162	3000	605	613	67.8	68.9	61.6	63.0	22.0	72.9		18.8	[illegible]	8.6	5.2		610
6	250	280	43.6	.12	43	.6	1.64	1.41	339	420	1095	3000	589	597	67.8	69.3	62.3	62.1	23	71.4	18.1	18.7	1.61	8.1	4.9		550
7		285	41.5	.12	44	.6	1.60	1.39	111	330	1097	3000	594	616	67.8	69.7	64.5	61.1	23.6	73.2		19.1	1.60	8.4	5.16		100
Avg	247	267	40.3	.10	46	.6	1.7	1.5	359	286	1055	2999	598	601	67.6	69.5	60.5	62.9	23.3	73.2	18.3	19.2	1.56	5.9	5.2		

APPENDIX F

PROCEDURES

Particulate Loadings and Emission Rates

The particulate emission rates were determined per EPA Methods 1-5, CFR Title 40, Part 60, Appendix A (revised July 1, 1987). In this procedure, a preliminary velocity profile of the gases in the flue is obtained by means of a temperature and velocity traverse. On the basis of these values, sampling nozzles of appropriate diameter are selected to allow isokinetic sampling, a necessary prerequisite for obtaining a representative sample.

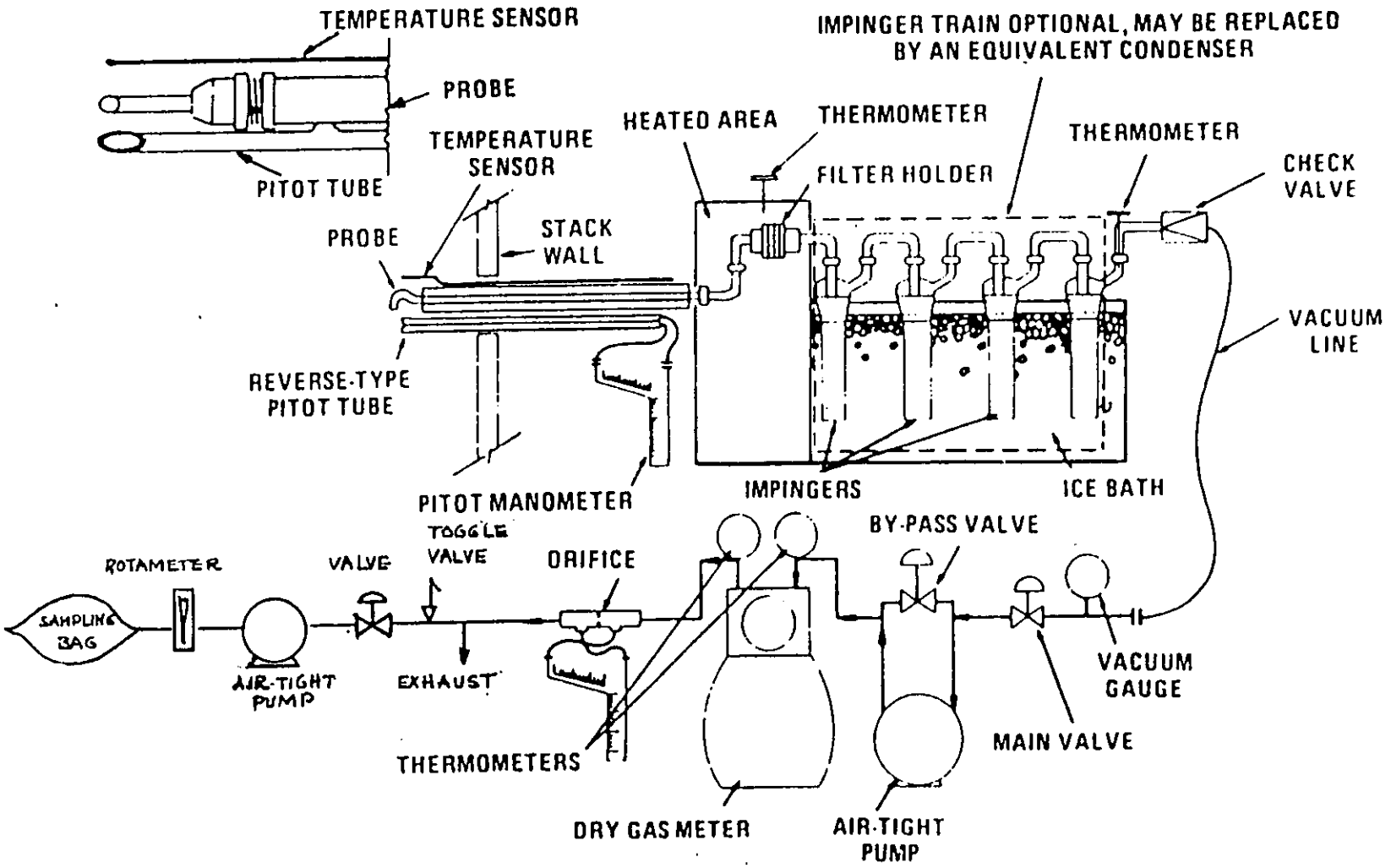
The sampling train consists of a heated glass-lined sampling probe equipped with a Type S pitot and a thermocouple. The probe is attached to a sampling module which houses the all-glass in line filter holder in a temperature controlled oven. In addition, the sampling module also houses the condenser case and a Drierite drying column. The sampling module is connected by means of an umbilical cord to the control module which houses the dry test gasmeter, the calibrated orifice, a leakless pump, two inclined manometers, and all controls required for operating the sampling train.

