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

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

AP42 Section: 11.1

Reference Number: 67

Title: Results Of The May 26, 1993 Particulate And Opacity Compliance Test Conducted On The Buffalo Bituminous Portable Asphalt Plant Stationed Near Hanover, Minnesota,

Interpoll Laboratories, Inc., Circle Pines, MN,

June 17, 1993.

AP-42 Section 11.1
Reference
Report Sect. 4
Reference 67

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RESULTS OF THE MAY 26, 1993 NSPS PARTICULATE AND OPACITY COMPLIANCE TEST CONDUCTED ON THE BUFFALO BITUMINOUS PORTABLE ASPHALT PLANT STATIONED NEAR HANOVER, MINNESOTA

Submitted to:

BUFFALO BITUMINOUS
P.O. Box 337
Buffalo, Minnesota 55313

Attention:

Brad Arntson

Approved by:

Daniel Despen
Manager
Stationary Source Testing Department

Report Number 3-8921
June 17, 1993
SP/slp

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ABBREVIATIONS

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

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

1 INTRODUCTION

On May 26, 1993 Interpoll Laboratories Personnel conducted a NSPS Particulate and Visible Emission Compliance Test on the Buffalo Bituminous Portable Asphalt Plant stationed near Hanover, Minnesota. Mark Kaehler, Ed Trowbridge, Duke Brennan, Ken Rosenthal, and Rick Eidem performed the on-site portion of the test. Coordination between testing activities and plant operation was provided by Brad Arntson of Buffalo Bituminous. The test was witnessed by Yolanda Hernandez of the Minnesota Pollution Control Agency.

The unit tested is a Barber Greene Model DM 70 portable asphalt plant which has a rated capacity of 275 TPH with 5% aggregate moisture and normal operating range of 250 - 275 TPH with 5% aggregate moisture. The unit was tested first processing virgin aggregate and then tested again processing approximately 45% recycled aggregate. The plant burned No. 6 Industrial Fuel and operated under normal conditions.

Particulate evaluations were performed in accordance with EPA Methods 1 - 5, and 9, CFR Title 40, Part 60, Appendix A (revised July 1, 1991). A preliminary determination of the gas linear velocity profile was made before the first particulate determination to allow selection of the appropriate nozzle diameter required for isokinetic sample withdrawal. An Interpoll Labs sampling train which meets or exceeds specifications in the above-cited reference was used to extract particulate samples by means of a heated glass-lined probe. Wet catch samples were collected in the back half of the Method 5 sampling train and analyzed as per Minnesota Rules part 7005.0500.

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 5 test ports oriented horizontally on the stack. The test ports are located 5 diameters downstream and 1 diameter upstream of the nearest flow disturbances. A 25-point traverse was used to collect representative particulate samples. Each traverse point was sampled 2.5 minutes to give a total sampling time of 62.5 minutes per run. Visible emissions determinations were performed by Ken Rosenthal and Rick Eidem, both of which are EPA-certified observers.

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 results are summarized in the table below.

Process		Concentration (GR/DSCF)	Emission Rate (LB/HR)
Virgin	(Dry + Organic Wet Catch)	0.0413	15.5
Virgin	(Dry Catch Only)	0.019	7.14
Recycle	(Dry + Organic Wet Catch)	0.111	38.3
Recycle	(Dry Catch Only)	0.012	4.20

Opacity averaged 2.76 percent while processing recycled aggregate, and 5.2 percent while processing virgin aggregate. Note that three one hour determinations were performed while processing recyled aggregate, while one hour was performed while processing virgin aggregate.

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 May 26, 1993 Particulate Emission Test on the Buffalo Bituminous Portable Asphalt Plant Stationed in Hanover, Minnesota.

ITEM		Run 1	Run 2
Date of test		05-26-93	05-26-93
Time runs were done	(HRS)	805/ 911	1003/1112
Process rate	(TON/HR)		
recycle		0.0	0.0
aggregate		280.0	276.0
asphalt		16.8	16.8
total		296.8	292.8
Volumetric flow			
actual	(ACFM)	69413	70709
standard	(DSCFM)	44778	43069
Gas temperature	(DEG-F)	148	153
Moisture content	(%V/V)	23.30	27.02
Gas composition	(%V/V,dry)		
carbon dioxide		5.80	6.60
oxygen		14.00	13.10
nitrogen		80.20	80.30
Isokinetic variation	(%)	99.2	102.0
Part. emission rate	(LB/HR)	13.54	17.44
Particulate concentration			
actual	(GR/ACF)	.0227	.0288
standard	(GR/DSCF)	.0353	.0472

Note: Dry + Organic Wet Catch

* Federal regulations restrict particulate emissions from portable asphalt plants to .04 GR/DSCF, CFR Title 40, Part 60, Subpart I.

Table 2. Summary of the Results of the May 26, 1993 Particulate Emission Test on the Buffalo Bituminous Portable Asphalt Plant Stationed in Hanover, Minnesota.

ITEM		Run 1	Run 2
Date of test		05-26-93	05-26-93
Time runs were done	(HRS)	805/ 911	1003/1112
Process rate	(TON/HR)		
recycle		0.0	0.0
aggregate		280.0	276.0
asphalt		16.8	16.8
total		296.8	292.8
Volumetric flow			
actual	(ACFM)	69413	70709
standard	(DSCFM)	44778	43069
Gas temperature	(DEG-F)	148	153
Moisture content	(%V/V)	23.30	27.02
Gas composition	(%V/V,dry)		
carbon dioxide		5.80	6.60
oxygen		14.00	13.10
nitrogen		80.20	80.30
Isokinetic variation	(%)	99.2	102.0
Part. emission rate	(LB/HR)	6.29	7.98
Particulate concentration			
actual	(GR/ACF)	.0106	.0132
standard	(GR/DSCF)	.0164	.0216

Note: Dry Catch Only

* Federal regulations restrict particulate emissions from portable asphalt plants to .04 GR/DSCF, CFR Title 40, Part 60, Subpart I.

Table 3. Summary of the Results of the May 26, 1993 Particulate Emission Test on the Buffalo Bituminous Portable Asphalt Plant Stationed near Hanover, Minnesota.

ITEM		Run 1	Run 2	Run 3
Date of test		05-26-93	05-26-93	05-26-93
Time runs were done	(HRS)	1300/ 157	1510/1620	1640/1745
Process rate	(TON/HR)			
recycle		145.0	143.0	143.0
aggregate		170.0	171.0	172.0
asphalt		12.3	11.6	11.3
total		327.3	325.6	326.3
Volumetric flow				
actual	(ACFM)	73155	70767	72540
standard	(DSCFM)	41506	39475	40339
Gas temperature	(DEG-F)	158	160	159
Moisture content	(%V/V)	31.44	32.44	32.70
Gas composition	(%V/V,dry)			
carbon dioxide		6.90	6.90	6.90
oxygen		11.80	11.60	11.70
nitrogen		81.30	81.50	81.40
Isokinetic variation	(%)	101.4	101.5	100.6
Part. emission rate	(LB/HR)	34.21	39.96	40.67
Particulate concentration				
actual	(GR/ACF)	.0545	.0658	.0654
standard	(GR/DSCF)	.0961	0.118	0.118

Note: Dry + Organic Wet Catch

* Federal regulations restrict particulate emissions from portable asphalt plants to .04 GR/DSCF, CFR Title 40, Part 60, Subpart I.

Table 4. Summary of the Results of the May 26, 1993 Particulate Emission Test on the Buffalo Bituminous Portable Asphalt Plant Stationed near Hanover, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-26-93	05-26-93	05-26-93
Time runs were done (HRS)	1300/ 157	1510/1620	1640/1745
Process rate (TON/HR)			
recycle	145.0	143.0	143.0
aggregate	170.0	171.0	172.0
asphalt	12.3	11.6	11.3
total	327.3	325.6	326.3
Volumetric flow			
actual (ACFM)	73155	70767	72540
standard (DSCFM)	41506	39475	40339
Gas temperature (DEG-F)	158	160	159
Moisture content (%V/V)	31.44	32.44	32.70
Gas composition (%V/V,dry)			
carbon dioxide	6.90	6.90	6.90
oxygen	11.80	11.60	11.70
nitrogen	81.30	81.50	81.40
Isokinetic variation (%)	101.4	101.5	100.6
Part. emission rate (LB/HR)	3.63	4.43	4.55
Particulate concentration			
actual (GR/ACF)	.00579	.00729	.00731
standard (GR/DSCF)	.0102	.0131	.0132

Note: Dry Catch Only

* Federal regulations restrict particulate emissions from portable asphalt plants to .04 GR/DSCF, CFR Title 40, Part 60, Subpart I.

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 and opacity 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 Determinations

Test No. 1
Asphalt Plant Stack

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

	Run 1	Run 2
Date of run	05-26-93	05-26-93
Dry basis (orsat)		
carbon dioxide.....	5.80	6.60
oxygen.....	14.00	13.10
carbon monoxide.....	0.00	0.00
nitrogen.....	80.20	80.30
Wet basis (orsat)		
carbon dioxide.....	4.45	4.82
oxygen.....	10.74	9.56
carbon monoxide.....	0.00	0.00
nitrogen.....	61.51	58.60
water vapor.....	23.30	27.02
Dry molecular weight.....	29.49	29.58
Wet molecular weight.....	26.81	26.45
Specific gravity.....	0.926	0.914
Water mass flow.....(LB/HR)	38163	44726
FO	1.190	1.182

Test No. 2
Asphalt Plant Stack

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

	Run 1	Run 2	Run 3
Date of run	05-26-93	05-26-93	05-26-93
Dry basis (orsat)			
carbon dioxide.....	6.90	6.90	6.90
oxygen.....	11.80	11.60	11.70
nitrogen.....	81.30	81.50	81.40
Wet basis (orsat)			
carbon dioxide.....	4.73	4.66	4.64
oxygen.....	8.09	7.84	7.87
nitrogen.....	55.74	55.06	54.78
water vapor.....	31.44	32.44	32.70*
Dry molecular weight.....	29.58	29.57	29.57
Wet molecular weight.....	25.94	25.82	25.79
Specific gravity.....	0.896	0.892	0.891
Water mass flow.....(LB/HR)	53389	53171	56542

* Free or condensed water in the gas stream.

FO	1.319	1.348	1.333

3.2 Results of Particulate Loading Determinations

Test No. 1
Asphalt Plant Stack

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

	Run 1	Run 2
Date of run	05-26-93	05-26-93
Time run start/end.....(HRS)	805/ 911	1003/1112
Static pressure.....(IN.WC)	-2.10	-2.10
Cross sectional area (SQ.FT)	10.94	10.94
Pitot tube coefficient.....	.840	.840
Water in sample gas		
condenser.....(ML)	0.0	0.0
impingers.....(GRAMS)	273.0	329.0
desiccant.....(GRAMS)	16.0	19.0
total.....(GRAMS)	289.0	348.0
Total particulate material..		
.....collected (grams)	0.1025	0.1357
Gas meter coefficient.....	0.9997	0.9997
Barometric pressure..(IN.HG)	29.15	29.15
Avg. orif.pres.drop..(IN.WC)	1.89	1.81
Avg. gas meter temp..(DEF-F)	71.5	78.3
Volume through gas meter....		
at meter conditions...(CF)	46.15	46.20
standard conditions.(DSCF)	44.85	44.32
Total sampling time....(MIN)	62.50	62.50
Nozzle diameter.....(IN)	.180	.180
Avg.stack gas temp ..(DEG-F)	148	153
Volumetric flow rate.....		
actual.....(ACFM)	69413	70709
dry standard.....(DSCFM)	44778	43069
Isokinetic variation.....(%)	99.2	102.0
Particulate concentration...		
actual.....(GR/ACF)	0.02274	0.02877
dry standard.....(GR/DSCF)	0.03527	0.04724
Particle mass rate...(LB/HR)	13.54	17.44

Test No. 2
Asphalt Plant Stack

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

	Run 1	Run 2	Run 3
Date of run	05-26-93	05-26-93	05-26-93
Time run start/end.....(HRS)	1300/ 157	1510/1620	1640/1745
Static pressure.....(IN.WC)	-2.10	-2.10	-2.10
Cross sectional area (SQ.FT)	10.94	10.94	10.94
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	396.0	392.0	409.0
desiccant.....(GRAMS)	17.0	20.0	25.0
total.....(GRAMS)	413.0	412.0	434.0
Total particulate material..			
.....collected(grams)	0.2646	0.3096	0.3122
Gas meter coefficient.....	0.9997	0.9997	0.9997
Barometric pressure..(IN.HG)	29.15	29.15	29.15
Avg. orif.pres.drop..(IN.WC)	1.72	1.56	1.60
Avg. gas meter temp..(DEF-F)	82.1	89.4	90.4
Volume through gas meter....			
at meter conditions...(CF)	44.59	43.07	43.67
standard conditions.(DSCF)	42.46	40.45	40.95
Total sampling time....(MIN)	62.50	62.50	62.50
Nozzle diameter.....(IN)	.180	.180	.180
Avg.stack gas temp ..(DEG-F)	158	160	159
Volumetric flow rate.....			
actual.....(ACFM)	73155	70767	72540
dry standard.....(DSCFM)	41506	39475	40339
Isokinetic variation.....(%)	101.4	101.5	100.6
Particulate concentration...			
actual.....(GR/ACF)	0.05453	0.06585	0.06539
dry standard.....(GR/DSCF)	0.09615	0.11809	0.11764
Particle mass rate...(LB/HR)	34.205	39.956	40.674

3.3 Results of Opacity Observations

Test No. 1
Asphalt Plant Stack

Results of Opacity Observations ---------- EPA Method 9

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	1.00
5	0.0223	94.00
10	0.0458	5.00
15	0.0706	0.00
20	0.0969	0.00
25	0.1249	0.00
30	0.1549	0.00
35	0.1871	0.00
40	0.2219	0.00
45	0.2596	0.00
50	0.3010	0.00
55	0.3468	0.00
60	0.3979	0.00
65	0.4559	0.00
70	0.5229	0.00
75	0.6021	0.00
80	0.6690	0.00
85	0.8239	0.00
90	1.0000	0.00
95	1.3010	0.00
99	2.0000	0.00

Avg Opac 5.20 Avg OD 0.0233 Time average

Observer: Richard J. Eidem
Cert. Date: 03-30-93
Date of Observation: 05-26-93
Time of Observation: 0805-0905

* Processing Virgin.

