AP42 Section: 11.1

Reference Number: 64

Title: Results Of The July 6, 1994 Particulate And Opacity Compliance Tests On The No. 2 Portable Asphalt Plant Stationed South Of Mankato, Minnesota,

Interpoll Laboratories, Inc., Circle Pines, MN,

August 5, 1994.

AP-42 Section 11.1
Reference
Report Sect. 4
Reference 64

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

TEL: (612) 786-6020
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RESULTS OF THE JULY 6, 1994 NSPS PARTICULATE AND OPACITY COMPLIANCE TESTS CONDUCTED ON THE NO. 2 PORTABLE ASPHALT PLANT STATIONED SOUTH OF MANKATO, MINNESOTA

Submitted to:

BITUMINOUS MATERIALS INC.
P.O Box 246
Faribault, Minnesota 55021

Attention:

John Heselton

Approved by:

Daniel Despen
Manager
Stationary Source Testing Department

Report Number 4-3290
August 5, 1994
SB/sab

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APPENDICES:

ABBREVIATIONS

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

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Certifications Required For Performance Test Reports

Note: All performance test reports must contain a certification by the responsible parties that the test results have been reported accurately, that the field data is a true representation of the sampling procedures, and that the process data is a true indicator of the operating parameters of the emissions unit at the time of the performance test. (Ref. Minn. Rules pt. 7017.2040). Performance test results will not be accepted without certification of the report.

1. **Certification of sampling procedures by the team leader of the personnel conducting the sampling procedures:**

"I certify under penalty of law that the sampling procedures were performed in accordance with the approved test plan and that the data presented in this test report are, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: Gary Howe Printed Name of Person Signing: GARY HOWE
Title: FIELD TECH Date: 7-6-94

2. **Certification of analytical procedures by the person responsible for the laboratory analysis of field samples:**

"I certify under penalty of law that the analytical procedures were performed in accordance with the requirements of the test methods and that the data presented for use in the test report were, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: David Schneider Printed Name of Person Signing: David Schneider
Title: QA Officer Date: 8/8/94

3. **Certification of test report by the senior staff person at the testing company who is responsible for compiling and checking the test report:**

"I certify under penalty of law that this test report and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the test information submitted. Based on my inquiry of the person or persons who performed sampling and analysis relating to the performance test, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: Kathleen Eckstadt Printed Name of Person Signing: Kathleen Eckstadt
Title: Stationary Source Testing Coordinator Date: 8-11-94

4. **Certification of test report by owner or operator of the emission facility:**

"I certify under penalty of law that the information submitted in this test report accurately reflects the operating conditions at the emission facility during this performance test and describes the date and nature of all operational and maintenance activities that were performed on process and control equipment during the month prior to the performance test. Based on my inquiry of the person or persons who performed the operational and maintenance activities, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: J. T. Heselton Printed Name of Person Signing: J. T. Heselton
Title: Quality Control Date: 8-15-94

1-5-94-C:\STACK\WP\FORMS\S-480

1 INTRODUCTION

On July 6, 1994 Interpoll Laboratories Personnel conducted a NSPS Particulate and Visible Emission Compliance Test on the No. 2 Portable Asphalt Plant stationed south of Mankato, Minnesota. Ron Rosenthal, David Vaaler, and Jon Johnson performed the on-site portion of the test. Coordination between testing activities and plant operation was provided by John Heselton of Bituminous Materials, Inc. The test was not witnessed by a member of the Minnesota Pollution Control Agency.

The unit tested is a BCEC Model MS400RP portable asphalt plant which has a rated capacity of 400 TPH at 5% moisture. The particulate emissions are controlled by a PB-70 ACFM Baghouse. The unit was tested while processing 40% recycle. During the test the plant was fired with waste oil and processing 430 - 450 TON/HR at a moisture content of 3 - 7%.

Particulate evaluations were performed in accordance with EPA Methods 1 - 5, and 9, CFR Title 40, Part 60, Appendix A (revised July 1, 1993). 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 7011.0725.

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 situated horizontally on the stack. The test ports are located 5.91 diameters downstream and 0.51 diameters 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 David Vaaler, an EPA-certified observer.

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 1a and 1b. The average results are summarized in the table below.

Process	Concentration (GR/DSCF)	Emission Rate (LB/HR)
40% Recycle (Dry + Organic Wet Catch)	0.0412	12.12
40% Recycle (Dry Catch Only)	0.0141	4.05

Opacity averaged 0.6 percent.

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 1a. Summary of the Results of the July 6, 1994 Particulate Emission Compliance Test on the Portable Asphalt Plant Stack at the Bituminous Materials, Inc. Plant Located in Mankato, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	07-06-94	07-06-94	07-06-94
Time runs were done (HRS)	1108/1227	1610/1800	1830/1947
Process rate (TON/HR)			
recycle	170.0	173.0	176.0
aggregate	255.0	259.0	266.0
asphalt	3.9	4.0	4.2
total	428.9	436.0	446.2
Volumetric flow			
actual (ACFM)	67379	75230	71357
standard (DSCFM)	30344	37982	33952
Gas temperature (DEG-F)	246	253	255
Moisture content (%V/V)	37.74	29.49	33.33
Gas composition (%V/V,dry)			
carbon dioxide	7.10	5.30	6.20
oxygen	11.10	13.80	12.50
nitrogen	81.80	80.90	81.30
Isokinetic variation (%)	106.3	92.0	101.3
Part. emission rate (LB/HR)	11.18	16.53	8.66
Particulate concentration			
actual (GR/ACF)	.0193	.0256	.0142
standard (GR/DSCF)	.0430	.0508	.0298

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 1b. Summary of the Results of the July 6, 1994 Particulate Emission Compliance Test on the Portable Asphalt Plant Stack at the Bituminous Materials, Inc. Plant Located in Mankato, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	07-06-94	07-06-94	07-06-94
Time runs were done (HRS)	1108/1227	1610/1800	1830/1947
Process rate (TON/HR)			
recycle	170.0	173.0	176.0
aggregate	255.0	259.0	266.0
asphalt	3.9	4.0	4.2
total	428.9	436.0	446.2
Volumetric flow			
actual (ACFM)	67379	75230	71357
standard (DSCFM)	30344	37982	33952
Gas temperature (DEG-F)	246	253	255
Moisture content (%V/V)	37.74	29.49	33.33
Gas composition (%V/V,dry)			
carbon dioxide	7.10	5.30	6.20
oxygen	11.10	13.80	12.50
nitrogen	81.80	80.90	81.30
Isokinetic variation (%)	106.3	92.0	101.3
Part. emission rate (LB/HR)	3.85	3.09	5.20
Particulate concentration			
actual (GR/ACF)	.00666	.00479	.00849
standard (GR/DSCF)	.0148	.00949	.0179

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 Analyses

Test No. 1
Portable Asphalt Plant Stack

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

	Run 1	Run 2	Run 3
Date of run	07-06-94	07-06-94	07-06-94
Dry basis (orsat)			
carbon dioxide.....	7.10	5.30	6.20
oxygen.....	11.10	13.80	12.50
nitrogen.....	81.80	80.90	81.30
Wet basis (orsat)			
carbon dioxide.....	4.42	3.74	4.13
oxygen.....	6.91	9.73	8.33
nitrogen.....	50.93	57.04	54.20
water vapor.....	37.74	29.49	33.33
Dry molecular weight.....	29.58	29.40	29.49
Wet molecular weight.....	25.21	26.04	25.66
Specific gravity.....	0.871	0.899	0.886
Water mass flow.....(LB/HR)	51604	44553	47620
FO	1.380	1.340	1.355

3.2 Results of Particulate Loading Determinations

Test No. 1
Portable Asphalt Plant Stack

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

	Run 1	Run 2	Run 3
Date of run	07-06-94	07-06-94	07-06-94
Time run start/end.....(HRS)	1108/1227	1610/1800	1830/1947
Static pressure.....(IN.WC)	-0.47	-0.47	-0.47
Cross sectional area (SQ.FT)	15.67	15.67	15.67
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	532.0	380.0	469.0
desiccant.....(GRAMS)	27.0	38.0	23.0
total.....(GRAMS)	559.0	418.0	492.0
Total particulate material..			
.....collected(grams)	0.1211	0.1551	0.0895
Gas meter coefficient.....	1.0069	1.0069	1.0069
Barometric pressure..(IN.HG)	28.97	28.97	28.97
Avg. orif.pres.drop..(IN.WC)	1.77	2.11	2.08
Avg. gas meter temp..(DEF-F)	92.5	100.9	111.2
Volume through gas meter....			
at meter conditions...(CF)	46.47	51.10	51.23
standard conditions.(DSCF)	43.47	47.13	46.39
Total sampling time....(MIN)	62.50	62.50	62.50
Nozzle diameter.....(IN)	.249	.249	.249
Avg.stack gas temp ..(DEG-F)	246	253	255
Volumetric flow rate.....			
actual.....(ACFM)	67379	75230	71357
dry standard.....(DSCFM)	30344	37982	33952
Isokinetic variation.....(%)	106.3	92.0	101.3
Particulate concentration...			
actual.....(GR/ACF)	0.01935	0.02563	0.01416
dry standard.....(GR/DSCF)	0.04298	0.05078	0.02977
Particle mass rate...(LB/HR)	11.179	16.532	8.663

