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: 54

Title: Results Of The August 5, 1994 NSPS Particulate And Opacity Test On The Mark Sand & Gravel No. 8 Portable Asphalt Plant Near Fergus Falls, Minnesota,

Interpoll Laboratories, Inc., Circle Pines, MN,

November 22, 1994.

AP-42 Section	11.1
Reference	
Report Sect.	4
Reference	54

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

TEL: (612) 786-6020
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RESULTS OF THE AUGUST 5, 1994 NSPS PARTICULATE AND OPACITY TEST CONDUCTED ON THE MARK SAND & GRAVEL NO. 8 PORTABLE ASPHALT PLANT NEAR FERGUS FALLS, MINNESOTA (PERMIT FILE NO. 417D-94-G-1)

Submitted to:

MARK SAND & GRAVEL COMPANY
1230 Pebble Lake Road
Fergus Falls, Minnesota 56538-0396

Attention:

Don Ashworth

Approved by:

Daniel Despen
Manager
Stationary Source Testing Department

Report Number 4-3532
August 22, 1994
SP/slp

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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 Hove Printed Name of Person Signing: GARY HOVE
Title: FIELD TECH Date: 8-5-94

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: 9/8/94

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: Daniel J. Deegan Printed Name of Person Signing: Daniel J. Deegan
Title: Mgr Stationary Source Date: Sept 8, 1994

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: D.P. Ashworth Printed Name of Person Signing: D.P. ASHWORTH
Title: V.PRES. Date: 9/12/94

1-5-94-G:\STACK\WP\FORMS\S-180

1 INTRODUCTION

On August 5, 1994 Interpoll Laboratories Personnel conducted a State Particulate and Visible Emission Compliance Test on the Mark Sand & Gravel No. 8 Portable Asphalt Plant near Fergus Falls, Minnesota. Gary Hove, Ed Juers, and Jon Johnson performed the on-site portion of the test. Coordination between testing activities and plant operation was provided by Barry Rieken of Mark Sand & Gravel. The test was not witnessed by a member of the Minnesota Pollution Control Agency.

The unit tested is a Barber Greene Model DM70 portable asphalt plant built in 1992. The plant has a rated capacity of 400 TPH at 5% moisture. Waste Oil fires the plant, and a Stansteel PA-1088 baghouse limits particulate emissions. During the test the plant processed approximately 44% recycle.

Particulate evaluations were performed in accordance with EPA Methods 1 - 5, and 9, CFR Title 40, Part 60, Appendix A (revised July 1, 1993). Previous data collected at this test site was used to select 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 stainless steel-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 five test ports situated horizontally on the stack. The test ports are located approximately 1.9 diameters downstream and 0.61 diameters upstream of the nearest flow disturbances. A 24-point traverse was used to collect representative particulate samples. Each traverse point was sampled 2.5 minutes to give a total sampling time of 60 minutes per run. Visible emission determinations were performed concurrent

with Run 2 of particulate evaluations by Ed Juers, 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 particulate concentration averaged 0.0332 GR/DSCF (dry + organic wet catch) and 0.0139 GR/DSCF (dry catch only). The corresponding particulate emission rates averaged 9.1 and 3.8 LB/HR respectively. Opacity averaged 0 percent.

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

Table 1a. Summary of the Results of the August 5, 1994 Particulate Emission Compliance Test on the No. 8 Portable Asphalt Plant at the Mark Sand & Gravel Facility Located in Fergus Falls, Minnesota.

ITEM		Run 1	Run 2	Run 3
Date of test		08-05-94	08-05-94	08-05-94
Time runs were done	(HRS)	825/ 935	955/1126	1200/1307
Process rate	(TON/HR)			
recycle		161.0	161.0	174.0
aggregate		196.0	196.0	212.0
asphalt		13.0	13.0	13.6
total		370.0	370.0	399.6
Volumetric flow				
actual	(ACFM)	57416	61277	56301
standard	(DSCFM)	31187	33103	31274
Gas temperature	(DEG-F)	237	234	236
Moisture content	(%V/V)	26.03	26.74	24.41
Gas composition	(%V/V,dry)			
carbon dioxide		4.60	4.90	4.50
oxygen		14.60	14.10	14.70
nitrogen		80.80	81.00	80.80
Isokinetic variation	(%)	93.1	101.0	98.4
Part. emission rate	(LB/HR)	7.66	11.00	8.64
Particulate concentration				
actual	(GR/ACF)	.0156	.0209	.0179
standard	(GR/DSCF)	.0287	.0388	.0322

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 August 5, 1994 Particulate Emission Compliance Test on the No. 8 Portable Asphalt Plant at the Mark Sand & Gravel Facility Located in Fergus Falls, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	08-05-94	08-05-94	08-05-94
Time runs were done (HRS)	825/ 935	955/1126	1200/1307
Process rate (TON/HR)			
recycle	161.0	161.0	174.0
aggregate	196.0	196.0	212.0
asphalt	13.0	13.0	13.6
total	370.0	370.0	399.6
Volumetric flow			
actual (ACFM)	57416	61277	56301
standard (DSCFM)	31187	33103	31274
Gas temperature (DEG-F)	237	234	236
Moisture content (%V/V)	26.03	26.74	24.41
Gas composition (%V/V,dry)			
carbon dioxide	4.60	4.90	4.50
oxygen	14.60	14.10	14.70
nitrogen	80.80	81.00	80.80
Isokinetic variation (%)	93.1	101.0	98.4
Part. emission rate (LB/HR)	3.24	4.97	3.28
Particulate concentration			
actual (GR/ACF)	.00659	.00945	.00679
standard (GR/DSCF)	.0121	.0175	.0122

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
No. 8 Portable Asphalt Plant Stack

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

	Run 1	Run 2	Run 3
Date of run	08-05-94	08-05-94	08-05-94
Dry basis (orsat)			
carbon dioxide.....	4.60	4.90	4.50
oxygen.....	14.60	14.10	14.70
nitrogen.....	80.80	81.00	80.80
Wet basis (orsat)			
carbon dioxide.....	3.40	3.59	3.40
oxygen.....	10.80	10.33	11.11
nitrogen.....	59.77	59.34	61.07
water vapor.....	26.03	26.74	24.41
Dry molecular weight.....	29.32	29.35	29.31
Wet molecular weight.....	26.37	26.31	26.55
Specific gravity.....	0.911	0.909	0.917
Water mass flow.....(LB/HR)	30776	33900	28332
FO	1.370	1.388	1.378

3.2 Results of Particulate Loading Determinations

Test No. 1
No. 8 Portable Asphalt Plant Stack

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

	Run 1	Run 2	Run 3
Date of run	08-05-94	08-05-94	08-05-94
Time run start/end.....(HRS)	825/ 935	955/1126	1200/1307
Static pressure.....(IN.WC)	-0.44	-0.44	-0.44
Cross sectional area (SQ.FT)	17.10	17.10	17.10
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	229.0	284.0	233.0
desiccant.....(GRAMS)	32.0	28.0	21.0
total.....(GRAMS)	261.0	312.0	254.0
Total particulate material..			
.....collected(grams)	0.0650	0.1012	0.0775
Gas meter coefficient.....	0.9946	0.9946	0.9946
Barometric pressure..(IN.HG)	29.03	29.03	29.03
Avg. orif.pres.drop..(IN.WC)	1.21	1.64	1.40
Avg. gas meter temp..(DEF-F)	82.0	96.2	97.7
Volume through gas meter....			
at meter conditions...(CF)	37.11	43.82	40.46
standard conditions.(DSCF)	34.98	40.29	37.08
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.251	.251	.251
Avg.stack gas temp ..(DEG-F)	237	234	236
Volumetric flow rate.....			
actual.....(ACFM)	57416	61277	56301
dry standard.....(DSCFM)	31187	33103	31274
Isokinetic variation.....(%)	93.1	101.0	98.4
Particulate concentration...			
actual.....(GR/ACF)	0.01557	0.02093	0.01791
dry standard.....(GR/DSCF)	0.02867	0.03875	0.03225
Particle mass rate...(LB/HR)	7.665	10.996	8.645