Test No. 1
Asphalt Plant Stack

Results of Opacity Observations ---------- EPA Method 9

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	73.00
5	0.0223	23.00
10	0.0458	3.00
15	0.0706	1.00
20	0.0969	0.00
25	0.1249	0.00
30	0.1549	0.00
35	0.1871	0.00
40	0.2219	0.00
45	0.2596	0.00
50	0.3010	0.00
55	0.3468	0.00
60	0.3979	0.00
65	0.4559	0.00
70	0.5229	0.00
75	0.6021	0.00
80	0.6690	0.00
85	0.8239	0.00
90	1.0000	0.00
95	1.3010	0.00
99	2.0000	0.00

Avg Opac 1.60 Avg OD 0.0072 Time average

Observer: Kenneth A. Rosenthal
Cert. Date: 04-17-93
Date of Observation: 05-26-93
Time of Observation: 1300-1400

* Processing Recycle.

Test No. 2
Asphalt Plant Stack

Results of Opacity Observations ---------- EPA Method 9

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	47.08
5	0.0223	47.50
10	0.0458	5.00
15	0.0706	0.42
20	0.0969	0.00
25	0.1249	0.00
30	0.1549	0.00
35	0.1871	0.00
40	0.2219	0.00
45	0.2596	0.00
50	0.3010	0.00
55	0.3468	0.00
60	0.3979	0.00
65	0.4559	0.00
70	0.5229	0.00
75	0.6021	0.00
80	0.6690	0:00
85	0.8239	0.00
90	1.0000	0.00
95	1.3010	0.00
99	2.0000	0.00

Avg Opac 2.94 Avg OD 0.0132 Time average

Observer: Kenneth A. Rosenthal
Cert. Date: 04-17-93
Date of Observation: 05-26-93
Time of Observation: 1510-1610

* Processing Recycle.

Test No. 3
Asphalt Plant Stack

Results of Opacity Observations ---------- EPA Method 9

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	35.00
5	0.0223	56.67
10	0.0458	7.08
15	0.0706	1.25
20	0.0969	0.00
25	0.1249	0.00
30	0.1549	0.00
35	0.1871	0.00
40	0.2219	0.00
45	0.2596	0.00
50	0.3010	0.00
55	0.3468	0.00
60	0.3979	0.00
65	0.4559	0.00
70	0.5229	0.00
75	0.6021	0.00
80	0.6690	0.00
85	0.8239	0.00
90	1.0000	0.00
95	1.3010	0.00
99	2.0000	0.00

Avg Opac 3.73 Avg OD 0.0168 Time average

Observer: Kenneth A. Rosenthal
Cert. Date: 04-17-93
Date of Observation: 05-26-93
Time of Observation: 1640-1740

* Processing Recycle.

4 RESULTS OF FUEL AND AGGREGATE ANALYSES

INTERPOLL LABORATORIES, INC.
(612)786-6020

Buffalo Bituminous
Sample Log No. 8921-26

Results of Fuel Oil Analysis

Test: 1
Sample Description: Composite, 5/26/93
Sample Type: No. 6 Fuel Oil

Parameter		Method	As Received
Gross heating value	BTU/LB	ASTM D240	18265
Sulfur	%	ASTM D3177	0.50
Ash	%	ASTM D482	0.02
Density	LB/GAL	ASTM D1298	8.3807

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

JFO/cg

INTERPOLL LABORATORIES, INC.
(612)786-6020

Buffalo Bituminous
Sample Log No. 8921-33

Results of Fuel Oil Analysis

Test: 2
Sample Description: Composite, 5/26/93
Sample Type: No. 6 Fuel Oil

Parameter		Method	As Received
Gross heating value	BTU/LB	ASTM D240	18340
Sulfur	%	ASTM D3177	0.55
Ash	%	ASTM D482	0.02
Density	LB/GAL	ASTM D1298	8.3474

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

JFO/cg

INTERPOLL LABORATORIES, INC.
(612)786-6020

Buffalo Bituminous
Laboratory Log No. 8921

Results of Moisture Analysis[1]

Log No.	Test/Run	Sample Type	% Moisture
8921-24	Test 1 Run 1	Virgin Aggregate	5.06
8921-25	Test 1 Run 2	Virgin Aggregate	4.85

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

JFO/cg

[1]Analysis by ASTM Method D3173

INTERPOLL LABORATORIES, INC.
(612)786-6020

Buffalo Bituminous
Laboratory Log No. 8921

Results of Moisture Analysis[1]

Log No.	Test/Run	Sample Type	% Moisture
8921-27	Test 2 Run 1	Virgin Aggregate	4.60
8921-28	Test 2 Run 2	Virgin Aggregate	5.63
8921-29	Test 2 Run 3	Virgin Aggregate	5.15
8921-30	Test 2 Run 1	Recycle Aggregate	5.50
8921-31	Test 2 Run 2	Recycle Aggregate	3.58
8921-32	Test 2 Run 3	Recycle Aggregate	4.02

Respectfully submitted,

Jeannie F. O'Neil

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

JFO/cg

[1]Analysis by ASTM Method D3173

APPENDIX A

VOLUMETRIC FLOW RATE DETERMINATION

Test No. 1
Asphalt Plant Stack

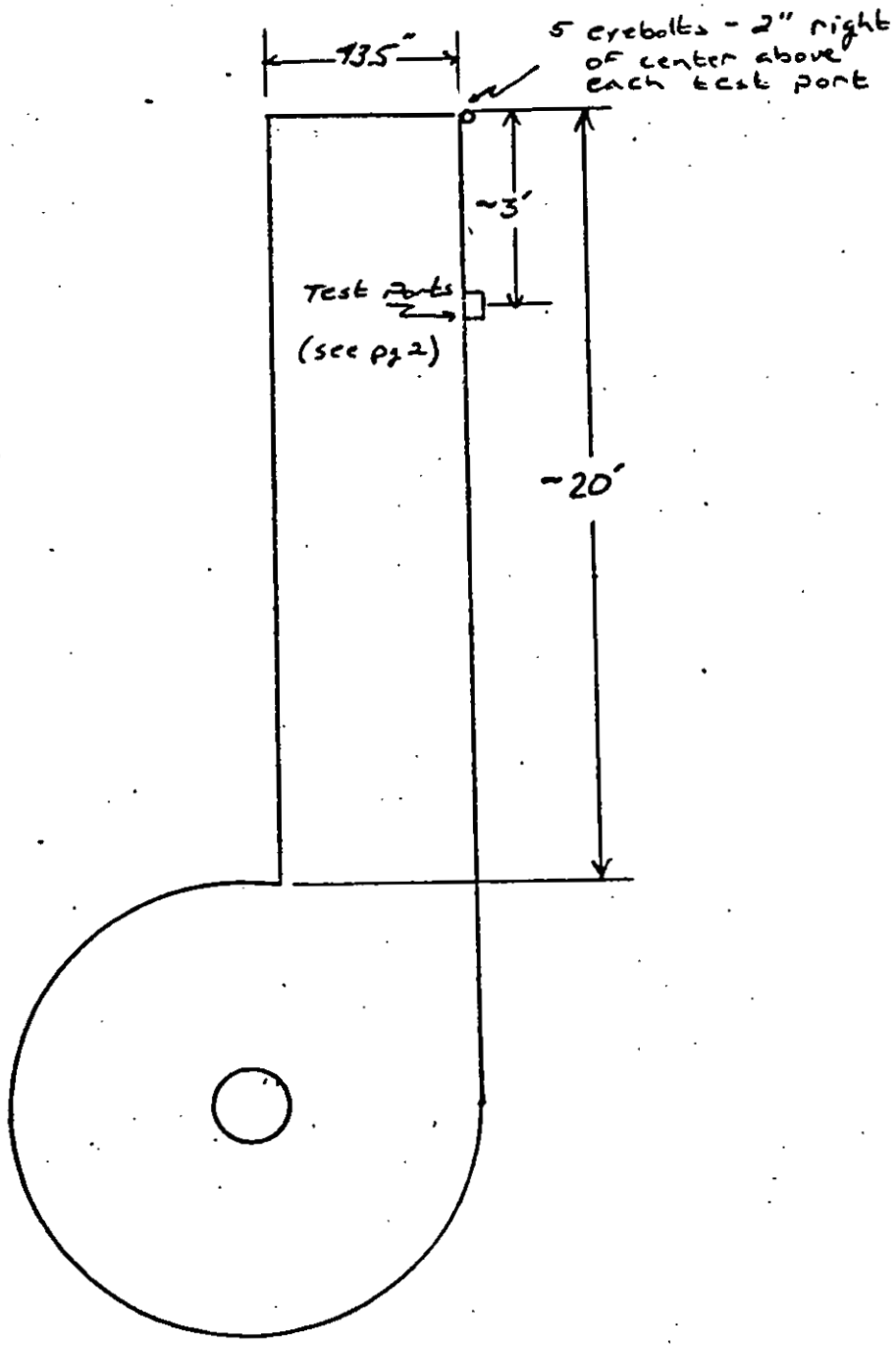
Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination.....	05-26-93
Time of Determination.....(HRS)	740
Barometric pressure.....(IN.HG)	29.15
Pitot tube coefficient.....	.84
Number of sampling ports.....	5
Total number of points.....	25
Shape of duct.....	Rectangular
Duct width.....(IN)	42
Duct length.....(IN)	37.5
Duct area.....(SQ.FT)	10.94
Direction of flow.....	UP
Static pressure.....(IN.WC)	-2.1
Avg. gas temp.....(DEG-F)	145
Moisture content.....(% V/V)	23.30
Avg. linear velocity.....(FT/SEC)	105.3
Gas density.....(LB/ACF)	.05889
Molecular weight.....(LB/LBMOLE)	29.49
Mass flow of gas.....(LB/HR)	244061
Volumetric flow rate.....	
actual.....(ACFM)	69077
dry standard.....(DSCFM)	44808

APPENDIX B

LOCATION OF TEST PORTS

DM 70

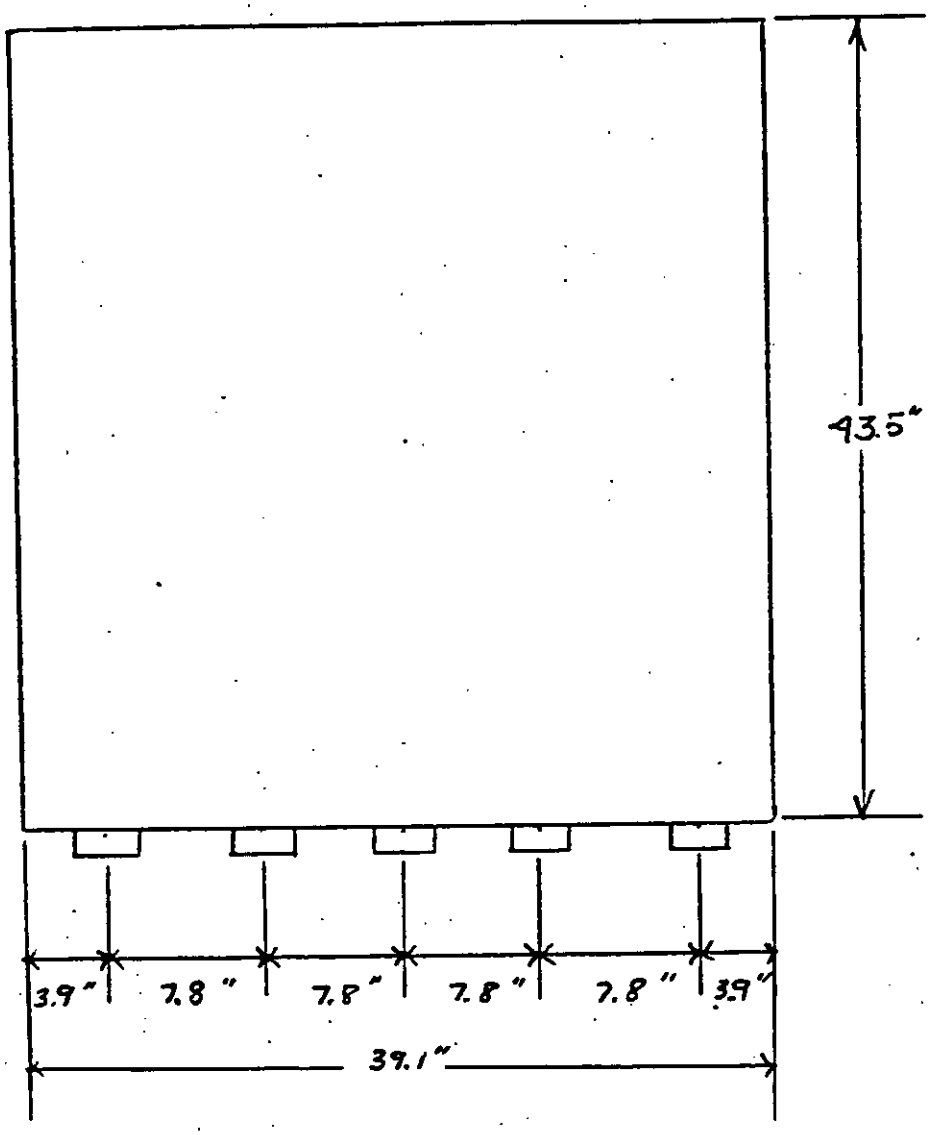


NOT TO SCALE

DJO 4/91

BUFFALO BITUMINOUS

DM 70



5 Test ports - 4" Schedule 40
threaded on exterior end

NOT TO SCALE
4/91 DJD

APPENDIX C

FIELD DATA SHEETS

Job BUFFALO BITUMINOUS

Source ASPHALT PLANT STACK

Test 1 Run 1 Date 5-26-93

Stack dimen. 42 X 37.5 IN.

