Commonwealth of Pennsylvania
Environmental Resources
January 18, 1991

Subject: Stack Test Review

To: Data File
Highway Materials, Inc.
Northampton County

From: Rick Begley
Air Pollution Control Engineer
Division of Technical Services and Monitoring
Bureau of Air Quality Control

Through: Chief, Source Testing and Monitoring

Highway Materials, Inc. operates a McCarter Corporation Model M-250-18, propane fired, batch type, 250 ton per hour asphalt plant at the above location.

Cold aggregate feed is transported by a conveyor to a rotary drier that is 34 feet long and 9 feet in diameter. The heated aggregate is then transported by an elevator to a stackup tower where it passes through screens, a hot bin, the pug mill where the oil is injected and mixed, and finally to an asphalt truck.

Air flow at 50,000 ACFM and 250°F passes through the rotary drier and is directed through a knockout box, a McCarter Corporation fabric collector, and finally discharged to the atmosphere by a 150 horsepower exhaust fan through 3 feet, 6 inch diameter stack that extends to a point approximately 33 feet above grade. Fugitive emissions from the stack up tower are also collected and directed through the collector with the rotary drier effluent.

The McCarter fabric collector, Model McC-648-6, has one compartment that contains 648 felted Nomex bags, 14 ounces per square yard, for an air-to-cloth ratio of 5.5:1. Ten percent of the bags are cleaned by a reverse air pulse every 10 to 15 seconds and the design pressure drop across the compartment is 2 to 4 inches WG. Material collected by the baghouse is stored in a sealed silo for eventual use in various mixes.

Three Method 5 particulate tests were performed by personnel from SSM, Inc., on October 16-17, 1990 on the stack serving the collector to demonstrate compliance with NSPS. The tests were conducted in accordance with a preapproved protocol and found to be acceptable to the Department.

The following tests results were extracted from the test report:

Run	H-1	H-2	H-3
Volumetric Flow Rate (DSCFM)	11,579	11,637	11,741
Rated Capacity (T/hr)	250	250	250
Actual Tested Rate (T/hr)*	103.3	91.5	119.8
Particulate Concentration (gr/DSCF)	0.005	0.003	0.002
Particulate Emission Rate (lbs/hr)	0.46	0.31	0.24
Allowable Particulate Concentration (gr/DSCF)**	0.02	0.02	0.02

*Determined by subtracting the percentage of oil, by weight, from the total tonnage of product delivered during testing periods according to production records submitted with the test report.

**Per Plan Approval No. 46-303-005B, Condition 6.

cc: William E. Nuver, Norristown Regional Office
File 46-303-005 through Doug Lesher
Reading File, Source Testing
EPA/ESL

RBstaw

STD-501, 9-86

COMMONWEALTH OF PENNSYLVANIA

DATE: December 14, 1990

SUBJECT: HIGHWAY MATERIALS, INC.
Upper Nazareth Township
Northampton County
Plan Approval No. 48-303-005B

TO: L. Blaine DeHaven, Section Chief
Technical Services & Monitoring
Bureau of Air Quality Control

FROM: William E. Nuver
Air Pollution Control Engineer

Attached for your review and comments is a copy of the stack test report for the subject company. Please be advised that the allowable particulate standard is 0.02 gr/dscft (indicated in the plan approval special conditions) and not 0.04 gr/dscft (indicated in the stack test report).

WEN/bas

HIGHWAY MATERIALS, INC.
600 WEST CLNEY AVENUE
PHILADELPHIA, PENNSYLVANIA 19120
(215) 224-7400

December 11, 1990

Mr. William E. Nuver
Air Pollution Control Engineer
Commonwealth of Pennsylvania
Department of Environmental Resources
Bethlehem District Office
Bethlehem, Pennsylvania 18017

Dear Mr. Nuvers:

Subject: Plant No. 15
Upper Nazareth Township
Northampton County
No. 48-303-005 B

In accordance with our conversation, enclosed are three (3) copies of the final test report as completed by SSM, Inc. for the above referenced plant.

Your prompt approval is appreciated. Contact me at your earliest convenience if you require any additional information.

Very truly yours,

HIGHWAY MATERIALS, INC.

Vincent P. Angelo,
Vice President - General Manager

VPA:mak

Enclosure

REPORT OF PARTICULATE EMISSION TESTING

HIGHWAY MATERIALS, INC.
NAZARETH, PENNSYLVANIA

TESTING PERFORMED ON
ASPHALT BATCH PLANT
BAGHOUSE EXHAUST STACK

TESTS PERFORMED
OCTOBER 16-17, 1990

SSM W.O. No. 1226-000

TABLE OF CONTENTS

REPORT OF PARTICULATE EMISSION TESTING

HIGHWAY MATERIALS, INC.
NAZARETH, PA

TESTING PERFORMED ON
ASPHALT BATCH PLANT
BAGHOUSE EXHAUST STACK

TESTS PERFORMED
OCTOBER 16-17, 1990

1.0 INTRODUCTION

Pursuant to a request from management, compliance particulate emission tests were performed on the Asphalt Batch Plant's Baghouse Exhaust Stack.

A total of three tests were performed. All tests were performed at normal production rates.

2.0 SUMMARY

The emission test results are as follows:

Run No.	Location	Gr./DSCF (PADER)	Lbs./Hr. (PADER)	Gr./DSCF (Total)	Lbs./Hr. (Total)
H-1	Baghouse Exhaust	0.005	0.46	0.008	0.81
H-2	Baghouse Exhaust	0.003	0.31	0.012	1.21
H-3	Baghouse Exhaust	0.002	0.24	0.006	0.62
Average		0.003			

The results of the average of the three test runs at the baghouse stack indicate the particulate matter was being exhausted at an average rate of 0.003 grains per dry standard cubic foot. Particulate matter being exhausted by Baghouse Exhaust is below the allowable of 0.04 grains per standard cubic foot.

3.0 SAMPLING AND ANALYTICAL PROCEDURES

3.1 The emission testing was performed by methods similar to those outlined in the Code of Federal Regulations, Title 40, Chapter 1, Subchapter C, Part 60, Appendix A, Method 5 - Determination of Particulate Emissions from Stationary Sources.

TABLE 2-1

HIGHWAY MATERIALS, INC.
NAZARETH, PA

ASPHALT BATCH PLANT
BAGHOUSE EXHAUST STACK

SUMMARY OF TEST RESULTS

DATE	10/16/90	10/16/90	10/17/90
LOCATION		Baghouse Stack	
RUN NO.	H-1	H-2	H-3
START TIME	0950	1332	0841
PRODUCTION DATA			
Tons/Hr.		170	
FLUE GAS CHARACTERISTICS			
DSCFM	11,579	11,637	11,741
ACFM	18,815	19,105	18,471
Temperature, °F.	192	203	194
Moisture, %	25.2	24.6	22.8
PARTICULATE EMISSIONS			
Gr./DSCF	0.005	0.003	0.002
Lbs./Hr.	0.46	0.31	0.24
Gr./DSCF (Average)		0.003	
VISIBLE EMISSIONS			
Opacity, %	0	0	1

3.2 The sampling train used in this test is shown schematically in Figure 3-1 of the Appendix. The main components of the sampling train were:

3.2.1 Nozzle - stainless steel tip with sharp, tapered leading edge.

3.2.1.1 The nozzle for run H-1 was 0.246".

3.2.1.2 The nozzle for runs H-2 and H-3 was 0.273".

3.2.2 Probe - sheathed stainless steel with heating system to keep the sample gases above the dew point.

3.2.3 Pitot Tube - S-type, attached to probe and inclined manometer, in order to monitor stack gas velocity at each traverse point.

3.2.4 Temperature Indicator - Thermocouple wire attached to probe and potentiometer to monitor stack temperature at each traverse point.

3.2.5 Filter Holder - Pyrex glass filter holder located in heated area. A Reeve Angel (934 AH) glass fiber filter was used.