Test No. 1
No. 8 Portable Asphalt Plant

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

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	100.00
5	0.0223	0.00
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 0.00 Avg OD 0.0000 Time average

Observer: Edward Juers
Cert. Date: 04-06-94
Date of Observation: 08-05-94
Time of Observation: 0955/1117

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Mark Sand & Gravel
Laboratory Log No. 3532

Results of Moisture Analysis

Sample Log No.	Test/Run	Sample Type	% Moisture
3532-08	Test 1 Run 1	Virgin/Recycled Aggregate	3.90
3532-09	Test 1 Run 2	Virgin/Recycled Aggregate	3.94
3532-10	Test 1 Run 3	Virgin/Recycled Aggregate	3.84

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

JFO/cg

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Mark Sand & Gravel
Sample Log No. 3532-11

Results of Waste Oil Profile

Sample Description: Test 1, Run 1
Sample Type: Waste Oil

Parameter	Units	Method	As Received
Gross heating value	BTU/LB	ASTM D240	18775
Sulfur	%	ASTM D3177[1]	0.50
Ash	%	ASTM D482	0.77
Flashpoint	°F	ASTM D93	125
Specific gravity	60/60°F	ASTM D1298	0.8854
Acidity		ASTM D1093	7.5
Total halogens	% w/w	EPA SW-846, 9056	0.23
Total lead	mg/Kg	EPA SW-846, 6010	49
Total PCB	mg/Kg	EPA SW-846, 8080	< 1.1

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

Wayne A. Olson, Manager
Organic Chemistry Group

JFO/WAO/cg

[1]Modified ASTM method.

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Mark Sand & Gravel
Sample Log No. 3532-12

Results of Waste Oil Profile

Sample Description: Test 1, Run 2
Sample Type: Waste Oil

Parameter	Units	Method	As Received
Gross heating value	BTU/LB	ASTM D240	18745
Sulfur	%	ASTM D3177[1]	0.50
Ash	%	ASTM D482	0.77
Flashpoint	°F	ASTM D93	127
Specific gravity	60/60°F	ASTM D1298	0.8852
Acidity		ASTM D1093	7.5
Total halogens	% w/w	EPA SW-846, 9056	0.24
Total lead	mg/Kg	EPA SW-846, 6010	30
Total PCB	mg/Kg	EPA SW-846, 8080	< 1.1

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

Wayne A. Olson, Manager
Organic Chemistry Group

JFO/WAO/cg

[1]Modified ASTM method.

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Mark Sand & Gravel
Sample Log No. 3532-13

Results of Waste Oil Profile

Sample Description: Test 1, Run 3
Sample Type: Waste Oil

Parameter	Units	Method	As Received
Gross heating value	BTU/LB	ASTM D240	18785
Sulfur	%	ASTM D3177[1]	0.51
Ash	%	ASTM D482	0.77
Flashpoint	°F	ASTM D93	123
Specific gravity	60/60°F	ASTM D1298	0.8854
Acidity		ASTM D1093	7.6
Total halogens	% w/w	EPA SW-846, 9056	0.23
Total lead	mg/Kg	EPA SW-846, 6010	30
Total PCB	mg/Kg	EPA SW-846, 8080	< 1.1

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

Wayne A. Olson, Manager
Organic Chemistry Group

JFO/WAO/cg

[1]Modified ASTM method.

APPENDIX A

VOLUMETRIC FLOW RATE DETERMINATION

Test No. 1
No. 8 Portable Asphalt Plant Stack

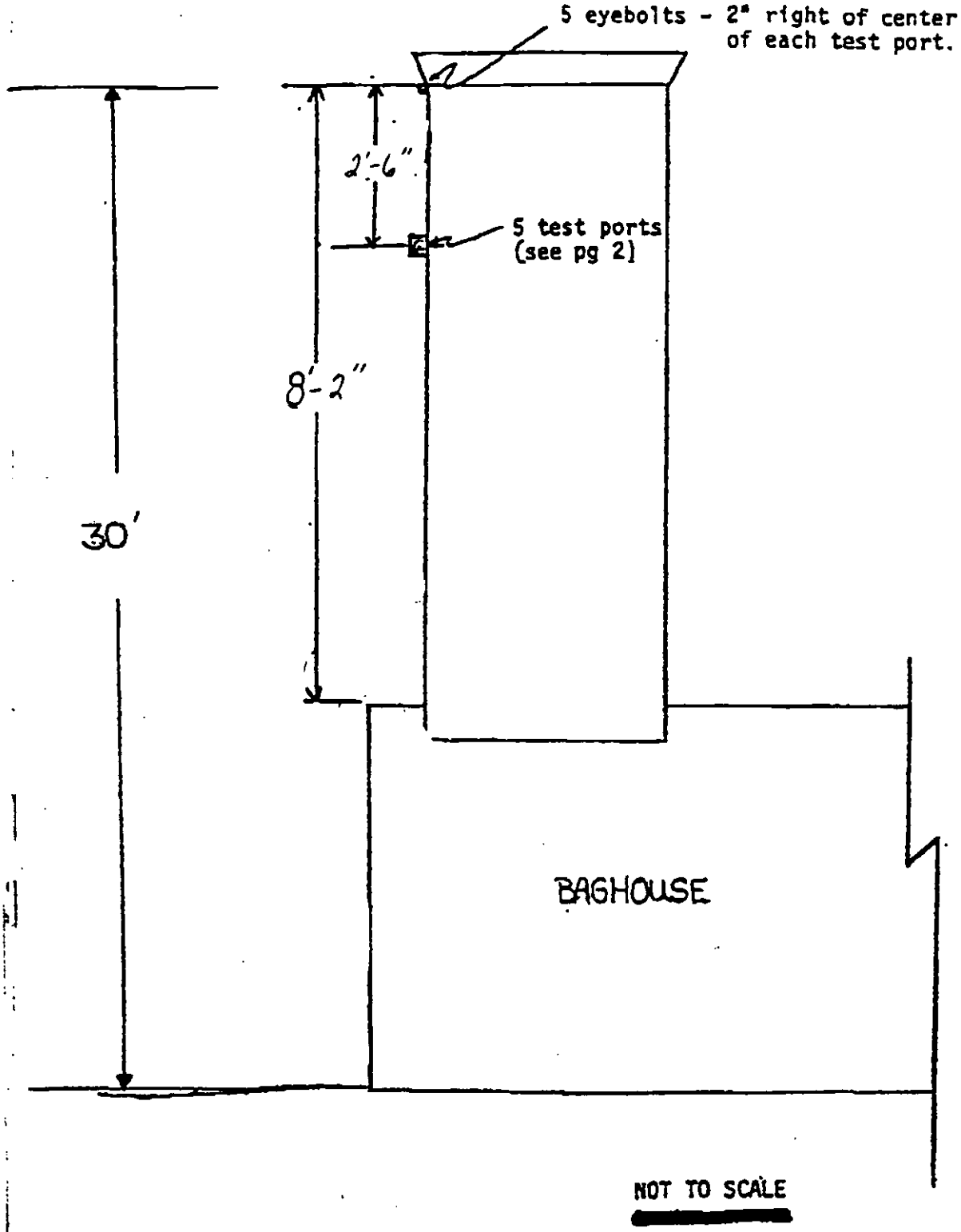
Results of Volumetric Flow Rate Determination-------Method 2