Dry bulb ____ °F Wet bulb ____ °F

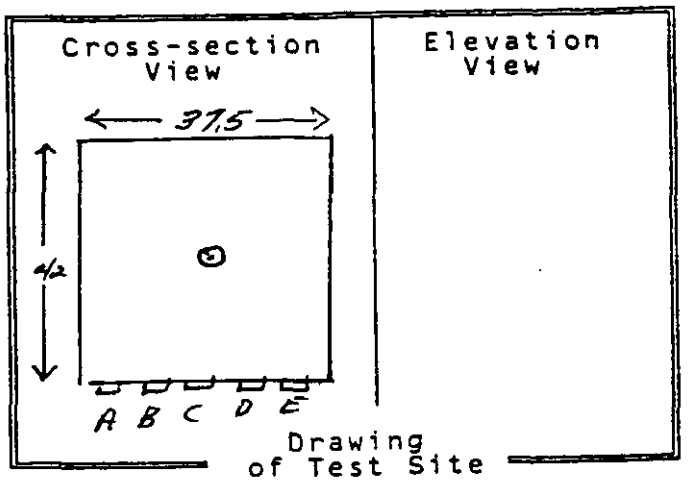
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 29.15 in Hg

Static pressure -2.10 in WC

Operators E. TROWBRIDGE - M. KACHLOK

Pitot No. 29X-4 C_p .840



Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length:	5 in.	Time start:	0740 hrs
A	1		4.20	7.20	.20	
	2		12.60	17.60	3.5	
	3		21.00	26.00	4.3	145
	4		29.40	34.40	4.3	
	5		37.80	42.80	1.00	
B	1				4.20	
	2				4.40	
	3				4.50	145
	4				4.50	
	5				2.50	
C	1				.25	
	2				3.80	
	3				4.30	145
	4				4.40	
	5				4.40	
D	1				.40	
	2				3.50	
	3				3.80	145
	4				4.20	
	5				4.70	
E	1				1.00	
	2				2.50	
	3				1.40	145
	4				1.50	
	5				3.40	
Temp. meas. device & S/N: PDT-12					Time end: 0753 hrs	

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

S-3921

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job BUFFALO BITUMINOUS
Source ASPHALT PLANT STACK
Method 5 Filter holder: 4" GLASS

Date 5-26-93 Test 1 Run 1
No. of traverse points 25
Filter type: 4" GLASS FRPP

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: 0 cfm at 14 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 5303

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		100	
Impinger No. 2	473	100	273
Impinger No. 3		0	
Condenser			
Desiccant	1485	1469	16
Total			289

Integrated Gas Sampling Data:

Bag Pump No. 294 Box No. 30 Bag No. 1

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

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

Time start: 0806 (HRS) Time end: 0910 (HRS)

Sampling rate: 400 cc/min Operator: ET

S/N of O_2 Analyzer used to monitor train outlet: 2

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: BUFFALO TERMINALS
Source: ASPHALT PLANT STACK
Date: 5-26-93 Test: 1 Run: 1
Operators: E. TRAWBRIDGE - M. KAMIN
Meter Box No.: 8 ΔH@: 1.82 IN WC
Barometer coeff.: .9999
Pitot No.: 29V-4 Cp: .840
Bar. Press.: 29.15 inHg H2O x
Nozzle No.: 5-3 Nozzle Dia: .160 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dry Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	0805	922.60											
A 5	2.5	923.75	1.10	.66	3.74	6.5	146	234	245	38	67	63	13.9
4	5	925.90	4.30	2.54	5.97	7.5	147				68	64	13.7
3	7.5	928.20	4.30	2.54	8.21	7.5	148	240	251	42	68	64	13.7
2	10	930.50	3.5	2.08	0.23	6.5	146				68	64	13.8
1	12.5	930.80	.20	.12	0.72	1	143	242	253	39	68	60	13.8
C 5	15	932.97	4.40	2.60	2.98	7.9	147				71	65	13.9
4	17.5	935.35	4.40	2.74	5.30	8.1	146	245	250	40	73	66	13.9
3	20	937.00	4.30	2.68	7.60	8.1	147				74	66	13.8
2	22.5	939.70	3.70	2.31	9.74	8.0	147	244	252	40	74	66	13.9
1	25	940.37	.30	.18	0.35	1	146				73	66	13.9
E 5	27.5	942.40	3.50	2.18	2.43	7.5	147	248	251	42	76	67	13.9
4	30	943.81	1.50	.94	3.60	4.0	148				76	67	13.6
3	32.5	945.14	1.40	.87	5.12	3.4	149	245	253	42	77	68	13.8
2	35	946.88	2.50	1.56	6.88	5.1	149				78	70	13.8
1	37.5	948.01	.98	.61	8.00	2.0	148	242	250	42	78	70	13.7
B 5	40	949.78	2.50	1.57	9.77	5.1	148				79	70	13.7
4	42.5	952.10	4.50	2.81	2.14	9.0	150	240	255	44	80	71	13.5
3	45	954.45	4.50	2.82	4.51	10.1	150				80	71	13.4
2	47.5	956.80	4.50	2.82	6.88	11.0	150	243	252	44	80	71	13.4
1	50	959.20	4.20	2.64	9.18	11.0	149				79	71	13.1
D 5	52.5	961.45	4.10	2.57	1.44	10.0	150	245	250	45	79	70	13.3
4	55	963.71	4.20	2.61	3.75	10.1	154				78	71	13.6
3	57.5	965.90	3.80	2.37	5.90	10.0	152	242	249	44	78	71	13.6
2	60	968.01	3.50	2.19	8.00	9.0	150				78	72	13.5
1	62.5	968.75	.40	.25	8.71	1	152	240	248	44	78	72	13.5
	θ = 62.5	Vm = 46.15		ΔH = 1.89							Avg. = 71.5		

(0911)

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job BUFFALO BITUMINOUS
Source ASPHALT PLANT STACK
Method 5 Filter holder: 4" GLASS

Date 5-26-93 Test 1 Run 2
No. of traverse points 25
Filter type: 4" GLASS FIBER

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: 0 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 5314

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1		100	
Impinger No. 2	529	100	329
Impinger No. 3		0	
Condenser			
Desiccant	1418	1399	19
Total			348

Integrated Gas Sampling Data:

Bag Pump No. 29A Box No. 30 Bag No. 2

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

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

Time start: 1002 (HRS) Time end: 1111 (HRS)

Sampling rate: 400 cc/min Operator: ET

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

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: Coffeyville Bitumuligen
Source: Asphalt Plant Stack
Date: 5-26-93 Test 1 Run 2

Operators: ET - MK
Water Box No.: 8 ΔH@ 1.82 IN WC
Gasmeter coeff.: .9997

Pitot No.: AV-4 Cp .840
Bar. Press.: 29.15 inHg H2O x
Nozzle No.: E-3 Nozzle Dia .180 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Water (inWC)	Dec. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (xx/v)
	1003	969.20											
D 5	2.5	971.48	4.20	2.54	1.46	9.0	152	258	242	38	71	70	13.3
4	5	973.75	4.70	2.77	3.80	10.5	156				73	70	13.1
3	7.5	975.90	3.90	2.32	5.95	10.0	153	240	255	37	75	71	13.1
2	10	977.98	3.50	2.10	7.99	8.8	149				77	71	12.9
1	12.5	978.85	.45	.27	8.73		150	246	251	39	77	71	13.0
B 5	15	980.25	1.60	.96	0.12	3.5	153				78	73	12.8
4	17.5	982.50	4.70	2.81	2.49	11.0	154	243	257	43	84	76	13.0
3	20	984.75	4.60	2.77	4.85	11.5	154				82	74	13.1
2	22.5	987.01	4.20	2.54	7.11	11.0	150	245	256	46	81	74	13.1
1	25	988.48	1.60	.97	8.51	4.0	148				81	74	12.8
E 5	27.5	990.40	3.20	1.93	0.48	7.1	150	242	255	48	80	74	12.6
4	30	992.60	4.10	2.45	2.70	10.0	156				83	75	13.1
3	32.5	994.76	3.80	2.29	4.85	10.0	154	243	256	48	83	75	13.0
2	35	996.85	3.40	2.05	6.88	9.5	152				84	76	13.0
1	37.5	998.30	1.30	.79	8.15	4.0	155	243	258	50	84	76	12.8
A 5	40	999.95	2.50	1.51	9.90	4.0	154				84	76	12.8
4	42.5	1001.32	1.50	.90	1.25	4.0	155	245	255	48	85	78	12.7
3	45	1002.59	1.00	.60	2.56	2.5	155				84	77	12.6
2	47.5	1003.50	1.20	.72	3.57	3.7	155	243	251	49	84	78	12.4
1	50	1004.74	1.30	.79	4.84	5.7	153				84	78	12.5
C 5	52.5	1006.80	3.50	2.12	6.91	8.9	153	247	254	47	84	78	12.5
4	55	1009.20	4.50	2.72	9.25	12.0	154				86	78	12.5
3	57.5	1011.40	4.20	2.53	1.52	12.0	156	245	252	47	86	78	12.4
2	60	1013.41	3.80	2.30	3.68	12.0	154				86	78	12.6
1	62.5	1015.40	2.40	1.45	5.40	9.0	154	245	250	46	85	79	12.4
	θ = 62.5	Vm = 46.2		ΔH = 1.81							Avg. =	78.3	

(1112)

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job Buffalo Bituminous
Source Asphalt Plant Stack
Test 2 Run 1 Date 5-26-93
Stack dimen. 42 x 37½ IN.
Dry bulb ____ °F Wet bulb ____ °F
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.
Barometric pressure 29.15 in Hg
Static pressure ____ in WC
Operators E. Throwbridge - M. Koehler
Pitot No. 29V-4 C_p .840

Cross-section View	Elevation View

Drawing of Test Site

Traverse Point No.		Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
			Port length:	5 in.	Time start:	hrs
A	1		4.20	9.20		
	2		12.60	17.60		
	3		21.00	26.00		
	4		29.40	34.40		
	5		37.80	42.80		

Temp. meas. device & S/N: | Time end: hrs

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

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job BUFFALO BITUMINOUS
Source ASPHALT PLANT STACK
Method 5 Filter holder: 4" GLASS

Date 5-26-93 Test 2 Run 1
No. of traverse points 25
Filter type: 4" GLASS FIBER

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: -.000 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 5276

Recovery solvent(s)
☒ acetone PROBE + NOZZLE
☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: D. BRENNAN

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	658	497 (100)	161.0
Impinger No. 2	530	295 (100)	235.0
Impinger No. 3		(0)	
Condenser			
Desiccant	1502	1485	17.0
Total			413

Integrated Gas Sampling Data:

Bag Pump No. 29A Box No. 10 Bag No. 1

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

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

Time start: 1300 (HRS) Time end: 1442 (HRS)

Sampling rate: 400 cc/min Operator: ET

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

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: BUFFALO BITUMINOUS
Source: ASPHALT PLANT STACK
Date: 5-20-93 Test: 2 Run: 1

Operators: ET-MK
Meter Box No.: 8 ΔH@: 1.82 IN WC
Gasmeter coeff.: .9997

Pitot No.: 241-4 Cp: .840
Bar. Press.: 29.15 inHg H2O 29 x
Nozzle No.: 8-3 Nozzle Dia: .180 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 (%v/v)
	1300	15.70											
C 5	2.5	17.49	4.50	2.49	7.44	8.5	153	247	252	40	76	75	12.2
4	5	20.15	4.60	2.50	0.18	9.0	157				76	75	12.2
3	7.5	22.42	4.50	2.44	2.39	10.0	157	250	255	42	78	75	11.8
2	10	24.50	4.40	2.22	4.50	9.5	159				80	76	12.0
1	12.5	26.55	4.00	2.03	6.52	9.0	157	247	253	43	81	77	12.2
A 5	15	28.15	2.2	1.17	8.06	4.5	157				81	77	12.3
4	17.5	29.19	1.00	.53	9.10	2	158	245	254	44	82	77	12.2
3	20	31.25	4.00	2.13	1.18	8.0	157				85	79	12.3
2	22.5	33.00	3.50	1.88	3.13	7.9	157	247	251	45	85	80	12.0
1	25	33.65	.20	.10	3.60	1	158				85	80	12.0
D 5	27.5	35.70	3.80	2.04	5.63	7.5	158	249	256	44	87	80	12.0
4	30	37.80	4.40	2.35	7.82	8.0	162				88	80	12.1
3	32.5	39.87	4.00	2.14	9.90	9.0	161	251	257	44	88	81	12.2
2	35	41.86	3.60	1.94	1.89	8.8	156				88	81	12.0
1	37.5	42.49	1.05	.56	2.97	2.9	158	248	253	45	88	81	11.8
B 5	40	44.80	3.00	1.61	4.79	6.0	159				88	82	11.9
4	42.5	47.02	4.70	2.52	7.05	11.0	160	245	250	45	90	82	11.8
3	45	49.28	4.70	2.53	9.52	11.0	159				90	83	11.8
2	47.5	51.50	4.50	2.32	1.50	11.0	160	248	249	46	90	83	11.7
1	50	53.00	2.00	1.08	2.44	5.0	156				90	83	11.8
FLT. DOWN 1400 1430 CM E 5	52.5	54.10	1.00	.54	4.04	3.0	160	246	251	44	81	79	12.2
4	55	56.12	3.8	2.03	6.07	8.0	159				84	81	11.8
3	57.5	58.05	3.5	1.87	8.02	8.0	159	248	250	44	84	81	11.8
2	60	59.78	3.0	1.61	9.83	8.0	159				86	82	11.8
1	62.5	60.288	.19	.10	6.28	1.0	157	251	246	45	86	81	11.8
	θ = 62.5	Vm = 41.588		ΔH 1.71A							Avg. =	82.1	

S-0037R

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job: BUFFALO BITUMINOUS
Date: 5/26/93 Test: 2 Run: 2
Source: ASPHALT PLANT STACK
No. of traverse points: 25
Method: 5 Filter holder: GLASS
Filter type: 4" G.F.

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac)
Postest: .000 cfm at 14 in. Hg. (vac)

Particulate Catch Data:

No.s of filters used: 1, 5315

Recovery solvent(s): ☒ acetone PROBE + NOZZLE ☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: D. BRENNAN

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	618	498	120
Impinger No. 2	568	296	272
Impinger No. 3			
Condenser			
Desiccant	1438	1418	20.0
Total			412

Integrated Gas Sampling Data:

Bag Pump No. 29A Box No. 10 Bag No. 2

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

Pretest leak check: .00 cc/min at 21 in. Hg.