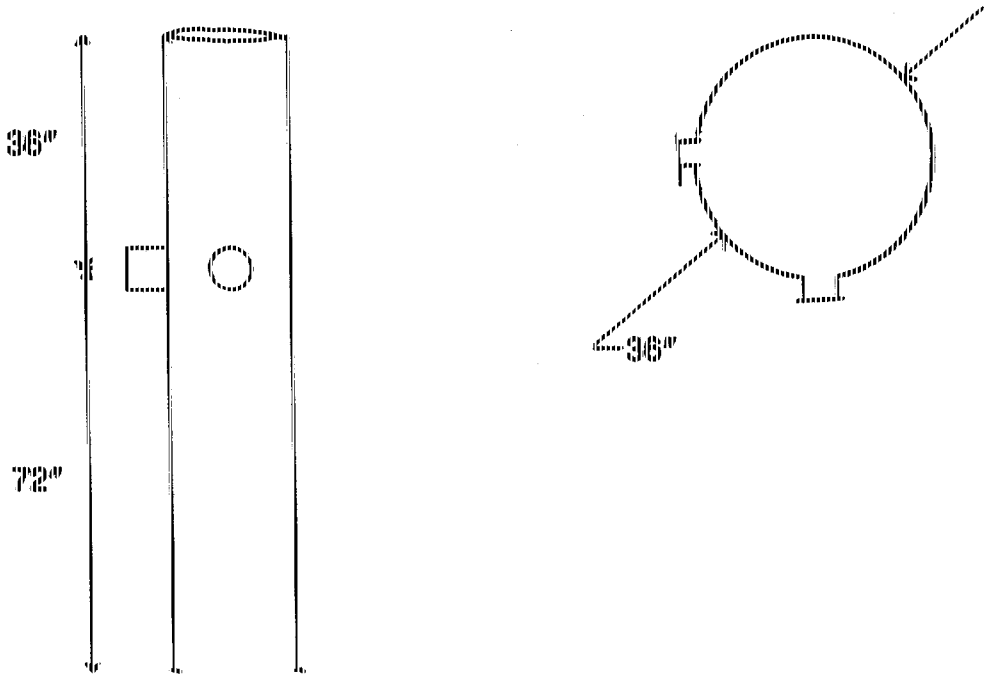
3.2.6 Impingers - Four Greenburg-Smith impingers connected in series with glass ball joint fittings. The first, third and fourth impingers were modified by replacing the tip with a 1/2 inch I.D. glass tube extending to 1/2 inch from the bottom of the bottle. The first and second impingers each contained 150 ml of distilled water, and the third impinger was dry at the start of sampling. The fourth impinger contained 200 grams of preweighed silica gel to collect any remaining moisture in the gas stream before entering the vacuum pump.

3.2.7 Metering System - Vacuum gauge, leakless pump, flow adjust valves, thermometers capable of measuring temperatures to within 2°F., calibrated dry gas meter with 3% accuracy and calibrated orifice tube -- all necessary equipment needed to maintain isokinetic sampling rates and determine sample volume.

3.3 The sample locations are described below.

3.3.1 Two sampling ports were located on 90° centers in the baghouse exhaust stack. Twenty-four (24) traverse points were sampled at the baghouse stack in order to obtain representative samples. Refer to Figure 3-2 for location of the traverse points.

3.4 Before testing, the complete sampling train was leak checked to 15 inches of mercury vacuum.



SAMPLE POINT	DISTANCE FROM PORT, INCHES
1	0.76
2	2.41
3	4.25
4	6.37
5	9.00
6	12.82
7	23.18
8	27.00
9	29.63
10	31.75
11	33.59
12	35.24

FIGURE 3-2

Highway Materials, Inc.
Nazareth, PA
Sample Port and Traverse Point Location
Asphalt Batch Plant Baghouse Exhaust Stack

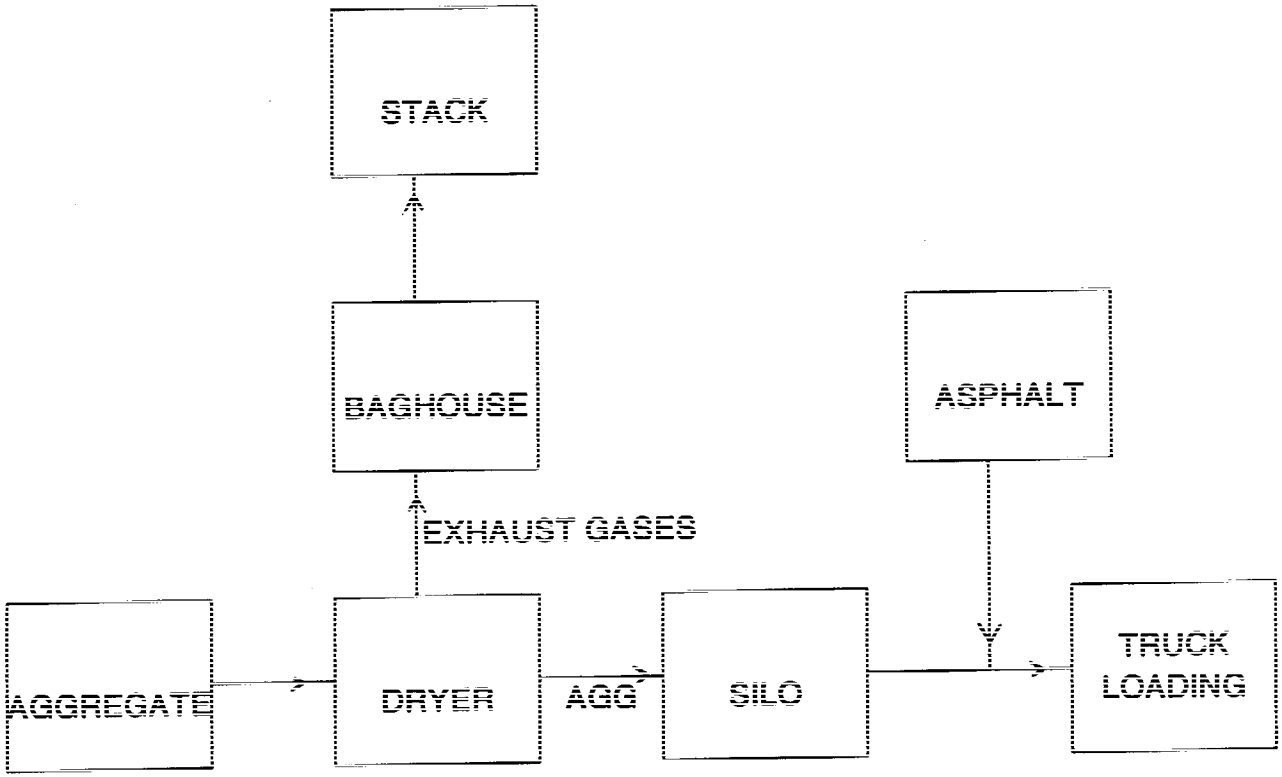


FIGURE 3-3

Highway Materials, Inc.
Nazareth, PA
Asphalt Batch Plant Schematic

3.5 The required sampling time for the test, to maintain a 1 hour minimum test time and 50 DSCF sample volume, was 120 minutes for test H-1 and 96 minutes for tests H-2 and H-3. The volume collected was in excess of the 50 DSCF required by PADER regulations.

3.6 After testing, the sample train was again leak tested. The leak test vacuum was above the highest vacuum recorded during the test.

3.7 After the leak check, the sampling train was cleaned up in the following manner:

3.7.1 The probe was removed from the sample train. It was then rinsed with DI water, brushed three times and again rinsed with DI water and placed into container number 1. Container number 2 was then used to collect the acetone wash of the probe.

3.7.2 The nozzle was also rinsed into container number 1 with DI water, brushed, and rinsed again with DI water. It was then rinsed with acetone into container number 2.

3.7.3 The filter holder was then removed from the sampling train and sealed. After the testing was completed for the day, the filter holder was cleaned up. The filter was removed and placed into its petri dish. The front half of the filter holder was rinsed with DI water, brushed and rinsed again with the DI water and put into container number 1. The front half of the filter holder was then rinsed into container number 2 with acetone. The back half of the filter holder was then rinsed with DI water into container number 3 -- the impinger water wash, and then with acetone into container number 4 -- the impinger acetone wash.

3.7.4 The final volumes of the first, second and third impinger were measured and placed into container number 3. The impingers and connecting glassware were then rinsed into container number 3 with DI water, then into container number 4 with acetone.

3.7.5 The silica gel in the fourth impinger was transferred into its container and reweighed.

3.8 The samples were analyzed individually, by the methods outlined below for determination of soluble and insoluble particulate matter in each sample:

3.8.1 Container number 1, containing the DI water washings of the nozzle, probe and front half of the filter holder, was desiccated to a constant weight.

3.8.2 Container number 2, containing the acetone wash of the nozzle, probe and front half of the filter holder, was desiccated to a constant weight.

3.8.3 The glass fiber filter was removed from its petri dish and desiccated to a constant weight.

3.8.4 The impinger water sample, container number 3, was filtered through a 0.22 micron filter. This filter was also dried down to a constant weight.