3.3 Results of Opacity Observations

Test No. 1
Portable Asphalt Plant Stack

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

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	87.92
5	0.0223	12.08
10	0.0458	0.00
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 0.60	Avg OD 0.0027	Time average

Observer: David Vaaler
Cert. Date: 04-06-94
Date of Observation: 07-06-94
Time of Observation: 1615/1754

4 RESULTS OF FUEL AND AGGREGATE ANALYSES

INTERPOLL LABORATORIES, INC.
(612)786-6020

Bituminous Materials, Inc.
Sample Log No. 3290-14

Results of Waste Oil Profile

Test: 1

Sample Description: Composite

Sample Type: Waste Oil

Parameter	Units	Method	As Received
Gross heating value	BTU/LB	ASTM D240	19062
Sulfur	%	ASTM D3177[1]	0.53
Ash	%	ASTM D482	0.78
Flashpoint	°F	ASTM D93	127
Specific gravity	60/60°F	ASTM D1298	0.8876
Acidity		ASTM D1093	7.9
Total organic halogens	% w/w	EPA SW-846, 9056	0.058
Total lead	mg/Kg	EPA SW-846, 6010	40
Total PCB	mg/Kg	EPA SW-846, 8080	< 11

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

Wayne A. Olson, Manager
Organic Chemistry Group

JFO/WAO/cg

[1]Modified ASTM method.

INTERPOLL LABORATORIES, INC.
(612)786-6020

Bituminous Materials, Inc.
Laboratory Log No. 3290

Results of Moisture Analysis

Sample Log No.	Test/Run	Sample Type	% Moisture
3290-08	Test 1 Run 1	Virgin Aggregate	5.95
3290-10	Test 1 Run 2	Virgin Aggregate	5.21
3290-12	Test 1 Run 3	Virgin Aggregate	5.26

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

JFO/cg

INTERPOLL LABORATORIES, INC.
(612)786-6020

Bituminous Materials, Inc.
Laboratory Log No. 3290

Results of Moisture Analysis

Sample Log No.	Test/Run	Sample Type	% Moisture
3290-09	Test 1 Run 1	Recycled Aggregate	5.17
3290-11	Test 1 Run 2	Recycled Aggregate	3.90
3290-13	Test 1 Run 3	Recycled Aggregate	4.56

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

JFO/cg

APPENDIX A

PRELIMINARY VOLUMETRIC FLOW RATE DETERMINATION

Test No. 1
Portable Asphalt Plant Stack

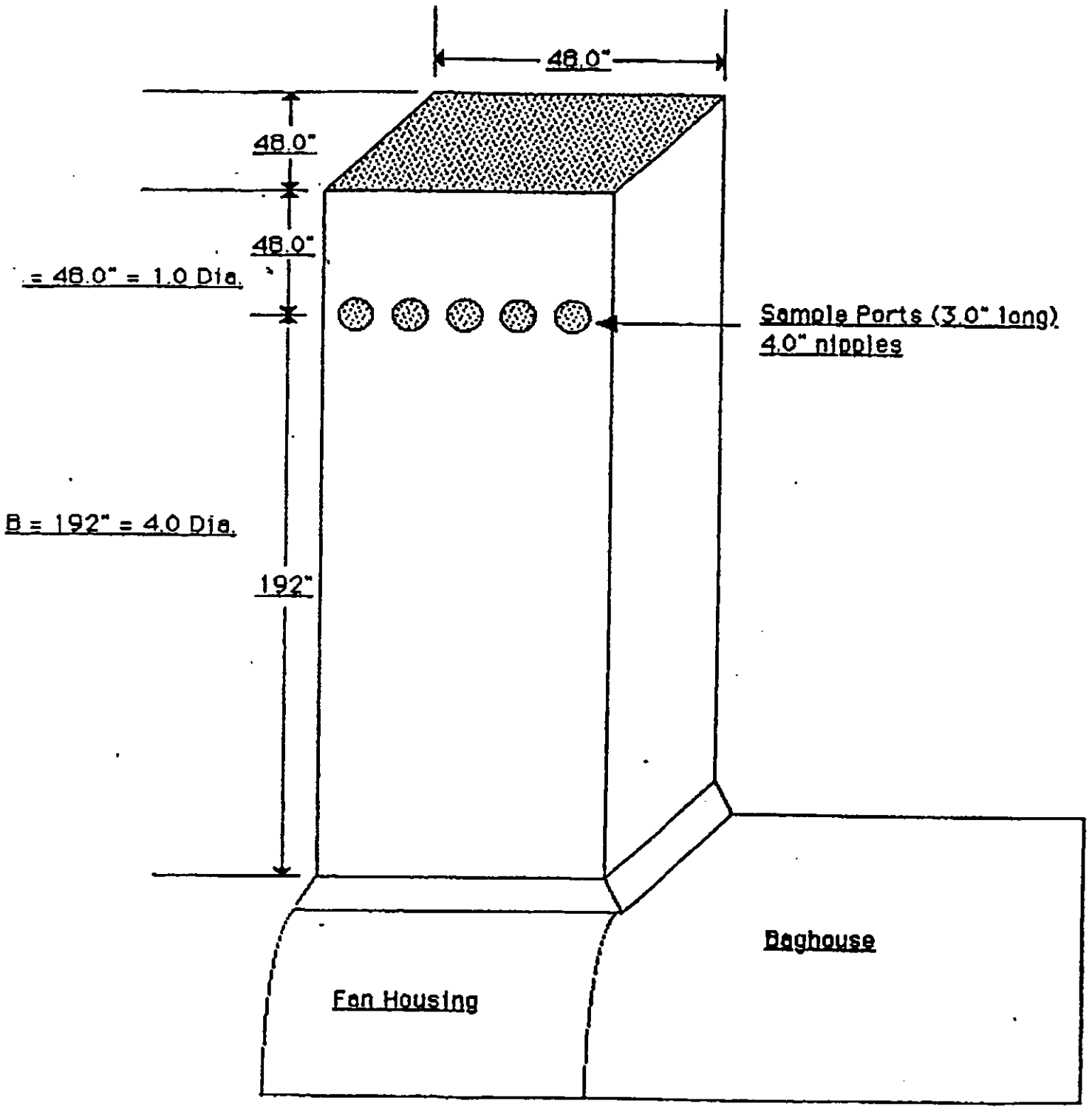
Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination.....	07-06-94
Time of Determination.....(HRS)	1010
Barometric pressure.....(IN.HG)	28.97
Pitot tube coefficient.....	.84
Number of sampling ports.....	5
Total number of points.....	25
Shape of duct.....	Rectangular
Duct width.....(IN)	47
Duct length.....(IN)	48
Duct area.....(SQ.FT)	15.67
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.47
Avg. gas temp.....(DEG-F)	262
Moisture content.....(% V/V)	37.74
Avg. linear velocity.....(FT/SEC)	86.0
Gas density.....(LB/ACF)	.04630
Molecular weight.....(LB/LBMOLE)	29.58
Mass flow of gas.....(LB/HR)	224592
Volumetric flow rate.....	
actual.....(ACFM)	80847
dry standard.....(DSCFM)	35597

APPENDIX B

LOCATION OF TEST PORTS

Stack Diagram of Staker Paving's Portable BCEC Model 400 Asphalt Plant



APPENDIX C

FIELD DATA SHEETS

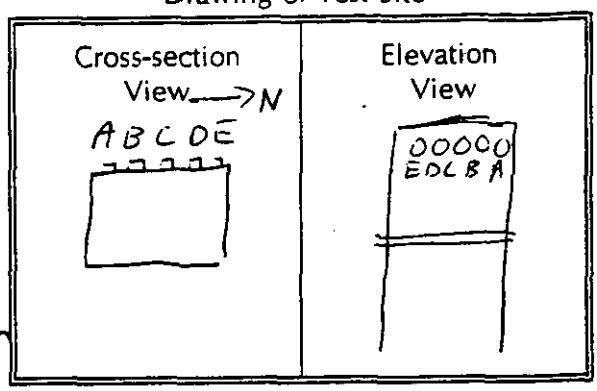
INTERPOLL LABORATORIES, INC.
(612) 786-6020

