AP42 Section: 11.1

Reference Number: 72

Title: Results Of The June 21, 1993 NSPS Particulate And Opacity Compliance Tests On The T. A. Schifsky & Sons Stationary Asphalt Plant Located In North St. Paul, Minnesota, Interpoll Laboratories, Inc., Circle Pines, MN,

July 22, 1993.

AP-42 Section 11.1
Reference
Report Sect. 4
Reference 72

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printed 8/5/93 ajr

RESULTS OF THE JUNE 21, 1993 NSPS PARTICULATE AND OPACITY COMPLIANCE TESTS CONDUCTED ON THE STATIONARY ASPHALT PLANT LOCATED IN NORTH ST. PAUL, MINNESOTA

Submitted to:

T.A. SCHIFSKY & SONS
2370 East Highway 36
North St. Paul, Minnesota 55109

Attention:

Tom Schifsky, Jr.

Approved by:

Daniel Despen
Manager
Stationary Source Testing Department

Report Number 3-9190
July 22, 1993
SP/slp

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

g:\stack\wp\misc\abbrev.frm

1 INTRODUCTION

On June 21, 1993 Interpoll Laboratories Personnel conducted a NSPS Particulate and Visible Emission Compliance Test on the T.A. Schifsky and Sons Stationary Asphalt Plant located in North St. Paul, Minnesota. Duane Van Hoever, Jeff Bergstrom, and Rick Eidem performed the on-site portion of the test. Coordination between testing activities and plant operation was provided by Tom Schifsky Jr. of T.A. Schifsky and Sons. The test was not witnessed by a member of the Minnesota Pollution Control Agency.

The unit tested is a Stansteel Model 628 stationary batch asphalt plant which has a rated capacity of 140 TPH with 5% moisture. The particulate emissions are controlled by a Stansteel Model 384 Baghouse. The unit was tested processing 100% virgin aggregate. The plant was fired with natural gas and operated under normal conditions.

Particulate evaluations were performed in accordance with EPA Methods 1 - 5, and 9, CFR Title 40, Part 60, Appendix A (revised July 1, 1992). A preliminary determination of the gas linear velocity profile was made before the first particulate determination to allow selection of the appropriate nozzle diameter required for isokinetic sample withdrawal. An Interpoll Labs sampling train which meets or exceeds specifications in the above-cited reference was used to extract particulate samples by means of a heated glass-lined probe. Wet catch samples were collected in the back half of the Method 5 sampling train and analyzed as per Minnesota Rules part 7005.0500.

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

rotameter. Bags with any detectable inleakage are discarded.

Testing was conducted from 2 test ports oriented at 90 degrees on the stack. The test ports are located 5 diameters downstream and 1 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 emissions determinations were performed by Rick Eidem, 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 1 - 2. The results are summarized in the table below.

Process		Concentration (GR/DSCF)	Emission Rate (LB/HR)
Virgin	(Dry + Organic Wet Catch)	0.0125	1.65
Virgin	(Dry Catch Only)	0.00796	1.05

Opacity averaged 0 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 1. Summary of the Results of the June 21, 1993 NSPS Particulate Emission Compliance Test on the TA Schifsky & Sons Stationary Asphalt Plant Located in St. Paul, Minnesota.

ITEM		Run 1	Run 2	Run 3
Date of test		06-21-93	06-21-93	06-21-93
Time runs were done	(HRS)	930/1032	1159/1255	1356/1457
Process rate	(TON/HR)			
recycle		0.0	0.0	0.0
aggregate		143.0	148.0	147.0
asphalt		7.5	7.7	7.5
total		150.5	155.7	154.5
Volumetric flow				
actual	(ACFM)	31428	31742	31014
standard	(DSCFM)	15720	15396	14992
Gas temperature	(DEG-F)	245	251	258
Moisture content	(%V/V)	31.00	32.50	32.12
Gas composition	(%V/V,dry)			
carbon dioxide		4.40	4.50	4.60
oxygen		13.40	13.30	13.10
nitrogen		82.20	82.20	82.30
Isokinetic variation	(%)	105.7	100.7	99.0
Part. emission rate	(LB/HR)	1.92	1.61	1.41
Particulate concentration				
actual	(GR/ACF)	.00713	.00592	.00531
standard	(GR/DSCF)	.0143	.0122	.0110

Note: Dry + Organic Wet Catch

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

Table 2. Summary of the Results of the June 21, 1993 NSPS Particulate Emission Compliance Test on the TA Schifsky & Sons Stationary Asphalt Plant Located in St. Paul, Minnesota.

ITEM		Run 1	Run 2	Run 3
Date of test		06-21-93	06-21-93	06-21-93
Time runs were done	(HRS)	930/1032	1159/1255	1356/1457
Process rate	(TON/HR)			
recycle		0.0	0.0	0.0
aggregate		143.0	148.0	147.0
asphalt		7.5	7.7	7.5
total		150.5	155.7	154.5
Volumetric flow				
actual	(ACFM)	31428	31742	31014
standard	(DSCFM)	15720	15396	14992
Gas temperature	(DEG-F)	245	251	258
Moisture content	(%V/V)	31.00	32.50	32.12
Gas composition	(%V/V,dry)			
carbon dioxide		4.40	4.50	4.60
oxygen		13.40	13.30	13.10
nitrogen		82.20	82.20	82.30
Isokinetic variation	(%)	105.7	100.7	99.0
Part. emission rate	(LB/HR)	1.03	1.06	1.05
Particulate concentration				
actual	(GR/ACF)	.00382	.00390	.00396
standard	(GR/DSCF)	.00765	.00804	.00819

Note: Dry Catch Only

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

3 RESULTS

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

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

3.1 Results of Orsat & Moisture Determinations

Test No. 1
Asphalt Plant Stack

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

	Run 1	Run 2	Run 3
Date of run	06-21-93	06-21-93	06-21-93
Dry basis (orsat)			
carbon dioxide.....	4.40	4.50	4.60
oxygen.....	13.40	13.30	13.10
nitrogen.....	82.20	82.20	82.30
Wet basis (orsat)			
carbon dioxide.....	3.04	3.04	3.12
oxygen.....	9.25	8.98	8.89
nitrogen.....	56.72	55.48	55.87
water vapor.....	31.00	32.50	32.12
Dry molecular weight.....	29.24	29.25	29.26
Wet molecular weight.....	25.76	25.59	25.64
Specific gravity.....	0.890	0.884	0.886
Water mass flow.....(LB/HR)	19810	20797	19895
FO	1.705	1.689	1.696

3.2 Results of Particulate Loading Determinations

Test No. 1
Asphalt Plant Stack

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

	Run 1	Run 2	Run 3
Date of run	06-21-93	06-21-93	06-21-93
Time run start/end.....(HRS)	930/1032	1159/1255	1356/1457
Static pressure.....(IN.WC)	-0.78	-0.78	-0.78
Cross sectional area (SQ.FT)	7.77	7.77	7.77
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	381.0	381.0	363.0
desiccant.....(GRAMS)	19.0	19.0	13.0
total.....(GRAMS)	400.0	400.0	376.0
Total particulate material..			
.....collected(grams)	0.0388	0.0310	0.0267
Gas meter coefficient.....	0.9979	0.9979	0.9979
Barometric pressure..(IN.HG)	29.01	29.01	29.01
Avg. orif.pres.drop..(IN.WC)	1.70	1.49	1.38
Avg. gas meter temp..(DEF-F)	92.2	98.2	103.4
Volume through gas meter....			
at meter conditions...(CF)	45.20	42.65	41.20
standard conditions.(DSCF)	41.98	39.17	37.47
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.245	.245	.245
Avg.stack gas temp ..(DEG-F)	245	251	258
Volumetric flow rate.....			
actual.....(ACFM)	31428	31742	31014
dry standard.....(DSCFM)	15720	15396	14992
Isokinetic variation.....(%)	105.7	100.7	99.0
Particulate concentration...			
actual.....(GR/ACF)	0.00713	0.00592	0.00531
dry standard.....(GR/DSCF)	0.01426	0.01221	0.01099
Particle mass rate...(LB/HR)	1.922	1.612	1.413