3.8.5 The soluble portion of container number 3 was dried down to a constant weight.

3.8.6 The acetone impinger wash, container number 4, was dried down to a constant weight.

3.9 The final particulate weight consists of nozzle, probe and front half filter holder washes, the weight of the glass fiber filter and the 0.22 micron filtration of the impinger water.

3.10 The Spotts, Stevens and McCoy, Inc. Chemistry Laboratory performed all analytical work for this project.

4.0 DISCUSSION OF RESULTS

4.1 Sample Run H-1

A PADER weight of 18.3 mg of particulate was collected in the sampling train during the test. Based on a volumetric flow rate of 11,579 DSCFM at the stack, the particulate concentration was calculated to be 0.005 grains per dry standard cubic foot and 0.46 pounds per hour.

A total weight of 32.1 mg of particulate was collected in the sampling train during the test. Based on a volumetric flow rate of 11,579 DSCFM at the stack, the particulate concentration was calculated to be 0.008 grains per dry standard cubic foot and 0.81 pounds per hour.

The visible emissions were measured to be 0% opacity.

4.2 Sample Run H-2

A PADER weight of 13.6 mg of particulate was collected in the sampling train during the test. Based on a volumetric flow rate of 11,637 DSCFM at the stack, the particulate concentration was calculated to be 0.003 grains per dry standard cubic foot and 0.31 pounds per hour.

A total weight of 53.8 mg of particulate was collected in the sampling train during the test. Based on volumetric flow rate of 11,637 DSCFM at the stack, the particulate concentration was calculated to be 0.012 grains per dry standard cubic foot and 1.21 pounds per hour.

The visible emissions were measured to be 0% opacity.

4.3 Sample Run #3

A PADER weight of 10.6 mg of particulate was collected in the sample train during the test. Based on a volumetric flow rate of 11,741 DSCFM at the stack, the particulate concentration was calculated to be 0.002 grains per dry standard cubic foot and 0.95 pounds per hour.

A total weight of 27.8 mg of particulate was collected in the sampling train during the test. Based on a volumetric flow rate of 11,741 DSCFM at the stack, the particulate concentration was calculated to be 0.006 grains per dry standard cubic foot and 2.49 pounds per hour.

The visible emissions were measured to be 1% opacity.

4.4 Sample Run Average

The average of the three sample runs at the Baghouse exhaust stack is 0.003 grains per dry standard cubic foot. This is below the allowable concentration of 0.04 grains per dry standard cubic foot.

The average of the three visible emission runs were measured to be 0% opacity.

APPENDICES

APPENDIX A

PROJECT PARTICIPANTS

APPENDIX A

PROJECT PARTICIPANTS

Field Sampling Participants:

David J. Hofmann	Project Manager
Donald Wary	Engineering Technician
Jeff Jessell	Engineering Technician

Laboratory Participants:

Vaughan O'Neill	Chemist

APPENDIX B

PRODUCTION DATA

Time	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10:12 —	2	— 1¼	366°	[illegible]	712 lbs
	2⅛	— 1¼	370°	210%	590 lbs
10:27 —	2	— 1¼	362°	205%	711 lbs
			368%	205%	390 lbs
10:42 —	2	— 1¼	362%	205%	538 lbs
10:57 —	2⅛	— 1¼	363%	205%	590 lbs
11:12 —		— 1¼	373°	205%	714 lbs
11:27 —	1¾	— 1¼	360%	205%	771 lbs
11:42 —	2			205%	
11:57 —	2⅛	— 1¼		205%	711 lbs
12:12 —	1¾	— 1¼	357%		589 lbs
12:27 —	2	— ¼	357%		
			380°	200%	716 lbs
1:30 —	2	— 1¼	360°	200%	714 lbs
1:45 —	2⅛	— 1¼	358°	200%	716 lbs
2:00 —	2	— 1¼	357°	200%	714 lbs
2:15 —	2⅛	— 1¼	355°	200%	228 lbs
		— 1¼			
2:30 —	1¾			200%	717 lbs.
2:45 —	2½	1¼	385°		
3:00 —	2¼	— 1¼	380	200%	716 lbs.
3:15 —	2½	1¼	385	200%	153 lbs.
3:30 —	2¼	— 1¼	392	200%	153 lbs.

170 Tons / Hr

HIGHWAY MATERIALS, INC.

GRADING REPORT

Date 10-26-90 | Raw Aggr.

Bit. Plant | Bin. No.

Bit. Mix. | Producer

Course | Technician

Sieve	Weight	%	Specifications
200	98.4	2.6	
100	252	5.7	
80			
50	1962	12.7	
40			
30	2137	18.0	
20			
16	1990	24.3	
10			
8	457.6	32.7	
4	2925	65.9	
1/4"			
3/8"	1085.6	93.5	
1/2"	1136.6	100	
5/8"			
3/4"	Cold Feed analysis		
1"	See Plant yield		
1-1/4"	Accepted as Aggregate		
1-1/2"			
2"			
2-1/2"			
3"			
3-1/2"			
4"			

Form #7

est 4 hot style

MATERIAL USAGE PRINT

Raw Material

Agg	Name		
	AGG3	0168.640	Tons
	AGG2	0234.405	Tons
	AGG1	0279.470	Tons
	M. F.	0006.825	Tons
	AGG4	0004.575	Tons
		0000.000	Tons
		0000.000	Tons
Agg Total		00693.915	Tons

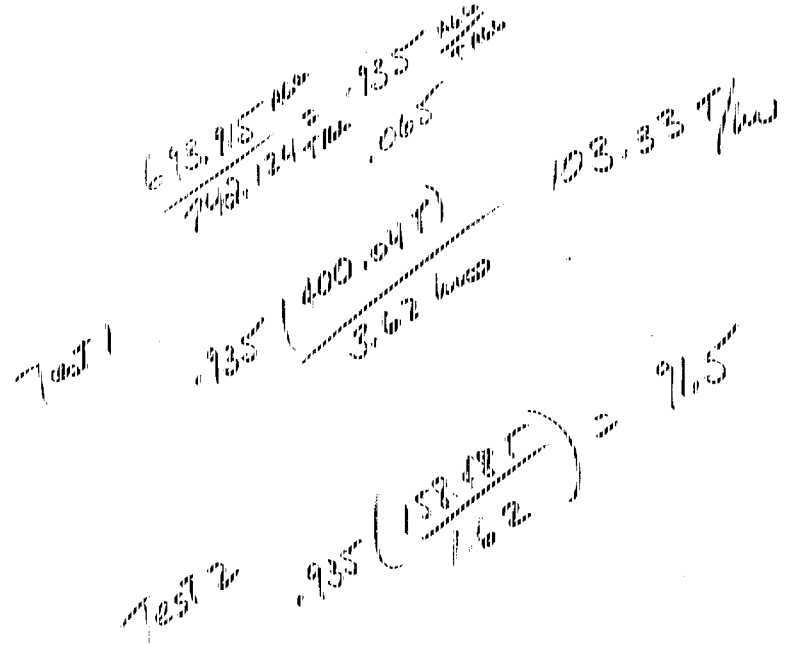
Asp	Name		
	ASP1	0048.209	Tons
		0000.000	Tons
Asp Total		00048.209	Tons
Grand Total		00742.124	Tons

Print

Product Totals

Prod Id	Prod Name		
02	ID-001-IDW	0051.15	Tons
04	ID-028-BC1	0014.70	Tons
02W	ID-001-IDW	0567.99	Tons
C02	ID-001-IDW-C	0007.04	Tons
07	ID-017-FJ1	0001.13	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
	Remaining	0000.00	Tons
	Grand Total	00742.01	Tons