Time start: 1510 (HRS) Time end: 1620 (HRS)

Sampling rate: 400 cc/min Operator: D. BRENNAN

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

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: BUFFALO BITUMINOUS
Source: ASPHALT STACK
Date: 3/26/93 Test: 2 Run: 2

Operators: BRENNAN + KIESSER
Meter Box No.: 8 ΔH: 1.82 IN WC
Gasmeter coeff.: .9999

Pitot No.: 29-4(Gross) Cp: .84
Bar. Press.: 29.15 inHg H2O: 31 %
Nozzle No.: 83 Nozzle Dia: .180 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 (%v/v)
	1510	60.50											
E- 5	2.5	61.92	1.90	.99	1.92	3.5	158	239	244	56	88	83	11.9
4	5.0	64.03	4.10	2.16	4.02	8.0	158				90	83	11.9
3	7.5	65.98	3.75	1.97	6.03	8.0	159	240	246	51	90	84	11.7
2	10.0	67.96	3.70	1.95	8.02	8.0	159				92	84	11.8
1	12.5	68.927	.78	.41	8.95	2.0	157	243	249	50	90	84	11.9
B- 5	15.0	70.50	2.40	1.27	6.56	4.5	159				92	84	11.7
4	17.5	72.77	4.75	2.51	2.83	10.0	159	240	253	46	93	85	11.6
3	20.0	75.01	4.60	2.43	5.06	10.0	159				93	85	11.7
2	22.5	77.17	4.30	2.27	7.22	9.5	160	242	251	46	93	86	11.6
1	25.0	78.923	2.50	1.32	8.87	6.5	160				93	86	11.6
D- 5	27.5	80.19	1.40	.74	0.11	3.5	158	248	255	46	91	86	11.7
4	30.0	82.32	4.50	2.37	2.31	10.0	160				94	86	11.6
3	32.5	84.38	4.00	2.11	4.40	9.0	162	250	259	46	94	86	11.7
2	35.0	86.37	3.80	2.01	6.43	8.5	160				94	87	11.5
1	37.5	87.646	1.30	.69	7.62	3.5	162	244	263	47	93	87	11.5
A- 5	40.0	88.90	1.35	.71	8.84	3.5	159				93	87	11.5
4	42.5	90.77	3.40	1.80	0.77	7.0	160	242	266	47	95	87	11.4
3	45.0	92.04	1.40	.74	2.00	3.5	162				95	87	11.6
2	47.5	93.09	1.10	.58	3.10	2.5	160	240	265	48	94	87	11.5
1	50.0	93.539	.16	.08	3.52	1.0	160				92	87	11.6
C- 5	52.5	95.62	4.30	2.27	5.68	9.5	160	243	269	48	94	88	11.5
4	55.0	97.85	4.60	2.43	7.92	10.0	161				96	88	11.4
3	57.5	100.04	4.50	2.38	0.14	10.0	161	245	262	49	95	88	11.4
2	60.0	102.16	3.95	2.09	2.22	9.0	161				95	88	11.3
1	62.5	103.566	1.50	.80	3.50	4.0	159	240	260	51	94	88	11.5
	θ = 62.5	Vm = 43.066		ΔH 1.56							Avg. =	89.4	

S-0037R

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job: BUFFALO BITUMINOUS
Source: ASPHALT PLANT STACK
Method: 5S Filter holder: GLASS

Date: 5/26/93 Test: 2 Run: 3
No. of traverse points: 25
Filter type: 4" G.F.

Sample Train Leak Check:

Pretest: < 0.02 cfm at 15 in. Hg. (vac)
Postest: .005 cfm at 15 in. Hg. (vac)

Particulate Catch Data:

No.s of filters used: 1, 5317

Recovery solvent(s): ☒ acetone PROBE + NOZZLE ☐ other(s)

No. of probe wash bottles: 1
Sample recovered by: D. BRENNAN

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	631	498	133
Impinger No. 2	575	299	276
Impinger No. 3			
Condenser			
Desiccant	1465	1440	25.0
Total			434

Integrated Gas Sampling Data:

Bag Pump No. 29A Box No. 10 Bag No. 3

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

Pretest leak check: .00 cc/min at 18 in. Hg.

Time start: 1646 (HRS) Time end: 1745 (HRS)

Sampling rate: 400 cc/min Operator: D. BRENNAN

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

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: BUFFALO BITUMINOUS
Source: ASPHALT PLANT STACK
Date: 5/22/93 Test: 2 Run: 3

Operators: BRENNAN + KOENIGA
Meter Box No.: 0.8 ΔH@ 1.82 IN WC
Gasmeter coeff.: .9997

Pitot No.: 29-4' (Glass) Cp: .84
Bar. Press.: 29.15 inHg H2O: 32 %
Nozzle No.: 8.3 Nozzle Dia: .150 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 (%v/v)
	(1640)	103.900											
C- 5	2.5	106.07	4.50	2.32	6.08	8.5	159	239	248	57	88	86	11.8
4	5.0	108.25	4.65	2.38	8.29	9.0	161				89	85	11.7
3	7.5	110.40	4.50	2.31	0.46	9.0	160	243	252	54	91	86	11.7
2	10.0	112.49	4.00	2.07	2.52	8.0	158				93	86	11.7
1	12.5	113.696	1.40	.72	3.74	3.0	158	242	250	54	93	87	11.8
A- 5	15.0	115.38	2.70	1.40	5.44	5.0	158				93	86	11.7
4	17.5	117.26	3.30	1.70	7.31	6.5	160	245	254	51	94	87	11.6
3	20.0	118.49	1.20	.62	8.45	3.0	161				95	88	11.7
2	22.5	119.57	1.05	.54	9.51	2.0	158	241	256	50	94	88	11.8
1	25.0	119.957	.15	.07	9.91	1.0	158				92	87	11.7
D- 5	27.5	121.84	3.40	1.76	1.81	6.5	159	239	255	50	95	88	11.6
4	30.0	124.02	4.40	2.29	3.99	9.0	155				96	88	11.5
3	32.5	126.10	3.95	2.05	6.04	8.5	160	240	257	49	95	88	11.6
2	35.0	128.09	3.75	1.94	8.05	8.5	160				95	88	11.6
1	37.5	129.203	1.20	.62	9.18	3.0	159	240	261	49	95	88	11.6
B- 5	40.0	130.65	2.00	1.04	0.65	4.5	158				93	87	11.7
4	42.5	132.87	4.80	2.48	2.91	10.0	158	243	263	49	96	88	11.7
3	45.0	135.05	4.65	2.41	5.14	10.0	160				95	88	11.5
2	47.5	137.27	4.40	2.28	7.30	10.0	160	245	260	51	95	88	11.5
1	50.0	138.877	2.40	1.24	8.91	5.0	159				94	88	11.6
E- 5	52.5	140.49	2.35	1.22	0.50	5.0	159	243	257	52	93	88	11.5
4	55.0	142.70	4.40	2.27	2.66	10.0	161				94	88	11.5
3	57.5	144.72	4.00	2.06	4.72	9.5	163	240	255	52	94	88	11.6
2	60.0	146.62	3.50	1.81	6.65	8.5	160				94	88	11.6
1	62.5	147.572	.75	.39	7.55	1.5	159	239	255	53	92	87	11.6
	θ = 62.5	Vm = 43.672		ΔH 1.60							Avg. =	90.4	

(1710)

S-0037R

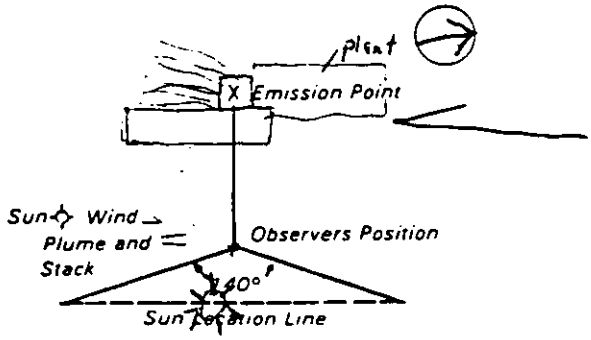
Interpoll Laboratories
(612)786-6020

Visible Emissions Form

TEST #1

SOURCE NAME	Buffalo Bituminous
ADDRESS	
CITY	Hanover
STATE	MN
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	Asphalt Plant #6 Fuel
OPERATING MODE	100%
CONTROL EQUIPMENT	Collector
OPERATING MODE	100%
DESCRIBE EMISSION POINT START	Square metal stack STOP ✓
HEIGHT ABOVE GROUND LEVEL START	20' STOP ✓
HEIGHT RELATIVE TO OBSERVER START	20' STOP ✓
DISTANCE FROM OBSERVER START	60' STOP ✓
DIRECTION FROM OBSERVER START	W STOP ✓
DESCRIBE EMISSIONS START	lofting, looping STOP ✓
EMISSION COLOR START	white STOP ✓
PLUME TYPE. CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☐ YES ☑	
IF WATER DROPLET PLUME: ATTACHED ☑ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START	after steam dissipated STOP ✓
DESCRIBE BACKGROUND START	sky STOP ✓
BACKGROUND COLOR START	blue STOP ✓
SKY CONDITIONS START	clear STOP ✓
WIND SPEED START	5-10 STOP ✓
WIND DIRECTION START	NE STOP ✓
AMBIENT TEMP. START	55° STOP 56°
WET BULB TEMP.	48°
RH.percent	55%

Source Layout Sketch — Draw North Arrow



OBSERVATION DATE	START TIME	STOP TIME
5-26-93	0805	0905

MIN	0	15	30	45	MIN	0	15	30	45
1	5	10	5	5	31	5	5	5	5
2	5	10	10	5	32	5	5	5	5
3	5	5	5	5	33	5	5	5	5
4	5	5	5	5	34	5	5	5	10
5	5	5	5	5	35	5	5	5	5
6	5	5	5	10	36	5	5	5	5
7	5	5	5	5	37	5	5	5	5
8	5	5	5	5	38	5	5	5	5
9	5	5	5	5	39	5	5	5	5
10	5	5	5	5	40	5	5	5	5
11	5	10	5	5	41	5	5	5	5
12	5	5	5	5	42	5	10	5	5
13	5	5	5	5	43	5	5	5	5
14	5	5	5	5	44	5	5	5	5
15	5	5	10	5	45	5	5	5	5
16	5	5	5	5	46	10	5	5	10
17	5	5	5	5	47	5	5	5	5
18	5	5	5	5	48	5	5	5	5
19	5	5	5	5	49	5	5	5	5
20	5	5	5	5	50	5	5	5	5
21	10	5	5	5	51	5	5	5	5
22	5	5	5	5	52	5	5	5	5
23	5	5	5	5	53	5	10	5	5
24	5	5	5	5	54	5	5	5	5
25	5	5	5	5	55	5	5	5	5
26	5	5	5	5	56	5	5	5	5
27	10	5	5	5	57	5	5	5	5
28	5	5	5	5	58	5	5	5	5
29	5	5	5	5	59	5	5	5	5
30	5	5	5	5	60	5	5	5	0

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT)	RICHARD J. EIDEM
OBSERVER'S SIGNATURE	Richard J. Eidem
DATE	5-26-93
ORGANIZATION	Interpoll Inc.
CERTIFIED BY	ETA INC.
DATE	3-30-93
VERIFIED BY	
DATE	

COMMENTS

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S-0079R

Interpoll Laboratories
(612)786-6020

Visible Emissions Form

TEST #1

SOURCE NAME: BUFFALO BITUMINOUS	OBSERVATION DATE: 5-26-93
ADDRESS	START TIME: 1300
	STOP TIME: 1440
CITY: HANCOCK	STATE: MN
ZIP	
PHONE	SOURCE ID NUMBER
PROCESS EQUIPMENT: ASPHALT PLANT	OPERATING MODE: 100%
CONTROL EQUIPMENT: WET SCRUBBER	OPERATING MODE: 100%
DESCRIBE EMISSION POINT: START STACK STOP ✓	
HEIGHT ABOVE GROUND LEVEL: START 20' STOP ✓	HEIGHT RELATIVE TO OBSERVER: START 20' STOP ✓
DISTANCE FROM OBSERVER: START 100' STOP ✓	DIRECTION FROM OBSERVER: START SOUTH STOP ✓
DESCRIBE EMISSIONS: START BROWN LOOPING STOP ✓	
EMISSION COLOR: START BROWN STOP ✓	PLUME TYPE: CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☐ YES ☑	IF WATER DROPLET PLUME: ATTACHED ☑ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START AFTER STEAM PLUME STOP ✓	
DESCRIBE BACKGROUND: START BLUE SKY STOP ✓	
BACKGROUND COLOR: START BLUE STOP ✓	SKY CONDITIONS: START SCATTERED STOP ✓
WIND SPEED: START CALM STOP ✓	WIND DIRECTION: START EAST STOP ✓
AMBIENT TEMP.: START 76° STOP ✓	WET BULB TEMP.: F; RH percent

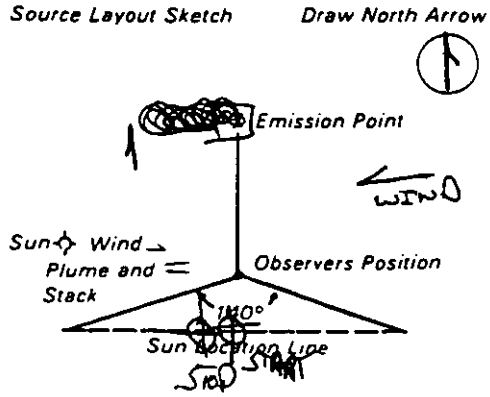
SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	5	31	5	0	0	0
2	5	0	0	0	32	0	0	0	5
3	0	0	0	0	33	5	0	0	0
4	0	0	0	0	34	5	5	5	0
5	0	0	0	0	35	0	5	15	15
6	0	0	0	0	36	10	10	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	5	5
9	0	0	0	0	39	5	0	0	5
10	0	0	0	0	40	5	0	5	5
11	0	0	0	0	41	0	0	0	0
12	5	5	5	5	42	0	0	0	0
13	15	10	10	0	43	0	0	0	0
14	0	0	5	5	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	5	46	5	0	0	0
17	5	0	0	5	47	5	5	5	0
18	5	5	5	5	48	0	0	0	5
19	5	5	5	10	49	5	0	0	0
20	5	10	10	0	50	5	5	0	0
21	0	0	0	5	51	0	0	0	0
22	0	0	0	0	52	5	0	0	0
23	0	0	0	0	53	0	0	5	5
24	0	0	0	0	54	5	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	5	5	0	57	5	0	0	0
28	5	0	0	5	58	0	5	0	0
29	5	0	0	0	59	0	0	0	0
30	0	0	5	0	60	0	5	0	0

1410

3.75

1330

Source Layout Sketch — Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD: 3.3	NUMBER OF READINGS ABOVE 20 % WERE 0
RANGE OF OPACITY READINGS: 0 MINIMUM	15 MAXIMUM
OBSERVER'S NAME (PRINT): ROSENTHAL KENNETH A	
OBSERVER'S SIGNATURE: Kenneth A Rosenthal	DATE: 5-26-93
ORGANIZATION: INTERPOLL LABS	
CERTIFIED BY: EIA	DATE: APR-17-93
VERIFIED BY	DATE