Particulate samples were collected as follows: The sample gas was drawn in through the sampling probe isokinetically and passed through a 4-inch diameter Gelman Type A/E glass fiber filter. The particulates were removed at this point and collected on the filter. The gases then passed through an ice-cooled condenser and a desiccant-packed drying column which quantitatively absorb all moisture from the sample gas stream after which the sample gas passes through the pump and the dry test gasmeter which integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gasmeter provides instantaneous flow rate data.

A representative particulate sample was acquired by sampling for equal periods of time at the centroid of a number of equal area regions in the duct. The sampling rate is adjusted at each site such that an isokinetic sampling condition prevails. Nomographs are used to aid in the rapid determination of the sampling rate.

After sampling is complete, the filter is removed and placed in a clean container. The nozzle and inlet side of the filter holder are quantitatively washed with acetone and the washings are stored in a second container. A brush is often used in the cleaning step to help dislodge deposits. The samples are returned to the laboratory where they are logged in and analyzed. The volume of the acetone rinse ("probe wash") is noted and then the rinse is quantitatively transferred to a tared 120 cc porcelain evaporating dish and the acetone evaporated off at 97-105 ^{o}F. This temperature is used to prevent condensation of atmospheric moisture due to the cooling effect induced by the evaporation of acetone. The acetone-free sample is then transferred to an oven and dried at 105 ^{o}C for 30 minutes, cooled in a desiccator over Drierite, and then weighed to the nearest .01 mg. The filter sample is quantitatively transferred to a 6-inch watch glass and dried in an oven at 105 ^{o}C for two hours. The filter and watch glass are then cooled in a desiccator and the filter weighed to the nearest .01 mg. All weighings are performed in a balance room where the relative humidity is hydrostatted to less than 50% relative humidity. Microscopic examination of the samples is performed if any unusual characteristics are observed. The weight of the acetone rinse is corrected for the acetone blank. The Drierite column is weighed on-site and the water collected by Drierite is added to the condensate so that the total amount of absorbed water may be ascertained.

Integrated flue gas samples for Orsat analysis were collected simultaneously from the stack and from the breeching at the inlet to the wet scrubber. The samples were collected in 15-liter gas sampling bags at a constant flow rate throughout each particulate run. The bags were then returned to the laboratory and analyzed by Orsat analysis. Standard commercially prepared solutions were used in the Orsat analyzer (sat. KOH for carbon dioxide and reduced methylene blue for oxygen).



Particulate-sampling train.