Tue Oct 16/90 15:41:43 Libra Systems



Ticket Performance Report

REPORT DATE: 10/16/90

DATE: 10/16/90 TIME: 15:52 PLANT ID: 15 PAGE: 1

Ticket	Rec. Code	Time	Date	Tran. Code	Truck Id	Cust Id	Job Id	Pdt Id	Product Name	Tons
000017	0	0740	101690	0	MT	168	168	02	ID-001-IDW	23.96
000018	0	0743	101690	0	EAGLE	168	168	02	ID-001-IDW	11.10
000019	0	0751	101690	0	CC12	157	157	04	ID-020-BC1	1.05
000020	0	0800	101690	0	1778069	P2	P2	P2W	.ID-001-IDW	16.14
000021	0	0807	101690	0	2998071	P2	P2	P2W	.ID-001-IDW	16.13
000022	0	0813	101690	0	8168064	P2	P2	P2W	.ID-001-IDW	15.98
000023	0	0817	101690	0	3298071	P2	P2	P2W	.ID-001-IDW	16.09
000024	0	0820	101690	0	BK	20	20	04	ID-020-BC1	7.13
000025	0	0822	101690	0	BK	20	20	02	ID-001-IDW	2.03
000026	0	0850	101690	0	1778069	P2	P2	P2W	.ID-001-IDW	16.02
000027	0	0933	101690	0	2998071	P2	P2	P2W	.ID-001-IDW	16.05
000028	0	0938	101690	0	8168064	P2	P2	P2W	.ID-001-IDW	16.04
000029	0	0940	101690	0	PIPS	08	08	02	ID-001-IDW	5.52
000030	0	0942	101690	0	HICKS	04	04	C02	ID-001-IDW-C	10.14
000031	0	0946	101690	0	HICKS	04	04	C02	ID-001-IDW-C	10.11
000032	0	0949	101690	0	ESW	45	45	04	ID-020-BC1	4.00
000033	0	0954	101690	0	3298071	P2	P2	P2W	.ID-001-IDW	16.11
000034	0	1001	101690	0	CC12	157	157	P2W	.ID-001-IDW	22.95
000035	0	1006	101690	0	HICKS	04	04	C02	ID-001-IDW-C	10.08
000036	0	1012	101690	0	8518064	P2	P2	P2W	.ID-001-IDW	16.05
000037	0	1018	101690	0	1778069	P2	P2	P2W	.ID-001-IDW	16.02
000038	0	1023	101690	0	HICKS	04	04	C02	ID-001-IDW-C	10.19
000039	0	1028	101690	0	2998071	P2	P2	P2W	.ID-001-IDW	16.02
000040	0	1034	101690	0	8168064	P2	P2	P2W	.ID-001-IDW	16.11
000041	0	1046	101690	0	3298071	P2	P2	P2W	.ID-001-IDW	15.97
000042	0	1050	101690	0	HICKS	04	04	C02	ID-001-IDW-C	9.99
000043	0	1055	101690	0	MT	27	27	02	ID-001-IDW	6.53
000044	0	1058	101690	0	ESW	45	45	02	ID-001-IDW	2.01
000045	0	1106	101690	0	8518064	P2	P2	P2W	.ID-001-IDW	16.07
000046	0	1109	101690	0	8372070	P2	P2	P2W	.ID-001-IDW	4.01
000047	0	1113	101690	0	1778069	P2	P2	P2W	.ID-001-IDW	16.01
000048	0	1117	101690	0	HICKS	04	04	C02	ID-001-IDW-C	10.03
000049	0	1135	101690	0	2998071	P2	P2	P2W	.ID-001-IDW	16.17
000050	0	1139	101690	0	8168064	P2	P2	P2W	.ID-001-IDW	15.94
000051	0	1143	101690	0	3298071	P2	P2	P2W	.ID-001-IDW	16.21
000052	0	1150	101690	0	CC12	157	157	P2W	.ID-001-IDW	23.01
000053	0	1222	101690	0	HICKS	04	04	C02	ID-001-IDW-C	9.98
000054	0	1244	101690	0	CC10	157	157	P2W	.ID-001-IDW	17.97
000055	0	1250	101690	0	8518064	P2	P2	P2W	.ID-001-IDW	16.14
000056	0	1255	101690	0	1778069	P2	P2	P2W	.ID-001-IDW	15.97
000057	0	1300	101690	0	2998071	P2	P2	P2W	.ID-001-IDW	16.05
000058	0	1303	101690	0	BK	20	20	04	ID-020-BC1	2.52
000059	0	1308	101690	0	BURNS	09	09	C02	ID-001-IDW-C	10.00
000060	0	1313	101690	0	8168064	P2	P2	P2W	.ID-001-IDW	15.91
000061	0	1326	101690	0	3298071	P2	P2	P2W	.ID-001-IDW	16.02
000062	0	1333	101690	0	CC12	157	157	P2W	.ID-001-IDW	22.93
000063	0	1347	101690	0	8518064	P2	P2	P2W	.ID-001-IDW	16.00
000064	0	1351	101690	0	1778069	P2	P2	P2W	.ID-001-IDW	15.93
000065	0	1355	101690	0	2998071	P2	P2	P2W	.ID-001-IDW	15.97
000066	0	1406	101690	0	8168064	P2	P2	P2W	.ID-001-IDW	16.04
000067	0	1418	101690	0	3298071	P2	P2	P2W	.ID-001-IDW	16.02
000068	0	1422	101690	0	HICKS	04	04	C02	ID-001-IDW-C	1.53
000069	0	1439	101690	0	8518064	P2	P2	P2W	.ID-001-IDW	15.94

Ticketed Reference Report

REPORT DATE: 10/16/90

DATE: 10/16/90 TIME: 15:52 PLANT ID: 15

Ticket	Rec. Code	Time	Date	Tran. Code	Truck Id	Cust Id	Job Id	Pit Id	Product Name	Tons
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0 071	A	1458	101690	0	2990071	P2	P2	P2W	.ID-001-IDW	15.00
0000072	A	1502	101690	0	00006	04	04	C02	ID-001-IDW-C	6.99
0000073	A	1510	101690	0	JBP	67	67	07	ID-017-FJ1	1.13
									Report Total	742.01

8700
15 10
8.5 tons

2 0
8 10

15:33
15:10

8 7
1 0
1 3 7
1.62 tons

OFFICE
600 WEST OLNEY AVENUE
PHILADELPHIA, PA 19120
PHONE: (215) 224-7400

HIGHWAY MATERIALS, INC.

PLANT# 15
ASPHALT PAVING MIXES
TATAMY ROAD
NAZARETH, PA 18064
(215) 759-8134

PLANTS
LVER YMQ WEET
LITITZ, PERKIOMENVILLE,
NAZARETH, DOWNINGTOWN,
WRIGHTSVILLE

No. 15 08023

SOLD TO: PDT. NORTH CNTY.
P. O. # 349-386

VARIOUS RTES

HAZARD WARNING: THERMAL BURNS FROM CONTACT WITH HOT LIQUID, INHALATION, AND EYE IRRITATION. HAZARDS FROM HYDROGEN SULFIDE GAS.

Job Number: P2

TIME	DATE	PLANT #	CUSTOMER #	TICKET #	TYPE MATERIAL	TRUCK #
08:17	10/16/90	15	P2	008023	ID-001-IDW	3298071

PRODUCT # - NAME/LOAD # - ACCUMULATED TOTALS (TONS)		
ID-001-IDW 000-0000.00	005-IDWR 000-0000.00	ID-001-IDW 004-0064.34
000-0000.00	000-0000.00	000-0000.00

TRUCK WEIGHT IN TONS

GROSS	TARE	NET
		16.09

DRIVER _____ RECVD. BY _____

ALL WEIGHTS ARE IN POUNDS UNLESS OTHERWISE SPECIFIED

NO.	TARE	1	2	3	4	5	6	7	TARE	ASPHALT	BATCH TOT
		AGG3	AGG2	AGG1	M.F.					ASP1	
1	0	2460	5950	9840	10020				1.0	712.0	10732
2	0	2440	5980	10050	10080				1.0	714.0	10794
3	0	2420	5980	9860	9940				1.0	717.0	10657

INSPECTOR'S SIGNATURE

LOAD TOTAL 32183

HIGHWAY MATERIALS, INC.