EPA Method 2 Field Data Sheet

Job: BMI - Mankato - 3290
Source: Asphalt Stack Plant
Test: 1 Run 1 Date 7-6-94
Stack Dimen.: 47" x 48" IN.
Dry Bulb: 262 °F Wet bulb 156 °F
Manometer: ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure: 28.97 IN.HG
Static Pressure: -.47 IN.WC
Operators: David Vitale, Ron Rosenthal, John Johnson
Pitot No.: C_p .840

TOTAL = 50

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: 3.0" IN.		Time Start: 10:10 HRS	
A-1	.1	4.70	7.70	1.60	262
2	.3	14.10	17.10	1.17	
3	.5	23.50	26.50	1.14	
4	.7	32.90	35.90	1.03	
5	.9	42.30	45.30	1.10	
B-1				1.63	
2				1.25	
3				1.02	
4				1.15	
5				1.21	
C-1				1.75	
2				1.45	
3				1.63	
4				1.12	
5				1.38	
D-1				1.90	
2				1.65	
3				1.60	
4				1.55	
5				1.60	
E-1				1.93	
2				2.14	
3				1.60	
4				1.52	
5				1.48	
Temp. Meas. Device & S/N: 37				Time End: 10:25 HRS	

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

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job BMI
Source Asphalt Plant
Method 5 Filter holder: glass
Sample Train Leak Check:

Date 7-6-94 Test 1 Run 1
No. of traverse points 25
Filter type: glass fiber

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.0 cfm at 9 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:
1
6770

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

No. of probe wash bottles: 1
Sample recovered by: R.R. & J.J.

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	773	495	278
Impinger No. 2			
Impinger No. 3	549	295	254
Condenser			
Desiccant	1465	1438	27
Total			559

Integrated Gas Sampling Data:

Bag Pump No. 318
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0.0
Time start: 11:08
Sampling rate: 400

Box No. 21 Bag No. 1
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 12:27 (HRS)
cc/min Operator: DV

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

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[illegible]

Job: BMI -3290
Source: Asphalt Plant
Date: 7-6-94 Test 2 Run 1

Operators: DV; R.R. + J.J.
Meter Box No. 12 ΔH@ 1.90 in HG
Gas meter coeff. 1.0069

Pitot No. 318-4 Cp .840
Bar. Press. 28.97 in Hg H2O 25 %
Nozzle No. 9-4 Nozzle Dia .249 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dry. Vol. (cf)	VAC. inHg	Temperature (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	11:08	358.35											
A- 5	2.5	360.12	.92	1.65	0.12	5	242	241	233	57	80	78	13.0
4	5.0	361.76	1.08	1.96	2.06	7	243	246	234	54	83	77	11.5
3	7.5	363.99	1.05	1.91	3.97	9	243	251	237	55	85	77	11.3
2	10.0	365.95	1.07	1.95	5.91	8	244	257	232	56	87	78	11.5
1	12.5	367.83	1.04	1.90	7.82	7	244	254	234	51	89	78	11.5
C- 5	15.0	369.83	1.18	2.16	9.86	7	244	257	231	53	89	82	11.1
4	17.5	371.64	1.08	1.79	1.73	7	244	249	231	55	94	83	11.1
3	20.0	373.45	.99	1.66	3.53	7	242	251	236	49	96	83	11.3
2	22.5	375.19	.92	1.54	5.26	7	243	251	234	52	98	84	11.2
1	25.0	376.95	.94	1.58	7.02	6	243	253	236	48	99	84	11.4
E- 5	27.5	379.91	1.30	2.19	9.09	7	242	254	231	49	98	85	11.3
4	30.0	380.81	1.10	1.84	1.00	7	246	253	233	52	100	86	11.1
3	32.5	382.66	.97	1.63	2.79	7	246	259	239	49	102	86	11.3
2	35.0	384.54	1.06	1.78	4.66	8	244	255	238	54	103	87	11.3
1	37.5	386.46	1.02	1.73	6.51	8	242	254	232	55	104	88	11.3
B- 5	40.0	388.37	1.12	1.90	8.45	7	243	250	239	51	101	89	10.9
4	42.5	390.25	1.09	1.83	0.35	8	247	255	234	56	104	90	11.0
3	45.0	392.15	1.04	1.76	2.22	8	247	254	232	50	105	90	10.9
2	47.5	393.03	.94	1.59	3.99	8	246	258	242	52	107	91	11.0
1	50.0	395.78	.91	1.54	5.75	7	247	257	248	53	108	91	11.0
D- 5	52.5	397.82	1.28	2.17	7.82	8	246	252	244	54	106	92	10.9
4	55.0	399.63	1.03	1.73	9.68	7	252	254	243	51	109	93	10.9
3	57.5	401.35	.91	1.53	1.43	6	255	255	248	49	109	93	10.8
2	60.0	403.04	.86	1.44	3.13	6	256	262	249	50	110	94	10.6
1	62.5	404.82	.91	1.54	4.88	7	254	262	252	50	110	94	10.8
	θ = 62.5 (12:27)	Vm = 46.47		ΔH = 1.77							Avg. = 92.5		

S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job BMI
Source Asphalt Plant
Method 5 Filter holder: glass
Sample Train Leak Check:

Date 7-6-94 Test 1 Run 2
No. of traverse points 25
Filter type: Glass fiber

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.0 cfm at 13 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: 1

6740

Recovery solvent(s)

☒acetone

☐other(s)

No. of probe wash bottles: 1
Sample recovered by: R.P.JJ

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	756	495	261
Impinger No. 3	414	295	119
Condenser			
Desiccant	1527	1489	38
Total			418

Integrated Gas Sampling Data:

Bag Pump No. 318
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0.0
Time start: 1610
Sampling rate: 400

Box No. 21 Bag No. 2
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: (HRS)
cc/min Operator: DV

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

123093-GASTACK\WP\METHODS\S-0046RR

ENTROPY LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job BMI - 3290
Source Asphalt Plant
Date 7-6-94 Run 1 Run 2

Operators OVS RR: JT
Meter Box No. 18 Y 1.90 ΔH 1.90
Counter coeff. 1.0069

Pitot No. 318-4' Cp .84D
Bar. Press. 28.47 Static H2O ± "
Nozzle No. B4 Nozzle Dia .247 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (in H2O)	Orifice Meter (in H2O)	Dry Gas Vol. (cf)	VAC. (inHg)	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas In	Gas Out	Oxygen (x v/v)
	1610	406.40			8.25	6	244	234	233	37	87	86	13.4
B-5	2.5	408.24	1.10	1.76	0.13	6	247	238	240	33	88	87	13.4
4	5.0	410.09	1.15	1.81	2.12	7	248	242	244	33	95	87	13.5
3	7.5	412.08	1.30	2.04	4.23	8	253	244	238	34	97	88	13.5
2	10.0	414.21	1.45	2.28	6.58	9	256	240	247	35	101	89	14.2
1	12.5	416.56	1.80	2.82	8.67	8	255	238	249	34	100	90	14.2
D-5	15.0	418.67	1.40	2.21	0.68	7	259	245	249	37	105	90	14.1
4	17.5	420.69	1.30	2.04	2.65	7	259	243	251	38	107	90	14.0
3	20.0	422.64	1.25	1.97	4.68	7	253	245	251	40	110	94	14.1
2	22.5	424.67	1.30	2.07	6.98	8	253	247	245	45	112	94	14.1
1	25.0	426.95	1.65	2.64	8.85	6	255	242	253	48	110	95	14.1
A-5	27.5	428.83	1.10	1.76	0.82	6	252	242	254	50	112	95	14.0
4	30.0	430.78	1.20	1.93	2.87	8	249	245	259	53	115	96	14.0
3	32.5	432.79	1.30	2.10	5.08	9	246	248	250	58	117	97	13.7
2	35.0	435.01	1.50	2.44	7.41	10	244	247	257	60	120	98	13.7
1	37.5	437.41	1.60	2.69	9.36	6	245	239	247	48	100	97	13.8
C-5	40.0	439.27	1.15	1.89	1.28	7	247	244	237	49	102	97	13.9
4	42.5	441.29	1.15	1.85	3.15	7	252	246	238	47	106	97	13.9
3	45.0	443.17	1.10	1.76	5.22	8	257	245	245	49	108	98	13.9
2	47.5	445.21	1.35	2.15	7.41	8	257	243	246	52	111	99	13.7
1	50.0	447.42	1.50	2.39	9.49	8	256	237	231	52	134	99	13.5
E-5	52.5	449.45	1.35	2.17	1.58	8	260	242	225	53	110	100	13.5
4	55.0	451.61	1.30	2.12	3.49	7	262	242	238	54	112	98	13.5
3	57.5	453.50	1.15	1.83	5.46	7	260	244	248	55	113	98	13.6
2	60.0	455.53	1.20	1.91	7.50	8	260	240	242	57	117	101	13.7
1	62.5	457.50	1.30	2.08									
	θ = 62.5 (1800)	Vm = 51.1		ΔH = 2.11							Avg. = 100.9		