APPENDIX G

CALCULATION EQUATIONS

CALCULATION EQUATIONS

METHOD 2

$$\bar{V}_s = 35.48\ C_p\ (\sqrt{\Delta p})_{avg}\ \sqrt{\frac{T_{s(avg)}}{P_s\ M_s}}$$

$$Q_{s,d} = 60(1 - B_{ws})\ \bar{V}_s\ A\ \left(\frac{528}{T_{s(avg)}}\right)\ \left(\frac{P_s}{29.92}\right)$$

$$Q_a = 60\ \bar{V}_s\ A$$

$$\dot{m}_g = \frac{4.995\ Q_{s,d}\ G_d}{1 - B_{ws}}$$

$$RH^* = 100\ (vp_{twb}\ 0.0003641\ P_s\ (T_{db} - T_{wb}))/vp_{tdb}$$

$$B^*_{ws} = RH(vp_{tdb})/P_s$$

$$= \frac{4.585 \times 10^{-2}\ P_s M_s}{T_{s\ (avg)}}$$

*Alternate equations for calculating moisture content from wet bulb and dry buld data.

SYMBOLS

A = Cross sectional area of stack, SQ. FT.

A_n = Cross sectional area of nozzle, SQ. FT.

B_{ws} = Water vapor in gas stream, proportion by volume

C_p = Pitot tube coefficient, dimensionless

C_a = Concentration of particulate matter in stack gas, wet basis, GR/ACF

C_s = Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, GR/DSCF

EA = Excess air, percent by volume

γ = Dry test meter correction factor, dimensionless

G_d = Specific gravity (relative to air), dimensionless

I = Isokinetic variation, percent by volume

M_d = Molecular weight of stack gas, dry basis, g/g - mole.

$\dot{m}_g$ = Mass flow of wet flue gas, LB/HR

$\dot{m}_p$ = Particulate mass flow, LB/HR

M_s = Molecular weight of stack gas, wet basis, g/g, mole.

M_p = Total amount of particulate matter collected, g

P_{bar} = Atmospheric pressure, IN. HG. (uncompensated)

P_g = Stack static gas pressure, IN. WC.

P_s = Absolute pressure of stack gas, IN.HG.

P_{std} = Standard absolute pressure, 29.92 IN. HG.

A_a = Actual volumetric stack gas flow rate, ACFM

$Q_{s,d}$ = Dry volumetric stack gas flow rate corrected to standard conditions, DSCFM

RH = Relative humidity, %

T_{db} = Dry bulb temperature of stack gas, ^oF

T_{wb} = Wet bulb temperature of stack gas, ^oF

$T_{m(avg)}$ = Absolute average dry gas meter temperature, ^oR

$T_s(avg)$ = Absolute average stack temperature, ^oF

T_{std} = Standard absolute temperature, 528 ^oF (68 ^oF)

θ = Total sampling time, min.

V_{lc} = Total volume of liquid collected in impingers and silica gel, ml

V_m = Volume of gas sample as measured by dry gas meter, CF

$V_{m(std)}$ = Volume of gas sample measured by the dry gas meter corrected to standard conditions, DSCF

$V_{w(std)}$ = Volume of water vapor in the gas sample corrected to standard conditions, SCF

$\bar{V}_s$ = Average actual stack gas velocity, FT/SEC

vp_{tdb} = Vapor pressure at T_{db}, IN. HG.

vp_{twb} = Vapor pressure at T_{wb}, IN. HG

$\overline{\Delta H}$ = Average pressure differential across the orifice meter, IN. WC.

ΔP = Velocity pressure of stack gas, IN. WC.

γ = Dry test meter correction coefficient, dimensionless

ρ = Actual gas density, LB/ACF

CALCULATION EQUATIONS

METHOD 3

$$\%EA = \frac{100(\%O_2 -).5\%\ CO)}{0.264\%\ N_2 - \%O_2 + 0.5\%\ CO}$$

$$M_d = 0.44(\%CO_2) + 0.32\ (\%O_2) + 0.28\ (\%N_2 + \%CO)$$

$$M_s = M_d\ (I - B_{ws}) + 0.18\ B_{ws}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

CALCULATION EQUATIONS

METHOD 5

$$V_{m(std)} = 17.65\ V_m\ \gamma\ \left(\frac{P_{bar} + \overline{\Delta H}/13.6}{T_{m(avg)}}\right)$$

$$V_{w(std)} = 0.0472\ V_{Is}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

$$I = 0.0944\ \left(\frac{T_{s(avg)}\ V_{m(std)}}{P_s\ V_s\ A_n\ \theta\ (1 - B_{ws})}\right)$$

$$C_s = \frac{15.43\ M_p}{V_{m(std)}}$$

$$C_a = \frac{272.3\ M_p\ P_s}{T_{s(avg)}\ (V_{w(std)} + V_{m(std)})}$$

$$(\dot{m}_p)_1 = 8.5714 \times 10^{-3}\ C_s\ Q_{s,d}$$

$$(\dot{m}_p)_2 = \frac{1.3228 \times 10^{-1}\ M_p\ A}{\theta\ A_n}$$

$$\dot{m}_p = \frac{(\dot{m}_p)_1 + (\dot{m}_p)_2}{2}$$

SYMBOLS

A = Cross sectional area of stack, SQ. FT.