3.3 Results of Opacity Observations

Test No. 1
Asphalt Plant Stack

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

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	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: Richard J. Eidem
Cert. Date: 03-30-93
Date of Observation: 06-21-93
Time of Observation: 0930-1030

4 RESULTS OF AGGREGATE ANALYSES

INTERPOLL LABORATORIES, INC.
(612)786-6020

T.A. Schifsky & Sons
Laboratory Log No. 9190

Results of Moisture Analysis[1]

Log No.	Test/Run	Sample Type	% Moisture
9190-16	Test 1 Run 1	Virgin Aggregate	5.53
9190-17	Test 1 Run 2	Virgin Aggregate	5.28
9190-18	Test 1 Run 3	Virgin Aggregate	4.63

Respectfully submitted,

Jeannie F. O'Neil, Manager
Inorganic Chemistry Group

JFO/cg

[1]Analysis by ASTM Method D3173

APPENDIX A

PRELIMINARY VOLUMETRIC FLOW RATE DETERMINATION

Test No. 1
Asphalt Plant Stack

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

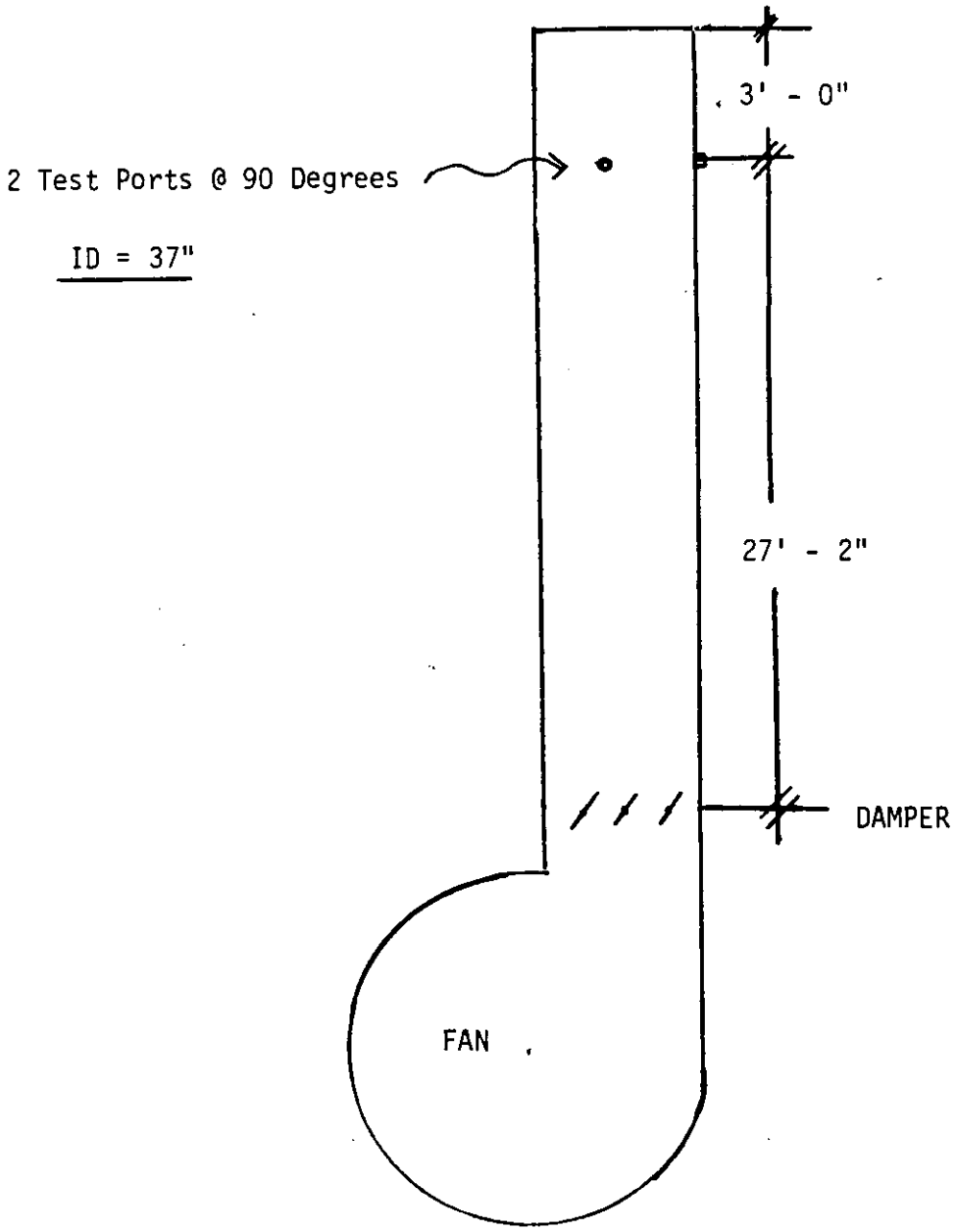
Date of Determination.....	06-21-93
Time of Determination.....(HRS)	800
Barometric pressure.....(IN.HG)	29.01
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	37.75
Duct area.....(SQ.FT)	7.77
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.78
Avg. gas temp.....(DEG-F)	250
Moisture content.....(% V/V)	31.00
Avg. linear velocity.....(FT/SEC)	68.8
Gas density.....(LB/ACF)	.04813
Molecular weight.....(LB/LBMOLE)	29.24
Mass flow of gas.....(LB/HR)	92676
Volumetric flow rate.....	
actual.....(ACFM)	32091
dry standard.....(DSCFM)	15935

APPENDIX B

LOCATION OF TEST PORTS

T.A. SCHIFSKY AND SONS

ASPHALT PLANT STACK



PS 7-22-93

APPENDIX C

FIELD DATA SHEETS

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job T.A. Schifsky

Source Asphalt Plant Stack

Test 1 Run 1 Date 6/21/93

Stack dimen. 37.75 IN.

Dry bulb ____ °F Wet bulb ____ °F

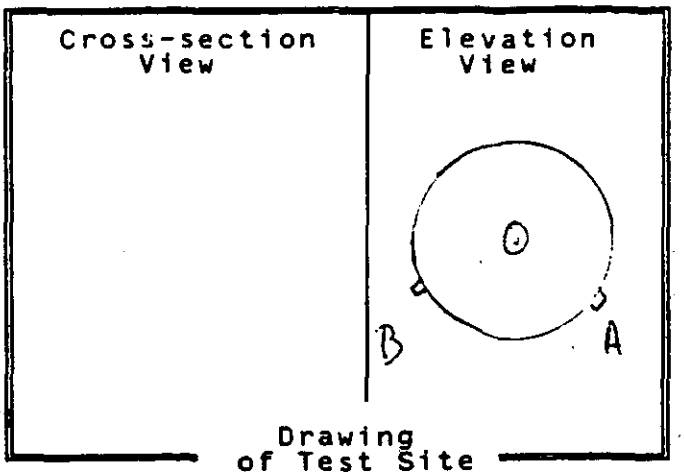
Manometer: ☒ Reg. ☐ Exp. ☐ Elec.