Date of Determination.....	08-05-94
Time of Determination.....(HRS)	745
Barometric pressure.....(IN.HG)	29.03
Pitot tube coefficient.....	.84
Number of sampling ports.....	4
Total number of points.....	24
Shape of duct.....	Rectangular
Duct width.....(IN)	57.25
Duct length.....(IN)	43
Duct area.....(SQ.FT)	17.10
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.44
Avg. gas temp.....(DEG-F)	249
Moisture content.....(% V/V)	26.03
Avg. linear velocity.....(FT/SEC)	66.1
Gas density.....(LB/ACF)	.04943
Molecular weight.....(LB/LBMOLE)	29.32
Mass flow of gas.....(LB/HR)	201136
Volumetric flow rate.....	
actual.....(ACFM)	67814
dry standard.....(DSCFM)	36207

APPENDIX B

LOCATION OF TEST PORTS

MARK SAND & GRAVEL CO.
BARBER GREENE DRUM
PORTABLE ASPHALT PLANT # P-8

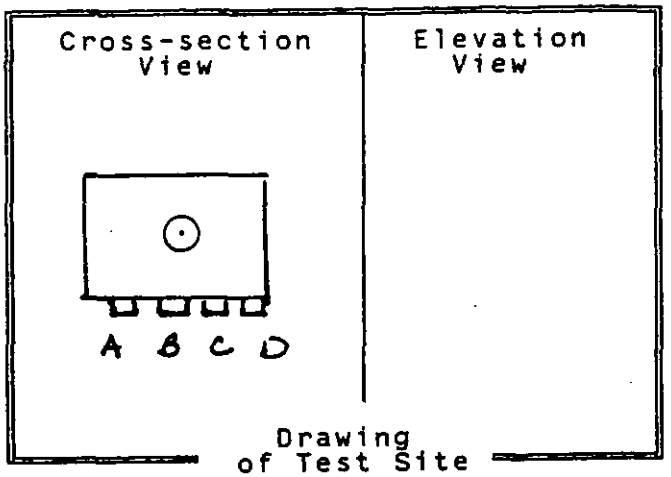


APPENDIX C

FIELD DATA SHEETS

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job MARK SAND AND GRAVEL
Source P-8 ASPHALT PLANT
Test 1 Run 0 Date 8-4-94
Stack dimen. 57.25 x 43 IN.
Dry bulb 243 °F Wet bulb 149 °F
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.
Barometric pressure 29.03 in Hg
Static pressure -.44 in WC
Operators CH JJ
Pitot No. ~~S6 V-4~~ 24-4 SAB Cp .84



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: 0745 hrs	
A 6		3.58	8.58	.35	249
5		10.74	15.75	.31	
4		17.9	22.9	.55	
3		25.0	30.0	.55	
2		32.2	37.2	.70	
1		39.38	44.4	1.00	
B 6				.32	249
5				.43	
4				.58	
3				.94	
2				1.1	
1				1.1	
C 6				1.1	249
5				1.1	
4				.82	
3				.95	
2				1.2	
1				1.5	
D 6				1.2	249
5				1.3	
4				1.4	
3				1.4	
2				1.6	
1				1.6	
Temp. meas. device & S/N: PDT 25				Time end: 0800 hrs	

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

S-3921

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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job MARK SAND AND GRAVEL Date 8-5-94 Test 1 Run 1
Source P-8 ASPHALT PLANT No. of traverse points 24
Method 5 Filter holder: GLASS Filter type: 4" G.F
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: .00 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: 6752

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	726	497	229
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1455	1423	32
Total			261

Integrated Gas Sampling Data:

Bag Pump No. 36A Box No. 21 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: .00 cc/min at 22 in. Hg.
Time start: 0825 (HRS) Time end: 0935 (HRS)
Sampling rate: 400 cc/min Operator: GH

S/N of O_2 Analyzer used to monitor train outlet: 36B

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: MARK SAND AND GRAVEL
Source: P.B. ASPHALT PLANT
Date: 8-5-94 Test: 1 Run: 1

Operators: G HOVE, JS
Meter Box No.: 2 ΔH@ 1.76 IN WC
Barometer reading: 29.94

Pitot No.: 24 V4 Cp .84
Bar. Press.: 29.03 inHg H2O 31 %
Nozzle No.: 1-4 Nozzle Dia: .251 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dry Gas Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	0825	851.70											
A 6	2.5	853.64	.95	1.59	3.51	7	225	249	242	39	65	65	14.8
5	5	855.59	1.2	2.00	5.54	7	228	251	244	40	73	65	14.5
4	7.5	857.58	1.3	2.18	7.66	9	228	252	246	41	78	66	14.1
3	10	859.68	1.2	2.00	9.71	9	238	255	247	43	79	66	13.9
2	12.5	861.61	.95	1.58	1.53	9	237	256	248	44	80	66	14.0
1	15.	863.49	1.1	1.83	3.49	9	238	255	249	45	81	67	13.7
B 6	17.5	865.09	.65	1.08	5.00	9	240	252	248	45	80	67	13.7
5	20	866.69	.75	1.25	6.62	8	239	253	249	45	81	70	13.9
4	22.5	867.98	.50	.84	7.95	5	239	254	248	46	88	71	14.3
3	25	869.59	.74	1.25	9.58	6	238	255	249	47	89	72	13.9
2	27.5	870.99	.55	.93	0.98	5	240	251	252	41	92	74	14.0
1	30	872.96	1.1	1.85	2.97	8	240	252	255	42	93	74	13.7
C 6	32.5	873.89	.22	.37	3.86	3	240	253	258	42	89	77	13.5
5	35	874.99	.35	.59	4.99	3	239	254	259	43	92	77	13.6
4	37.5	876.29	.45	.77	6.28	3	237	255	260	42	95	78	13.8
3	40	878.21	.95	1.62	8.14	8	238	256	261	43	98	79	13.7
2	42.5	880.05	1.0	1.72	0.07	9	238	257	263	44	99	80	13.7
1	45	882.06	1.1	1.89	2.09	9	238	258	261	41	100	81	14.0
D 6	47.5	882.86	.15	.26	2.84	1	238	259	262	42	93	82	14.1
5	50	883.79	.25	.43	3.80	1	239	260	263	44	96	83	14.2
4	52.5	884.94	.35	.60	4.94	2	239	261	261	40	98	84	14.1
3	55	886.08	.36	.60	6.09	2	240	262	258	41	100	85	14.0
2	57.5	887.32	.45	.78	7.39	4	235	263	259	42	101	85	14.0
1	60.0	888.81	.55	.96	8.84	5	235	262	261	44	102	86	
	(0935)												
	θ = 60	Vm = 37.11		~H 1.21							Avg. 82.0		

S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job MARK SAND AND GRAVEL Date 8-5-94 Test 1 Run 2
Source P-8 ASPHALT PLANT No. of traverse points 24
Method 5 Filter holder: GLASS Filter type: 4" GF
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: .00 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: 6910

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3	775	491	284
Condenser			
Desiccant	1458	1430	28
Total			312

Integrated Gas Sampling Data:

Bag Pump No. 36A Box No. 28 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: .00 cc/min at 23 in. Hg.
Time start: 0955 (HRS) Time end: 1126 (HRS)
Sampling rate: 400 cc/min Operator: GH

S/N of O_2 Analyzer used to monitor train outlet: 36 B

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: MARK SAND AND GRAVEL
Source: P-8 ASPHALT PLANT
Date: 8-5-94 Test: 1 Run: 2