A_n = Cross sectional area of nozzle, SQ. FT.

B_{ws} = Water vapor in gas stream, proportion by volume

C_p = Pitot tube coefficient, dimensionless

C_a = Concentration of particulate matter in stack gas, wet basis, GR/ACF

C_s = Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, GR/DSCF

EA = Excess air, percent by volume

γ = Dry test meter correction factor, dimensionless

G_d = Specific gravity (relative to air), dimensionless

I = Isokinetic variation, percent by volume

M_d = Molecular weight of stack gas, dry basis, g/g - mole.

$\dot{m}_g$ = Mass flow of wet flue gas, LB/HR

$\dot{m}_p$ = Particulate mass flow, LB/HR

M_s = Molecular weight of stack gas, wet basis, g/g, mole.

M_p = Total amount of particulate matter collected, g

P_{bar} = Atmospheric pressure, IN. HG. (uncompensated)

P_g = Stack static gas pressure, IN. WC.

P_s = Absolute pressure of stack gas, IN.HG.

P_{std} = Standard absolute pressure, 29.92 IN. HG.

A_a = Actual volumetric stack gas flow rate, ACFM

$Q_{s,d}$ = Dry volumetric stack gas flow rate corrected to standard conditions, DSCFM

RH = Relative humidity, %

T_{db} = Dry bulb temperature of stack gas, ^oF

T_{wb} = Wet bulb temperature of stack gas, ^oF

$T_{m(avg)}$ = Absolute average dry gas meter temperature, ^oR

$T_s(avg)$ = Absolute average stack temperature, ^oF

T_{std} = Standard absolute temperature, 528 ^oF (68 ^oF)

θ = Total sampling time, min.

V_{lc} = Total volume of liquid collected in impingers and silica gel, ml

V_m = Volume of gas sample as measured by dry gas meter, CF

$V_{m(std)}$ = Volume of gas sample measured by the dry gas meter corrected to standard conditions, DSCF

$V_{w(std)}$ = Volume of water vapor in the gas sample corrected to standard conditions, SCF

$\bar{V}_s$ = Average actual stack gas velocity, FT/SEC

vP_{tdb} = Vapor pressure at T_{db}, IN. HG.

VP_{twb} = Vapor pressure at T_{wb}, IN. HG

$\overline{\Delta H}$ = Average pressure differential across the orifice meter, IN. WC.

ΔP = Velocity pressure of stack gas, IN. WC.

γ = Dry test meter correction coefficient, dimensionless

ρ = Actual gas density, LB/ACF

APPENDIX H

SAMPLING TRAIN CALIBRATION DATA

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job A.C.S. / CRAYTON Date 12/1/92

Operator [redacted] Module No. 9

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.57 in. Hg. $_T$ = .9945 ^H@ 1.81 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	(431.20)	[redacted]	
2.5	433.16	63	61
5.0	435.08	68	63
7.5	437.00	72	65
10	439.04	73	67
[redacted]	V_m= 7.86	Avg(t_m)=	66.5°F

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{T\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(.9945)(7.86)}\left[\frac{(66.5) + 460}{(28.57)}\right]^{0.5}$$

$$Y_{cn} = .98$$

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job ACS ORAYTON Date 11-30-93

Operator C HOVE Module No. 3

Instructions: Operate the control module at a flow rate equal to ^H@ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.45 in. Hg. τ = 1.0007 ^H@ 1.85 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	912.00	[redacted]	
2.5	913.95	70	61
5.0	915.94	73	62
7.5	917.68	75	63
10	919.54	76	64
[redacted]	V_m= 7.54	Avg(t_m)= 68	°F