Barometric pressure 29.01 in Hg

Static pressure -.78 in WC

Operators D VanHoover & J. Bergstrom

Pitot No. 123-4 C_p .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: 1.75 in.		Time start: 0800 hrs	
A 1	.021	.79	2.54	.63	
2	.067	2.52	4.28	.82	
3	.118	4.45	6.20	.90	
4	.177	6.68	8.43	1.0	
5	.250	9.43	11.18	1.05	
6	.356	13.44	15.18	1.05	250
7	.644	24.31	26.06	1.0	
8	.750	28.31	30.06	1.05	
9	.823	31.07	32.82	1.05	
10	.882	33.30	35.05	1.0	
11	.933	35.22	36.97	.96	
12	.979	36.96	38.70	.92	
B 1				~~.65~~	
2				.70	
3				.73	
4				.83	
5				.92	
6				.98	
7				1.20	
8				1.20	
9				1.20	
10				1.20	
11				1.20	
12				1.10	

Temp. meas. device & S/N: PDT #18 & PDTH1 Time end: hrs

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

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job T.A. Shifsky Date 6/21/93 Test 1 Run 1
Source Asphalt Plant Stack No. of traverse points 24
Method 5 Filter holder: Glass Filter type: glass fiber

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: Recovery solvent(s)

☒ acetone
☐ other(s)

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	581	200	381
Impinger No. 3			
Condenser			
Desiccant	1334	1315	19
Total			400

Integrated Gas Sampling Data:

Bag Pump No. 23B Box No. 12 Bag No. 1
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 14 in. Hg.
Time start: 0935 (HRS) Time end: 1032 (HRS)
Sampling rate: 400 cc/min Operator: DWH
S/N of O_2 Analyzer used to monitor train outlet: 3

CF-023

S-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job T.A. Shifsky
Source Asphalt Plant Stack
Date 6/21/93 Test 1 Run 1

Operators DVH & JLB
Meter Box No. 6 ΔH 1.74 IN WC
Counter coeff. 9929

Pitot No. 1123-4 Cp .84
Bar. Press. 29.01 inHg H2O % x
Nozzle No. 7-4 Nozzle Dia .245 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dec. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (x v/v)
	0930	234.10											
B 12	2.5	236.23	1.20	2.18	6.30	7	211	246	236	50	80	80	11.6
11	5	238.50	1.30	2.41	8.53	7	211				88	81	11.2
10	7.5	240.80	1.30	2.37	0.76	7	226	250	246	50	92	83	11.3
9	10	242.98	1.30	2.35	2.98	8	235				91	84	11.3
8	12.5	245.15	1.20	2.17	5.11	8	239	251	242	49	95	85	11.4
7	15	247.21	1.15	2.07	7.20	7	244				95	86	11.7
6	17.5	249.13	.92	1.65	9.07	6	247	250	243	49	96	86	11.3
5	20	250.95	.85	1.52	0.86	6	248				96	87	11.6
4	22.5	252.66	.75	1.35	2.56	6	247	249	243	47	96	87	11.6
3	25	254.22	.71	1.27	4.10	5	248				96	87	11.5
2	27.5	255.80	.60	1.08	5.71	5	247	248	245	48	96	88	11.8
1	30	257.20	.56	1.01	7.18	5	247				97	88	11.8
A 12	32.5	259.10	1.00	1.80	9.13	7	247	250	246	48	97	87	11.8
11	35	261.11	1.10	1.95	1.16	7	256				98	89	11.5
10	37.5	263.15	1.1	1.95	3.20	7	257	251	247	49	98	90	12.0
9	40	265.19	1.10	1.96	5.24	7	257				99	90	12.1
8	42.5	267.24	1.05	1.87	7.24	7	255	254	246	50	99	91	12.0
7	45	269.29	1.05	1.87	9.27	7	257				99	91	12.2
6	47.5	271.02	.89	1.59	1.07	6	257	251	248	51	100	91	12.0
5	50	272.90	.85	1.53	2.88	6	248				100	92	11.9
4	52.5	274.76	.89	1.61	4.74	6	248	253	250	52	100	92	12.0
3	55	276.31	.62	1.12	6.29	5	248				100	92	11.9
2	57.5	277.69	.62	1.12	7.83	5	248	254	251	53	100	93	11.9
1	60	279.30	.60	1.09	9.36	5	248				100	93	
	(1032)												
	θ = 60	Vm = 45.20		ΔH = 1.7							Avg. = 92.2		

C-3

S-0037R

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job T.A. Shitsky
Source Asphalt Plant Stack
Method 5 Filter holder: glass

Date 6/21/93 Test 1 Run 2
No. of traverse points 24
Filter type: glass fiber

Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Postest: 0 cfm at 9 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: 5423

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	581	200	381
Impinger No. 3			
Condenser			
Desiccant	1429	1410	19
Total			400

Integrated Gas Sampling Data:

Bag Pump No. 23B Box No. 12 Bag No. 2
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: 0 cc/min at 14 in. Hg.
Time start: 1159 (HRS) Time end: 1255 (HRS)
Sampling rate: 400 cc/min Operator: DHH
S/N of O_2 Analyzer used to monitor train outlet: 3

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job T.A Schifsky
Source Asphalt Plant Stack
Date 6/21/93 Test 1 Run 2

Operators Dust & J.B
Meter Box No. 6 ΔH 1.77 IN WC
Counter coeff. .9979

Pitot No. 1123-41 Cp .80
Bar. Press. 29.01 inHg H2O 2 x
Nozzle No. T-4 Nozzle Dia .245 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dev. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas/In	Gas/Out	Oxygen (xv/v)
	1140	279.55											
12	2.5	281.44	1.05	1.68	1.43	7	230	251	247	53	88	88	11.4
11	5	283.30	1.10	1.76	3.36	7	225				94	90	12.1
10	7.5	285.23	1.10	1.76	5.29	5.3	231	254	252	53	96	91	12.2
9	10	287.20	1.10	1.75	7.22	5.7	237				98	91	12.1
8	12.5	289.14	1.10	1.74	9.14	6	241	253	253	53	99	92	12.0
7	15	291.03	1.10	1.74	1.07	6	241				100	93	12.0
6	17.5	292.80	.93	1.46	2.84	5	249	254	250	52	100	93	12.0
5	20	294.60	1.0	1.57	4.67	5	251				100	93	11.8
4	22.5	296.30	.82	1.28	6.33	5	252	254	251	53	101	94	11.9
3	25	297.90	.73	1.18	7.92	5	251				101	94	11.8
2	27.5	299.43	.69	1.08	9.46	5	251	254	252	52	102	95	11.8
1	30	300.94	.66	1.04	0.94	5	251				102	95	11.8
12	32.5	302.90	1.08	1.70	2.85	7	251	257	252	53	103	96	11.6
11	35	304.91	1.20	1.89	4.86	7	251				103	96	11.7
10	37.5	306.87	1.20	1.87	6.87	7	258	253	254	51	104	96	11.8
9	40	308.90	1.20	1.87	8.87	7	259				104	97	12.0
8	42.5	310.75	1.20	1.87	0.88	7	260	251	253	51	105	97	12.0
7	45	312.81	1.10	1.71	2.80	7	262				105	98	11.9
6	47.5	314.55	.86	1.34	4.50	6	262	252	253	51	105	98	12.1
5	50	316.23	.80	1.25	6.14	5	262				106	98	11.8
4	52.5	317.73	.74	1.15	7.72	5	262	254	254	54	105	98	11.7
3	55	319.26	.70	1.09	9.25	5	262				106	98	11.7
2	57.5	320.74	.65	1.01	0.73		263	253	254	54	106	98	11.6
1	60	322.20	.61	.95	2.17						106	99	
	1255												
	θ = 60	Vm = 42.65		ΔH 1.49							Avg. = 98.2		

1156 JB

C-5

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job T.A. Shifsky
Source Asphalt Plant Stack
Method 5 Filter holder:

Date 6/21/93 Test 1 Run 3
No. of traverse points 24
Filter type: Glass Fiber

Sample Train Leak Check:

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

Particulate Catch Data:

No.s of filters used: 5424

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

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

Condensate Data:

Item	Weight(g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	563	200	363
Impinger No. 3			
Condenser			
Desiccant	1347	1334	13
Total			376

Integrated Gas Sampling Data:

Bag Pump No. 233 Box No. 12 Bag No. 3

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

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

Time start: 1400 (HRS) Time end: 1457 (HRS)

Sampling rate: 400 cc/min Operator: DLH

S/N of O_2 Analyzer used to monitor train outlet: 3

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job T.A. Schifski
Source Asphalt Plant Stack
Date 6/22/93 Test 1 Run 3