MOVE PROBE

S-00378

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job BMI
Source Babcock Plant
Method 5 Filter holder: glass
Sample Train Leak Check:

Date 7-6-94 Test 1 Run 3
No. of traverse points 25
Filter type: glass fiber

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

Particulate Catch Data:

No. of filters used:
1
6771

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

No. of probe wash bottles: 1
Sample recovered by: J.J.'s R.R

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	754	495	259
Impinger No. 3	506	296	210
Condenser			
Desiccant	1488	1465	23
Total			492

Integrated Gas Sampling Data:

Bag Pump No. 318
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0.0
Time start:
Sampling rate: 400

Box No. 21 Bag No. 3
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1947 (HRS)
cc/min Operator: RV

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

123093-GASTACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 - CLD vs. A Sheet

Job BMF 3290 Operators DV, R.A.'s, JT Pitot No. 318-4' Cp .840
Source Asphalt Plant Meter Box No 18 ΔH 1.70 IN HG Bar. Press. 28.97 Init. H2O 37 Y
Date 7-6-94 Test 1 Run 3 Coupler code: 10069 Nozzle No. 4-4 Nozzle Dia .249 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (in H2O)	Orifice Meter (in H2O)	Dry Gas Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas In	Gas Out	Oxygen (%v/v)
	(18:30)	457.80											
A-5	2.5	459.92	1.38	2.37	9.97	7	259	245	248	58	107	101	12.6
4	5.0	461.98	1.25	2.17	2.05	8	254	252	246	52	114	101	11.3
3	7.5	463.92	1.22	2.13	4.12	8	255	252	243	52	116	101	11.3
2	10.0	466.12	1.35	2.35	6.30	8	259	254	250	53	118	102	11.1
1	12.5	468.38	1.43	2.49	8.54	10	260	255	244	54	119	102	11.2
B-5	15.0	470.37	1.11	1.94	0.52	8	259	249	250	57	117	102	12.4
4	17.5	472.38	1.10	1.92	2.49	8	259	247	251	56	119	102	12.4
3	20.0	474.34	1.04	1.80	4.41	7	264	252	251	52	120	103	12.5
2	22.5	476.35	1.09	1.89	6.37	8	264	250	244	56	122	103	12.6
1	25.0	478.36	1.12	1.94	8.36	8	265	252	238	59	123	103	12.9
C-5	27.5	480.11	.90	1.60	0.17	6	248	244	238	54	119	104	13.0
4	30.0	482.95	.98	1.74	2.05	7	248	246	244	58	123	104	13.0
3	32.5	483.82	.97	1.73	3.92	7	248	250	246	56	124	104	13.0
2	35.0	485.84	1.10	1.96	5.93	8	248	250	244	57	125	105	13.1
1	37.5	487.92	1.08	1.92	7.91	8	251	248	254	51	125	105	13.0
D-5	40.0	490.22	1.42	2.63	0.22	9	256	247	250	44	117	105	13.1
4	42.5	492.33	1.17	2.15	2.31	8	257	248	258	50	120	105	13.2
3	45.0	494.26	.99	1.83	4.24	7	257	254	241	51	121	105	13.3
2	47.5	496.32	1.15	2.12	6.32	8	258	252	238	52	121	105	13.1
1	50.0	498.40	1.25	2.31	8.49	8	257	250	235	53	120	105	12.8
E-5	52.5	500.61	1.27	2.37	0.68	8	250	244	247	54	115	104	13.0
4	55.0	502.72	1.13	2.07	2.73	8	257	249	251	57	117	105	12.8
3	57.5	504.75	1.10	2.02	4.75	8	258	253	251	57	117	105	13.0
2	60.0	506.81	1.15	2.10	6.82	8	261	251	249	57	117	105	12.9
1	62.5	509.03	1.35	2.47	9.06	9	262	251	248	58	117	104	13.6
	θ = 62.5	Vm = 51.23		ΔH = 2.08							Avg. = 111.2		
	(19:47)												

C-7

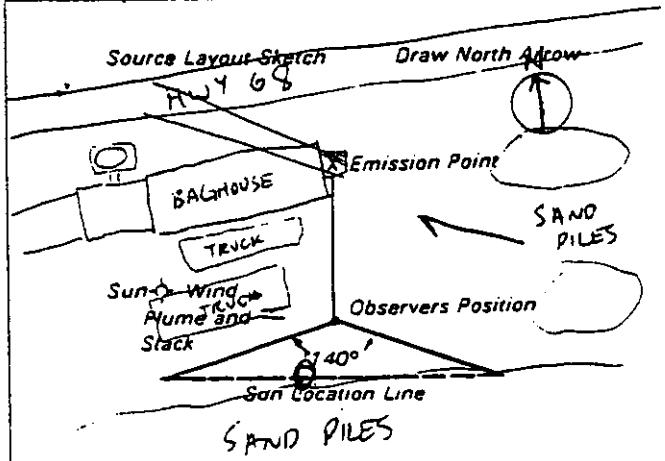
S-00378

Interpoll Laboratories
(612)786-6020

Visible Emissions Form

SOURCE NAME: SMI	OBSERVATION DATE: 7-6-94	START TIME: 16:15
ADDRESS:		STOP TIME: 17:54
CITY: Mankato	STATE: MN	ZIP:
PHONE:	SOURCE ID NUMBER:	
PROCESS EQUIPMENT: Asphalt Plant	OPERATING MODE: 100%	
CONTROL EQUIPMENT: Baghouse	OPERATING MODE: 100%	
DESCRIBE EMISSION POINT: START RECTANGULAR STACK AT END OF BAGHOUSE	STOP SAME	
HEIGHT ABOVE GROUND LEVEL: START 25' STOP SAME	HEIGHT RELATIVE TO OBSERVER: START 20' STOP Same	
DISTANCE FROM OBSERVER: START 100' STOP SAME	DIRECTION FROM OBSERVER: START N STOP Same	
DESCRIBE EMISSIONS: START BLOWING PLUME STOP SAME		
EMISSION COLOR: START WHITE STOP SAME	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 3' above STACK STOP SAME		
DESCRIBE BACKGROUND: START SKY STOP SAME		
BACKGROUND COLOR: START WHITE STOP	SKY CONDITIONS: START SCATTERED STOP SAME	
WIND SPEED: START 0-2 STOP	WIND DIRECTION: START N STOP	
AMBIENT TEMP.: START 83°F STOP SAME	WET BULB TEMP.	RH percent: 68%

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



AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT): DAVID VITALER	
OBSERVER'S SIGNATURE: David Vitaler	DATE: 7-6-94
ORGANIZATION: INTERPOLL LABS	
CERTIFIED BY: ETA	DATE: 7-6-94
VERIFIED BY	DATE

COMMENTS: SHUT DOWN AT 17:00 RESTART AT 17:15

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS
SIGNATURE | TITLE | DATE

S-0079R

VISIBLE EMISSIONS EVALUATOR

This is to certify that

David Vaales

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 Lore
President

243003
Certificate Number

Vice President

Minneapolis
Location

David B. Savage, Jr.
Program Manager

April 6, 1994
Date of Issue

APPENDIX D

INTERPOLL LABORATORIES ANALYTICAL DATA

7.(

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job BMI
Team Leader DV
Date Submitted 7-8-94
Test No. 1
Date of Analysis 7-12-94

Source Asphalt Plant
Test Site stack
Date of Test 7-6-94
No. of Runs Completed 3
Technician C. Helgeson