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\tau\ V_m}\left[\frac{(t_m + 460)}{P_b}\right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{(1.0007)(7.54)}\left[\frac{(68) + 460}{(29.45)}\right]^{0.5}$$

$$Y_{cn} = 1.002$$

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: December 3, 1992

Meter Box No. : 3 (Rockwell Dry Test Meter Serial No. 712852)

Date of Last Calibration: November 30, 1992
Calibration Technician: D. Brennan
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
December 1, 1992	2-7629	912.00	1153.35	241.35	241.35

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: December 3, 1992

Meter Box No. : 9 (Rockwell Dry Test Meter Serial No. 949231)

Date of Last Calibration: October 30, 1992
Calibration Technician: D. Van Hoever
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.)
November 17, 1992	2-7521	581.71	1191.09	609.38	609.38
November 21, 1992	2-7597	1191.51	1430.80	239.29	848.67
December 1, 1992	2-7629	1431.20	1702.45	271.25	1090.02

* Total volume through meter since last calibration.

Date 11/30/92

Bar. Press. 29.08 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 3
Serial No. DTM 712 852
Wet Test Meter No. AL-20
Technician D. BRENNAN

ΔH (in. WC)		Gas Volume Wet Test Meter (ft^3)	* Cal. Index Φ (%)	* 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. ΔHθ	C_f
							Wet Test t_w (°F)	Dry Test					
nominal	actual				V_{di}	V_{df}		t_{di} (°F)	t_{do} (°F)				
0.5	.50	2	99.85	0.01	901.500	903.530	70.5	81	76	5:01	.9973	1.80	
1.2	1.2	3	99.91	0.025	904.000	907.032	70.5	84	77	4:50	1.0041	1.77	
2.0	2.0	3	99.93	0.055	887.000	890.012	71.0	77	73	3:49	.9976	1.86	
3.3	3.3	5	100.00	0.09	890.500	895.517	71.0	81	75	4:59	1.0012	1.87	
4.7	4.7	5	100.02	0.12	896.000	901.013	71.0	84	77	4:12	1.0032	1.885	
										AVG.	1.0007	1.84	

Positive leak check performed by D. BRENNAN
Meter was in tolerance ■
Meter was not in tolerance ☐; readjusted linkage
Meter was not in tolerance ☐; changed dry test meters

Approved by Daniel LaVoie Date 11/30/92

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

S0102RR 11/91

Date 10/30/92

Bar. Press. 29.16 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 9
Serial No. DTM 949231
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. ΔHθ	C_f
							Wet Test	Dry Test					
nominal	actual				V_{d1}	V_{df}	t_w (°F)	t_{d1} (°F)	t_{do} (°F)				
0.5	.5	2	99.85	0.01	576.40	578.45	68	83	78	5:00	.9954	1.76	
1.2	1.2	3/2	99.91	0.025	578.97	581.025	68	84	78	3:17	.9932	1.81	
2.0	2.0	3.5	99.93	0.055	557.98	561.55	68	83	76	4:28	.9959	1.83	
3.3	3.3	5.5	100.00	0.09	562.06	567.68	68	86	77	5:25	.9942	1.79	
4.7	4.7	5	100.02	0.12	568.20	573.31	68	87	78	4:11	.9935	1.84	
	8	8	4	8	6	7	8	8	16	11/13	.9945	1.81	

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 10/30/92

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

S0102RR 11/91

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 12-1-92 Nozzle Number 7-6
Technician: Duane Van Hoever

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

Position	Diameter (inches)
1	.374
2	.374
3	.375
Average:	.374

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 12-2-92 Nozzle Number 7-7
Technician: Duane Van Hoever