Operators D.W.H. & J.B.
Meter Box No. 6 ΔH 1.39 IN WC
Cosmeter coeff. 99.70

Pitot No. 103-4 Cp .84
Bar. Press. 29.91 inHg H2O 32.x
Nozzle No. 7-4 Nozzle Dia. .242 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Orifice Meter (inWC)	Dec. Vol. (cf)	VAC. inHg	Temperatures (°F) Stack	Probe	Oven	Impg.	Gas In	Gas Out	Oxygen (xv/v)
	1356	322.50											
B 12	2.5	324.52	1.10	1.74	4.43	4	230	253	250	57	95	95	12.1
11	5	326.40	1.10	1.72	6.34	4	233				96	95	12.7
10	7.5	328.35	1.20	1.88	8.34	7	233	257	254	54	98	95	12.7
9	10	330.35	1.25	1.95	0.38	7	236				100	96	12.3
8	12.5	332.25	1.15	1.79	2.34	7	242	260	257	54	102	97	12.2
7	15	334.24	1.15	1.78	4.29	7	247				103	98	12.1
6	17.5	336.20	.94	1.44	6.06	7	253	261	258	52	104	98	12.0
5	20	337.83	.84	1.29	7.72	6	256				105	99	11.9
4	22.5	339.36	.77	1.18	9.32	6	258	257	257	53	105	99	11.9
3	25	340.85	.73	1.11	0.87	5	259				106	100	11.8
2	27.5	342.25	.60	.92	2.28	5	259	257	256	53	106	100	11.5
1	30	343.70	.60	.92	3.69	5	259				106	100	11.9
A 12	32.5	345.46	.92	1.41	5.44	7	259	255	257	54	108	101	11.8
11	35	347.24	.97	1.47	7.23	7	266				108	102	11.8
10	37.5	349.22	1.05	1.60	9.09	7	266	256	257	54	109	102	11.7
9	40	351.09	1.10	1.67	1.00	7	266				110	103	11.6
8	42.5	352.85	.98	1.48	2.79	7	271	258	260	55	110	103	11.7
7	45	354.58	.93	1.41	4.55	7	268				110	104	11.8
6	47.5	356.20	.81	1.23	6.19	6	268	257	261	56	111	104	11.8
5	50	357.86	.90	1.37	7.92	6	267				111	104	12.0
4	52.5	359.51	.77	1.17	9.52	6	267	257	263	56	111	105	11.8
3	55	361.60	.67	1.02	1.02	6	267				112	105	11.7
2	57.5	362.36	.56	.85	2.59	6	267	256	263	56	112	106	11.8
1	60	363.70	.52	.79	3.71		267				112	106	11.8
	1457												
	θ = 60	Vm = 41.20		ΔH = 1.38							Avg. = 103.4		

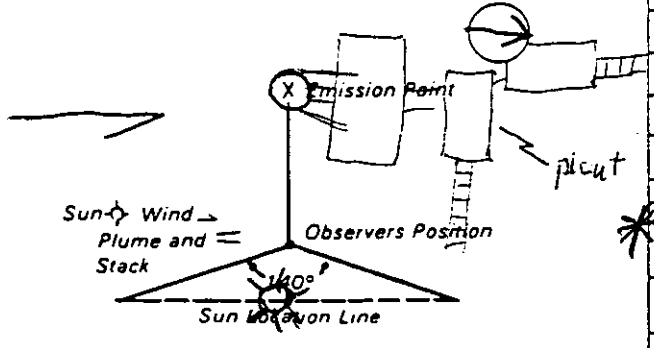
C-7

Interpoll Laboratories
(612)786-6020

Visible Emissions Form

SOURCE NAME: T.A. Schifsky & Sons Inc.	OBSERVATION DATE: 6-21-93
ADDRESS: 2370 E. Hwy. 36	START TIME: 0930
CITY: North ST. Paul	STATE: MN ZIP:
PHONE:	SOURCE ID NUMBER:
PROCESS EQUIPMENT: Asphalt Plant	OPERATING MODE: 100 %
CONTROL EQUIPMENT: Baghouse	OPERATING MODE: 100 %
DESCRIBE EMISSION POINT: START round metal stack STOP ✓	
HEIGHT ABOVE GROUND LEVEL: START 39' STOP ✓	HEIGHT RELATIVE TO OBSERVER: START 39' STOP ✓
DISTANCE FROM OBSERVER: START 117' STOP ✓	DIRECTION FROM OBSERVER: START W STOP ✓
DESCRIBE EMISSIONS: START lofting STOP ✓	
EMISSION COLOR: START clear STOP ✓	PLUME TYPE: CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☐ YES ☑	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☑
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START 2' above stack STOP ✓	
DESCRIBE BACKGROUND: START SKY STOP ✓	
BACKGROUND COLOR: START blue STOP ✓	SKY CONDITIONS: START clear STOP ✓
WIND SPEED: START 5-10 STOP ✓	WIND DIRECTION: START S STOP ✓
AMBIENT TEMP: START 73° STOP 74°	WET BULB TEMP: 67° RH percent: 72%

Source Layout Sketch — Draw North Arrow



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 | NUMBER OF READINGS ABOVE % WERE

RANGE OF OPACITY READINGS: MINIMUM | MAXIMUM

OBSERVER'S NAME (PRINT): RICHARD J. EIDEM

COMMENTS: * 2 minute break for port change - steam dissipated

OBSERVER'S SIGNATURE: Richard J. Eidem | DATE: 6-21-93

ORGANIZATION: Interpoll Inc.

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

CERTIFIED BY: ETA Inc. | DATE: 3-30-93

VERIFIED BY | DATE

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Richard Eidem

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

Thomas Lee
President

238303
Certificate Number

Vice President

Minneapolis
Town

David B. Savage, Jr.
Program Manager

March 31, 1993
Date of Issue

APPENDIX D

INTERPOLL LABORATORIES ANALYTICAL DATA

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job T.A. Schifsky
Team Leader [illegible]
Date Submitted [illegible]
Test No.
Date of Analysis [illegible]

Source Asphalt Plant
Test Site Stack
Date of Test 8-21-93
No. of Runs Completed 3
Technician C. [illegible]

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	9190-07	1	0.00	4.40	17.80	4.40	13.40	1.70
		2	0.00	4.40	17.80	4.40	13.40	1.70
	☑ B ☐ F	Avg				4.40	13.40	
1/2	-11	1	0.00	4.50	17.80	4.50	13.30	1.69
		2	0.00	4.50	17.80	4.50	13.30	1.69
	☑ B ☐ F	Avg				4.50	13.30	
1/3	-15	1	0.00	4.60	17.70	4.60	13.10	1.70
		2	0.00	4.60	17.70	4.60	13.10	1.70
	☑ B ☐ F	Avg				4.60	13.10	
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						
		1						
		2						
	☐ B ☐ F	Avg						

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

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

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

EPA Method 3 Guidelines

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

LSC 04 RR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job TA Schifsky
Team Leader DOH
Date Submitted 6-22-93
Test No. 1
Date of Analysis 7-6-93

Source Asphalt Plant
Test Site Stack
Date of Test 6-21-93
No. of Runs Completed 3
Technician C. Nelson

0	Test 1 Run 0 Field Blank Log Number 9190-03 Comments	Dish No. 61A Dish Tare Wt. 51.4732 g Dish+Sample Wt 51.4737 g Sample Wt. 0.0005 g
1	Test 1 Run 1 Log Number -06 Comments	Dish No. 102 Dish Tare Wt. 44.3251 g Dish+Sample Wt. 44.3436 g Sample Wt. 0.0185 g
2	Test 1 Run 2 Log Number -10 Comments	Dish No. 105 Dish Tare Wt. 47.8643 g Dish+Sample Wt. 47.8754 g Sample Wt. 0.0111 g
3	Test 1 Run 3 Log Number -14 Comments	Dish No. 206 Dish Tare Wt. 47.8189 g Dish+Sample Wt. 47.8262 g Sample Wt. 0.0073 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. 0.0005 g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0180	0.0106	0.0068		

D-2

LSC-03.GR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job T. A. Schifs Ky
Team Leader DUH
Date Submitted 6-22-93
Test No. 1
Date of Analysis 7-6-93
Transport Leakage [X] None [ ] _____ ml

Source Asphalt Plant
Test Site Stack
Date of Test 6-21-93
No. of Runs Completed 3
Technician C. Helgeson
Solvent Acetone