Test/Run	Sample Log Number and Type	No. of An.	Buret Readings (ml) Zero Pt.	After CO_2	After O_2	Conc. CO_2 %v/v Dry	Conc. O_2 %v/v Dry	F_o
1/1	3290-05	1	0.00	7.10	18.20	7.10	11.10	1.38
		2	0.00	7.10	18.20	7.10	11.10	1.38
	☑ B ☐ F	Avg				7.10	11.10	
1/2	-06	1	0.00	5.30	19.10	5.30	13.80	1.34
		2	0.00	5.30	19.10	5.30	13.80	1.34
	☑ B ☐ F	Avg				5.30	13.80	
1/3	-07	1	0.00	6.20	18.70	6.20	12.50	1.35
		2	0.00	6.20	18.70	6.20	12.50	1.35
	☑ B ☐ F	Avg				6.20	12.50	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

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

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

EPA Method 3 Guidelines

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

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

LSC-04-BR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job BMI - Mankato
Team Leader DU
Date Submitted 7-8-94
Test No. 1
Date of Analysis 7-13-94

Source Asphalt Plant
Test Site Stack
Date of Test 7-6-94
No. of Runs Completed 3
Technician C. GIERKE

0	Test 1 Run 0 Field Blank Log Number 3890-01I Comments	Dish No. 12 Dish Tare Wt. 48.1484 g Dish+Sample Wt. 48.1488 g Sample Wt. 0.0004 g
1	Test 1 Run 1 Log Number -02I Comments	Dish No. 36 Dish Tare Wt. 43.5639 g Dish+Sample Wt. 43.6437 g Sample Wt. 0.0798 g
2	Test 1 Run 2 Log Number -03I Comments	Dish No. 44 Dish Tare Wt. 47.6194 g Dish+Sample Wt. 47.7459 g Sample Wt. 0.1265 g
3	Test 1 Run 3 Log Number -04I Comments	Dish No. 115 Dish Tare Wt. 45.0690 g Dish+Sample Wt. 45.1052 g Sample Wt. 0.0362 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. 0.0004 g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0794	0.1261	0.0358	D-2	

LSC-03.GR

Interpoll Laboratories
(312) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job BMI
Team Leader DV
Date Submitted 7-8-94
Test No. 1
Date of Analysis 7-14-94
Transport Leakage ☒ None ☐ _____ ml

Source Asphalt Plant Stack
Test Site _____
Date of Test 7-6-94
No. of Runs Completed 3
Technician C. Hutchison
Solvent Acetone

Test 1 Run 1
Field Blank
Log Number 3290-01P
Vol. of Solvent 100 ml
*Solvent Residue 3.00 ug/ml
Comments -01P

Dish No. 200
Dish Tare Wt. 44.9457 g
Dish+Sample Wt. 44.9460 g
Sample Wt. 0.0003 g

Test 1 Run 2
Vol. of Solvent 95 ml
Log Number -02P
Comments

Dish No. 209
Dish Tare Wt. 43.2104 g
Dish+Sample Wt. 43.2287 g
Sample Wt. 0.0183 g

Test 1 Run 3
. of Solvent 75 ml
Number -03P
ments

Dish No. 312
Dish Tare Wt. 45.2401 g
Dish+Sample Wt. 45.2549 g
Sample Wt. 0.0148 g

Run
of Solvent ml
mber
ts

Dish No. 609
Dish Tare Wt. 45.5675 g
Dish+Sample Wt. 45.5917 g
Sample Wt. 0.0242 g

Run
Solvent ml
er

Dish No.
Dish Tare Wt.
Dish+Sample Wt. g
Sample Wt. g

Dish No.
Dish Tare Wt.
Dish+Sample Wt. g
Sample Wt. g

sidue 3.00 ug/ml = [(Sample Wt. 0.0003 g)(10^6)]/Vol. of Sol. 100 ml
tone Residue Blank Spec. (7.3 ug/ml

Run 1	Run 2	Run 3	Run 4	Run 5
0.0180	0.0146	0.0240	D-3	

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job BMI
Team Leader DV
Date Submitted 7-8-94
Test No. 1
Date of Analysis 7-13-94

Source Asphalt Plant
Test Site Stack
Date of Test 7-6-94
No. of Runs Completed 3
Technician C. Helgesen

0	Test 1 Run 0 Field Blank Log Number 3290-01F Comments	Filter No. 6700 Filter Type 4"6F Filter Tare Wt. .9433 g Filter+Sample Wt. .9434 g Sample Wt. 0.0001 g
1	Test 1 Run 1 Log Number -02F Comments	Filter No. 6770 Filter Type 4"6F Filter Tare Wt. .9363 g Filter+Sample Wt. .9600 g Sample Wt. 0.0237 g
2	Test 1 Run 2 Log Number -03F Comments	Filter No. 6740 Filter Type 4"6F Filter Tare Wt. .9405 g Filter+Sample Wt. .9549 g Sample Wt. 0.0144 g
3	Test 1 Run 3 Log Number -04F Comments	Filter No. 6771 Filter Type 4"6F Filter Tare Wt. .9451 g Filter+Sample Wt. .9748 g Sample Wt. 0.0297 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
	0.0237	0.0144	0.0297		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1211	0.1551	0.0895		

LSC-02PR

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: BMI — Source: Asphalt plant — Site: Stack — Log No.: ____
Field Engineer: D.V — Date of Test: 7-6-94 — Test No.: 1 — No. of Runs: 3

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

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

Relinquished by/Affiliation	Accepted by/Affiliation	Date
David Vander/ Interpoll Labs		7-7-94
	Interpoll	7/8/94 0830

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

APPENDIX E

ASPHALT PLANT INFORMATION SHEET

Interpoll Laboratories
(612)786-6020

Asphalt Plant Information Sheet

Manufacturer and Model No. of the Plant BCEC MS 400 RP

Owner and Operator of the Plant Bituminous Materials, Inc.

Location of Plant at time of Test (State, County and Address) 1/4 Mile SE of the junction of Co Rd 116 + TH 68 in Blue Earth Co, Minnesota

Estimated Total Time of the Plant at this Site (from when to when) 6-15-94 to 8-15-94

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

Model No. of Pollution Control Equipment PB-70 ACFM

If wet scrubber, provide the following information:

Percent recycle of scrubber water — %

Flow of water to scrubber — GPM

Manufacturer recommended pressure drop across venturi — IN.WC.

Rated Capacity of Asphalt Plant 400 TONS/HR at an aggregate moisture content of 5 %

Type of Fuel Used to Fire Plant:

- ☐ Natural Gas
- ☐ No. 2 Fuel Oil
- ☐ No. 5 Fuel Oil
- ☐ Propane
- ☒ Waste Oil

Normal Production Rate of Plant 430-450 TONS/HR at an aggregate moisture content of 3-7 %

NOTE: Attach drawings of plant and pollution control equipment.

Name of Individual Supplying Information John T. Heselton

Date 7-06-94

S-0150R(2)

APPENDIX F

ASPHALT PLANT OPERATING DATA

REQUIRED OPERATING DATA FOR ASPHALT PLANT

This form MUST BE COMPLETED , AND SUBMITTED with the performance stack test.

1. Itemize all fuels and materials that are added to the combustion process during the test period. Please label Run Number with Test Number. Fuel used during testing (if oil, please specify grade) Waste Oil
If other units are used, specify and calculate heat input appropriately.

Test No. ___	FUEL INPUT (Gal/hr)	% MOISTURE (as recv'd)	BTU/GAL (as recv'd)	HEAT INPUT (Btu/hr)
Run No. 1				
Run No. 2				
Run No. 3				

2. Are the above fuels substantially the same as those normally burned? Yes.
If not, explain _____.

3. Are the above fuels normally burned in the proportions shown above? No.
If not, explain Depending on the moisture content of the aggregate.

4. Describe any changes anticipated for procurement of fuels within the next twelve (12) months. None.

5. Is the plant operating at normal or maximum conditions? Normal.

AIR POLLUTION CONTROL EQUIPMENT

1. Type/Model control equipment Baghouse PB - 70 ACFM.

2. Air pressure drop across the control equipment 2 - 10.

3. Air flow through the control equipment 70,000 ACFM.

4. Was the control equipment operating normally? Yes.

5. Date and procedures of last maintenance/cleaning of control equipment
7-05-94 Check and replace older bags with new bags.

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 J. T. Hewlett, Position Quality Control
Phone number where you may be reached (507) 384-5155

Asphalt Plant Operating Conditions During Stack Testing

Rev/YH/93

Test Date(s) 7-06-94

Plant Mfr. & Model BCEC MS400RP

Type (circle one): (Drum Mix) Conventional

Other (list): _____

Pollution Control Equipment: (Baghouse) Venturi Scrubber wet scrubber cyclone muiticlone

(circle one)

If wet scrubbing: _____% scrubber water recycled

List model: PB-70 ACFM

Normal pressure drop across control equipment: 2-10 inches water

Air flow through control equipment: 70,000 acfm at 250F

Was control equipment operating normally during testing? Yes.