Operators: GH SS
Meter Box No.: 2 ΔH@ 1.76 IN WC
Gasmeter coeff.: .9946

Pitot No.: 24 V 4 Cp: .84
Bar. Press: 29.03 Static H2O: 25 IN.
Nozzle No.: 1-4 Nozzle Dia: .2051 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dry Gas Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(0955)	889.000											
D 6	2.5	891.14	1.1	2.14	1.13	9	240	262	251	39	99	92	14.9
5 (1024)	5	893.43	1.2	2.41	3.42	10	235	263	255	41	102	92	14.2
START 4	7.5	895.82	1.3	2.65	5.82	10	226	259	258	42	96	93	14.3
3	10	898.22	1.3	2.62	8.20	11	231	248	247	45	102	98	14.1
2	12.5	900.78	1.5	3.07	0.79	12	232	248	254	49	98	92	14.1
1	15	903.32	1.5	3.02	3.34	12	232	249	251	40	98	92	13.5
C 6	17.5	905.31	.92	1.85	5.35	8	233	249	252	41	97	92	13.8
5	20	907.29	.91	1.85	7.36	9	225	251	253	42	96	92	13.8
4	22.5	909.18	.80	1.62	9.24	9	226	247	251	43	98	91	13.5
3	25	911.01	.70	1.42	1.00	9	226	243	252	44	99	92	13.7
2	27.5	912.65	.60	1.22	2.64	6	227	244	251	45	100	91	13.6
1	30	915.04	1.3	2.63	5.03	6	228	245	252	41	101	92	13.4
B 6	32.5	916.86	.75	1.51	6.85	5	235	239	255	42	101	92	13.6
5	35	917.86	.23	.46	7.85	2	235	240	251	42	101	93	13.1
4	37.5	919.10	.32	.64	9.04	2	237	241	252	43	101	97	13.8
3	40	921.05	.90	1.81	1.04	8	237	242	251	44	102	93	14.2
2	42.5	923.13	.98	1.97	3.11	8	238	241	258	45	103	92	13.9
1	45	925.12	.98	1.97	5.19	8	238	243	256	45	102	91	14.4
A 6	47.5	926.32	.28	.56	6.30	2	238	243	256	39	102	91	14.4
5	50	927.44	.32	.64	7.48	3	239	242	257	40	98	90	14.3
4	52.5	928.81	.40	.80	8.80	4	239	241	252	42	101	91	14.5
3	55	930.14	.40	.80	0.13	4	239	242	255	44	101	91	14.5
2	57.5	931.40	.40	.80	1.45	4	239	245	251	46	102	92	14.5
1	60	932.82	.45	.90	2.86	4	239	246	252	47	103	92	14.5
	1026												
	θ = 60	Vm = 43.82		ΔH = 1.64							Avg. = 96.2		

S-00378

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job MARK SAND & GRAVEL Date 8-5-94 Test 1 Run 3
Source P-8 ASPHALT No. of traverse points 24
Method 5 Filter holder: GLASS Filter type: GF 4"
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: .00 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: 6896

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

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

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3	500	733	233
Condenser			
Desiccant	1440	1419	21
Total			254

Integrated Gas Sampling Data:

Bag Pump No. 36A Box No. 28 Bag No. 3
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: .00 cc/min at 23 in. Hg.
Time start: 1200 (HRS) Time end: 1307 (HRS)
Sampling rate: 400 cc/min Operator: GH

S/N of O_2 Analyzer used to monitor train outlet: 36B

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job: MARK SAND & GRAVEL
Source: P-8 ASPHALT PLANT
Date: 8-5-95 Test 1 Run 3

Operator: GROVE, JJ
Meter Box No.: 2 ΔH@ 1.76 IN WC
Counter coeff.: .9946

Pitot No.: 24 V4 Cp: .84
Bar. Press.: 27.03 Static H2O: 35 %
Nozzle No.: 1-4 Nozzle Dia: .35 IN.

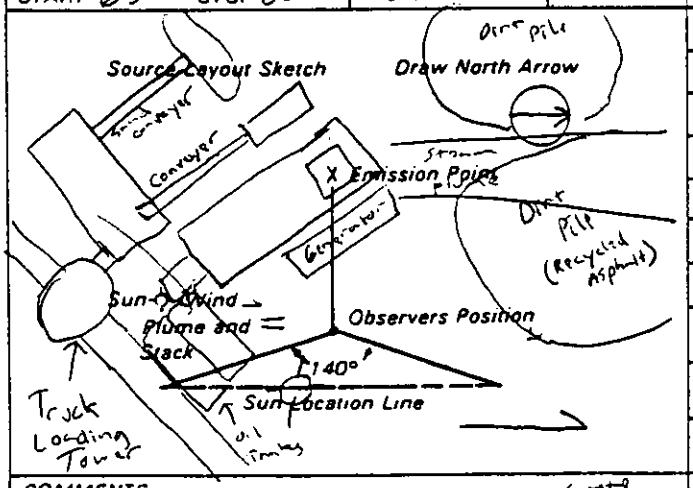
Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dec. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (%v/v)
	(1200)	941.30											
D 6	2.5	943.48	1.1	2.21	3.49	10	235	243	251	39	92	92	16.3
5	5	945.62	1.1	2.19	5.67	10	236	241	255	40	95	94	15.2
4	7.5	948.14	1.4	2.81	8.14	12	233	241	257	40	96	93	15.0
3	10	950.48	1.3	2.61	0.52	13	234	239	256	42	97	94	15.2
2	12.5	952.98	1.4	2.81	2.99	14	234	235	253	42	97	94	15.1
1	15	955.47	1.4	2.81	5.46	14	234	242	251	42	95	94	15.0
C 6	17.5	957.43	.89	1.79	7.43	11	233	243	252	43	96	94	14.7
5	20	958.79	.40	.80	8.76	5	235	245	251	44	95	94	15.1
4	22.5	960.51	.68	1.36	0.48	7	234	244	252	45	98	94	15.1
3	25	962.18	.65	1.31	2.18	6	233	243	251	44	99	94	15.1
2	27.5	963.99	.75	1.50	3.99	6	237	244	252	45	99	94	15.0
1	30	966.23	1.1	2.20	6.19	6	237	244	251	41	104	93	15.1
B 6	32.5	967.43	.35	.71	7.43	4	235	243	258	42	104	93	15.1
5	35	968.74	.38	.77	8.74	4	234	244	258	42	104	94	15.2
4	37.5	970.15	.45	.91	0.15	5	234	245	261	43	106	94	15.0
3	40	971.58	.48	.97	1.62	5	239	245	262	42	107	94	15.4
2	42.5	973.18	.55	1.11	3.18	6	238	241	266	43	107	93	15.3
1	45	974.60	.45	.91	4.60	5	238	233	265	44	107	95	15.4
A 6	47.5	975.50	.18	.36	5.50	2	238	235	267	45	105	93	15.4
5	50	976.55	.25	.50	6.55	2	240	236	261	41	105	95	15.3
4	52.5	977.81	.35	.70	7.80	3	241	239	259	42	106	94	15.1
3	55	979.10	.38	.76	9.09	4	242	240	259	43	107	96	15.5
2	57.5	980.34	.35	.70	0.34	4	242	241	260	44	108	96	15.5
1	60	981.76	.46	.90	1.76	4	242	242	251	45	108	96	15.6
	(1307)												
	θ = 60	Vm = 40.46		ΔH 1.40							Avg. = 97.7		