0	Test 1 Run 0 Field Blank Log Number 9190-01 Vol. of Solvent 110 ml *Solvent Residue 3.6 ug/ml	Dish No. 405 Dish Tare Wt. 48.4903 g Dish+Sample Wt. 48.4907 g Sample Wt. 0.0004 g
1	Test 1 Run 1 Vol. of Solvent 155 ml Log Number -04 Comments	Dish No. 513 Dish Tare Wt. 47.4132 g Dish+Sample Wt. 47.4281 g Sample Wt. 0.0149 g
2	Test 1 Run 2 Vol. of Solvent 115 ml Log Number -08 Comments	Dish No. 515 Dish Tare Wt. 50.0146 g Dish+Sample Wt. 50.0303 g Sample Wt. 0.0157 g
3	Test 1 Run 3 Vol. of Solvent 115 ml Log Number -12 Comments	Dish No. 517 Dish Tare Wt. 48.5960 g Dish+Sample Wt. 48.6100 g Sample Wt. 0.0140 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 3.6 ug/ml = [(Sample Wt. 0.0004 g)(10^6)]/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
	0.0143	0.0153	0.0136	D-3	

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job TA Schifsky
Team Leader DUH
Date Submitted 6-22-93
Test No. 1
Date of Analysis 7-6-93

Source Asphalt Plant
Test Site Steck
Date of Test 6-21-93
No. of Runs Completed 3
Technician C. Helgesen

0	Test 1 Run 0 Field Blank Log Number 9190-02 Comments	Filter No. 5426 Filter Type 4"GF Filter Tare Wt. .9176 g Filter+Sample Wt. .9178 g Sample Wt. 0.0002 g
1	Test 1 Run 1 Log Number -05 Comments	Filter No. 5421 Filter Type 4"GF Filter Tare Wt. .9244 g Filter+Sample Wt. .9309 g Sample Wt. 0.0065 g
2	Test 1 Run 2 Log Number -09 Comments	Filter No. 5423 Filter Type 4"GF Filter Tare Wt. .9227 g Filter+Sample Wt. .9278 g Sample Wt. 0.0051 g
3	Test 1 Run 3 Log Number -13 Comments	Filter No. 5424 Filter Type 4"GF Filter Tare Wt. .9129 g Filter+Sample Wt. .9192 g Sample Wt. 0.0063 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
	0.0065	0.0051	0.0063		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0358	0.0310	0.0267		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

Sample Deposition

Job T.A. Schifsky
Field Engineer Dirt
Date Submitted 6/21/93
Test No. 1

Source Asphalt Plant
Test Site Stack
Date of Test 6/21/93
No. of Runs Completed 3

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

Type of Source: _____

Fuel Type:

Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
Wood: ☐ Wood Waste ☐ Dust ☐ Bark
Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
☒ Natural Gas ☐ RDF ☐ Other _____

S-278
G:\STACK\WP\FORMS\S-278.LAS

APPENDIX E

ASPHALT PLANT INFORMATION

Interpoll Laboratories
(612)786-6020

MPCA Exhibit C for Process Emissions

JOB 93-16
SOURCE T.A. Schifsky & Sons Inc
DATE 6/21/93

C. Equipment & Operating Data

1. Process Equip. No./Ident. Standsteel / 628.
2. Process Equip. Description Batch Plant.
3. Process equipment operating under normal operating conditions:
   No ___. Yes X.

D. Instrument Data on Process Equipment

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

E. Air Pollution Control Equipment

1. Type/model control equipment Standsteel / 384.
2. Air pressure drop across the control equipment 3.0 to 4.0.
3. Air flow through the control equipment 31,434 ACFM At 275°.
4. Was the control equipment operating normally? YES.
5. Data of last major maintenance/cleaning of control equipment
   None.

F. Plant Manager's Certification

I certify that the information submitted herein is accurate and correct and that no information requested was withheld from MPCA, Division of Air Quality.

By Thomas L Schifsky, Position Vice Pres.

S-349R

Interpoll Laboratories
(612)786-6020

Asphalt Plant Information Sheet

Manufacturer and Model No. of the Plant Stanstee1 / 628

Owner and Operator of the Plant

Location of Plant at time of Test (State, County and Address) 2370 E. Hwy 36
North St. Paul, MN. RAMSEY CO.

Estimated Total Time of the Plant at this Site (from when to when) 1959 to present

Type of Pollution Control Equipment (wet scrubber, mechanical collector, etc. Stanstee1 Baghouse

Model No. of Pollution Control Equipment model 384

If wet scrubber, provide the following information:

Percent recycle of scrubber water N/A %

Flow of water to scrubber N/A GPM

Manufacturer recommended pressure drop across venturi 3.0 to 4.0 IN.WC.

Rated Capacity of Asphalt Plant 140 TONS/HR
at an aggregate moisture content of 5 %

Type of Fuel Used to Fire Plant:

- [x] Natural Gas
- [ ] No. 2 Fuel Oil
- [ ] No. 5 Fuel Oil
- [ ] Propane

Normal Production Rate of Plant 140 TONS/HR
at an aggregate moisture content of 5 %

NOTE: Attach drawings of plant and pollution control equipment.

Name of Individual Supplying Information [signature]

Date 6/21/93

S-0150R(2)

APPENDIX F

ASPHALT PLANT OPERATING DATA

TEST 1

MPCA

Asphalt Plant

Records of Operating Conditions During Compliance Tests

Plant Manufacturer and Model STANSTEEL 628 Plant type BATCH

Date of first installation _____

Test date 6/21/93 Location 2370 E Hwy 36 Time: start 9:30 AM stop 10:30 AM

Fuel burned NAT. GAS 41.0 CUBIC FT. Dust collector ( ) Venturi scrubber, ( ) Other wet scrubber ( ) Cyclone/multiclone (X) Baghouse

Number of burners 1 Burner(s) rating 50 MMBTUH = 100% setting

If wet scrubbing, percent water recycle N/A %

Time	Burner setting %	Aggregate TPH		Recycle TPH	Asphalt TPH		Mix Temperature °F	Pressure drop across dust collector(s) in H_2O	Water Flow rate through wet collectors gpm
9:30	100%	0		–	0		300°	3.25	
9:45	100%	37		–	1.96		295°	3.25	
10:00	100%	36.6	73.6	–	1.92	3.88	302°	3.25	
10:15	100%	37.8	111.4	–	2.0	5.88	300°	3.25	
10:30	100%	32	143.4	–	1.64	7.54	300°	3.25	

1434 | 41.0 [redacted] .29

Moisture content in the aggregates

	Run No. 1	Run No. 2	Run No. 3	Average
Virgin				
Recycle				

Average Measured or calculated* fuel usage: .29 [redacted] cf/ton product _____ gal/ton product

Responsible Signature and Date: Randy Bomgaars 6/21/93

* if calculated, applicant should attach a schedule showing the bases, assumptions, sources of colligative data, and the computation.

Include fuel analysis as required

CES:pmw9.4

S-319R

TEST 2

MPCA

Asphalt Plant

Records of Operating Conditions During Compliance Tests

Plant Manufacturer and Model STANSTEEL 628 Plant type BATCH

Date of first installation _____

Test date 6/21/93 Location 2370 E HWY 36 Time: start 11:55 stop 12:55

Fuel burned NAT. GAS 38.0 cubic ft Dust collector () Venturi scrubber, () Other wet scrubber () Cyclone/multiclone (X) Baghouse

Number of burners 1 Burner(s) rating 50 MMBTUH = 100% setting

If wet scrubbing, percent water recycle N/A %

Time	Burner setting %	Aggregate TPH		Recycle TPH	Asphalt TPH		Mix Temperature °F	Pressure drop across dust collector(s) in H_2O	Water Flow rate through wet collecto gpm
11:55	100%	0		–	0		300°	3.25	
12:10	100%	43		–	2.28		300°	3.25	
12:25	100%	36	79	–	1.87	4.1	295°	3.25	
12:40	100%	37	116	–	1.95	6.05	300°	3.25	
12:55	100%	31.5	147.5	–	1.61	7.66	300°	3.25	

Moisture content in the aggregates 1475 38.0 [redacted]

	Run No. 1	Run No. 2	Run No. 3	Average
Virgin				
Recycle				

Average Measured or calculated* fuel usage: .26 [redacted] cf/ton produc _____ gal/ton produc

Responsible Signature and Date: Randy Bjorquist 6/21/93

* if calculated, applicant should attach a schedule showing the bases, assumptions, sources of colligative data, and the computation.