Date & procedures of last maintenance/cleaning of control equipment 7-05-94 Check and replace older bags with new bags.

Fuel: Waste Oil

Itemize all fuels and materials added to the combustion process during the test period. List fuel type used during testing (if oil, specify grade) Waste. If other units of measure are used, specify and calculate appropriate heat input.

Test No. 1	Fuel Input (Gal/hr)	BTU/GAL (as received)	Heat Input (BTU/HR)	%Moisture (as received in aggregate) Virgin	recycle	combined
Run 1	766					
Run 2	778					
Run 3	801					

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

1.8 gal/ton hot mix

No. of Burners: 1 Burner(s) rating: 116 MMBTU/HR = 100% setting

Operation:

time 15 min. intervals	burner setting %	aggregate tons per hour	recycle tons per hour	asphalt tons per hour gpm	Drum Mix temp. F	dust collector pressure drop inches water	scrubber water flow rate gpm	Other (list)
11:00	81	252.60	168.4	16.7	275	3.5	—	—
11:15	81	259	173	16.8	275	4	—	—
11:30	81	252	168	16.6	260	4	—	—
11:45	81	253	169	16.6	265	4	—	—
12:00	81	260	174	16.5	265	4.1	—	—
12:15	81	250	167	16.3	280	4.4	—	—
4:15	80	257	171	16.5	275	2	—	—
4:30	70	260	173	17.0	280	2.2	—	—
4:45	70	263	176	17.0	275	2.3	—	—
5:00	70	250	166	15.9	270	2.3	—	—
5:30	75	267	178	16.7	270	2.9	—	—
6:45	81	264	176	17.7	265	3.0	—	—
7:00	81	265	177	17.5	260	3.1	—	—

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: John Wanless, Phone: (507) 334-5155

Position: Quality Control

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

Rev/YH/93

Test Date(s) _____

Plant Mfr. & Model _____ Type (circle one): Drum Mix Conventional

Other (list): _____

Pollution Control Equipment: Baghouse Venturi Scrubber wet scrubber cyclone multiclone

(circle one)

If wet scrubbing: _____% *scrubber water recycled*

List model: _____ Normal pressure drop across control equipment: _____inches water

Air flow through control equipment: _____ acfm at _____F Was control equipment operating normally during testing? _____

Date & procedures of last maintenance/cleaning of control equipment _____

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) _____. *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						
Run 2						
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)
7:15	81	265	177	18.2	260	3.2	—	—
7:30	81	271	180	17.9	260	3.9	—	—

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:* (_____)_____

Position: _____

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.

	Time	Aggregate (TPH)	Recycle (TPH)	Asphalt (GPM)	Asphalt (TPH)	Total (TPH)	% Recycle
Run 1	1100	253	168	16.7	4.0l	425.0	39.5
1108/122	1115	259	173	16.8	4.0l	436.0	39.7
	1130	252	168	16.6	3.9l	423.9	39.6
	1145	253	169	16.6	3.9l	425.9	39.7
	1200	260	174	16.5	3.9l	437.9	39.7
	1215	250	167	16.3	3.9l	420.9	39.7
Average		255	170		3.9l		
Run 2	1615	257	171	16.5	3.9l	431.9	39.6
1610/180	1630	260	173	17	4.0l	437.0	39.6
	1645	263	176	17	4.0l	443.0	39.7
	1700	250	166	15.9	3.8l	419.8	39.5
	1730	267	178	16.7	4.0l	449.0	39.6
Average		259	173		3.95		
Run 3	1845	264	176	17.7	4.2l	444.2	39.6
1830/194	1900	265	177	17.5	4.1l	446.1	39.7
	1915	265	177	18.2	4.3l	446.3	39.7
	1930	271	180	17.9	4.2l	455.2	39.5
Average		266	176		4.21		

APPENDIX G

PROCEDURES

Particulate Loading and Emission Rates

The particulate emission rates were determined per EPA Methods 1 - 5, CFR Title 40, Part 60, Appendix A (revised July 1, 1992). 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. The sampling module also houses the impinger case and a Drierite filled column. The sampling module is connected by means of an umbilical cord to the control module. The control module houses the dry test gas meter, the calibrated orifice, a leakless pump, two inclined manometers, and all controls required for operating the sampling train.

Particulate samples are collected as follows: The sample gas is drawn through the sampling probe isokinetically and passed through a 4-inch diameter Gelman Type A/E glass fiber filter where particulates are removed. The sample gas is then passed through an ice-cooled impinger train and a desiccant-packed column which absorbs remaining moisture. The sample gas then passes through a vacuum pump followed by a dry test gas meter. The gas meter integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gasmeter provides real time 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 test point maintaining isokinetic sampling conditions. Nomographs are used for rapid determination of the sampling rate.

Particulate Loading and Emission Rates

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 with each pollutant sample. The samples were collected in 15-liter gas sampling bags at a constant flow rate throughout each particulate run. The bags were 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).

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 snugly 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.

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°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-03G.

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-03G.

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°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-03G.

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 not use ether as an extraction solvent. Substitute toluene for ethyl ether in Section I. (Ether in the presence of peroxide forms explosive hydroperoxide.)

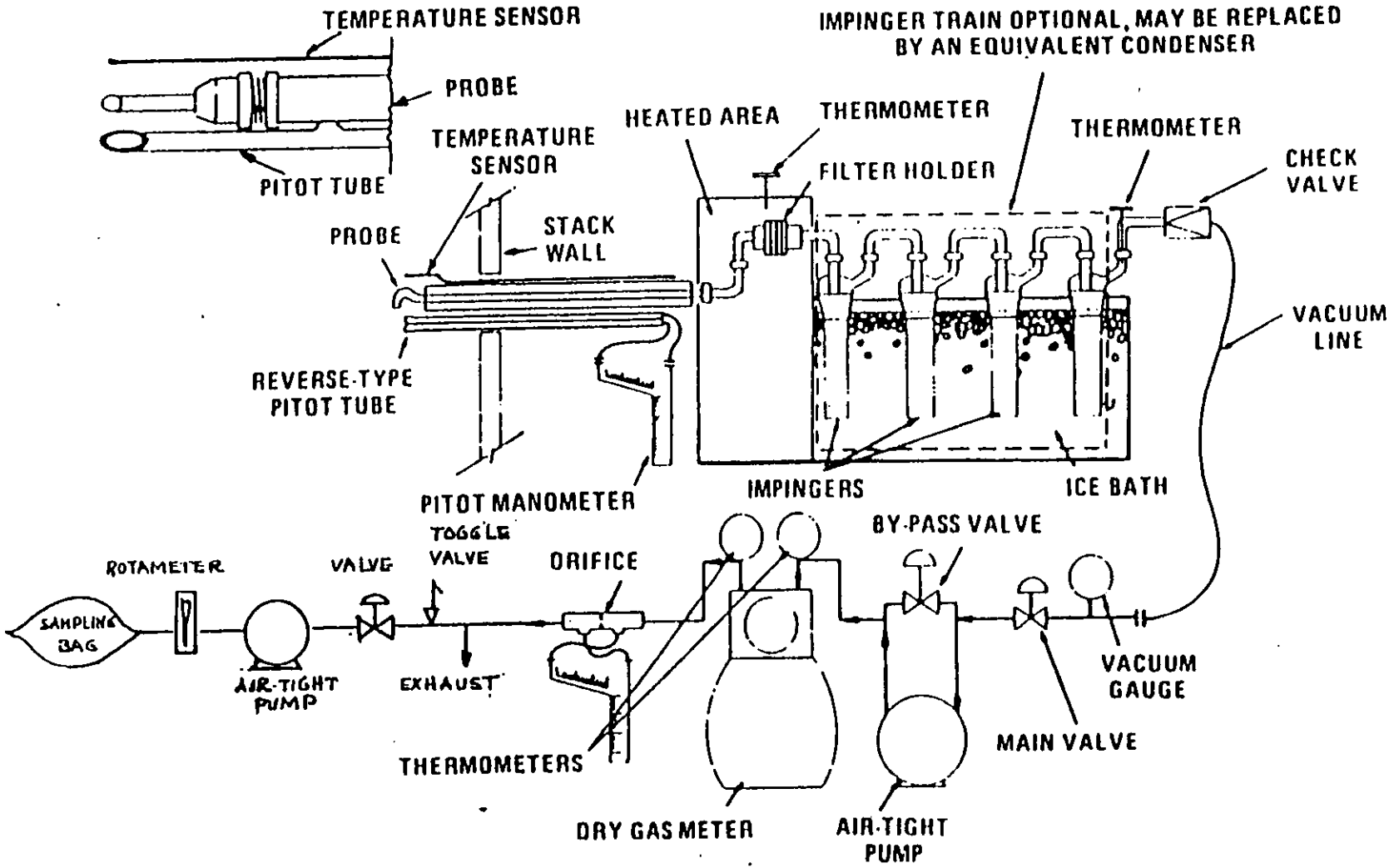
2. In the organics determination, more than three extractions may be required to extract all of the organics. Additional extractions should be performed if the aqueous phase is still cloudy.