GRADING REPORT

Date 10-17-90	Raw Aggr.
Bit. Plant	Bin. No.
Bit. Mix.	Producer
Course	Technician

Sieve	Weight	%	Specifications
200	39.3	4.0	
100	91.0	9.2	
80			
50	122.6	12.4	
40			
30	226.3	23.0	
20			
16	293.8	29.6	
10			
8	420.8	42.4	
4	622.2	62.7	
1/4"			
3/8"	967.7	97.4	
1/2"	993.3	100	
5/8"			
3/4"	Cold Fe	ed off	Belt
1"	Plant	#15	
1-1/4"			
1-1/2"			
2"			
2-1/2"			
3"			
3-1/2"			
4"			

Form #7

OFF Cold Belt

MATERIAL USAGE PRINT

Raw Material

Grp	Name		
	AGG1	0137.195	Tons
	AGG2	0116.835	Tons
	M.F.	0005.045	Tons
	AGG3	0079.300	Tons
	AGG4	0002.225	Tons
		0000.000	Tons
		0000.000	Tons
Agg	Total	0340.605	Tons
Asp	Name		
	ASP1	0023.763	Tons
		0000.000	Tons
Asp	Total	0023.763	Tons
Grand	Total	0364.368	Tons

print

Product Totals

Prod Id	Prod Name		
P2W	ID-001-IDW	0280.95	Tons
02	ID-001-IDW	0060.21	Tons
04	ID-026-BC1	0007.14	Tons
05	ID-008-174	0016.04	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
		0000.00	Tons
-------	Remaining	0000.00	Tons
	Grand Total	0364.34	Tons

Wed Oct 17 90 10:37:14 Libra Systems

$\frac{340.6 \text{ tons}}{364.368 \text{ tons}} = .935$ % mix

$(.935)\left(\frac{256.34}{9}\right)$

Ticket Reprint Report

REPORT DATE: 10/17/90

DATE: 10/17/90 TIME: 10:38 PLANT ID: 15

Ticket	Rec. Code	Time	Date	Trans. Code	Truck Id	Cust Id	Job Id	Pdt Id	Product Name	Tons
000074	A	0759	101790	0	CC12	157	157	P2N	.ID-001-IDW	23.03
000075	A	0807	101790	0	85180064	P2	P2	P2N	.ID-001-IDW	16.00
000076	A	0810	101790	0	81680064	P2	P2	P2N	.ID-001-IDW	15.96
000077	A	0814	101790	0	32980071	P2	P2	P2N	.ID-001-IDW	15.99
000078	A	0820	101790	0	17780069	P2	P2	P2N	.ID-001-IDW	16.01
000079	A	0824	101790	0	29980071	P2	P2	P2N	.ID-001-IDW	16.00
000080	A	0827	101790	0	04	14	14	02	ID-001-IDW	5.01
000081	A	0844	101790	0	BK	28	28	04	ID-028-BC1	7.14
000082	A	0851	101790	0	CC10	157	157	P2N	.ID-001-IDW	18.02
000083	A	0904	101790	0	85180064	P2	P2	P2N	.ID-001-IDW	16.00
000084	A	0908	101790	0	ME	29	29	P2N	.ID-001-IDW	10.02
000085	A	0912	101790	0	81680064	P2	P2	P2N	.ID-001-IDW	16.00
000086	A	0913	101790	0	90	13	13	02	ID-001-IDW	3.02
000087	A	0917	101790	0	32980071	P2	P2	P2N	.ID-001-IDW	15.95
000088	A	0923	101790	0	CC12	157	157	P2N	.ID-001-IDW	22.96
000089	A	0927	101790	0	17780069	P2	P2	P2N	.ID-001-IDW	16.05
000090	A	0930	101790	0	ME	29	29	P2N	.ID-001-IDW	14.99
000091	A	0949	101790	0	29980071	P2	P2	P2N	.ID-001-IDW	16.01
000092	A	0951	101790	0	HT	27	27	02	ID-001-IDW	10.02
000093	A	0955	101790	0	HT	27	27	02	ID-001-IDW	12.03
000094	A	0958	101790	0	HICKS	04	04	05	ID-008-174	8.03
000095	A	1000	101790	0	FP	83	83	02	ID-001-IDW	10.02
000096	A	1003	101790	0	FP	83	83	02	ID-001-IDW	10.09
000097	A	1008	101790	0	85180064	P2	P2	P2N	.ID-001-IDW	16.01
000098	A	1015	101790	0	81680064	P2	P2	P2N	.ID-001-IDW	15.95
000099	A	1020	101790	0	FULMER	17	17	02	ID-001-IDW	10.02
000100	A	1034	101790	0	HICKS	04	04	05	ID-008-174	8.01
									Report Total	364.34

MAIN OFFICE
800 WEST OLNEY AVENUE
PHILADELPHIA, PA 19120
PHONE: (215) 224-7400

HIGHWAY MATERIALS, INC.

PLANT # 15
ASPHALT PAVING MIXES

TATAMY ROAD
NAZARETH, PA 18064
(215) 759-6134

MALVERN, PLYMOUTH MEETING,
LITITZ, PERKIOMENVILLE,
NAZARETH, DOWNINGTOWN,
WRIGHTSVILLE

No. 15 08098

SOLD
TO: PDT. NORTH CNTY.
P. O. # 351-124

VARIOUS RTES

HAZARD WARNING: THERMAL BURNS FROM CONTACT WITH HOT LIQUID, INHALATION, AND EYE IRRITATION HAZARDS FROM HYDROGEN SULFIDE GAS.

Job Number: P2

TIME	DATE	PLANT #	CUSTOMER #	TICKET #	TYPE MATERIAL	TRUCK #
10:15	10/17/90	15	P2	008098	ID-001-IDW	8168064

PRODUCT # – NAME / LOAD # – ACCUMULATED TOTALS (TONS)		
ID-001-IDW 000-0000.00	005-IDWR 000-0000.00	ID-001-IDW 012-0191.93
000-0000.00	000-0000.00	000-0000.00

TRUCK WEIGHT IN TONS		
GROSS	TARE	NET
		15.95

DRIVER _____ RECVD. BY _____

ALL WEIGHTS ARE IN POUNDS UNLESS OTHERWISE SPECIFIED

NO.	TARE	1	2	3	4	5	6	7	TARE	ASPHALT	BATCH TOT
		AGG1	AGG2	M.F.	AGG3					ASP1	
1	0	3850	7290	7460	9960				0.0	711.0	10671
2	0	3840	7290	7450	9990				0.0	715.0	10705
3	0	3820	7290	7470	9820				0.0	713.0	10533

INSPECTOR'S SIGNATURE _____

LOAD TOTAL 31909

APPENDIX C

ANALYTICAL RESULTS

SSM/Laboratories

ANALYTICAL REPORT

CLIENT: Highway Materials Inc.
800 West Olney AVe
Philadelphia PA 19120

PROJECT: 101100
PO NO:
REPORTED: 30-OCT-90
RECEIVED: 18-OCT-90
WORK ORDER: 1226-000

REPORT TO: D.J. Hofmann
SSM/Spotts,Stevens & McCoy
Central Engineering

PROJECT DESCRIPTION: Stack Samples

SAMPLING DATE: 16-OCT-90 BY: N.Wary

	UNITS	RESULT
SAMPLE: 1004817		
H-1		
Particulate Weight - Wash Solutions		
Wt - Wash Soln' (0.22u filter)	mg	2.3
Wt - Acetone Impinger	mg	2.8
Wt - Acetone Probe	mg	10.1
Wt - Water Probe	mg	2.9
Wt - Water Impinger	mg	11.0
Particulate Weight - Filter	mg	3.0
SAMPLE: 1004818		
H-2		
Particulate Weight - Wash Solutions		
Wt - Wash Soln' (0.22u filter)	mg	0.6
Wt - Acetone Impinger	mg	5.0
Wt - Acetone Probe	mg	6.5
Wt - Water Probe	mg	2.8
Wt - Water Impinger	mg	35.2
Particulate Weight - Filter	mg	3.7

CLIENT: Highway Materials Inc.
PROJECT: 101100

SAMPLE: 1004819
H-3

Particulate Weight - Wash Solutions

Wt - Wash Soln' (0.22u filter)	mg	2.2
Wt - Acetone Impinger	mg	4.8
Wt - Acetone Probe	mg	1.3
Wt - Water Probe	mg	3.4
Wt - Water Impinger	mg	12.4
Particulate Weight - Filter	mg	3.7

Respectfully submitted,

Vaughan J. O'Neill

Vaughan J. O'Neill,
Group Leader, Physical Testing

APPENDIX D

RAW FIELD DATA

SPOTTS, STEVENS and McCOY, INC
AIR PROGRAMS

SHEET 1 OF 2

CLIENT: [illegible]	PITOT TUBE COEF.:
J.O. NO.:	AMBIENT TEMP.:
PLANT: [illegible]	BP:
LOCATION: [illegible]	ASSUMED MOIS.:
DATE: [illegible]	PROBE LENGTH:
RUN NO.: M-1	NOZZLE DIA.:
OPERATOR: [illegible]	PROBE HEAT SET:
SAMPLE BOX NO.:	LEAK RATE:
METER BOX NO.: 1522	THIMBLE NO.:
METER H:	FILTER NO.:
METER FACTOR:	