S-0037R

Interpoll Laboratories
(612)786-6020

Visible Emissions Form

SOURCE NAME: Mark Sand + Gravel Co.	OBSERVATION DATE: 8-5-94
ADDRESS: 1230 Pebble Lake Rd.	START TIME: 0955
CITY: Fergus Falls	STATE: MN
ZIP: 56538-0396	STOP TIME: 1117
PHONE:	SOURCE ID NUMBER:
PROCESS EQUIPMENT: Barber Green Drum	OPERATING MODE: 100%
CONTROL EQUIPMENT: Baghouse	OPERATING MODE: 100%
DESCRIBE EMISSION POINT: START Short square stack on end of baghouse STOP SAME	
HEIGHT ABOVE GROUND LEVEL: START 30' STOP SAME	HEIGHT RELATIVE TO OBSERVER: START ~30' STOP SAME
DISTANCE FROM OBSERVER: START ~110' STOP SAME	DIRECTION FROM OBSERVER: START ~270 STOP SAME
DESCRIBE EMISSIONS: START NONE STOP SAME	
EMISSION COLOR: START NONE STOP SAME	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☒ YES ☐	IF ~~WATER~~ STEAM DROPLET PLUME: ATTACHED ☐ DETACHED ☒
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START ~10'-15' Above stack before steam plume STOP SAME	
DESCRIBE BACKGROUND: START Clear Sky STOP Hazy sky	
BACKGROUND COLOR: START Blue STOP Bluish white	SKY CONDITIONS: START Clear STOP Hazy
WIND SPEED: START ~5-10 STOP ~15 mph	WIND DIRECTION: START 180° STOP SAME
AMBIENT TEMP.: START 65° STOP 66°	WET BULB TEMP.: Unknown / RH.percent: Unknown



SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	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	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	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	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	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD: 0	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS: MINIMUM 0	MAXIMUM 0
OBSERVER'S NAME (PRINT): Edward Juers III	
OBSERVER'S SIGNATURE: [signature]	DATE: 8-5-94
ORGANIZATION: Interpoll Labs, Inc.	
CERTIFIED BY: ETA	DATE: 9-6-94
VERIFIED BY	DATE

COMMENTS: See back for side view (Note on Back

Steam Plume Disappeared at times

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS
SIGNATURE

TITLE | DATE

S-0079R

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Edward Guerd

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 Hope
President

243004
Certificate Number

Vice President

Minneapolis
Location

David B. Savage, Jr.
Program Manager

April 6, 1994
Date of Issue

APPENDIX D

INTERPOLL LABORATORIES ANALYTICAL DATA

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job: Mark Sand & Gravel
Team Leader: G.H.
Date Submitted: 8-8-94
Test No.: 1
Date of Analysis: 8-8-94

Source: P-8 Asphalt Plant
Test Site: Stack
Date of Test: 8-5-94
No. of Runs Completed: 3
Technician: B. Duke

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	3532-05	1	0.00	4.60	19.20	4.60	14.60	1.37
		2	0.00	4.60	19.20	4.60	14.60	1.37
	☑ B ☐ F	Avg				4.60	14.60	
1/2	-06	1	0.00	4.90	19.00	4.90	14.10	1.34
		2	0.00	4.90	19.00	4.90	14.10	1.34
	☑ B ☐ F	Avg				4.90	14.10	
1/3	-07	1	0.00	4.50	19.20	4.50	14.70	1.38
		2	0.00	4.50	19.20	4.50	14.70	1.38
	☑ B ☐ F	Avg				4.50	14.70	
		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						
		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 Mark Sand & Gravel
Team Leader G. Kurz
Date Submitted
Test No. 1
Date of Analysis 8/12/84

Source P-8
Test Site Stack Asphalt
Date of Test 8-4-84
No. of Runs Completed 3
Technician Lorenz

	Run 0	Run 1	Run 2	Run 3	Run 4	Run 5
Test	1	1	1	1		
Log Number	Field Blank	3532-01 I	-02 I	-03 I	-04 I	
Comments						
Dish No.		(13)	(3)	(51)	(61)	
Dish Tare Wt.		47.3882 g	52.1190 g	50.8893 g	48.4375 g	
Dish+Sample Wt.		47.3883 g	52.1566 g	50.9449 g	48.4857 g	
Sample Wt.		.0001 g	.0376 g	.0556 g	.0482 g	

Blank Solvent Wt. .0001 g

Run 2	Run 3	Run 4	Run 5
.055	.0481		

D-2

LSC-03

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job: Mark Sand & Gravel
Team Leader: GH
Date Submitted: 8-8-94
Test No.: 1
Date of Analysis: 8-9-94
Transport Leakage ☒ None ☐ _____ ml

Source: P-8 Asphalt Plant
Test Site: Stack
Date of Test: 8-5-94
No. of Runs Completed: 3
Technician: B. Duke
Solvent: Acetone

0	Test 1 Run 0 (Field Blank) Log Number 3532-01P Vol. of Solvent 110 ml *Solvent Residue 2.73 ug/ml	Dish No. 8 Dish Tare Wt. 46.9755 g Dish+Sample Wt. 46.9758 g Sample Wt. .0003 g
1	Test 1 Run 1 Vol. of Solvent 70 ml Log Number -02P Comments	Dish No. 17 Dish Tare Wt. 48.3901 g Dish+Sample Wt. 48.4128 g Sample Wt. 0.0227 g
2	Test 1 Run 2 Vol. of Solvent 90 ml Log Number -03P Comments	Dish No. 45 Dish Tare Wt. 48.1505 g Dish+Sample Wt. 48.1920 g Sample Wt. 0.0415 g
3	Test 1 Run 3 Vol. of Solvent 160 ml Log Number -04P Comments	Dish No. 512 Dish Tare Wt. 49.3579 g Dish+Sample Wt. 49.3796 g Sample Wt. 0.0217 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 2.73 ug/ml = [(Sample Wt. 0.0003 g)(10⁶)]/Vol. of Sol. 110 ml
EPA-M5 Acetone Residue Blank Spec. (7.8 ug/ml

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0225	0.0413	0.0213	D-3	

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job: Mark Sand & Gravel
Team Leader: G.H.
Date Submitted: 8-8-94
Test No.: 1
Date of Analysis: 8-8-94

Source: P-8 Asphalt Plant
Test Site: Stack
Date of Test:
No. of Runs Completed:
Technician:

0	Test 1 Run 0 Field Blank Log Number 3532-01F Comments	Filter No. 6901 Filter Type 4"GF Filter Tare Wt. .9447 g Filter+Sample Wt. .9447 g Sample Wt. 0.0000 g
1	Test 1 Run 1 Log Number -02F Comments	Filter No. 6752 Filter Type 4"GF Filter Tare Wt. .9408 g Filter+Sample Wt. .9458 g Sample Wt. 0.0050 g
2	Test 1 Run 2 Log Number -03F Comments	Filter No. 6910 Filter Type 4"GF Filter Tare Wt. .9368 g Filter+Sample Wt. .9412 g Sample Wt. 0.0044 g
3	Test 1 Run 3 Log Number -04F Comments	Filter No. 6896 Filter Type 4"GF Filter Tare Wt. .9379 g Filter+Sample Wt. .9460 g Sample Wt. 0.0081 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
	0.0050	0.0044	0.0081		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0650	0.1012	0.0775		

LSC-02PR

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Sample Chain of Custody

Job: MARK SAND & GRAVEL Source: P-8 ASPHALT Site: STACK Log No. 3532
Field Engineer: G. HOVE Date of Test: 8-4-94 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		
4	**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		
0	**Oxides of Nitrogen:**		☐ EPA M-7A ☐ _____			
3	**Fuel Lab:** ☒ Fuel Sample	1/2 oz jar ☒ Aggregate 3 oz jar	☐ Per S-0163			
0	**Particle Sizing:**		☐ X-Ray Sdgraph ☐ _____	☐ Cascade Imp		
0	**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
Gary Hove - stack	[signature] / interpoll	8/8/94 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 Barber Greene Model D.M. 70

Owner and Operator of the Plant

Location of Plant at time of Test (State, County and Address) Ottertail County Mn.
Sec. 23 - R44W - T133N N.E. 1/4
Mann Pit

Estimated Total Time of the Plant at this Site (from when to when) 7/27/94 Thru Freezeup

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

Model No. of Pollution Control Equipment PA1088-9 Pulse Jet

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
- Waste Oil ☒ No. 5 Fuel Oil
- ☐ Propane

Normal Production Rate of Plant 400 TONS/HR
at an aggregate moisture content of 5 %

NOTE: Attach drawings of plant and pollution control equipment.