COMMENTS: 1330 - 1440 PLANT DOWN

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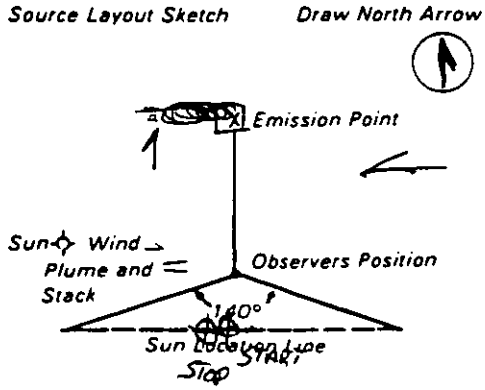
Interpoll Laboratories
(612)786-6020

Visible Emissions Form

TEST #2

SOURCE NAME	Buffalo Bituminous
ADDRESS	
CITY	HANOVER
STATE	MN
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	ASPHALT PLANT
OPERATING MODE	100%
CONTROL EQUIPMENT	WET SCRUBBER
OPERATING MODE	100%
DESCRIBE EMISSION POINT START	STACK
STOP	✓
HEIGHT ABOVE GROUND LEVEL START	20'
STOP	✓
HEIGHT RELATIVE TO OBSERVER START	20'
STOP	✓
DISTANCE FROM OBSERVER START	100'
STOP	✓
DIRECTION FROM OBSERVER START	SOUTH
STOP	✓
DESCRIBE EMISSIONS START	LOOPING
STOP	✓
EMISSION COLOR START	BROWN
STOP	✓
PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☐ YES ☑	
IF WATER DROPLET PLUME: ATTACHED ☑ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START	AFTER STEAM PLUME
STOP	✓
DESCRIBE BACKGROUND START	HAZY BLUE SKY
STOP	✓
BACKGROUND COLOR START	WHITE/BLUE
STOP	✓
SKY CONDITIONS START	HAZY
STOP	✓
WIND SPEED START	CALM
STOP	✓
WIND DIRECTION START	EAST
STOP	✓
AMBIENT TEMP. START	74°
STOP	✓
WET BULB TEMP.	
RH, percent	

Source Layout Sketch — Draw North Arrow



OBSERVATION DATE	START TIME	STOP TIME
5-26-93	1510	1610

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	5	0	31	5	0	0	0
2	5	5	0	0	32	0	0	0	0
3	0	0	0	0	33	0	5	0	0
4	5	5	0	0	34	0	0	0	0
5.	10	10	10	10	35	0	5	5	0
6.	15	10	5	5	36	0	5	5	5
7.	5	5	5	5	37	5	5	10	5
8.	10	10	5	5	38	5	5	5	0
9	5	5	5	0	39	0	0	5	5
10	0	0	5	5	40	5	5	0	0
11	5	5	0	0	41	0	0	0	5
12	0	5	5	5	42	5	5	0	5
13	5	0	0	0	43	5	0	0	0
14	0	0	0	5	44	0	0	0	5
15	0	5	5	10	45	5	5	0	0
16	10	5	5	5	46	0	0	0	0
17	0	0	0	0	47	5	5	0	0
18	0	0	0	0	48	0	0	0	5
19	5	5	0	5	49	5	0	5	5
20	5	0	0	0	50	10	10	5	5
21	0	5	5	5	51	0	0	5	5
22	0	0	0	0	52	5	5	5	5
23	0	0	5	5	53	0	0	5	5
24	0	5	5	5	54	0	0	0	5
25	5	0	5	0	55	5	0	5	5
26	5	5	5	5	56	0	5	0	0
27	5	0	0	0	57	0	5	5	5
28	5	0	0	5	58	5	0	0	5
29	5	5	5	0	59	0	5	5	5
30	0	0	5	5	60	5	5	5	5

AVERAGE OPACITY FOR HIGHEST PERIOD	63% ✓
NUMBER OF READINGS ABOVE 20 % WERE	0
RANGE OF OPACITY READINGS MINIMUM	0
MAXIMUM	15
OBSERVER'S NAME (PRINT)	ROSENTHAL KENNETH A
OBSERVER'S SIGNATURE	Kenneth A Rosenthal
DATE	5-26-93
ORGANIZATION	INTERPOLL LABS
CERTIFIED BY	EPA
DATE	APR 17 93
VERIFIED BY	
DATE	
COMMENTS	
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TITLE	
DATE	

S-0079R

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(612)786-6020

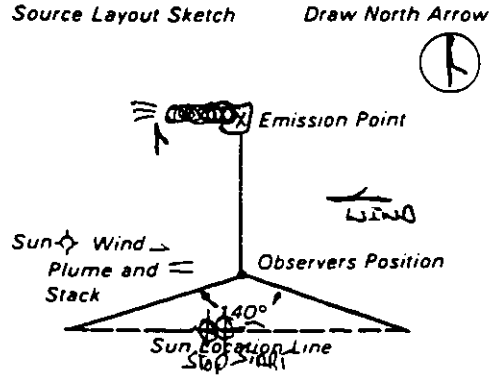
Visible Emissions Form

TEST #3

SOURCE NAME: BUFFALO BITUMINOUS	OBSERVATION DATE: 5-26-93	START TIME: 1640	STOP TIME: 1740
ADDRESS			
CITY: HANOVER	STATE: MN	ZIP	
PHONE	SOURCE ID NUMBER		
PROCESS EQUIPMENT: ASPHALT PLANT	OPERATING MODE: 100%		
CONTROL EQUIPMENT: WET SCRUBBER	OPERATING MODE: 100%		
DESCRIBE EMISSION POINT START STACK	STOP ✓		
HEIGHT ABOVE GROUND LEVEL START 20'	STOP ✓	HEIGHT RELATIVE TO OBSERVER START 20'	STOP ✓
DISTANCE FROM OBSERVER START 100'	STOP ✓	DIRECTION FROM OBSERVER START SOUTH	STOP ✓
DESCRIBE EMISSIONS START LOOPING	STOP ✓		
EMISSION COLOR START BROWN	STOP ✓	PLUME TYPE: CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐	
WATER DROPLETS PRESENT: NO ☐ YES ☑		IF WATER DROPLET PLUME: ATTACHED ☑ DETACHED ☐	
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START AFTER STEAM PLUME	STOP ✓		
DESCRIBE BACKGROUND START BLUE SKY WHITE CLOUDS	STOP ✓		
BACKGROUND COLOR START BLUE	STOP ✓	SKY CONDITIONS START CLOUDY	STOP ✓
WIND SPEED START CALM	STOP ✓	WIND DIRECTION START EAST	STOP ✓
AMBIENT TEMP. START 73°	STOP ✓	WET BULB TEMP.	RH percent

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	5	5	5	5	31	0	0	5	5
2	0	5	5	5	32	10	10	10	10
3	5	5	0	0	33	10	15	5	5
4	5	0	5	5	34	5	5	5	5
5	5	5	5	0	35	5	10	5	5
6	0	0	0	5	36	5	10	15	15
7	5	5	0	5	37	5	5	5	5
8	5	5	0	0	38	5	0	0	0
9	0	0	5	5	39	0	5	5	5
10	0	5	0	0	40	5	5	5	5
11	5	10	5	0	41	5	0	0	0
12	0	0	0	5	42	0	5	0	5
13	5	5	5	0	43	0	0	5	5
14	0	0	0	0	44	5	5	0	0
15	0	5	5	5	45	5	5	5	5
16	5	5	5	0	46	5	5	5	10
17	0	0	0	5	47	5	10	10	5
18	5	5	5	5	48	0	0	5	5
19	0	0	0	5	49	0	5	5	0
20	5	5	10	5	50	0	5	5	10
21	10	5	5	5	51	5	5	5	5
22	5	5	5	5	52	0	0	5	5
23	0	5	5	5	53	5	5	10	5
24	5	5	5	5	54	0	0	5	10
25	0	0	0	5	55	5	5	0	0
26	0	0	0	5	56	0	0	0	5
27	5	5	5	0	57	5	5	0	0
28	0	0	5	5	58	5	5	0	0
29	5	5	5	0	59	0	5	0	0
30	0	0	0	0	60	5	5	5	10

Source Layout Sketch — Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD 7.1%	NUMBER OF READINGS ABOVE 20 % WERE 0
RANGE OF OPACITY READINGS 0 MINIMUM	15 MAXIMUM
OBSERVER'S NAME (PRINT) ROSENTHAL KENNETH A	
OBSERVER'S SIGNATURE Kenneth A Rosenthal	DATE 5-26-93
ORGANIZATION INTERPOLL LABS	
CERTIFIED BY ETA	DATE APR-17-93
VERIFIED BY	DATE

COMMENTS

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TITLE | DATE

S-0079R

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Richard Eidem

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

Thomas Rose
President

238303
Certificate Number

Vice President

Minneapolis
Location

David B. Savage, Jr.
Program Manager

March 31, 1993
Date of Issue

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Kenneth Rosenthal

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

Thomas Rose
President

238305
Certificate Number

Vice President

Minneapolis
Location

David B. Savage, Jr.
Program Manager

April 1, 1993
Date of Issue

APPENDIX D

INTERPOLL LABORATORIES ANALYTICAL DATA

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job Buffalo Bituminous
Team Leader CT
Date Submitted 5-27-93
Test No. 1
Date of Analysis 5-27-93

Source Asphalt Plant
Test Site stack
Date of Test 5-26-93
No. of Runs Completed 2
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	8921-07	1	0.00	5.80	19.80	5.80	14.00	1.19
		2	0.00	5.80	19.80	5.80	14.00	1.19
	☑ B ☐ F	Avg				5.80	14.00	
1/2	-11	1	0.00	6.60	19.70	6.60	13.10	1.18
		2	0.00	6.60	19.70	6.60	13.10	1.18
	☑ B ☐ F	Avg				6.60	13.10	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

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

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

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

EPA Method 3 Guidelines

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

LSC-04-BR

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job Buffalo Bituminous
Team Leader ET
Date Submitted 5-27-93
Test No. 2
Date of Analysis 5-27-93

Source Asphalt Plant
Test Site Stack
Date of Test 5-26-93
No. of Runs Completed 3
Technician C. Helgesen

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	8921-15	1	0.00	6.90	18.70	6.90	11.80	1.32
		2	0.00	6.90	18.70	6.90	11.80	1.32
	☑ B ☐ F	Avg				6.90	11.80	
2/2	-19	1	0.00	6.90	18.50	6.90	11.60	1.35
		2	0.00	6.90	18.50	6.90	11.60	1.35
	☑ B ☐ F	Avg				6.90	11.60	
2/3	-23	1	0.00	6.90	18.60	6.90	11.70	1.33
		2	0.00	6.90	18.60	6.90	11.70	1.33
	☑ B ☐ F	Avg				6.90	11.70	
		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 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job Buffalo Bituminous
Team Leader ET
Date Submitted 5-27-93
Test No. 1
Date of Analysis 5-27-93

Source Asphalt Plant
Test Site Stack
Date of Test 5-26-93
No. of Runs Completed 2
Technician C. Helgeson

0	Test 1 Run 0 Field Blank Log Number 8921-03 Comments	Dish No. 26 Dish Tare Wt. 48.3862 g Dish+Sample Wt. 48.3865 g Sample Wt. 0.0003 g
1	Test 1 Run 1 Log Number -06 Comments	Dish No. 36 Dish Tare Wt. 43.5658 g Dish+Sample Wt. 43.6210 g Sample Wt. 0.0552 g
2	Test 1 Run 2 Log Number -10 Comments	Dish No. 61 Dish Tare Wt. 44.5914 g Dish+Sample Wt. 44.6653 g Sample Wt. 0.0739 g
3	Test ____ Run ____ Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g
4	Test ____ Run ____ Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g
5	Test ____ Run ____ Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. g

Blank Solvent Wt. 0.0003 g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0549	0.0736	D-3		

LSC-03.GR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Buffalo Bituminous
Team Leader CT
Date Submitted 5-27-93
Test No. 1
Date of Analysis 5-27-93
Transport Leakage [X] None [ ] _____ ml

Source Asphalt Plant
Test Site Stack
Date of Test 5-26-93
No. of Runs Completed 2
Technician C. Helgeson
Solvent Acetone

0	Test 1 Run 0 Field Blank Log Number 8921-01 Vol. of Solvent 165 ml *Solvent Residue 1.82 ug/ml	Dish No. 404 Dish Tare Wt. 47.6421 g Dish+Sample Wt. 47.6424 g Sample Wt. 0.0003 g
1	Test 1 Run 1 Vol. of Solvent 120 ml Log Number -04 Comments	Dish No. 407 Dish Tare Wt. 47.9942 g Dish+Sample Wt. 48.0188 g Sample Wt. 0.0246 g
2	Test 1 Run 2 Vol. of Solvent 160 ml Log Number -08 Comments	Dish No. 504 Dish Tare Wt. 50.0245 g Dish+Sample Wt. 50.0537 g Sample Wt. 0.0292 g
3	Test ____ Run ____ Vol. of Solvent ____ ml Log Number Comments	Dish No. Dish Tare Wt. g Dish+Sample Wt. g Sample Wt. 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. 165 ml
EPA-M5 Acetone Residue Blank Spec. ≤7.8 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0244	0.0289	D-4		

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Buffalo Bituminous
Team Leader ET
Date Submitted
Test No. 1
Date of Analysis 5-27-93

Source Asphalt Plant
Test Site Stack
Date of Test 5-26-93
No. of Runs Completed 2
Technician C. Helgeson

0	Test 1 Run 0 Field Blank Log Number 8921-02 Comments	Filter No. 5316 Filter Type 4"6F Filter Tare Wt. .9224 g Filter+Sample Wt. .9224 g Sample Wt. 0.0000 g
1	Test 1 Run 1 Log Number -05 Comments	Filter No. 5303 Filter Type 4"6F Filter Tare Wt. .9322 g Filter+Sample Wt. .9554 g Sample Wt. 0.0232 g
2	Test 1 Run 2 Log Number -09 Comments	Filter No. 5314 Filter Type 4"6F Filter Tare Wt. .9330 g Filter+Sample Wt. .9662 g Sample Wt. 0.0332 g
3	Test ____ Run ____ Log Number Comments	Filter No. Filter Type Filter Tare Wt. g Filter+Sample Wt. g Sample Wt. 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
	0.0232	0.0332			

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1025	0.1357			

LSC-02PR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job: Buffalo Bituminous
Team Leader: ET
Date Submitted: 5-27-93
Test No.: 2
Date of Analysis: 5-27-93

Source: Asphalt Plant
Test Site: Stack
Date of Test: 5-26-93
No. of Runs Completed: 3
Technician: C. Helyeson