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

Position	Diameter (inches)
1	.255
2	.256
3	.256
Average:	.256

Interpoll Laboratories, Inc.
(612) 786-6020

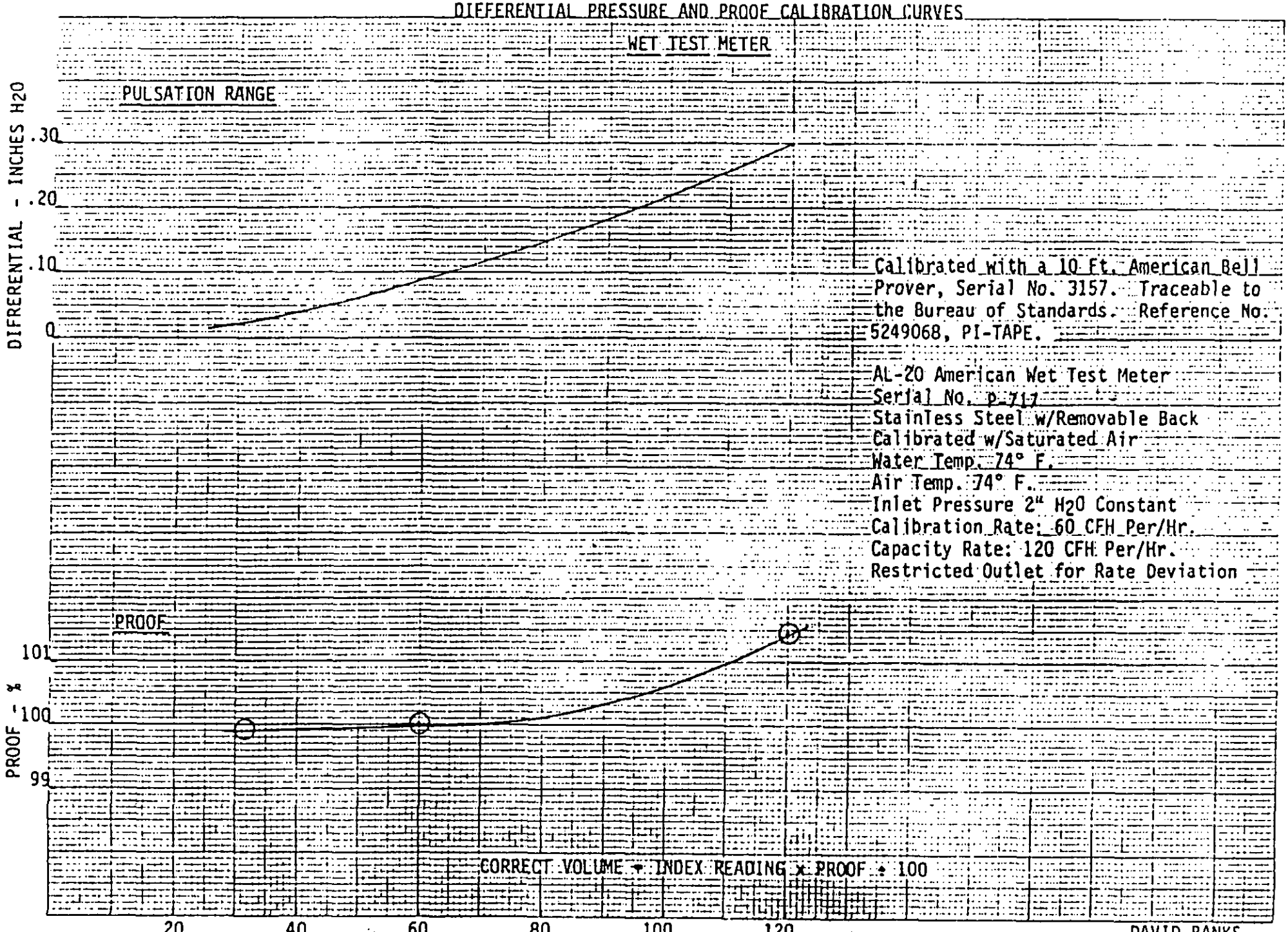
Nozzle Calibration
Data Sheet

Date of Calibration: 12-1-92 Nozzle Number 23-5
Technician: Gary Hove

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	.370
2	.370
3	.376
Average:	.372

DIFFERENTIAL PRESSURE AND PROOF CALIBRATION CURVES



DAVID BANKS

November 1991

H-10

Interpoll Laboratories, Inc.

Temperature Measurement Device Calibration Sheet

Unit under test:

Vendor Beckman

Model HD 110T — Serial Number 18

Range 0-1999 °F — Thermocouple Type K

Date of Calibration 9/9/92 — Technician Dutt

Method of Calibration:

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

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

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation Δt (°F)	Deviation (%)
0	0	0	0	0
100	100	96	4	.71
200	200	199	1	.15
300	300	298	2	.26
400	400	395	5	.58
500	500	494	6	.63
600	600	597	3	.28
700	700	698	2	.17
800	800	803	3	.24
900	900	905	5	.37
1000	1000	1010	10	.68
1100	1100	1114	14	.90
1200	1200	1220	20	1.20
1300	1300	1321	21	1.19
1400	1400	1425	25	1.37
1500	1500	1523	23	1.17
1600	1600	1624	24	1.16
1700	1700	1720	20	.92
1800	1800	1818	18	.80
1900	1900	1911	11	.46
2000				
2100				
		Averages:		.696

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.