POINT NO.	POINT DIS.	CLOCK TIME ACTUAL	CLOCK TIME RUN	METER CU. FT.	PITOT "H2O	ORIFICE "H2O	METER TEMP. INLET	METER TEMP. OUTLET	STACK TEMP. F	PUMP VAC "HG	BOX TEMP F	IMP TEMP F	
A-1		1137	0.0	655.912	0.59	0.95	96	81	183	2	255	64	
2			1.5	656.9	0.63	1.04	97	81	186	3	250		
3			3	657.7	0.65	1.08	97	82	185	3	250		
4			4.5	658.7	0.73	1.21	99	82	192	3	255		
5			6	659.6	0.69	1.03	98	83	191	3	255		
6			7.5	660.5	0.79	1.15	98	83	190	3	250	65	
7			9	661.5	0.59	0.88	100	84	191	4	250		
8			10.5	662.2	0.57	0.84	103	86	194	3	250		
9			12	662.9	0.40	0.65	100	85	198	3	245		
10			13.5	663.8	0.37	0.59	100	85	198	3	245		
11			15	664.4	0.34	0.55	100	86	198		245		
12			16.5	665.0	0.31	0.50	100	85	197		240	64	
Stop			18	665.590									
B-1		1206	0.0	665.590	0.45	0.84	88	84	170	2	255		
2			1.5	666.2	0.45	0.73	88	85	179	3	245		
3			3	666.9	0.61	0.98	89	85	186	3	250	65	
4			4.5	667.6	0.55	0.90	90	85	172	3	250		
5			6	668.5	0.50	0.82	93	86	193	3	250		
6			7.5	669.2	0.52	0.81	97	86	195	3	250	66	
7			9	670.2	0.43	0.70	97	86	196	3	250		
8			10.5	670.7	0.41	0.67	96	87	206	3	255		
9			12	671.5	0.48	0.79	96	89	209	3	255		
10			13.5	672.3	0.35	0.57	97	88	200	3	250		
11			15	673.0	0.38	0.62	98	88	197	3	250		
12			16.5	673.6	0.37	0.60	99	87	195	3	250		
Stop			18	674.241									

IMPINGERS	END	START	DIFF
1			
2			
3			
GEL			

ORSAT	CO2	CO2+O2	O2
1			
2			
3			

84
26
[illegible]

SPOTTS, STEVENS and McCOY, INC
AIR PROGRAMS

SHEET 1 OF 1

CLIENT: Highway Materials
W.O. NO.:
PLANT: Nazareth
LOCATION: Stack
DATE: 10/15/98
RUN NO.: H-3
OPERATOR:
SAMPLE BOX NO.:
METER BOX NO.: 12
METER H:
C FACTOR: .998

PITOT TUBE COEF.: .84
AMBIENT TEMP.: 52
BP: 30.54
ASSUMED MOIS.: 22
PROBE LENGTH:
NOZZLE DIA.: .223
PROBE HEAT SET: 60 kv
LEAK RATE: .019 @ 15"
THIMBLE NO.: ———
FILTER NO.: D-24

POINT NO.	POINT DIS.	CLOCK TIME ACTUAL	CLOCK TIME RUN	METER CU. FT.	PITOT "H2O	ORIFICE "H2O	METER TEMP. INLET	METER TEMP. OUTLET	STACK TEMP. F	PUMP VAC "HG	BOX TEMP F	IMP TEMP F	
A-1		0844	0.0	246.006	0.25	0.89	50.	52.	165.	3	260	48	
2			4.	248.3	0.57	1.92	52.	54.	162.	4	265		
3			8.	252.0	0.35	1.20	64.	54.	183.	4	265		
4			12.	254.5	0.60	2.02	70.	59.	183.	5	260		
5			16.	255.8	0.42	1.43	75.	56.	199.	4	260		
6			20.	258.4	0.45	1.59	80.	60.	201.	5	255	49	
7			24.	260.6	0.65	2.22	83.	60.	202.	6	250		
8			28.	263.8	0.34	1.16	82.	62.	202.	4	250		
9			32.	265.9	0.39	1.32	87.	64.	198.	4	245	50	
10			36.	268.6	0.38	1.12	82.	66.	203.	5	245		
11			40.	271.5	0.31	1.05	90.	69.	195.	4	250		-.050
12			44.	273.8	0.32	1.10	90.	70.		4	255	52	
			48.	276.728									
B-1		0915	0.0	276.728	0.58	1.95	72.	62.	169.	5	265	57	
2			4.	279.6	0.59	1.95	80.	70.	174.	5	260	58	
3			8.	282.7	0.66	2.25	85.	70.	195.	6	260	59	
4			12.	286.2	0.70	2.38	92.	72.	205.	6	255	61	
5			16.	289.4	0.65	2.22	95.	72.	198.	6	265		
6			20.	293.0	0.75	2.53	97.	73.	210.	7	260	62	-.040
7			24.	296.5	0.44	1.50	100.	74.	199.	5	255		
8			28.	299.2	0.40	1.38	99.	75.	199.	5	250	63	
9			32.	302.2	0.28	1.28	99.	76.	204.	5	250		
10			36.	304.8	0.31	1.05	99.	76.	196.	4	245	64	
11			40.	306.8	0.34	1.17	99.	77.	202.	5	245		
12			44.	309.4	0.30	1.02	99.	78.	204.	4	245	65	
			48.	311.711									

IMPINGERS	END	START	DIFF
1 408	217	150	
2 694	239	150	
3	28	0	
GEL	479	437	42

ORSAT	CO2	CO2+O2	O2
1	2.2		19.1
2	6.6		13.6
3	2.0		17.6
	2.0		19.3

APPENDIX E

COMPUTER PRINTOUT

Client:	HIGHWAY MATERIALS	Plant:	NAZARETH
Unit Tested:	ASPHALT PLANT	Pollutant:	PARTICULATE & FLOW
Sampling Location:	BAGHOUSE STACK	W.O. NO.:	1220-000

DATE	10/16/90	10/16/90	10/17/90
RUN NUMBER	H-1	H-2	H-3
DN - NOZZLE DIAMETER, IN.	0.248	0.273	0.273
PB - BAROMETRIC PRESS., IN. OF HG.	30.45	30.38	30.54
TT - NET SAMPLING TIME, MIN.	120.0	96.0	96.0
VM - VOLUME METERED, ACF	80.510	88.209	87.706
TM - AVG. METER TEMP., DEG. F	82	93	76
PM - AVG. DELTA H, IN. OF H2O	0.794	1.620	1.593
Y - GAS METER CALIB. FACTOR	1.01	1.01	1.01
VMSTD - STD. GAS VOL., SCF	80.707	88.108	89.083
VW - TOTAL WATER COLLECTED, ML.	436	471	433
%M - PERCENT MOISTURE	25.2	24.6	22.8
MD - MOLE FRACTION DRY	0.75	0.75	0.77
%CO2 - PERCENT CO2 DRY	7.9	7.1	7.0
%O2 - PERCENT O2 DRY	12.8	12.4	12.2
MWD - DRY MOLECULAR WEIGHT	29.67	29.64	0.00
MW - WET MOLECULAR WEIGHT	26.73	26.78	26.95
%EA - PERCENT EXCESS AIR	154.2	141.3	132.0
AS - STACK AREA, SQ. IN.	1,017.9	1,017.9	1,017.9
PST - STATIC PRESS., IN. OF H2O	-0.35	-0.46	-0.45
TS - STACK TEMP., DEG. F	192	203	194
CP - PITOT COEFFICIENT	0.84	0.84	0.84
VS - STACK GAS VELOCITY, FPM	2,662	2,699	2,603
QS - STACK GAS FLOW, DSCFM	11,570	11,637	11,741
QA - STACK GAS FLOW, ACFM	18,815	19,105	18,471
%I - ISOKINETIC RATIO	93.3	105.7	106.2
GR/DSCF, PARTICULATE LOADING	0.005	0.003	0.002
LBS/HR, PARTICULATE EMISSIONS	0.46	0.31	0.24
AVG. GR/DSCF EMISSION RATE		0.003	
ALLOWABLE GR/DSCF EMISSION RATE		0.04	

REV. 0(11/16/90)

SSM

[illegible]

Client:	[illegible]	Plant:	[illegible]
Unit Tested:	ASPHALT PLANT	Pollutant:	PARTICULATE & PSQW
Sampling Location:	BAGHOUSE STACK	W.O. NO.:	1120-020
Run No: 1-1	Date: 10/10/10	Start: 0800	End: 1100

DATA

DN:	0.191	PB:	30.45	PST:	-0.56	AS:	1,017.0
O2%:	12.0	CO2%:	7.5	H2O%:	70.0	VW:	486
GAS METER Y-FACTOR:			1.01	E.A.%:	154.2		