3. Special state requirements:
   Michigan - Total sample evaporated in tared evaporating dish on steam bath.
   Iowa - Organics and inorganics separately, as required.
   Wisconsin - Use Method II-8672-WI.
   Rest of states - Organics only.

REFERENCES

Proposed standards of Performance for New Stationary Sources, Federal Register 36(159) Part II, August 1, 1979.

Minnesota Pollution Control Agency, Exhibit C.



Particulate-sampling train.

APPENDIX H

CALCULATION EQUATIONS

METHOD 2
CALCULATION EQUATIONS

$$\overline{V_s} = 85.49\ C_p\ (\sqrt{\Delta p})_{avg}\ \sqrt{\frac{T_{s(avg)}}{P_s\ M_s}}$$

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

$$Q_a = 60\ \overline{V_s}\ A$$

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

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

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

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

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

SYMBOLS

A	=	Cross Sectional area of stack. SQ. FT.
A_n	=	Cross sectional area of nozzle, SQ. FT.
B_{ws}	=	Water vapor in gas stream, proportion by volume
C_p	=	Pitot tube coefficient, dimensionless
C_a	=	Concentration of particulate matter in stack gas, wet basis, GR/ACF
C_s	=	Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, GR/DSCF
EA	=	Excess air, percent by volume
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.
m_g	=	Mass flow of wet flue gas, LB/HR
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, °R
T_{std}	=	Standard absolute temperature, 528 °R (68 °F)
θ	=	Total sampling time, *min.*
V_{lc}	=	Total volume of liquid collected in impingers and silica gel, ml
V_m	=	Volume of gas sample as measured by dry gas meter, CF
$V_{m(std)}$	=	Volume of gas sample measured by the dry gas meter corrected to standard conditions, DSCF
$V_{w(std)}$	=	Volume of water vapor in the gas sample corrected to standard conditions, SCF
$\bar{V}_s$	=	Average actual stack gas velocity, FT/SEC
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

METHOD 3
CALCULATION EQUATIONS

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

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

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

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

METHOD 5
CALCULATION EQUATIONS

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

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

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

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

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

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

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

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

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

APPENDIX I

SAMPLING TRAIN CALIBRATION DATA

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

Job BMI - Mankato Date 7-5-94

Operator D.V Module No. 18

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

Bar press 28.87 in. Hg. $_T$ = 1.0069 ^H@ 1.90 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F) Inlet	Outlet			
[redacted]	(338.70)	[redacted]		350.60		
2.5	340.55	81	74	352.51	87	78
5.0	342.42	83	74	354.04	87	74
7.5	344.31	85	74	356.31	87	72
10	346.18	86	73	358.19	87	71
[redacted]	V_m = 7.48	Avg(t_m) = 78.8 °F		7.59		80.4

Calculate Y_{cn} as follows:

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

$$Y_{cn} = \frac{1.786}{(1.0069)(7.59)}\left[\frac{(80.4) + 460}{(28.87)}\right]^{0.5}$$

7.64

$$Y_{cn} = 1.00$$

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

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

S-432

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: July 11, 1994

Meter Box No. : 18 (Rockwell Dry Test Meter Serial No. 1334117)

Date of Last Calibration: April 25, 1994
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
June 21, 1994	4-3191	689.80	1015.80	326.00	326.00
June 28, 1994	4-3253	32.90	151.68	118.78	444.78
June 29, 1994	4-3254	152.39	338.34	185.95	630.73
July 06, 1994	4-3290	358.35	509.03	150.68	781.41

* Total volume through meter since last calibration.

Date 1-25-94

Bar. Press. 28.66 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 6

Control Module No. 18
Serial No. DTM 1334117
Wet Test Meter No. AL-20
Technician [signature]

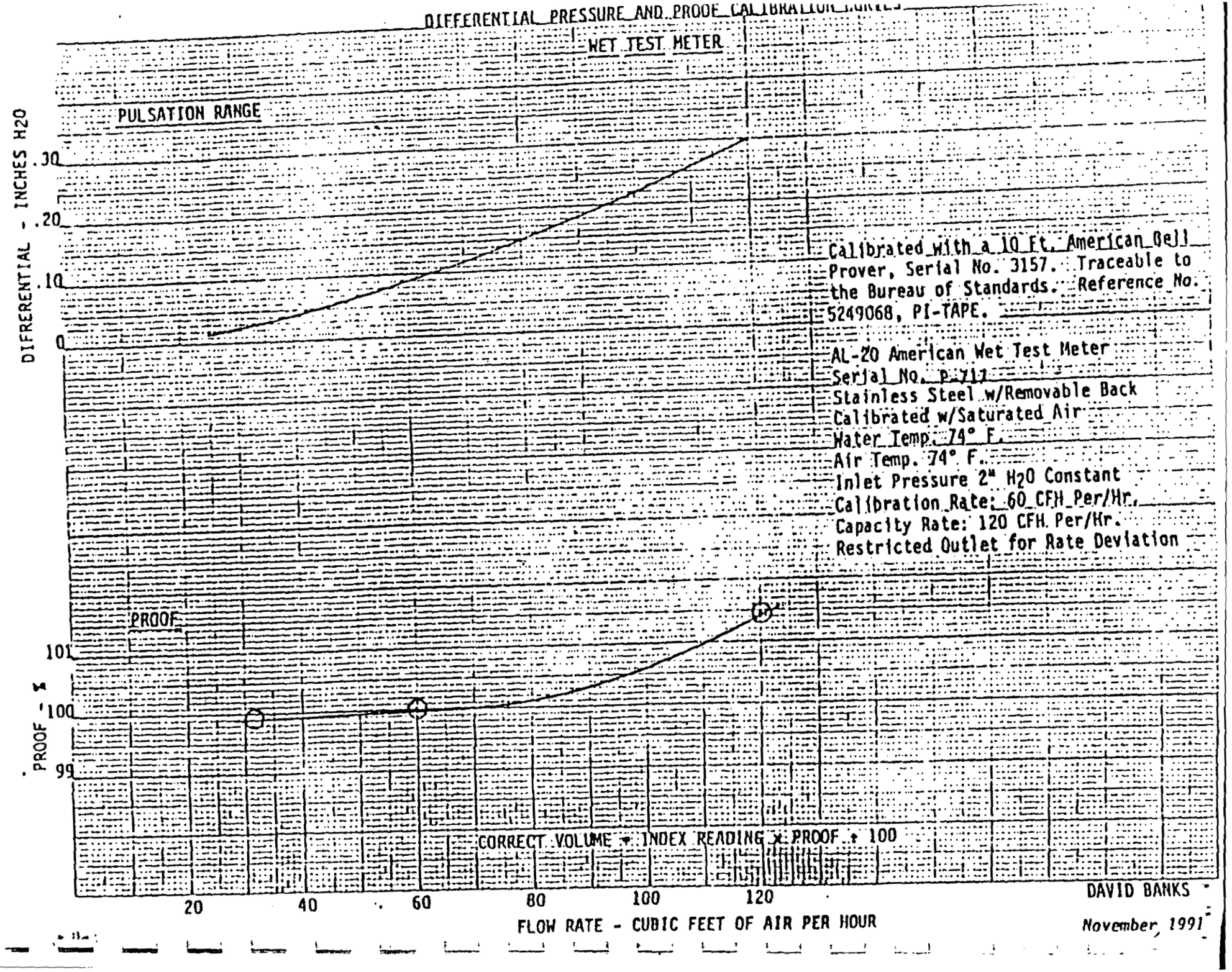
ΔH (in. WC)		Gas Volume Wet Test Meter (ft^3)	* Cal. Index θ (X)	* Diff. Wet Test Meter ΔP_w (in.WC)	Gas Volume Dry test meter (ft^3)		Gas temperatures			Time θ min/sec	Meter Coeff. Y	Orifice Const. ΔH@	C_f
							Wet Test	Dry Test					
nominal	actual				V_{d1}	V_{df}	t_w (°F)	t_{d1} (°F)	t_{do} (°F)				
0.6	.5	2	99.85	0.01	655.700	657.710	71	84	76	5/01	1.0090	1.82	
1.2	1.2	3	99.91	0.025	652.500	655.524	71	82	76	4/56	1.0029	1.88	
2.0	2.0	3	99.93	0.055	658.000	661.030	71	87	77	3/53	1.0046	1.93	
3.3	3.3	5	100.00	0.09	661.400	666.441	71	92	78	5/04	1.0092	1.94	
4.7	4.7	6	100.02	0.12	667.000	672.044	71	94	80	4/16	1.0088	1.95	
											1.0069	1.90	