Temperature Measurement Device
Calibration Sheet

GARY HOVE

Unit under test:
Vendor OMEGA
Model HA21 Serial Number 24
Range 0 - 2000 °F Thermocouple Type K
Date of Calibration 7-20-92 Technician G Trowbridge

Method of Calibration:

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

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

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	-.1	.1	.15
100	100	98.8	1.2	.21
200	200	200.9	.9	.13
300	300	299.5	.5	.07
400	400	398.9	1.1	.12
500	500	498.8	1.2	.125
600	600	601.4	1.4	.13
700	700	700.2	.2	.02
800	800	801.7	1.7	.13
900	900	900.1	.1	.007
1000	1000	1001.0	1.0	.07
1100	1100	1100	0	0
1200	1200	1202	~~2000~~	.12
1300	1300	1300.1	.1	.006
1400	1400	1402.5	2.5	.134
1500	1500	1500.3	.3	.015
1600	1600	1602.1	2.1	.102
1700	1700	1699.6	.4	.019
1800	1800	1801.4	1.6	.07
1900	1900	1801.6	1.6	.068
2000	2000	2000	0	0
2100		~~2098.6~~	1.4	.07
		Averages:	1.0	.080

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

(612)786-6020

S-Type Pitot Tube Inspection Sheet

Pitobe No. 23-4

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) .462 IN.

Alignment:

4. α_1 <10° 0
5. α_2 <10° 0

6. B_1 <5° 1
7. B_2 < 5° 1

8. Z <.125" .02
9. W <.0625" .04

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .758 IN.
11. Pitot to probe sheath 3.00 IN.
12. Pitot to thermocouple (parallel to probe) 3.00 IN.
13. Pitot to thermocouple (perpendicular to probe) .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: 3-2-92

Inspected by: [signature]

CFR Title 40 Part 60 Appendix A Method 2

Interpoll Inc.
(612)786-6020

S-Type Pitot Tube Inspection Sheet

Pitobe No. 2½-27

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .462 IN.
3. Base to Side B opening plane (P_B) .464 IN.

Alignment:

4. α_1 <10° 0
5. α_2 <10° 0

6. B_1 < 5° 1°
7. B_2 < 5° 1°

8. Z <.125" .03
9. W <.0625" .01

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .758 IN.
11. Pitot to probe sheath 3 IN.
12. Pitot to thermocouple (parallel to probe) _____ IN.
13. Pitot to thermocouple (perpendicular to probe) _____ IN.

Date of Inspection: 1-3-92

Inspected by: [signature]

S-348(1)

Interpoll Inc.
(612)786-6020

S-Type Pitot Tube Inspection Sheet

Pitobe No. 4-27

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) .462 IN.

Alignment:

4. $\alpha_1 < 10^o$ 0
5. $\alpha_2 < 10^o$ 0

6. $B_1 < 5^o$ 0
7. $B_2 < 5^o$ 1°

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

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .760 IN.
11. Pitot to probe sheath 3 IN.
12. Pitot to thermocouple (parallel to probe) _____ IN.
13. Pitot to thermocouple (perpendicular to probe) _____ IN.

Date of Inspection: 1-3-92

Inspected by: E Tunkel

S-348(1)

INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 7-31-92
Technician GARY HOVE
Mercury Column Barometer No. NOVA-1
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})
29.30	74°F	.121	29.179	29.18	0
/ADJUST		.001	29.178		

Has this barometer shown any consistent problems with calibration? (Yes)/No. If yes, explain. LAST OWNER

Has problem been alleviated? (Yes)/No. How? RE-ADJUSTED

*Note

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

S-312

INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 9/9/92

Technician D. Van Hoever

Mercury Column Barometer No. 1

Aneroid Barometer No. DV44

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
28.85	68	.105	28.75	28.80	.+05

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.

S-312