Name of Individual Supplying Information Barry Ruiter

Date 8/5/94

S-0150R(2)

APPENDIX F

ASPHALT PLANT OPERATING DATA

ASPHALT PLANT OPERATING CONDITIONS DURING STACK TESTING

05/27/94

Test Date(s) 8/5/94

Original

Plant Mfr. & Model Barber Greene DM 70 Type(circle one): Drum Mix Conventional

This plant is (circle one): portable stationary Other: _____

Pollution Control Equipment(circle one): Baghouse Venturi Scrubber Wet Scrubber Cyclone Multicione

If wet scrubbing: %scrubber water recycled

List Model: Stanstel Baghouse Model II PA 1088-9 Pulse Set

Normal pressure drop across control equipment is 5" inches water

Was control equipment operating normally during test? Yes

Date & procedure of last maintenance/cleaning of control equipment: May 1994

Fuel:

Itemize all fuels and materials added to the combustion process during the test period. List fuel type used during testing (if oil, specify type) Waste 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)
Run 1	555 G.P.H.		
Run 2	555 G.P.H.		
Run 3	600 G.P.H		

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 1.5 gal/ton hot mix

No. of burners: _____ Burner(s) rating: 95 MMBTU/HR=100% setting

Test No.____	% Recycle %R=Recycle ÷ (Aggregate + Recycle+Asphalt)	Estimated % moisture of aggregate (or aggregate & recycle)
Run 1	370 T.P.H. 196 V 161 R 13 A.	5% virgin 3% Recycle
Run 2	370 T.P.H. 197 V 160 R 13 A.	5% Virgin 3% Recycle
Run 3	400 T.P.H. 212 V 174 R 13.6 A	5% Virgin 3% Recycle

Other Control Equipment Parameters	Design	During Testing
Cleaning Cycles	Pulse Set	Pulse every 20 Seconds
Air to Cloth Ratios	5.5:1 Acfm/sq.ft.	
No. of spray bars including delivery pressure	68 Spray Bars	100 lbs Air Pressure

Describe the location of the thermocouples reading exiting dryer temperature: Two Temp Probes One on each end of Baghouse

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: Barry Rich, Phone: (918) 736-7523

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.

RECEIVED

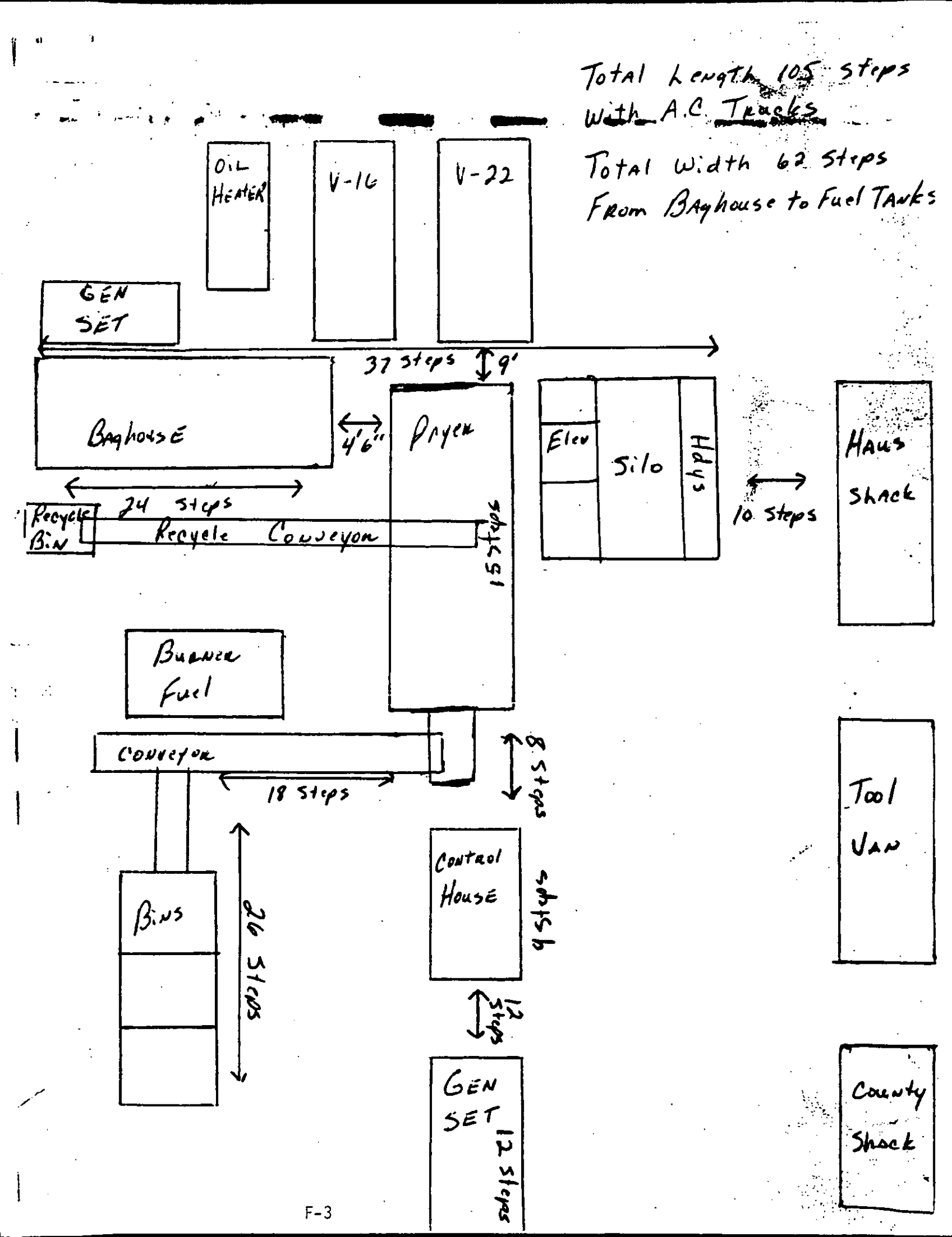
AUG 19 1994

INTERPOLL LABORATORIES

Time in 15 min. intervals	Burner Setting %	Aggregate Material TPH	Recycle Material TPH	Asphalt Material TPH	Total Material TPH (Aggregate +Recycle+Asphalt)	Temperature of Gases Exiting Dryer deg F	Dust Collector Pressure Drop inches water	Scrubber Water Flow Rate GPM	Water Supply Pressure psi	Other (list)	Other (list)
8:20	.5	196	161	13	370 T.P.H.	280°	5"				
8:35	.5	196	161	13	370 T.P.H.	280°	5"				
8:50	.5	196	161	13	370 T.P.H.	280°	5"				
9:05	.5	196	161	13	370 T.P.H.	280°	5"				
9:55	.5	196	161	13	370 T.P.H.	280°	4½"				
10:24	.5	196	161	13	370 T.P.H.	280°	4½"				
10:39	.5	196	161	13	370 T.P.H.	280°	5"				
10:54	.5	196	161	13	370 T.P.H.	282°	4½"				
12:00	.55	212	174	13.6	400 T.P.H.	278°	5"				
12:15	.55	212	174	13.6	400 T.P.H.	280°	5"				
12:30	.55	212	174	13.6	400 T.P.H.	284°	4½"				
12:45	.55	212	174	13.6	400 T.P.H.	280	5"				

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: Barry Ritter, Position Plant Operator, Phone: (918) - 736 - 7523


Total Length 105 steps
With A.C. Trucks
Total Width 62 steps
From Baghouse to Fuel Tanks
Oil Heater
V-16
V-22
Gen Set
37 steps
9'
Baghouse
4'6"
Dryer
Elev
Silo
Hdqs
Haus Shack
24 steps
Recycle Bin
Recycle Conveyor
15 steps
10 steps
Burner Fuel
Conveyor
18 steps
8 steps
Tool Van
Control House
9 steps
Bins
26 steps
12 steps
Gen Set
12 steps
County Shack

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 or stainless steel-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 gas meter, 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 gas meter which integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gas meter 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.