SAMPLE POINT	DISTANCE AT POINT	CLOCK TIME	TIME AT POINT	GAS METER	VELOCITY HEAD	PM ORIFICE	METER TEMPERATURE IN	OUT	STACK TEMP.	ODE	VEL.	O2	CO2
A-1	1.31	800	3.6	013.701	0.100	0.180	67	66	167	8.30	1,288	13.4	7.3
2	4.12		3.6	014.700	0.400	0.020	61	66	170	14.00	2,564	12.0	7.3
3	8.40		3.5	016.100	0.610	1.010	64	67	180	18.09	3,001	12.2	7.4
4	13.74		3.5	018.400	0.560	0.970	73	60	202	18.01	2,803		
5	19.60		3.5	020.000	0.500	0.820	74	60	203	18.20	2,791		
6	25.09		3.6	022.300	0.530	0.870	75	62	200	18.02	2,865		
7	41.57		3.5	024.030	0.490	0.700	78	63	200	18.05	2,561		
8	54.03		3.5	026.000	0.410	0.670	80	64	203	16.40	2,401		
9	59.91		3.5	027.400	0.410	0.703	81	66	209	17.06	2,806		
10	65.91		3.5	029.250	0.350	0.570	82	60	194	16.15	2,290		
11	67.11		3.5	030.050	0.310	0.480	82	60	194	16.76	2,302		
12	70.40		3.5	032.400	0.370	0.100	83	60	191	16.40	2,340		
B-1	1.31	1000	3.5	033.071	0.510	0.160	67	67	175	19.30	3,026		
2	4.02		3.8	036.100	0.650	1.060	72	61	179	20.50	3,092		
3	8.40		3.6	037.900	0.680	1.000	70	61	183	20.16	3,190		
4	13.74		3.6	039.303	0.750	1.210	68	70	190	21.70	3,292		
5	19.90		3.6	042.200	0.640	1.090	84	70	180	20.40	3,012		
6	25.09		3.6	044.200	0.703	1.150	80	72	188	21.43	3,250		
7	40.57		3.5	046.200	0.340	0.610	80	73	187	18.84	2,344		
8	54.00		3.5	049.200	0.380	0.610	82	74	187	18.40	2,763		
9	59.20		3.6	050.100	0.400	0.650	94	76	186	18.19	2,449		
10	63.10		3.6	051.000	0.375	0.610	91	77	193	18.61	2,548		
11	67.10		3.5	051.100	0.360	0.610	97	70	192	14.01	2,360		
12	70.40		3.5	161.030	0.310	0.500	80	81	191	14.21	2,147		
C-1	1.61		1.5	161.012	0.500	0.850	86	81	185	16.45	2,493		
2	4.02		1.5	161.050	0.630	1.040	87	81	110	20.17	3,060		
3	8.49		1.5	167.700	0.610	1.003	87	82	110	20.54	3,104		
4	13.74		1.5	168.700	0.710	1.210	90	82	112	21.02	3,207		
5	19.09		1.5	060.050	0.640	1.050	90	83	107	20.41	3,004		
6	25.05		1.5	060.500	0.700	1.160	90	83	180	21.38	3,225		
7	40.97		1.5	061.400	0.560	0.100	100	84	181	18.75	2,839		
8	54.00		1.5	062.300	0.520	0.640	100	85	184	18.44	2,717		
9	59.20		1.5	062.800	0.400	0.660	100	85	181	18.22	2,452		
10	63.90		1.5	065.100	0.370	0.600	100	83	181	16.10	2,350		
11	67.10		1.5	066.400	0.340	0.550	100	81	181	14.16	2,280		
12	70.40		1.5	066.400	0.310	0.500	100	85	187	14.27	2,157		
D-1	1.31		1.5	066.100	0.165	0.310	81	84	170	8.72	1,400		
2	4.12		1.5	066.700	0.460	0.730	81	85	174	18.00	2,581		
3	8.40		1.5	068.105	0.610	0.010	81	85	186	18.15	3,000		
4	13.74		1.6	067.000	0.560	0.900	83	85	182	18.01	2,803		
5	19.60		1.5	068.600	0.500	0.820	83	86	185	18.07	2,750		
6	25.09		1.5	069.200	0.530	0.800	84	86	186	18.03	2,814		
7	41.57		1.5	070.200	0.490	0.700	84	86	190	18.03	2,551		
8	54.00		1.5	070.700	0.410	0.670	86	87	200	18.87	2,407		
9	59.91		1.5	071.000	0.410	0.703	86	86	204	17.05	2,401		
10	65.91		1.5	072.300	0.350	0.575	87	88	200	16.20	2,207		
11	67.11		1.5	072.050	0.310	0.480	88	80	197	16.05	2,300		
12	70.40		1.5	073.060	0.370	0.103	89	87	186	16.87	2,362		
				074.265									
RESULTS			TT	VM	PT	PM		TM	TS	ODE	VEL.	O2	CO2
			180.0	10.591	0.483	0.784		82	188	17.30	2,082	12.0	7.3
			min	cf	avg	avg		avg	avg	avg	avg	avg	avg

PCM=	30.61	VMSTD=	09.987	VWSTD=	20.409	%H2O=	25.2	AVG OF VELOCITIES =	15.0
MD=	0.75	MWS=	26.47	NTD=	30.75	PS=	30.43		

STACK GAS VELOCITY =	2,082	FPM
STACK GAS VOLUME =	11,970	DSCFM
STACK GAS VOLUME =	16,015	ACFM
STACK GAS VOLUME =	0.50501	[illegible]
ISOKINETIC RATIO =	103	

PARTICULATE EMISSIONS	PROBE	TOTAL
Weight, mg =	10.30	32.10
GR/DSCF =	0.006	0.301
LB/HR =	0.40	0.01

REV. 01/17/00

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[illegible]

Client:	[illegible]	Plant:	NAZARETH
Unit Tested:	ASPHALT PLANT	Pollutant:	PARTICULATE & FLOW
Sampling Location:	BAGHOUSE STACK	W.O. NO.:	1220-400
Run No: [illegible]-2	Date: 10/1990	Start: [illegible]	End: [illegible]

DATA

DN:	0.279	PB:	30.30	PST:	-0.48	AS:	1,017.0
O2%:	12.4	CO2%:	7.1	N2%:	80.4	VW:	471
GAS METER Y-FACTOR:			1.01	E.A.%:	143.3		

SAMPLE POINT	DISTANCE AT POINT	CLOCK TIME	TIME AT POINT	GAS METER	VELOCITY HEAD	PM ORIFICE	METER TEMPERATURE IN	METER TEMPERATURE OUT	STACK TEMP.	SQE	VEL.	O2	CO2
A-1	1.61	1322	4.0	674.551	0.210	0.900	75	70	165	11.46	1,732	12.4	7.6
2	4.82		4.0	678.400	0.450	1.300	82	70	170	16.56	2,470	13.3	7.0
3	8.46		4.0	680.400	0.670	2.300	86	80	193	20.02	3,101	11.7	6.8
4	12.74		4.0	682.500	0.550	1.500	88	82	196	16.70	2,870		
5	18.00		4.0	686.800	0.380	1.170	88	83	199	15.12	2,306		
6	25.83		4.0	689.100	0.610	1.890	96	84	205	18.42	2,793		
7	44.37		4.0	691.000	0.390	1.120	98	84	200	14.60	2,294		
8	54.00		4.0	693.950	0.390	1.100	98	86	203	14.70	2,234		
9	60.20		4.0	696.050	0.400	1.610	102	86	206	17.54	2,851		
10	65.50		4.0	698.000	0.310	1.020	104	88	202	14.33	2,166		
11	67.10		4.0	700.000	0.360	1.190	103	88	205	15.59	2,309		
12	70.40		4.0	704.300	0.300	0.944	101	88	195	13.54	2,080		
B-1	1.51	1230	4.0	705.632	0.520	1.070	86	87	185	18.31	2,759		
2	4.82		4.0	708.700	0.700	2.200	90	88	195	21.44	3,244		
3	8.46		4.0	712.000	0.540	1.650	98	85	205	18.30	2,817		
4	12.74		4.0	715.000	0.820	2.700	100	87	212	23.47	3,564		
5	18.00		4.0	719.000	0.910	3.000	104	88	221	24.89	3,762		
6	26.85		4.0	723.500	0.580	1.860	107	89	217	19.47	2,963		
7	40.37		4.0	726.600	0.590	1.910	107	89	210	20.02	3,025		
8	54.00		4.0	729.700	0.630	2.030	108	89	210	20.85	3,128		
9	60.28		4.0	733.000	0.330	1.000	106	90	210	14.07	2,202		
10	65.50		4.0	735.500	0.740	2.400	105	90	210	22.42	3,386		
11	67.10		4.0	738.500	0.310	1.020	105	90	210	14.41	2,170		
12	70.40		4.0	741.300	0.360	1.180	108	90	210	15.53	2,347		
				743.734									
RESULTS			TT	VM	PT	PM		TM	TS	SQE	VEL.	O2	CO2
			96.0	69.253	0.475	1.550		89	203	17.82	2,603	12.4	7.1
			tot	tot	avg	avg		avg	avg	avg	avg	avg	avg