0	Test ____ Run 0 Field Blank Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
1	Test 2 Run 1 Log Number 8921-14 Comments ____	Dish No. 10 Dish Tare Wt. 47.5470 g Dish+Sample Wt. 47.7838 g Sample Wt. 0.2368 g
2	Test 2 Run 2 Log Number -18 Comments ____	Dish No. 14 Dish Tare Wt. 47.6604 g Dish+Sample Wt. 47.9360 g Sample Wt. 0.2756 g
3	Test 2 Run 3 Log Number -22 Comments ____	Dish No. 608 Dish Tare Wt. 48.2820 g Dish+Sample Wt. 48.5596 g Sample Wt. 0.2776 g
4	Test ____ Run ____ Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
5	Test ____ Run ____ Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g

Blank Solvent Wt. 0.0003 g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.2365	0.2753	0.2773		

LSC-03.GR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Buffalo Bituminous
Team Leader CT
Date Submitted 5-27-93
Test No. 2
Date of Analysis 5-27-93
Transport Leakage ☒ None ☐ _____ ml

Source Asphalt Plant
Test Site Stack
Date of Test 5-26-93
No. of Runs Completed 3
Technician C. Helgeson
Solvent Acetone

0	Test ____ Run 0 Field Blank Log Number ____ Vol. of Solvent ____ ml *Solvent Residue 1.82 ug/ml	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
1	Test 2 Run 1 Vol. of Solvent 55 ml Log Number 8921-12 Comments ____	Dish No. 1 Dish Tare Wt. 51.9705 g Dish+Sample Wt. 51.9818 g Sample Wt. .0113 g
2	Test 2 Run 2 Vol. of Solvent 85 ml Log Number -16 Comments ____	Dish No. 9 Dish Tare Wt. 47.9754 g Dish+Sample Wt. 47.9928 g Sample Wt. 0.0174 g
3	Test 2 Run 3 Vol. of Solvent 105 ml Log Number -20 Comments ____	Dish No. 509 Dish Tare Wt. 47.6218 g Dish+Sample Wt. 47.6390 g Sample Wt. 0.0172 g
4	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g
5	Test ____ Run ____ Vol. of Solvent ____ ml Log Number ____ Comments ____	Dish No. ____ Dish Tare Wt. ____ g Dish+Sample Wt. ____ g Sample Wt. ____ g

*Solvent Residue ___ ug/ml = [(Sample Wt. ____ g)(10⁶)]/Vol. of Sol. ____ ml
EPA-M5 Acetone Residue Blank Spec. ≤ 7.8 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0112	0.0172 D-	0.0170		

SC_M1VP

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Buffalo Bituminous
Team Leader CT
Date Submitted 5-27-93
Test No. 2
Date of Analysis 5-27-93

Source Asphalt Plant
Test Site Stack
Date of Test 5-26-93
No. of Runs Completed 3
Technician C. Helgeson

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 8921-13 Comments ____	Filter No. 5276 Filter Type 4"6F Filter Tare Wt. .9395 g Filter+Sample Wt. .9564 g Sample Wt. 0.0169 g
2	Test 2 Run 2 Log Number -17 Comments ____	Filter No. 5315 Filter Type 4"6F Filter Tare Wt. .9220 g Filter+Sample Wt. .9391 g Sample Wt. 0.0171 g
3	Test 2 Run 3 Log Number -21 Comments ____	Filter No. 5317 Filter Type 4"6F Filter Tare Wt. .9272 g Filter+Sample Wt. .9451 g Sample Wt. 0.0179 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
	0.0169	0.0171	0.0179		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.2646	0.3096	0.3122		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

Sample Deposition

Job: Buffalo Bituminous
Field Engineer: [illegible]
Date Submitted: 5-26-93
Test No.: 1

Source: Asphalt Plant
Test Site: Stack
Date of Test: 5-26-93
No. of Runs Completed: 2

No.	Sample Type	Analysis	Comments
2	Probe Wash: ☒ Acetone ☐ $MeCl_2$ ☐ DI Water ☐	☒ As per EPA M-5 ☐ As per EPA M-29 ☐ As per EPA M-201A ☐ Other	
3	Filter: ☒ 4" Glass ☐ SS Thimble ☐ 2.5" Glass ☐ Pallflex	☒ As per EPA M-5 ☐ As per EPA M-29 ☐ As per EPA M-201A ☐ As per EPA M-17 ☐ Other	
5	Impingers: ☒ DI Water ☐ 3% H_2O_2 ☐ 1N NaOH ☐ KOH (Cr VI) ☐ H_2SO_4 (HCl) ☐ 2,4-DNPH ☐ ☐	☒ MN Protocol ☐ WI Protocol ☐ As per EPA M-202 ☐ As per EPA M-6,8 ☐ Acid Gases ☐ Formaldehyde ☐ As per EPA M-29 ☐ As per EPA M-26 ☐ Other	
2	Integrated Gas Sample ☒ Tedlar Bag ☐	☒ As per EPA M-3 ☐ As per EPA M-10 ☐ Other	
	Oxides of Nitrogen (NO_x)	☐ As per EPA M-7A ☐ Other	
1 1	☒ Fuel Sample ☒ Aggregate	☐ Attached Form S-0163	
	Particle Size	☐ X-Ray Sedigraph ☐ Cascade Impactor ☐ Other	
	Misc Samples ☐ ☐	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other	

Type of Source: Asphalt Plant

Fuel Type:

Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite

Wood: ☐ Wood Waste ☐ Dust ☐ Bark

Oil: ☐ Waste Oil ☐ No. 2 ☒ No. 6

☐ Natural Gas ☐ RDF ☒ Other Virgin Aggregate

S-278

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Interpoll Laboratories
(612) 786-6020

Sample Deposition

Job: Buffalo Bituminous
Source: Asphalt Plant
Field Engineer: [illegible]
Test Site: Stack
Date Submitted: 5-26-93
Date of Test: 5-26-93
Test No.: 2
No. of Runs Completed:

No.	Sample Type	Analysis	Comments
3	Probe Wash: ☒ Acetone ☐ $MeCl_2$ ☐ DI Water ☐	☒ As per EPA M-5 ☐ As per EPA M-29 ☐ As per EPA M-201A ☐ Other	
3	Filter: ☒ 4" Glass ☐ SS Thimble ☐ 2.5" Glass ☐ Pallflex	☒ As per EPA M-5 ☐ As per EPA M-29 ☐ As per EPA M-201A ☐ As per EPA M-17 ☐ Other	
6	Impingers: ☒ DI Water ☐ 3% H_2O_2 ☐ 1N NaOH ☐ KOH (Cr VI) ☐ H_2SO_4 (HCl) ☐ 2,4-DNPH ☐ ☐	☒ MN Protocol ☐ WI Protocol ☐ As per EPA M-202 ☐ As per EPA M-6,8 ☐ Acid Gases ☐ Formaldehyde ☐ As per EPA M-29 ☐ As per EPA M-26 ☐ Other	
3	Integrated Gas Sample ☒ Tedlar Bag ☐	☒ As per EPA M-3 ☐ As per EPA M-10 ☐ Other	
0	Oxides of Nitrogen (NO_x)	☐ As per EPA M-7A ☐ Other	
1	☒ Fuel Sample ☒ Aggregate	☐ Attached Form S-0163	
0	Particle Size	☐ X-Ray Sedigraph ☐ Cascade Impactor ☐ Other	
0	Misc Samples ☐ ☐	☐ As per EPA M-6 ☐ As per EPA M-7A ☐ Other	

Type of Source: Asphalt Plant

Fuel Type:

Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite

Wood: ☐ Wood Waste ☐ Dust ☐ Bark

Oil: ☐ Waste Oil ☐ No. 2 ☒ No. 6

☐ Natural Gas ☐ RDF ☒ Other Recycle Aggregate

S-278

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APPENDIX E

ASPHALT PLANT INFORMATION SHEET

Interpoll Laboratories
(612)786-6020

Asphalt Plant Information Sheet

Manufacturer and Model No. of the Plant: Barber Greene DM70X171

Owner and Operator of the Plant:

Location of Plant at time of Test (State, County and Address): MN - Hennepin - Hanover - Greenfield Rd

Estimated Total Time of the Plant at this Site (from when to when): Spring 93 to Fall 93

Type of Pollution Control Equipment (wet scrubber, mechanical collector, etc.: CV80 wet scrubber

Model No. of Pollution Control Equipment: CV80 - Barber Greene

If wet scrubber, provide the following information:

Percent recycle of scrubber water: 100 %

Flow of water to scrubber: 400 GPM

Manufacturer recommended pressure drop across venturi: 6 to 15 IN.WC.

Rated Capacity of Asphalt Plant: 300 TONS/HR

at an aggregate moisture content of: 4 %

Type of Fuel Used to Fire Plant:

- ☐ Natural Gas
- ☐ No. 2 Fuel Oil
- ☐ No. 5 Fuel Oil
- ☐ Propane
- X No 6 Fuel Oil

Normal Production Rate of Plant: 300 TONS/HR

at an aggregate moisture content of: 4 %

NOTE: Attach drawings of plant and pollution control equipment.

Name of Individual Supplying Information: [illegible]

Date: 5-26-93

S-0150R(2)

APPENDIX F

ASPHALT PLANT OPERATING DATA

VIRGIN

REQUIRED DATA
for
PROCESS EMISSIONS

Company Name Buffalo Bituminous

C. Equipment & Operating Data

1. Process Equipment No./Ident. Plant #2 DM70X171.

2. Process Equipment Description Wet wash scubber

3. Process equipment operating under normal operating conditions? YES

No _____. Yes ✓. Process rate during the test 305.
(raw materials or finished product)

D. Instrument Data on Process Equipment

1. Include copy of production records or instrumentation which indicates rate of production or operation of the equipment, i.e. units per hour, lbs. per hour, pressure, air flow, etc.

E. Air Pollution Control Equipment

1. Type/model of control equipment CV80 Barber Greene.

2. Air pressure drop across the control equipment 11.

3. Air flow through the control equipment 62000 cfm.

4. Was the control equipment operating normally? Yes.

5. Data of last major maintenance/cleaning of control equipment Completely rebuilt wet wash - duct work - dryer 4-30-93

F. Plant Manager's Certification

I certify that the information submitted herein is accurate and correct and that no information requested was withheld from the Division Manager.

By [signature], Position Plant Superintendent

lmb1770

Asphalt Plant Operating Conditions During Stack Testing

Rev/YH/93

Test Date(s) 5-26-93

Plant Mfr. & Model DM 70 X 171

Type (circle one): (Drum Mix) Conventional

Other (list): _____

Pollution Control Equipment: Baghouse Venturi Scrubber (wet scrubber) cyclone multicione
(circle one)

List model: CV80

If wet scrubbing: 100 % scrubber water recycled

Normal pressure drop across control equipment: 10-12 inches water

Air flow through control equipment: 62000 acfm at 150 F

Was control equipment operating normally during testing? yes

Date & procedures of last maintenance/cleaning of control equipment Rebuilt wet scrubber - duct work - dryer. Spring 1993

Fuel:

Itemize all fuels and materials added to the combustion process during the test period. List fuel type used during testing (if oil, specify grade) No 6. If other units of measure are used, specify and calculate appropriate heat input.

Test No.___	Fuel Input (Gal/hr)	BTU/GAL (as received)	Heat Input (BTU/HR)	%Moisture (as received in aggregate) Virgin	recycle	combined
Run 1	448	58000	26432000			
Run 2	448	59000	26432000			
Run 3						

Is the above fuel substantially the highest sulfur containing fuel normally burned? Yes

Production specific fuel usage: (circle one) measured or (calculated) _____ cubic foot/ ton hot mix

1.6 gal/ton hot mix

No. of Burners: 1 Burner(s) rating: 100 million MMBTU/HR = 100% setting

Operation:

VIRGIN

time 15 min. intervals	burner setting %	aggregate tons per hour	recycle tons per hour	asphalt tons per hour	Drum Mix temp. F	dust collector pressure drop inches water	scrubber water flow rate gpm	Other (list)
800	100	280		16.8	320°	10	400	
815	100	282		16.9	310	11	400	
830	100	279		16.8	300	11	400	
845	100	280		17	300	11	400	
9:00	100	277		16.8	295	11	410	
915	100%	283		17	300	11	400	
10:05	100%	274		16.6	285	10	410	
1020	100%	279		16.8	300	10	410	
1035	100%	266		16.4	295	10.5	410	
1050	100%	282		16.8	290	10.5	410	
11:05	100%	280		17.2	290	11.5	410	

Plant Operator's Certification: I certify that the information submitted herein is accurate and correct and that no information requested was withheld from the Division Manager.

By: [signature], Phone: (612) 339-5438

Position: Plant Operator

Note: All information required must be completed and submitted as part of the performance test. Failure to submit the required information will result in an incomplete performance test report.

Asphalt Plant Operating Conditions During Stack Testing

Plant Mfr. & Model DM 70×171 Test Date(s) 5-26-93

Pollution Control Equipment: Baghouse Venturi Scrubber (circle one) wet scrubber Type (circle one): Drum M[redacted] Other (list):

List model: CV 80 If wet scrubbing: 100 % scrubber water recycled

Air flow through control equipment: 67000 acfm at 150 F Normal pressure drop across control equipment:

Date & procedures of last maintenance/cleaning of control equipment Broken - Spring 1993 Was control equipment operating nom[redacted]

Rebuilt wet scrubber

Fuel:

Itemize all fuels and materials added to the combustion process during the test [redacted] testing (if oil, specify grade) _____. If other units of measure are used, speci[redacted]

Test No.	Fuel Input (Gal/hr)	BTU/GAL (as received)	Heat Input (BTU/HR)	%Moisture Virgin	[redacted]
Run 1	448	5900	2643200		[redacted]
Run 2					[redacted]
Run 3					[redacted]

[redacted] the above fuel substantially the highest sulfur containing fuel normally burned? yes

[redacted]oduction specific fuel usage: (circle one) measured or calculated: _____ cubic foot/ ton hot mix

[redacted]. of Burners: 1 Burner(s) rating: 100 million MMBTU/HR = 100% setting 1.6 gal/ton hot mix

[redacted]eration:

time 15 min. intervals	burner setting %	aggregate tons per hour	recycle tons per hour	asphalt tons per hour	Drum Mix temp. F	dust collector pressure drop inches water	scrubber water flow rate gpm	Other (list)
1:00	100%	170	144	12.2	285	10.5	410	
115	100%	168	140	11.8	280	10	400	
130	100%	170	146	12.3	280	10	400	
145	100%	170	144	12.5	285	10	410	
200	100%	172	146	12.4	280	10	410	
245	100%	170	147	12.3	280	10	420	

Recycle

Plant ran out of Recycle 4 times during test

Plant Operator's Certification: I certify that the information submitted herein is accurate and correct and that no [redacted]nformation requested was withheld from the Division Manager.