Include fuel analysis as required

CES:pmw9.4

S-319R

TEST # 3

MPCA

Asphalt Plant

Records of Operating Conditions During Compliance Tests

Plant Manufacturer and Model STANSTEEL 628 Plant type BATCH

Date of first installation _____

Test date 6/21/93 Location 2370 E HWY 36 Time: start 2:00 pm stop 3:00 pm

Fuel burned NAT GAS 41.0 cubic ft Dust collector () Venturi scrubber, () Other wet scrubber () Cyclone/multiclone (X) Baghouse

Number of burners 1 Burner(s) rating 50 MMBTUH = 100% setting

If wet scrubbing, percent water recycle _____ %

Time	Burner setting %	Aggregate TPH		Recycle TPH	Asphalt TPH		Mix Temperature °F	Pressure drop across dust collector(s) in H_2O	Water Flow rate through wet collector(s) gpm
2:00	100%	0		—	0		305	3.25	
2:15	100%	39		—	1.96		302	3.25	
2:30	100%	36	75	—	1.89	3.85	300	3.25	
2:45	100%	33	108	—	1.69	5.54	300	3.25	
3:00	100%	38.5	146.5	—	1.96	7.5	300	3.25	

Moisture content in the aggregates 146.5/141.0 = .28

	Run No. 1	Run No. 2	Run No. 3	Average	Average Measured or calculated* fuel usage:
Virgin					.28 cf/ton product
Recycle					_____ gal/ton product

Responsible Signature and Date: Stanley R Thompson 6/21/93

* if calculated, applicant should attach a schedule showing the bases, assumptions, sources of colligative data, and the computation.

Include fuel analysis as required

CES:pmw9.4

S-319R

TEST 1

THE METAL DOCTOR

Steel & Aluminum Welding

770-6285

	Tons	lbs ASP.
9:30	162	2247800
9:45	199 (37)	2251724 / 2000 | 3924 (1.96)
10:00	236.2 (36.6)	2255565 / 2000 | 3841 (1.92)
10:15	274.8 (37.8)	2259567 / 2000 | 4002 2.001 (2)
10:30	306 (32)	2262856 / 2000 | 3289 (1.64)

F-4

- Truck Bodies
- Hoists
- Fuel & Hyd. Tanks
- Ladder Racks
- Truck Frames
- Custom Trailers
- Hitches
- Aluminum Floors

"V___e t___Dua___ is E___In"

TEST 2

THE METAL DOCTOR

Steel & Aluminum Welding

770-6285

	Total Tons	
11:55	316 START	2263844
12:10	359 (43 tons)	2268400 / 2000 | 4556 (2.28)
12:25	395 (36 ton)	2272038 / 2000 | 3638 (1.82)
12:40	432 (37)	2275932 / 2000 | 3894 (1.95)
12:55	463.5 (31.5)	2279156 / 3224 (1.61)

- Truck Bodies
- Hoists
- Fuel & Hyd. Tanks
- Ladder Racks
- Truck Frames
- Custom Trailers
- Hitches
- Aluminum Floors

1 L 21 F5

THE METAL DOCTOR

Steel & Aluminum Welding

770-6285

2:00	499	2282794
2:15	538 (39)	2286707
2:30	574 (36)	2000/3913 (1.96)
2:45	607 (33)	2290481
3:00	645.5 (38.5)	2000/3774 (1.89)
		2293859
		2000/3378 (1.69)
		2297773
		/3914 (1.96)

- Truck Bodies
- Hoists
- Fuel & Hyd. Tanks
- Ladder Racks
- Truck Frames
- Custom Trailers
- Hitches
- Aluminum Floors

"Where the Quality is Built In"

APPENDIX G

PROCEDURES

Particulate Loadings and Emission Rates

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

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

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

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

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

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

Interpoll Laboratories
(612)786-6020

Condensible Organic Compounds Analysis

(State of Minnesota - MPCA Exhibit C)

Method II-8672-MN

Equipment: Separatory funnel - 500 cc with Teflon stopcock

Powder funnel - 75 mm ID with a 17 mm stem

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

Reagents: Diethyl ether - reagent grade

Chloroform - reagent grade

Sodium sulfate - (ACS) granular anhydrous

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

Glass wool (Pyrex microfiber)

PREPARATION

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

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

SAMPLING

An all-glass impinger assembly is used in the back half of the EPA Method 5 sampling train when an organic wet catch is to be collected. The impinger assembly consists of a modified impinger, a Greenburg Smith impinger followed by another modified impinger. The third impinger should have a temperature measuring device at the outlet upstream of a final impinger or desiccant column to monitor the temperature of the outlet gas stream. Prior to the start of the test, each of the first two impingers should be charged with 100 g of Class I water. The Method 5 train should be operated as provided for in EPA Method 5. Ice should be added to the impinger bath to keep the temperature of the gas at the outlet at or less than 68 ^{o}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 ^{o}C if the analysis is not conducted within 48 hours.

ANALYSIS

I. Organics

Caution! Work in vented hood!!!

A. Organic Blank Determination

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

B. Organic Sample Determination

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

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

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

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

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

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

II. Inorganics

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

A. Inorganic Blank Determination

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

B. Inorganic Sample Determination

Follow steps 1-5 in Section A above.

NOTES

1. For the organics determination, in the rare event that the impinger catch resulted from a Modified Method 6 determination (SO_2), whereby the solution contains dilute hydrogen peroxide ($\geq$ 3%), do 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.

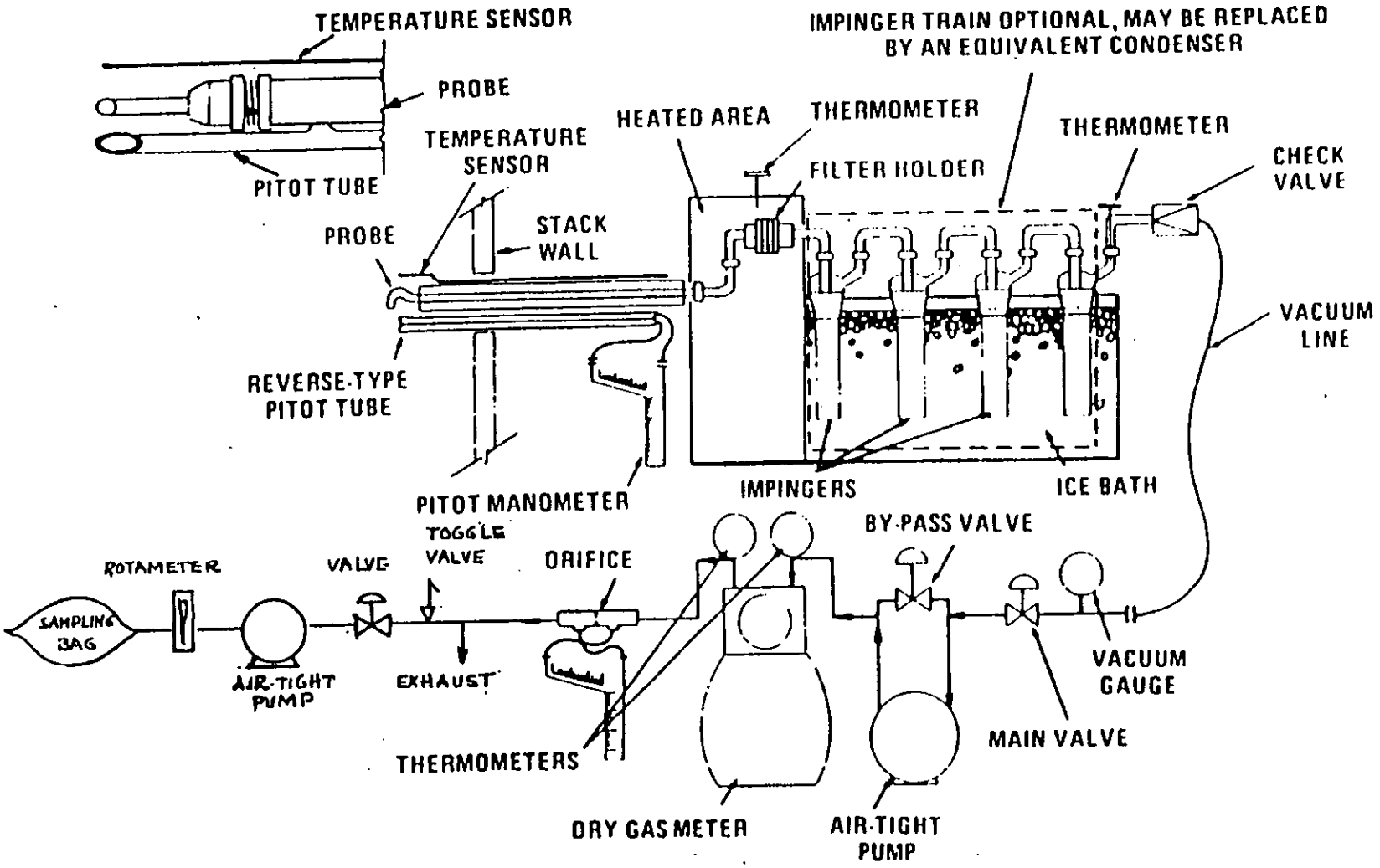
   Wisconsin - Use Method II-8672-WI.