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.

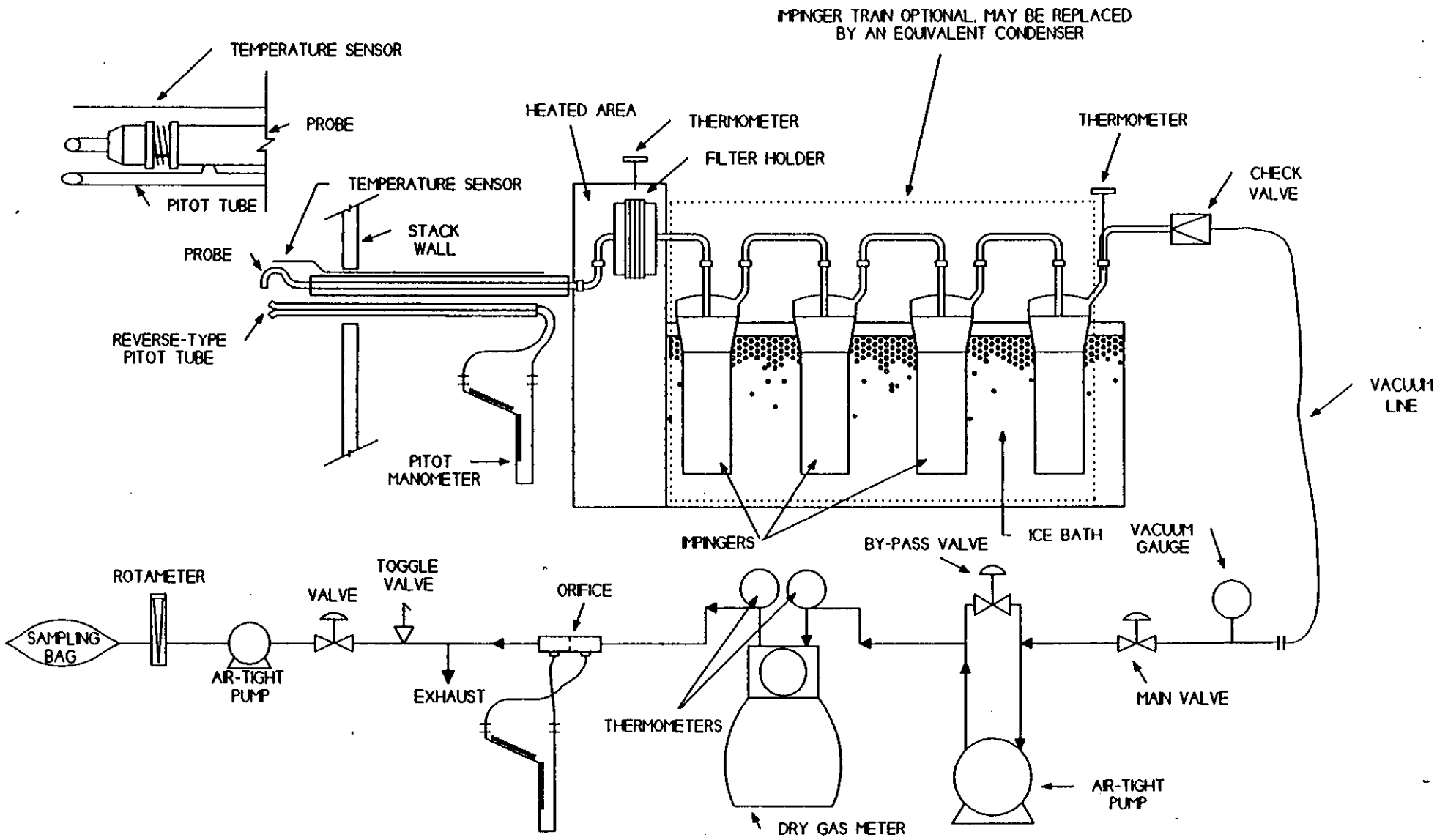
REFERENCES

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

Minnesota Pollution Control Agency, Exhibit C.

Interpoll Laboratories
(612) 786-6020

PARTICULATE SAMPLING TRAIN



APPENDIX H

CALCULATION EQUATIONS

METHOD 2
CALCULATION EQUATIONS

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

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

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

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

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

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

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

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

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1

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, %

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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

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

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

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

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

0

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METHOD 5
CALCULATION EQUATIONS

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

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

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

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

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

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

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

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

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

APPENDIX I

SAMPLING TRAIN CALIBRATION DATA

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

Job MARK SAND + GRAVEL Date 8-5-94

Operator G. HOVE Module No. 2

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 29.02 in. Hg. τ = 1.76 ^H@ .9946 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	933.20	[redacted]	
2.5	935.18	102	97
5.0	937.21	106	94
7.5	939.12	108	94
10	941.08	108	95
[redacted]	V_m= 7.88	Avg(t_m)= 99.5	°F

Calculate Y_{cn} as follows:

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

$$Y_{cn} = \frac{1.786}{(.9946)(7.88)}\left[\frac{(99.5) + 460}{(29.02)}\right]^{0.5}$$

Y_{cn} = 1.000

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: August 8, 1994

Meter Box No. : 2 (Rockwell Dry Test Meter Serial No. 964551)

Date of Last Calibration: July 20, 1994
Calibration Technician: D. Van Hoever
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
August 2, 1994	4-3526	734.95	849.98	115.03	115.03
August 5, 1994	4-3532	851.70	981.76	130.06	245.09

* Total volume through meter since last calibration.