By: [redacted]

Position: Plant Operator, Phone: (612) 339-5438

[redacted]ation required must be comp[redacted]ted and submitted as part of th[redacted]

[redacted]d information will result in an incomplete [redacted]

Asphalt Plant Operating Conditions During Stack Testing

Test Date(s) 5-26-93

Plant Mfr. & Model DM 70 x 171

Type (circle one): Drum

Other (list):

Pollution Control Equipment: Baghouse Venturi Scrubber wet scrubber
(circle one)

If wet scrubbing: ____ % scrubber water rec

List model: CV 80

Normal pressure drop across control equipme

Air flow through control equipment: 62000 acfm at 150 F

Was control equipment operatin

Date & procedures of last maintenance/cleaning of control equipment Rebuilt wet scrubber dryer spring 1993

Fuel:

Itemize all fuels and materials added to the combustion process during the te testing (if oil, specify grade) _____. If other units of measure are used, spe

Test No.___	Fuel Input (Gal/hr)	BTU/GAL (as received)	Heat Input (BTU/HR)	%Moisture Virgin	
Run 1					
Run 2	448	59000	26432000		
Run 3					

Is the above fuel substantially the highest sulfur containing fuel normally burned? _____

Production specific fuel usage: (circle one) measured or calculated: _____ cubic foot/ ton hot mix

_____ gal/ton hot mix

No. of Burners: _____ Burner(s) rating: _____ MMBTU/HR = 100% setting

Operation:

time 15 min. intervals	burner setting %	aggregate tons per hour	recycle tons per hour	asphalt tons per hour	Drum Mix temp. F	dust collector pressure drop inches water	scrubber water flow rate gpm	Other (list)
3:10	100%	168	141	12	275	10.5	400	
3:25	100%	173	142	12.3	280	10.5	410	
3:40	100%	171	143	11.3	275	10	400	
355	100%	172	140	11.1	280	10	400	
410	100%	170	143	11.3	280	10	400	

Plant Operator's Certification: I certify that the information submitted herein is accurate and correct and that no information requested was withheld from the Division Manager.

By: _____, Phone: (612) 339-5138

Position: Plant Operator

Note: All information required must be completed and submitted as part of the performance test. Failure to submit the required information will result in an incomplete performance test report.

Asphalt Plant Operating Conditions During Stack Testing

Test Date(s) 5-26-93

Plant Mfr. & Model Dm 70 x 171

Type (circle one): D

Other (list):

Pollution Control Equipment: Baghouse Venturi Scrubber wet scrubber (circle one)

If wet scrubbing: 100 % scrubber water

List model: CV80

Normal pressure drop across control equip

Air flow through control equipment: 62000 acfm at 50 F. Was control equipment opera

Date & procedures of last maintenance/cleaning of control equipment Clean wet Scrub

dryer Spring 1993

Fuel:

Itemize all fuels and materials added to the combustion process during the test period. L

testing (if oil, specify grade) _____. If other units of measure are used, specify and calcu

Test No.___	Fuel Input (Gal/hr)	BTU/GAL (as received)	Heat Input (BTU/HR)	%Moisture (as received in aggre		
				Virgin	recycle	combine
Run 1						
Run 2						
Run 3	448	59000	26432000			

Is the above fuel substantially the highest sulfur containing fuel normally burned? _____

Production specific fuel usage: (circle one) measured or calculated: _____ cubic foot/ ton hot mix

_____ gal/ton hot mix

No. of Burners: _____ Burner(s) rating: _____ MMBTU/HR = 100% setting

Operation:

time 15 min. intervals	burner setting %	aggregate tons per hour	recycle tons per hour	asphalt tons per hour	Drum Mix temp. F	dust collector pressure drop inches water	scrubber water flow rate gpm	Other (list)
4:40	100%	174	143	11.4	280	10	400	
4:55	100%	171	144	11.3	275	10	410	
510	100%	173	143	11.3	275	10	410	
525	100%	169	144	11.2	275	10	410	
5:40	100%	171	141	11.2	275	10	400	
5:50	100%	171	142	11.3	275	10	400	

Plant Operator's Certification: I certify that the information submitted herein is accurate and correct and that no information requested was withheld from the Division Manager.

By [signature], Phone: (62) 539-5432

Position: Plant Operator

Note: All information required must be completed and submitted as part of the performance test. Failure to submit the required information will result in an incomplete performance test report.

APPENDIX G

PROCEDURES

Particulate Loadings and Emission Rates

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

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

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

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

3a P1(1-5)

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

Integrated flue gas samples for Orsat analysis were collected simultaneously 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).

Interpoll Laboratories
(612)786-6020

Condensible Organic Compounds Analysis

(State of Minnesota - MPCA Exhibit C)

Method II-8672-MN

Equipment: Separatory funnel - 500 cc with Teflon stopcock

Powder funnel - 75 mm ID with a 17 mm stem

Evaporating dish(es) - 200 cc or 250 cc beaker

Reagents: Diethyl ether - reagent grade

Chloroform - reagent grade

Sodium sulfate - (ACS) granular anhydrous

Toluene - (if 3% hydrogen peroxide is used to collect the samples)

Glass wool (Pyrex microfiber)

PREPARATION

1. Place 1 kg of granular anhydrous sodium sulfate in a shallow tray and heat to 200 °C for at least four hours. Store in a tightly sealed glass container.

2. Place a plug of clean glass wool in the stem of the powder funnel. The plug must be of sufficient size so that it is held snuggly in place by its own pressure. Add a one-inch layer of dry sodium sulfate.

SAMPLING

An all-glass impinger assembly is used in the back half of the EPA Method 5 sampling train when an organic wet catch is to be collected. The impinger assembly consists of a modified impinger, a Greenburg Smith impinger followed by another modified impinger. The third impinger should have a temperature measuring device at the outlet upstream of a final impinger or desiccant column to monitor the temperature of the outlet gas stream. Prior to the start of the test, each of the first two impingers should be charged with 100 g of Class I water. The Method 5 train should be operated as provided for in EPA Method 5. Ice should be added to the impinger bath to keep the temperature of the gas at the outlet at or less than 68 °F. After the post test leak check, the impinger train is removed and impinger contents poured into a tared all-glass sample bottle and closed with a Teflon-lined cap. The sample bottle is then weighed and the total condensate calculated by subtraction of the bottle tare weight and the weight of initial water added to the impingers (200 g). A label is affixed and the sample is returned to the laboratory for analysis. The sample should be stored at 4 °C if the analysis is not conducted within 48 hours.

ANALYSIS

I. Organics

Caution! Work in vented hood!!!

A. Organic Blank Determination

1. Pour 125 mL of ethyl ether and 125 mL of chloroform into a tared beaker.
2. Evaporate solvent in hood at 70 ^{o}F or less until no solvent remains.
3. Desiccate the sample in dish for two hours.
4. Weigh the sample to nearest 0.1 mg, record and report on Form LSC-036.

B. Organic Sample Determination

1. Test for peroxide in sample ether using KI strips. (If KI strip shows positive, contact your supervisor before proceeding.)
2. Transfer the sample solution quantitatively to a 500 mL separatory funnel. Use the first of three 25 mL chloroform aliquots to rinse the sample container.
3. Extract with three 25 mL portions of chloroform. (Shake and vent to release pressure about 4 to 5 times each.) Allow the phases to separate. (Bottom layer is chloroform.) Draw off the bottom layer, transferring the solvent with a funnel containing a plug of sodium sulfate into a tared beaker. (Do not draw off any of the aqueous layer.)

4. After the three chloroform extractions, use two 25 mL portions of chloroform to rinse the sodium sulfate, collecting the rinses in the same tared beaker as the extracts.

5. Next extract the sample three times with 25 mL aliquots of ethyl ether. (Shake and vent to release pressure about 4 to 5 times each.) Allow the phases to separate. (Top layer is ethyl ether.) Draw off the bottom layer (aqueous) into another separatory funnel taking less than 1 mL of the ethyl ether layer with. Decant the ethyl ether, passing it through sodium sulfate and collecting the ethyl ether in the same tared dish as the chloroform.

6. After the three ethyl ether extractions, take two 25 mL portions of ethyl ether and rinse the sodium sulfate collecting the rinses in the same tared beaker as the extracts.

7. Evaporate the solvents (chloroform and ethyl ether) in the tared beaker in the hood at 70 °F or less until no solvent remains. (Use no heat and have no sources of ignition in the hood when doing this procedure.) Do not evaporate so quickly as to allow evaporative cooling to lower the temperature of the container below the dew point of water, otherwise, water will be condensed out in the container.

8. Desiccate to constant weight (two hours). Record and report the final weight to the nearest 0.1 mg on Form LSC-036.

II. Inorganics

If inorganic residue information is required, the following procedure should be conducted:

A. Inorganic Blank Determination

1. Vent the remaining aqueous phase from the organic extraction in the hood to remove residual organic solvents (usually overnight).
2. Decant the impinger catch into a tared evaporating dish.
3. Evaporate all of the water in the sample in an oven at 100 ^{o}C. Take care not to boil to prevent bumping and loss of sample.
4. Cool the dried sample in the desiccator and desiccate until a constant weight is obtained.
5. Report the results to the nearest 0.1 mg on Form LSC-036.

B. Inorganic Sample Determination

Follow steps 1-5 in Section A above.

NOTES

1. For the organics determination, in the rare event that the impinger catch resulted from a Modified Method 6 determination (SO_2), whereby the solution contains dilute hydrogen peroxide ($\geq$ 3%), do <u>not</u> use ether as an extraction solvent. <u>Substitute toluene</u> for ethyl ether in Section I. (Ether in the presence of peroxide forms explosive hydroperoxide.)

2. In the organics determination, more than three extractions may be required to extract all of the organics. Additional extractions should be performed if the aqueous phase is still cloudy.

3. Special state requirements:

   <u>Michigan</u> - Total sample evaporated in tared evaporating dish on steam bath.

   <u>Iowa</u> - Organics and inorganics separately, as required.

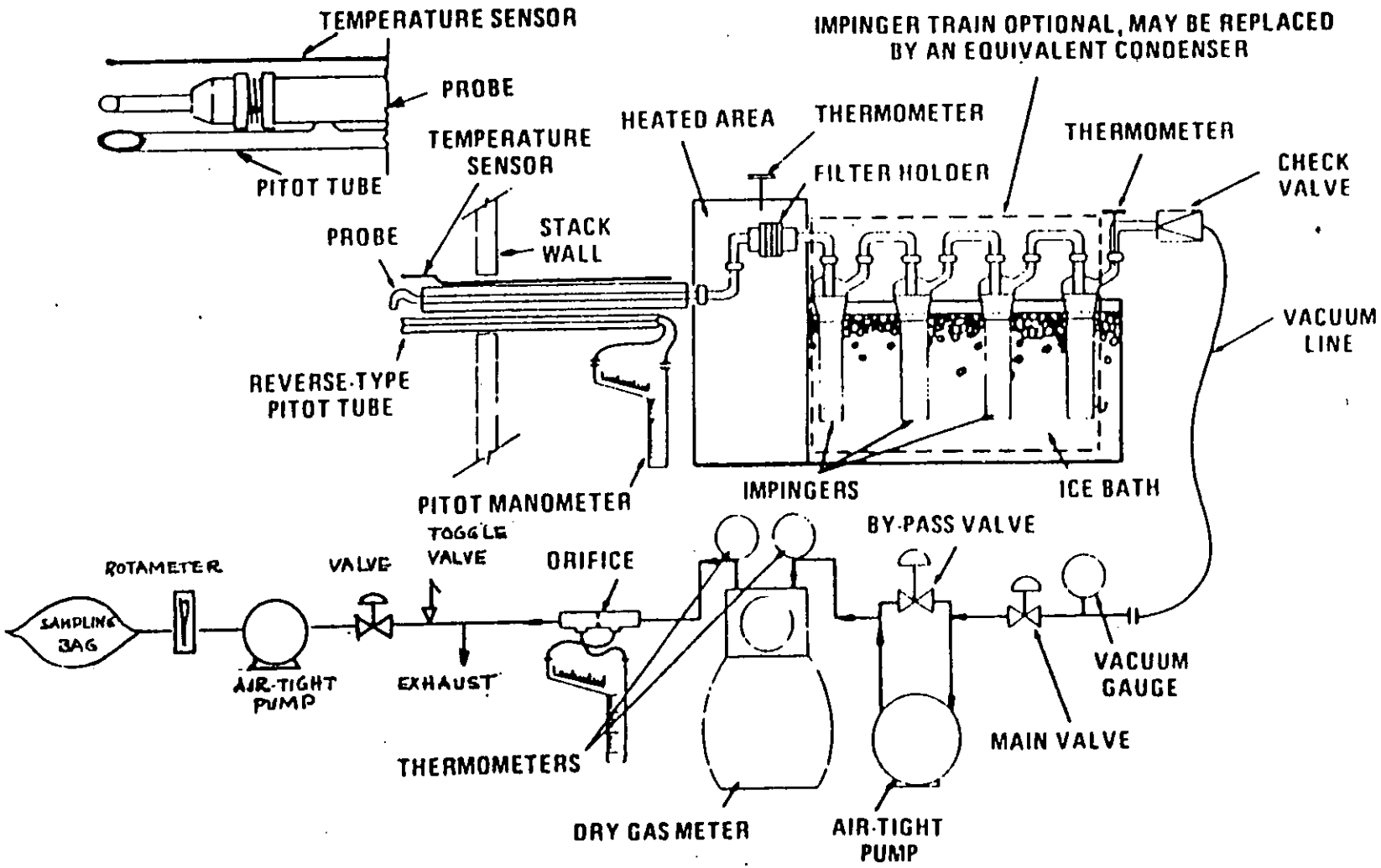
   <u>Wisconsin</u> - Use Method II-8672-WI.

   <u>Rest of states</u> - Organics only.

REFERENCES

Proposed Standards of Performance for New Stationary Sources, Federal Register <u>36</u>(159) Part II, August 1, 1979.

Minnesota Pollution Control Agency, Exhibit C.



Particulate-sampling train.