   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

CALCULATION EQUATIONS

METHOD 2

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

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

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

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

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

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

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

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

SYMBOLS

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

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

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

C_p = Pitot tube coefficient, dimensionless

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

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

EA = Excess air, percent by volume

γ = Dry test meter correction factor, dimensionless

G_d = Specific gravity (relative to air), dimensionless

I = Isokinetic variation, percent by volume

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

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

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

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

M_p = Total amount of particulate matter collected, g

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

P_g = Stack static gas pressure, IN. WC.

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

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

A_a = Actual volumetric stack gas flow rate, ACFM

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

RH = Relative humidity, %

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

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

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

$T_s(avg)$ = Absolute average stack temperature, ^{o}F

T_{std} = Standard absolute temperature, 528 ^{o}F (68 ^{o}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.

Y = Dry test meter correction coefficient, dimensionless

ρ = Actual gas density, LB/ACF

CALCULATION EQUATIONS

METHOD 3

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

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

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

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

CALCULATION EQUATIONS

METHOD 5

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

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

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

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

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

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

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

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

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

SYMBOLS

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

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

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

C_p = Pitot tube coefficient, dimensionless

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

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

EA = Excess air, percent by volume

γ = Dry test meter correction factor, dimensionless

G_d = Specific gravity (relative to air), dimensionless

I = Isokinetic variation, percent by volume

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

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

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

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

M_p = Total amount of particulate matter collected, g

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

P_g = Stack static gas pressure, IN. WC.

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

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

A_a = Actual volumetric stack gas flow rate, ACFM

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

RH = Relative humidity, %

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

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

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

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

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

θ = Total sampling time, min.

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

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

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

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

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

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

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

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

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

γ = Dry test meter correction coefficient, dimensionless

ρ = Actual gas density, LB/ACF

APPENDIX I

SAMPLING TRAIN CALIBRATION DATA

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

Job T.A Schifsky Date 6/17/93

Operator ~~DHH~~ Module No. 6

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 28.70 in. Hg. $_T$ = .9979 ^H@ 1.77 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
[redacted]	(226.20)	[redacted]	
2.5	228.09	73	71
5.0	230.02	74	71
7.5	231.85	76	73
10	233.74	77	73
[redacted]	V_m= 7.54	Avg(t_m)= 73.50 °F	

Calculate Y_{cn} as follows:

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

$$Y_{cn} = \frac{1.786}{(.9979)(7.54)}\left[\frac{(73.50) + 460}{(28.70)}\right]^{0.5}$$

Y_{cn} = 1.02

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: June 22, 1993

Meter Box No. : 6 (Rockwell Dry Test Meter Serial No. 712852)

Date of Last Calibration: May 7, 1993
Calibration Technician: D. Brennan
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
May 13, 1993	3-8767	207.50	435.80	228.30	228.30
May 19, 1993	3-8844	436.00	588.20	152.20	380.50
May 25, 1993	3-8918	591.70	846.45	254.75	635.25
June 4, 1993	3-8985	846.90	1008.07	161.17	796.42
June 15, 1993	3-9131	1009.40	1225.33	215.93	1012.35
June 21, 1993	3-9190	1226.20	1363.70	137.50	1149.85

* Total volume through meter since last calibration.

Date 5/7/93

Bar. Press. 29.02 in. Hg

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5

Control Module No. 6
Serial No. DTM 712852
Wet Test Meter No. AL-20
Technician D. BRENNAN

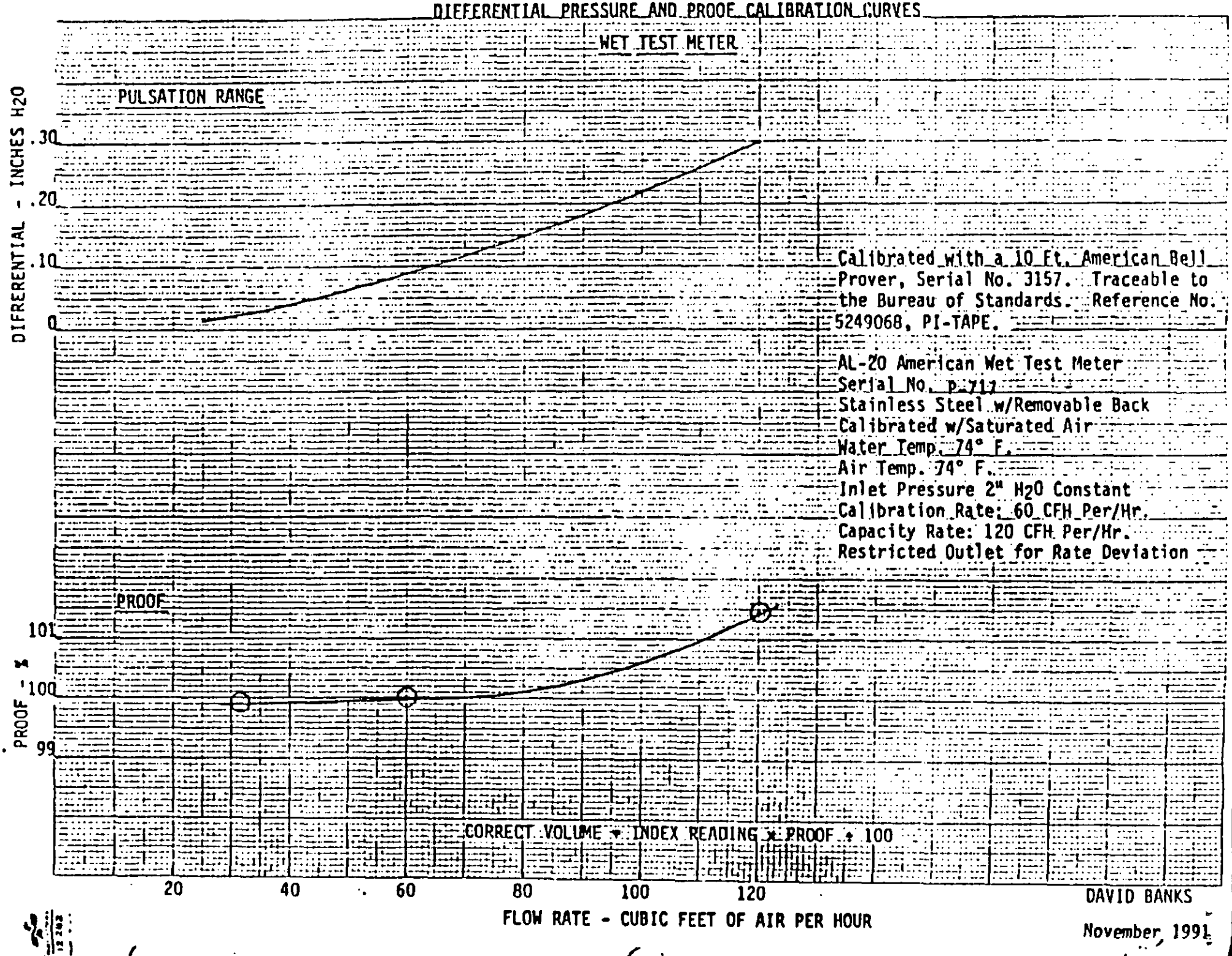
ΔH (in. WC)		Gas Volume Wet Test Meter (ft^3)	* Cal. Index Φ (%)	* Diff. Wet Test Meter ΔP_w (in.WC)	Gas Volume Dry test meter (ft^3)		Gas temperatures			Time θ (min/sec)	Meter Coeff. Y	Orifice Const. ΔHθ	C_f
							Wet Test	Dry Test					
nominal	actual				V_{d1}	V_{df}	t_w (°F)	t_{d1} (°F)	t_{df} (°F)				
0.5	.50	2	99.85	0.01	200.50	202.540	71	86	79	4:57	.9988	1.75	
1.2	1.2	3	99.91	0.025	203.000	206.057	71	87	80	4:48	1.0004	1.75	
2.0	2.0	3	99.93	0.055	185.000	188.043	71	84	75	3:44	.9958	1.77	
3.3	3.3	5	100.00	0.09	188.500	193.582	71	88	98	4:51	.9975	1.76	
4.7	4.7	(c) 6	100.02	0.12	194.000	200.102	71	91	79	4:57	.9972	1.81	
		3	4	5	6	7	8	9	10	11/12 AVG.	.9979	1.77	