Date 7/20/94

Bar. Press. 28.93 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 2
Serial No. DTM 964551
Wet Test Meter No. AL-20
Technician D. Van Hoever

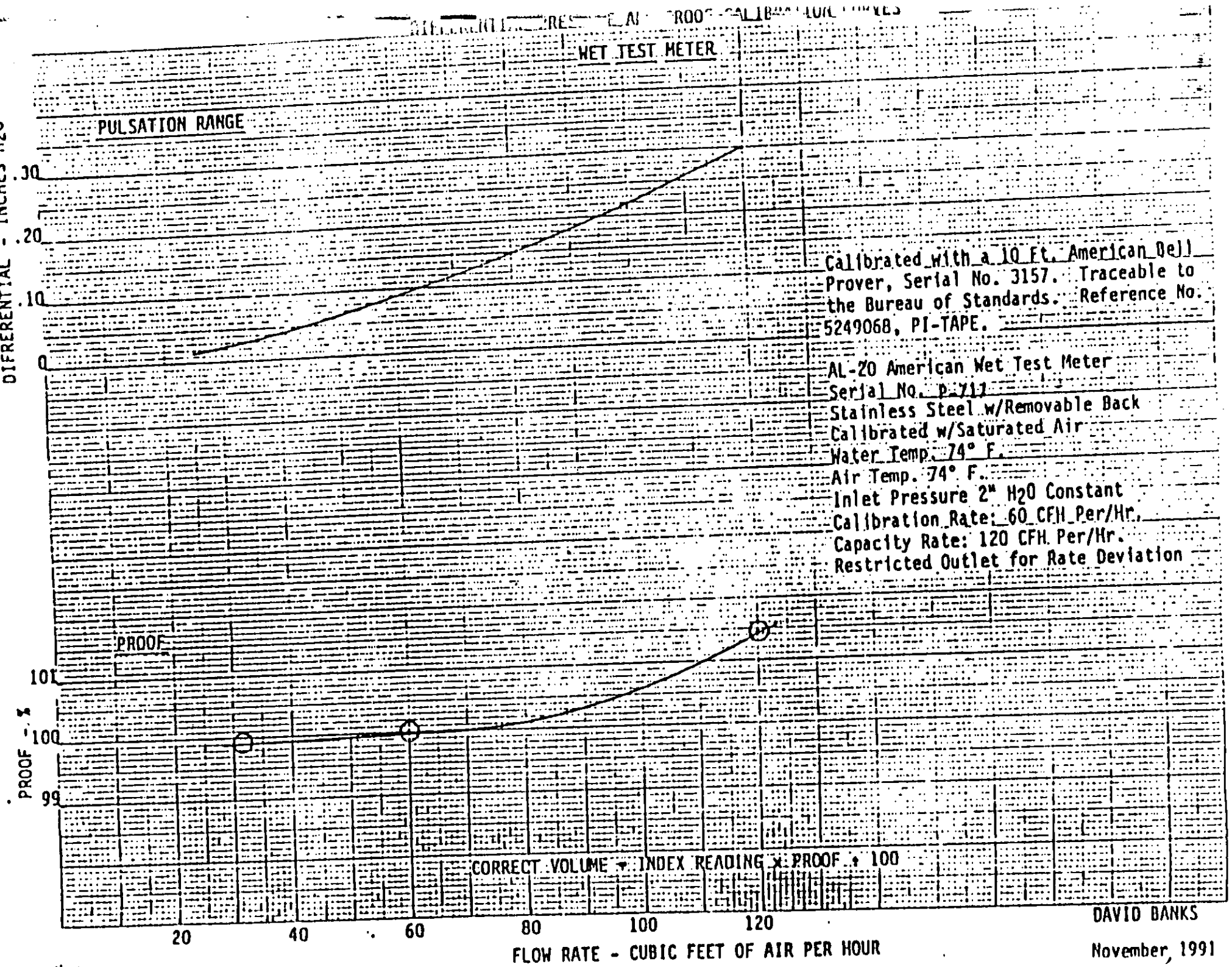
ΔH (in. WC) nominal	ΔH (in. WC) actual	Gas Volume Wet Test Meter (ft^3)	* Cal. Index Φ (%)	* Diff. Wet Test Meter ΔP_w (in.WC)	Gas Volume Dry test meter (ft^3) V_{di}	Gas Volume Dry test meter (ft^3) V_{df}	Gas temperatures Wet Test t_w (°F)	Gas temperatures Dry Test t_{di} (°F)	Gas temperatures Dry Test t_{do} (°F)	Time θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔHθ	C_f
0.6	.5	2	99.85	0.01	719.635	721.665	73	90	77	4:54.95	.0018	1.74	
1.2	1.2	2.5	99.91	0.025	715.78	718.335	73	93	76	3:59.53	.9917	1.75	
2.0	2.0	3	99.93	0.055	701.300	704.355	73.2	87	75	3:42.02	.9904	1.75	
3.3	3.3	4.5	100.00	0.09	704.86	708.91	73.0	91	75	3:51.92	.9975	1.77	
4.7	4.7	5	100.02	0.12	709.92	715.02	73.0	95	76	4:05.25	.9914	1.79	
	8	8	9	8	6	7	8	8	10	11/13	.9946	1.76	

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

Approved by [signature] Date 7/21/94

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

S0102RR 11/91


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

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 08-05-94 Nozzle Number 1-4
Technician: Gary Hove

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

Position	Diameter (inches)
1	.251
2	.251
3	.251
Average:	.251

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

#25

Unit under test:

Vendor BECKMAN INDUSTRIAL

Model HOLLOT

Serial Number 20109031

Range 0 - 1900 °F

Thermocouple Type K

Date of Calibration 7-19-94

Technician GH

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		01	1	~~.02~~ = .22
100		98	2	.35
200		202	2	.26
300		300	0	0
400		397	3	.35
500		497	3	.31
600		600	0	0
700		700	0	0
800		806	6	.47
900		908	8	.58
1000		1013	13	.89
1100		1116	16	1.02
1200		1223	23	1.39
1300		1323	23	1.31
1400		1428	28	1.51
1500		1526	26	1.33
1600		1627	27	1.31
1700		1723	23	1.06
1800		1821	21	.929
1900		1915	15	.68
2000		OF		
2100		OF		
		Averages:		.696

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

% dev = 100 Δt / (460 + t)

☒ Unit in tolerance

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

S-433

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 24-4

Pitot tube dimensions:

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

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

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

Distance from Pitot to Probe Components:

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

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

Date of Inspection: 1-8-94

Inspected by: [signature]

CFR Title 40 Part 60 Appenidix A Method 2

S-348

INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 7-20-94
Technician GH
Mercury Column Barometer No. NO 1
Aneroid Barometer No. GARY HOUE 636235

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
29.05	75	-.124 T_{ambt}	28.925	28.940	-.015

-.01

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. YES I DO ADJUSTED IT

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

*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

TEST PLAN

TEST PLAN FOR ASPHALT PLANT PERFORMANCE TEST

PART 1. GENERAL INFORMATION

Name and address of permittee: MARK SAND & GRAVEL COMPANY
1230 Pebble Lake Road
Fergus Falls, Minnesota 56538-0396

Permittee contact person: Don Ashworth
(218)736-7523
FAX (218)736-2647

Permit File No.: 417D.94.G.1

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.

Physical location of the emission unit to be tested: OTTERTAIL COUNTY SEC 23. R44W. T133N NE 1/4 MANN PIT

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

Test Plan Date: May 13, 1994
Test Date: ~~Tentative July, 1994~~ AUGUST 1, 1994

PART II. TESTING REQUIREMENTS

EP#	Pollutant	Emission Limit	Applicable Rule	Method	Run Length
1	PM	.04 GRAINS/DRY STD. CU. FT.	40 CFR 60 SUBP I MINN. RULES PT. 7011-0910	5	60 min
	Opacity	20%	MINN. RULES PT. 7011-0910	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 (also known as Part 11 of the Air Emission Permit). 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

ASTM D-1093
ASTM D-93

Halogens, % by weight
Acidity, Ph
Flash point, °F

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:
USE OF #6 BURNER FUEL

Normal Range of Process or Operating Rate:
APPROXIMATELY 400 TON / HOUR

Description of Process Equipment:
BARBER GREENE DM-70
DRUM STYLE HMA PLANT

* Description of How Process Equipment will be Monitored During Testing:
SEE ATTACHED INFORMATION

Description of Air Pollution Control Equipment
STANSTEEL PORTABLE FABRIC FILTER BAGHOUSE #PA 1088-9

* Description of How Air Pollution Control Equipment will be Monitored During Testing:
SEE ATTACHED INFORMATION

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 bot

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.