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

Approved by [signature] Date 5/2/94

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

S0102RR 11/91


DIFFERENTIAL PRESSURE AND PROOF CALIBRATION CURVES
WET TEST METER
PULSATION RANGE
DIFFERENTIAL - INCHES H20
.30
.20
.10
0
PROOF
101
100
99
PROOF - %
Calibrated with a 10 Ft. American Gell Prover, Serial No. 3157. Traceable to the Bureau of Standards. Reference No. 5249068, PI-TAPE.
AL-20 American Wet Test Meter
Serial No. P-711
Stainless Steel w/Removable Back
Calibrated w/Saturated Air
Water Temp. 74° F.
Air Temp. 74° F.
Inlet Pressure 2" H2O Constant
Calibration Rate: 60 CFH Per/Hr.
Capacity Rate: 120 CFH Per/Hr.
Restricted Outlet for Rate Deviation
CORRECT VOLUME = INDEX READING x PROOF ÷ 100
20
40
60
80
100
120
FLOW RATE - CUBIC FEET OF AIR PER HOUR
DAVID BANKS
November, 1991

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 07-06-94 Nozzle Number 9-4
Technician: Dave Vaaler

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

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

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

Unit under test: # 37

Vendor OMEGA
Model HH81
Range 0-2100 °F
Date of Calibration 5-5-94

Serial Number 74JX0225
Thermocouple Type K
Technician E TRAUBRIDGE

Method of Calibration:

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

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

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation Δt (°F)	Deviation (%)
0	0	0.5	-.5	.11
100	100	98.7	-1.3	.23
200	200	200.6	.6	.09
300	300	298.6	1.4	.18
400	400	399	-1.0	.11
500	500	499	-1.0	.10
600	600	601	+1.0	.09
700	700	700	0	0
800	800	802	+2.0	.16
900	900	901	+1.0	.07
1000	1000	1001	+1.0	.07
1100	1100	1100	0	0
1200	1200	1201	+1.0	.06
1300	1300	1299	-1.0	.05
1400	1400	1402	+2.0	.10
1500	1500	1501	+1.0	.05
1600	1600	1604	+4.0	.19
1700	1700	1701	+1.0	.04
1800	1800	1803	+3.0	.13
1900	1900	1901	+1.0	.04
2000	2000	2001	+1.0	.04
2100	2100	2099	+1.0	.04
		Averages:	1.218	.098

OF = off scale response by unit under test (°F)
% dev = 100 Δt / (460 + t)

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

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 31-4

Pitot tube dimensions:

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

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z <.125" .101
9. W <.0625" .101

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) .758 IN.

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

Date of Inspection: 4-7-94

Inspected by: [signature]

CFR Title 40 Part 60 Appenidix A Method 2

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INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 6-16-94

Technician SB

Mercury Column Barometer No. 1

Aneroid Barometer No. 9022200

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
29.20	70	.110	29.09	29.18	.09

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

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

*Note

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

PART 1. GENERAL INFORMATION

Name and address of permittee: BITUMINOUS MATERIALS, INC.
P.O. Box 246
Faribault, Minnesota 55021

Permittee contact person: John Heselton
(507)334-5155
FAX (507)334-0114

Permit File No.: 89B-94-G-2

Tests are mandated by above referenced Permit

Sketches of stack source point to be tested showing test port location, stack diameter, and other pertinent information are included with this plan (See Exhibit A).

Physical location of the emission unit to be tested: See Exhibit B

Independent Testing Company: Interpoll Laboratories, Inc.
Contact: Kathy Eickstadt (612)786-6020

Test Plan Date: June 9, 1994
Test Date: July 6, 1994

PART II. TESTING REQUIREMENTS

EP#	Pollutant	Emission Limit	Applicable Rule	Method	Run Length
1	PM	.04 GR/DSCF	40 CFR 60, Subp I Minn Rules Pt. 7011.0910	5	60 min
1	Opacity	20%	Minn Rules Pt. 7011.0900	9	60 min

Fuel Sampling and Analysis (as per Exhibit D):
One tap sample per particulate test run will be taken as close as possible to the burner (somewhere in the feeding line) to be representative of the fuel burned at the time of the test. The samples will be taken in pint-size clean containers and according to the procedures listed in Exhibit D. The three samples will be composited and analyzed for:

Gross heating value, BTU/gal	ASTM-240
Sulfur, % by weight	ASTM D-1552
Ash, % by weight	ASTM D-874
Specific gravity	ASTM D-1298
Lead, % by weight	ASTM D-2788
PCB, ppm by weight	EPA-600/4-81-045

Halogens, % by weight	ASTM D-1317
Acidity, Ph	ASTM D-1093
Flash point, °F	ASTM D-93

Moisture Content in the Virgin and Recycle Aggregate:
Two samples of each (virgin and recycle aggregate) per test run of particulates. Samples 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.

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

PART III. OPERATING CONDITIONS

Rational for Worst Case: Burner fuel, waste oil; RAP, 40%; Fugitive Recycling System from baghouse to drum.

Normal Range of Process or Operating Rate: 500 TPH @ 5% moisture.

Description of Process Equipment: See Exhibit C

Description of How Process Equipment will be Monitored During Testing: Monitor pressure drop, emission characteristics.

Description of Air Pollution Control Equipment: Portable Baghouse Model PB-70ACFM Air/Cloth Ration 5.64:1

Description of How Air Pollution Control Equipment will be Monitored During Testing: Record pressure drop across the baghouse.

PART IV. TEST METHODS

A. EPA Method 1 for location of sampling ports and points.

B. EPA Method 2 for velocity and volumetric flow rate. Three determinations: one measurement concurrently with each test run for every pollutant.

C. EPA Method 3 for gas analysis. One test run on an integrated sample taken concurrently with each test run for every pollutant.

D. EPA Method 4 for the determination of moisture in the flue gases. One test run concurrently with each test run for every pollutant.

E. EPA Method 5 as amended by Minn. Rules pt. 7005.2060 and 7011.0725 for the concentration of particulate matter including organic condensibles. The sampling time for each run must be at least 60 minutes, and the sampling rate must be at least

32 dscf (0.9 dscm). Three runs must be conducted. Results are to be reported both as total particulate matter containing condensibles where the limit includes organic condensibles and total particulate matter excluding condensibles where the limit does not include condensibles.

F. EPA Method 9 as amended by Minnesota Rules part 7017.2060 for visual determination of opacity. One hour of observations, concurrently with a test run for particulates.

PART V. CEMS RELATIVE ACCURACY

N/A

PART VI OTHER

1. Results to be presented in GR/DSCF and LB/HR for PM; percent for opacity.

2. One hard copy of the test report shall be submitted within 45 days after the date of the test.

3. A copy of the microfiche report shall be submitted within 105 days after the date of the test.

4. All submittals shall be addressed to:
Supervisor, Compliance Determination Unit
Compliance and Enforcement Section
Air Quality Division
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, Minnesota 55155-4194

5. **MPCA Warning:** Given the seriousness of exceeding an emission limit, the Company is hereby provided notice that enforcement action will be taken for a first performance test failure. This enforcement action will not be initiated until the results of the retest have been reviewed by MPCA staff and will require the Company to pay a civil penalty.

Please be advised that upon receiving written notice of a second performance test failure, the Company will be required to either shut down the tested process unit(s) or to submit a compliance plan, subject to MPCA approval, which indicates specific measures to be taken which are expected to all the unit(s) to operate in compliance with the applicable emission limitations. the plan must also include specific measures the facility will take to minimize emissions until compliance is demonstrated. However, if the unit(s) continue to operate, they will be considered to be operating in violation of the applicable limits from the date of the performance test until a retest has been conducted that demonstrates compliance.

Please note that results of a performance test are not final until MPCA staff provides a written compliance determination.