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

Approved by Daniel R. Dean Date 5/17/93

* 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 H2O
.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: 6-21-93 Nozzle Number 7-4
Technician: Duane Van Hoever

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

Position	Diameter (inches)
1	.245
2	.245
3	.246
Average:	.245

Interboll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

Unit under test:
Vendor Beckman Industrial
Model HD 110 T Serial Number POT #18
Range -199 °F Thermocouple Type K
Date of Calibration 4/7/93 Technician D. VAN Hoeven

Method of Calibration:

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

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

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation Δt (°F)	Deviation (%)
0		0	0	0
100		96	4	.71
200		199	1	.15
300		298	2	.26
400		395	5	.58
500		495	5	.52
600		597	3	.28
700		698	2	.25
800		803	3	.24
900		906	6	.38
1000		1011	11	.75
1100		1114	14	.89
1200		1220	20	1.20
1300		1321	21	1.19
1400		1426	26	1.39
1500		1524	24	1.22
1600		1625	25	1.21
1700		1721	21	.97
1800		1819	19	.89
1900		1912	12	.51
2000				
2100				
		Averages:		.68

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.

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(612)786-6020

S-Type Pitot Tube Inspection Sheet

Pitobe No. 23-4

Pitot tube dimensions:

1. External tubing diameter (D_t) .314 IN.
2. Base to Side A opening plane (P_A) .400 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° 1
7. B_2 < 5° 1

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

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .755 IN.
11. Pitot to probe sheath 3.00 IN.
12. Pitot to thermocouple (parallel to probe) 3.00 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

☒ Meets all EPA design criteria thus C_p = 0.84

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

Date of Inspection: 4-7-93

Inspected by: [signature]

CFR Title 40 Part 60 Appendix A Method 2

INTERPOLL LABORATORIES
(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 4/7/93

Technician D Van Hoever

Mercury Column Barometer No. _____

Aneroid Barometer No. 861216

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjsted Mercury Barometer Read	Initial Aneriod Barometer Read	Difference (P_{ba}-P_{bm})
29.11	72	.110	29.00	28.94	.06

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

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

*Note

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

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APPENDIX J

MPCA TEST PLAN AND PROTOCOL

Minnesota Pollution Control Agency
Division of Air Quality
Stack Testing Protocol

The following is a summary of the testing requirements for the facility owned by T.A. Schifsky and Sons:

I. Test Methods

A. EPA Method 1 for the location of sampling ports and points. Location of the sampling ports must be approved before the test.

Check for cyclonic flow must be done whenever there is a cyclonic type of device directly upstream of the sampling location. Correction of cyclonic flow by straightening vanes must also be verified by checking the cyclonic flow before the test.

If the location does not meet the minimum requirements in Method 1, the testing firm must conduct the flow pattern evaluation and testing according to the alternative procedures in part 2.5 of EPA Method 1 (Three-dimensional directional probe).

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

C. EPA Method 3 for gas analysis. Three determinations: one measurement on an integrated sample taken concurrently with each test run for pollutant.

D. EPA Method 4 for the determination of moisture in the flue gases. Three determinations: one measurement concurrently with each test for pollutant.

E. EPA Method 5 as amended in Exhibit C and Minn. Rules 7005.0500 for the determination of particulate matter emissions. Three one-hour determinations are required. The sampling time for each run must be at least 60 minutes and the sampling rate must be at least 0.9 dscm/hr (0.53 dscf/min). Report the results as dry catch only, and wet and dry catch separately.

F. EPA Method 9 for the determination of visible emissions as amended in Minn. Rules part 7005.1860. One hour of opacity readings are required.

AQD File No.: 104

NOTE: The protocol, testplan, and information required in Exhibit C shall be submitted as part of the performance test report. Please note the new Asphalt Plant Operating Conditions During Stack Testing Sheet.

TEST PLAN

I. GENERAL INFORMATION

Permittee: Schifsky, T.A. and Sons

Permittee's contact person and telephone number: Tom Schifsky 777-1313

Permittee's mailing address: 2370 Highway 36 North St. Paul, Mn. 55109

DAQ File No.: 104

MPCA permitting engineer: Jerry Liefert

Applicable regulations for each source tested (be specific): Mn. Rules pts. 7005.1860, 7005.2030, 7005.2040 for PM and opacity.

Reason for testing:

Is this test for initial compliance demonstration: Yes

Drawings showing location of sampling ports included: To be submitted

Location of the plant at the time of the test: North St. Paul

Date when test plan was discussed and agreed upon with the permittee, or Pre-test meeting needed: Pre-test meeting to be scheduled by Permittee.

II. NOTIFICATION REQUIREMENTS:

The permitee must contact the Agency at least two weeks before the scheduled test to have a pre-test meeting and obtain all necessary approvals, unless prior agreement is reached.

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

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

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

2. Permittee must schedule the test at a time when the plant can be operated at 100% of rated capacity, and at maximum recycle rate if applicable. If the plant is tested at less than 100% of capacity, the Permittee will be required to limit production to the tested rate.

3. Permittee must be ready to burn specified fuel.

4. Permittee may have to install pressure drop taps and gauges.

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

III. TEST PLAN

The following is the test plan developed for the Standard Steel Corp. plant.

A. Emission point(s) to be tested: Exhaust stack for fabric filter

B. Parameters to be tested at each emission point: PM and opacity for Emission Point 1.

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

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

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

2. Analysis. The composite must be analyzed as specified in Exhibit D.

D. Moisture content in the virgin aggregate

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

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

E. Operating Conditions during the Test

1. Operation must be at 100% of design capacity at the existing aggregate moisture content - no deliberate reduction of feed rate or fan speed during testing, except for nominal damper adjustment for proper combustion. - The test report must include copies of the manufacturer's specifications that define the design capacity of the plant as a function of the moisture content of the aggregate. If circumstances cause operation of the plant to be less than 100% during the test, the Permittee will be required to limit production to the tested rate.

2. Must burn 100% of the highest emitting fuel to be listed in and allowed by the permit: No. 2 fuel oil

3. If normal operation of the plant will be with recycling of collected PM from the baghouse into the dryer, the test must be conducted under the same conditions.

F. Operating Data to Be Recorded during the Test

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

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

1. During testing the following measurements must be made:

a) Pressure drop across the baghouse.

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

c) Moisture content of the aggregate.

2. Please provide the following data:

a) Average fuel consumption rate (calculated or measured) and type

b) Cleaning cycles of the baghouse

c) Operating data sheet enclosed

G. Testing schedules and testing firm: Test shall be conducted by June 30, 1993 by a firm acceptible to the MPCA

H. Permitting engineer to witness the test: No