APPENDIX H

CALCULATION EQUATIONS

CALCULATION EQUATIONS

METHOD 2

$$\overline{V}_s = 85.48\ C_p\ (\sqrt{\Delta p})_{avg}\ \sqrt{\frac{T_{s(avg)}}{P_s\ M_s}}$$

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

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

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

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

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

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

*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, °F

T_{wb} = Wet bulb temperature of stack gas, °F

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

$T_s(avg)$ = Absolute average stack temperature, °F

T_{std} = Standard absolute temperature, 528 °F (68 °F)

θ = Total sampling time, min.

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

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

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

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

$\overline{V}_s$ = 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, °F

T_{wb} = Wet bulb temperature of stack gas, °F

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

$T_s(avg)$ = Absolute average stack temperature, °F

T_{std} = Standard absolute temperature, 528 °F (68 °F)

θ = Total sampling time, min.

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

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

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

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

$\overline{V}_s$ = 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 I

SAMPLING TRAIN CALIBRATION DATA

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

Job Buffalo Bituminous Date 5-26-83
Operator [illegible] Module No. 8

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 29.15 in. Hg. τ = .9997 ^H@ 1.82 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	(915.00)	[redacted]	
2.5	916.85	67	63
5.0	918.75	69	64
7.5	919.60	69	65
10	922.41	69	65
[redacted]	V_m= 7.41	Avg(t_m)= 66.4 °F	

Calculate Y_{cn} as follows:

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

$$Y_{cn} = \frac{1.786}{(\quad)(\quad)}\left[\frac{(66.4) + 460}{(29.15)}\right]^{0.5} \quad 4.2455$$

$$Y_{cn} = 1.0245$$

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) 786-620

Meter Box Calibration and Usage Status

Date of Report: May 28, 1993

Meter Box No. : 8 (Rockwell Dry Test Meter Serial No. 964547)

Date of Last Calibration: May 20, 1993
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
May 26, 1993	3-8921	915.00	1147.57	232.57	232.57

* Total volume through meter since last calibration.

Date 5-20-93

Bar. Press. 29.00 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 8
Serial No. DTM 964547
Wet Test Meter No. AL-20
Technician E Tarbutton

ΔH (in. WC) nominal	ΔH (in. WC) actual	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) V_{di}	Gas Volume Dry test meter (ft^3) V_{df}	Gas temperatures Wet Test t_w (°F)	Gas temperatures Dry Test t_{di} (°F)	Gas temperatures Dry Test t_{do} (°F)	Time θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔHθ	C_f
0.5		2	99.85	0.01	886.500	888.531	67	81	75	4/59	1.0024	1.75	
1.2		3	99.91	0.025	879.500	882.544	67	80	75	4/49	1.0011	1.75	
2.0		3	99.93	0.055	883.000	886.048	67	83	75	3/51	1.0007	1.86	
3.3		5	100.00	0.09	889.000	894.090	67	86	76	5/02	.9998	1.87	
4.7		5	100.02	0.12	894.500	899.613	67	88	77	4/15	.9947	1.87	
											.9997	1.82	

Positive leak check performed by ET

Meter was in tolerance ☒

Meter was not in tolerance ☐; readjusted linkage

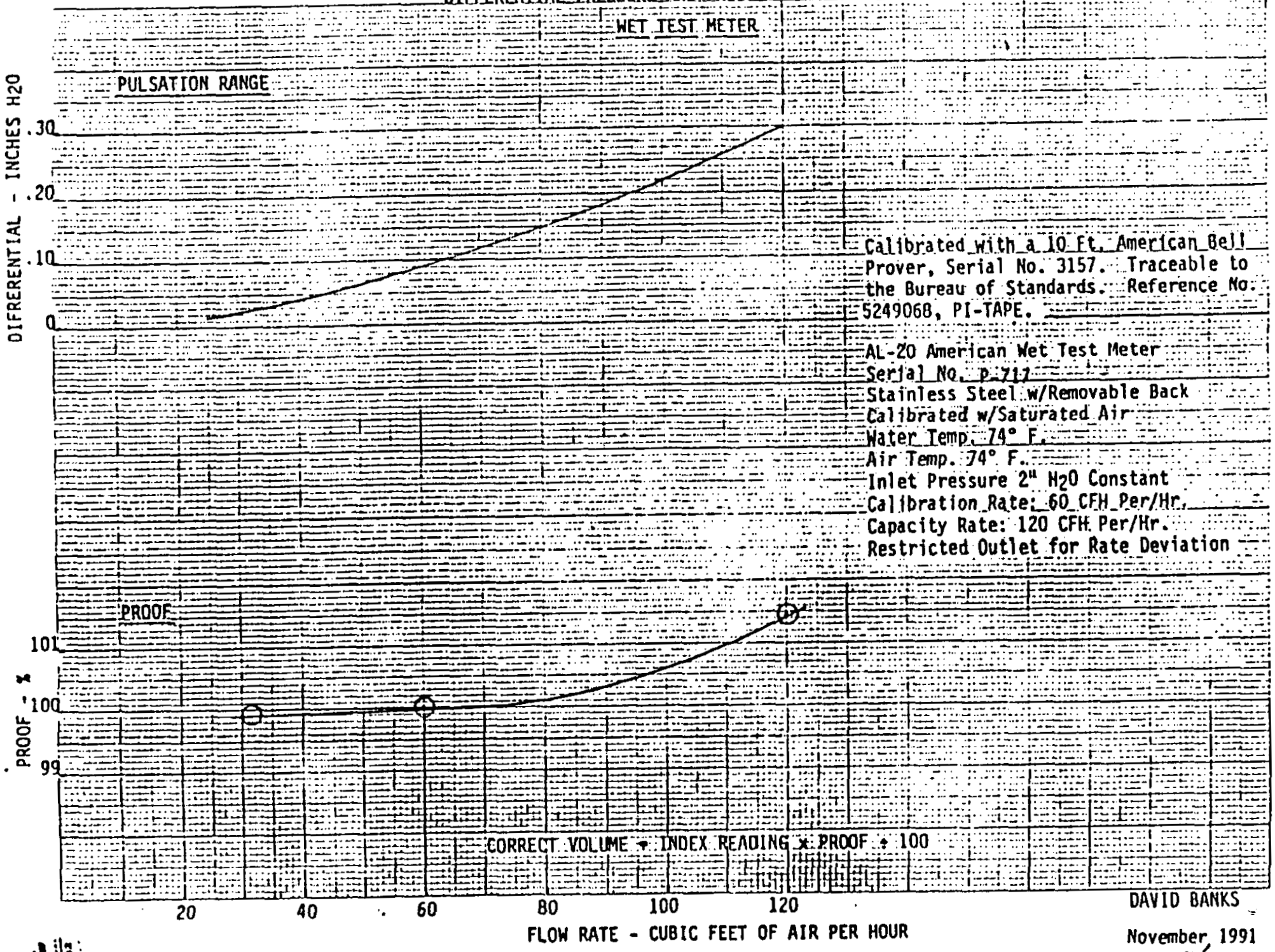
Meter was not in tolerance ☐; changed dry test meters

Approved by Daniel J. Dezza Date 5/21/93

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

S0102RR 11/91

DIFFERENTIAL PRESSURE AND PROOF CALIBRATION CURVES



DAVID BANKS

November, 1991

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 5-26-93 Nozzle Number 8-3
Technician: Ed Trowbridge

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

Position	Diameter (inches)
1	.186
2	.185
3	.186
Average:	.186

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 5-26-93 Nozzle Number 8-4
Technician: Ed Trowbridge

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

Position	Diameter (inches)
1	.180
2	.180
3	.180
Average:	.180

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

Unit under test:
Vendor Fluke # 12
Model 51 Serial Number 6030375
Range 0-2100 °F Thermocouple Type K
Date of Calibration 4-1-93 Technician [illegible]

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	.21
100	100	100.2	.2	.03
200	200	202.4	2.4	.36
300	300	301.2	1.2	.15
400	400	399.6	.4	.050
500	500	500.2	.2	.02
600	600	602.0	2.0	.18
700	700	700.2	.2	.02
800	800	801.4	1.4	.11
900	900	899.4	.6	.04
1000	1000	1001.0	1.0	.06
1100	1100	1100.8	.8	.06
1200	1200	1203.2	3.2	.19
1300	1300	1300.4	.4	.02
1400	1400	1403.2	3.2	.17
1500	1500	1500.8	.8	.04
1600	1600	1601.8	1.8	.08
1700	1700	1699.6	.4	.01
1800	1800	1801.6	1.6	.07
1900	1900	1899.4	.6	.02
2000	2000	2001.2	1.2	.14
2100	2100 A.D	2098.6	1.4	.05
		Averages:	1.18	.09

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.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 29-4

Pitot tube dimensions:

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

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 2
7. B_2 < 5° 1

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

Distance from Pitot to Probe Components:

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

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

Date of Inspection: 4-7-93

Inspected by: [signature]

CFR Title 40 Part 60 Appenidix A Method 2

S-348

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INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

ET's

Date 5-12-93
Technician E. TROWBRIDGE
Mercury Column Barometer No. 46
Aneroid Barometer No. SN-01002008

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
29.16	75	.12	29.04	29.04	

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

Has problem been alleviated? Yes/No. How?

*Note

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

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APPENDIX J

MPCA TEST PLAN AND PROTOCOL

TEST PLAN
for
BUFFALO BITUMINOUS

I. GENERAL INFORMATION

Permittee: Buffalo Bituminous

Permittee's contact person and telephone number: Brad Arntson

Permittee's mailing address: P.O. Box 337
Buffalo, MN 55313

DAQ File No.: 14B

MPCA permitting engineer: Bernadette Halverson

Applicable regulations for each source tested: Minn. Rules 7005.2020, subp. A and B for TSP aand opacity

Reason for testing: Compliance test using both aggregate and recycle

Is this test for initial compliance demonstration: Yes, initial compliance will be while processing aggregate. Another test will be completed while incorporating recycled asphalt pavement.

Drawings showing location of sampling ports included: must be sent to Yolanda Hernandez of the Compliance Determination Unit for approval prior to the test. They may be faxed to Yolanda at (612) 297-7709.

Location of the plant at the time of the test: Notify Yolanda Hernandez prior to the test

Date when test plan was discussed and agreed upon with the permittee: Pretest meeting held 4/19/93.

II. NOTIFICATION REQUIREMENTS

The permittee must contact the Agency at least two weeks before the scheduled test to obtain all necessary approvals.

It is very important to allow at least two weeks before the test to review the testing requirements in order to avoid last minute cancellations due to inadequate testing conditions.

Among the potential problems that may need to be solved before the test are:

1. Unsuitable location of sampling ports. The stack may need to be extended and/or straightening vanes be installed.

2. Permittee must schedule the test at a time when the plant can be operated at 100% of rated capacity, and at maximum recycle rate if applicable.

3. Permitte must be ready to burn specified fuel.

4. Permittee may have to install pressure drop taps and gauges, as well as water flow rate measuring devices.

5. Permittee may have to install sampling taps on the fuel feeding line to the burner.

III. TEST PLAN

The following is the test plan developed for emission point no. 1 at Buffalo Bituminous Plant no. 2:

A. Emission point(s) to be tested:
Barber-Greene DM-70 drum mix plant
MFR Rated Drying Capacity 300 tons/hour @ 4% moisture
Control equipment: wet scrubber

B. Parameters to be tested at each emission point: TSP (front and back catch reported separately) and opacity

C. Fuel sampling and analysis. (Fuel oils and used oil)

This is part of the compliance demonstration requirements. Please note that the test report will not be accepted without complete submittal of fuel analysis results of samples taken at the time of the test.

1. Sampling. One tap sample per particulate test run must be taken. The sample must be taken as close as possible to the burner, (somewhere in feeding line) to be representative of the fuel burned at the time of the test. The sample may be taken in a pint-size clean container, and according to the procedures listed in Exhibit D. Mix the three samples taken into a composite.

2. Analysis. The composite must be analyzed according to Exhibit D.

D. Moisture content in the virgin and recycle aggregate.

1. Take two samples of each: the virgin and recycle aggregate per test run of particulates. Sample must be taken as close as possible to the feeding conveyor and during the corresponding run. Mix

samples of virgin aggregate with the samples of recycle material in the same proportion as they enter the dryer, this will give one composite recycle/virgin sample per test run.

2. Perform one analysis of moisture content in each composite recycle/virgin aggregate sample as per ASTM or other recognized methodologies. A total of three analysis shall be performed, one per test run for particulates.

E. Moisture content in the virgin aggregate

1. Take two samples the virgin aggregate per test run of particulates. Sample must be taken as close as possible to the feeding conveyor and during the corresponding run. Mix the two samples of virgin aggregate, this will give one composite sample per test run.

2. Perform one analysis of moisture content in each composite sample as per ASTM or other recognized methodologies. A total of three analysis shall be performed, one per test run for particulates.

F. Operating Conditions during the Test

1. Operation must be at 100% of design capacity at the existing aggregate moisture content - no deliberate reduction of feed rate or fan speed during testing, except for nominal damper adjustment for proper combustion. - The test report must include copies of the manufacturer's specifications that define the design capacity of the plant as a function of the moisture content of the aggregate.

2. Must burn 100% of the highest emitting fuel to be listed in and allowed by the permit: used oil or fuel oil not to exceed 0.7% sulfur.

3. If the permit is to authorize recycling, then testing must be conducted while recycling and at the maximum ratio of recycle to virgin aggregate to be allowed by the permit: Maximum recycle percent to be determined during stack test.

4. The test must be conducted under normal operating conditions. If normal operation includes recycling of scrubber water, the test must be done under the same conditions.

G. Operating Data to Be Recorded during the Test

Operating data must be recorded during the test in its entirety i.e., particulates and visible emission observations. Operating data must be recorded every fifteen minutes. Please use the attached data sheet or equivalent.

Note: No test report will be accepted without a complete data sheet included.

1. During testing the following measurements must be made:

a) Pressure drop across the baghouse

c) Scrubber water flow rate. If the measurement is done indirectly from a pump pressure gauge, the test report must include calculations, nomograms or calibration data used to compute gallons per minute of water.

c) Virgin and recycle aggregate input (ton per hour) as well as asphalt input (ton per hour). Provide the manufacturer's rating of the asphalt plant at different moisture contents in the aggregate.

d) Moisture content of the aggregate, and if applicable, the recycling material.

2. Please provide the following data:

a) Average fuel consumption rate (calculated or measured)

b) Quality of the scrubber water: percent recycled

c) Operating data sheet enclosed

H. Testing schedules and testing firm: Tentative date May 26, 1993

I. Permitting engineer to witness the test: To be determined. Talk to Yolanda Hernandez prior to the test date.