PBM=	30.51	VMSTD=	66.106	VWGAS=	22.144	%M=	25.0	RMS OF VELOCITIES =	19.0
MD=	0.75	MWD=	28.84	MWW=	26.73	PS=	30.30		

STACK GAS VELOCITY =	2,603	FPM
STACK GAS VOLUME =	11,497	DSCFM
STACK GAS VOLUME =	19,106	ACFM
STACK GAS VOLUME =	6.34E+04	LBS/HR
ISOKINETIC RATIO =	103.7	

PARTICULATE EMISSIONS

	PROBE	TOTAL
Weight, mg =	13.00	53.00
GR/DSCF =	0.003	0.012
LBS/HR =	0.31	1.21

REV. 4(11/1990)

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[illegible]

Client:	HIGHWAY MATERIALS	Plant:	NAZARETH
Unit Tested:	ASPHALT PLANT	Pollutant:	PARTICULATE & FLOW
Sampling Location:	BAGHOUSE STACK	W.O. NO.:	
Run No: 15-3	Date: 10/17/90	Start: 0841	End: 1030

DATA

DN:	0.279	PB:	30.50	PST:	-0.46	AS:	1,017.9
O2%:	12.2	CO2%:	7.0	N2%:	80.8	VW:	438
GAS METER Y-FACTOR:			1.01	E.A.%:	132.0		

SAMPLE POINT	DISTANCE AT POINT	CLOCK TIME	TIME AT POINT	GAS METER	VELOCITY HEAD	PM ORIFICE	METER TEMPERATURE IN	METER TEMPERATURE OUT	STACK TEMP.	SDE	VEL.	O2	CO2
A-1	1.61	0841	4.0	744.000	0.280	0.850	60	51	185	12.50	1,878	12.1	7.2
2	4.82		4.0	746.300	0.570	1.820	67	52	187	14.90	2,541	12.6	6.8
3	8.40		4.0	749.000	0.360	1.250	68	54	188	15.00	2,254	11.8	7.0
4	12.74		4.0	751.600	0.600	2.030	70	55	187	19.70	2,591	12.3	7.0
5	18.00		4.0	754.000	0.420	1.430	76	58	190	18.54	2,500		
6	25.63		4.0	757.000	0.460	1.630	80	60	201	17.25	2,568		
7	46.37		4.0	760.000	0.660	2.220	83	60	202	20.74	3,117		
8	54.00		4.0	763.400	0.340	1.100	87	62	202	16.00	2,255		
9	59.26		4.0	765.900	0.380	1.320	87	64	198	16.02	2,407		
10	63.60		4.0	768.600	0.580	1.020	87	66	203	10.61	2,967		
11	67.18		4.0	771.500	0.310	1.060	90	68	195	14.25	2,141		
12	70.40		4.0	773.800	0.320	1.100	90	70	196	14.48	2,176		
B-1	1.61	0945	4.0	776.170	0.580	1.960	71	68	190	18.10	2,870		
2	4.82		4.0	779.900	0.580	1.960	80	70	174	18.18	2,802		
3	8.40		4.0	782.700	0.680	2.350	87	70	196	20.70	3,126		
4	12.74		4.0	786.200	0.700	2.380	92	71	205	21.56	3,242		
5	18.00		4.0	789.400	0.680	2.220	94	72	190	20.68	3,100		
6	25.63		4.0	793.000	0.760	2.530	97	73	210	22.42	3,300		
7	46.37		4.0	796.500	0.410	1.400	100	74	198	16.44	2,470		
8	54.00		4.0	799.250	0.400	1.380	90	75	198	16.24	2,440		
9	59.20		4.0	802.250	0.300	1.280	90	75	204	15.80	2,387		
10	63.60		4.0	804.800	0.310	1.050	90	75	195	14.20	2,143		
11	67.18		4.0	806.000	0.340	1.170	90	77	202	15.00	2,255		
12	70.40		4.0	809.400	0.300	1.020	90	78	204	14.11	2,121		
				811.711									
RESULTS			TT	VM	PIT	PM		TM	TS	SDE	VEL.	O2	CO2
			96.0	67.305	0.450	1.603		78	196	17.32	2,603	12.2	7.0
			tot	tot	avg	avg		avg	avg	avg	avg	avg	avg

PSM=	30.08	VMSTD=	65.003	VWGAS=	20.304	%M=	22.5	RMS OF VELOCITIES =	16.0		
MD=	0.77	MWD=	28.90	MW=	26.86	PS=	30.61				

STACK GAS VELOCITY =	2,603	FPM
STACK GAS VOLUME =	11,761	DSCFM
STACK GAS VOLUME =	18,471	ACFM
STACK GAS VOLUME =	8.20E+04	LBS/HR
ISOKINETIC RATIO =	100.2	

PARTICULATE EMISSIONS

	PROBE	TOTAL
Weight, mg =	10.60	27.80
GR/DSCF =	0.002	.0066
LBS/HR =	0.25	0.62

REV. 0(11/10/90)

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APPENDIX F

CALIBRATION DATA

SPQ STEX E.M. ENG.

AIR PROGRAMS

METER BOX CALIBRATION

METER BOX NUMBER: 1722

CALIBRATED BY: WARY

DATE: 9/26/90 - 9/27/90

BAROMETRIC PRESSURE: 30.02 30.40

ORIFICE MANOMETER SETTING (delta H) IN. H2O	WET GAS METER (Vn) cu. ft.	DRY TEST METER (Vd) cu. ft.	WET TEST METER (Tw) deg. F	INLET (Tdi) deg. F	OUTLET (Tdo) deg. F	AVERAGE (Td) deg. F	TIME min.	Yi	delta H@I
0.5	5.169	5.238	74	82	77	79.5	12.63	1.00	1.67
1.0	5.185	5.214	73	93	80	86.5	9.05	1.02	1.76
1.5	10.209	10.385	74.5	101	86	93.5	14.63	1.01	1.77
2.0	10.168	10.469	75	109	92	100.5	12.70	1.01	1.77
3.0	10.078	10.485	73.5	115	95	105.0	10.33	1.01	1.77
4.0	10.056	10.177	73.5	84	74	79.0	9.10	1.00	1.84

FORMULAS:

$$Yi = \frac{(Vw)(BP)(Td+460)}{(Vd)(BP+(H/13.6))(Tw+460)}$$

$$Qm = \frac{(Vd)(Tdo+460)}{(Time)(Td+460)}$$

$$Km = Qm\sqrt{\frac{(BP)(29)}{(Tdo+460)(delta\ H)}}$$

$$delta\ H@I = \frac{0.921}{(Km)(Km)}$$

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SPOTTS,STEVENS & McCOY,INC.
AIR PROGRAMS
METER BOX CALIBRATION

METER BOX NUMBER: 1722

CALIBRATED BY: WARY

DATE: 10/18/90

BAROMETRIC PRESSURE: 30.15

ORIFICE MANOMETER SETTING (delta H) IN. H2O	WET GAS METER (Vw) cu. ft.	DRY TEST METER (Vd) cu. ft.	WET TEST METER (Tw) deg. F	INLET (Tdi) deg. F	OUTLET (Tdo) deg. F	AVERAGE (Td) deg. F	TIME min.	YI	delta H@I
0.5	5.190	5.228	74	83.5	77.5	80.5	12.50	1.00	1.64
1.0	5.114	5.227	75.5	94	82	88.0	8.50	1.00	1.69
1.5	10.229	10.422	75	103	87	95.0	14.53	1.01	1.73
2.0	10.165	10.430	74.5	111	92	101.5	12.62	1.02	1.78
3.0	10.174	10.576	75.5	113.5	95	104.3	10.43	1.01	1.76
4.0	10.662	11.191	76	115	97	106.0	9.68	1.00	1.81

FORMULAS:

$$YI = \frac{(VwXBPX(Td+460)}{(VdXBP+(H/13.6)X(Tw+460)}$$

$$Qm = \frac{(VdX(Tdo+460)}{(TimeX(Td+460)}$$

$$Km = Qm \left| \frac{(BPX29)}{(Tdo+460)X(\text{delta H})} \right.$$

$$\text{delta H@I} = \frac{0.921}{(KmXKm)}$$

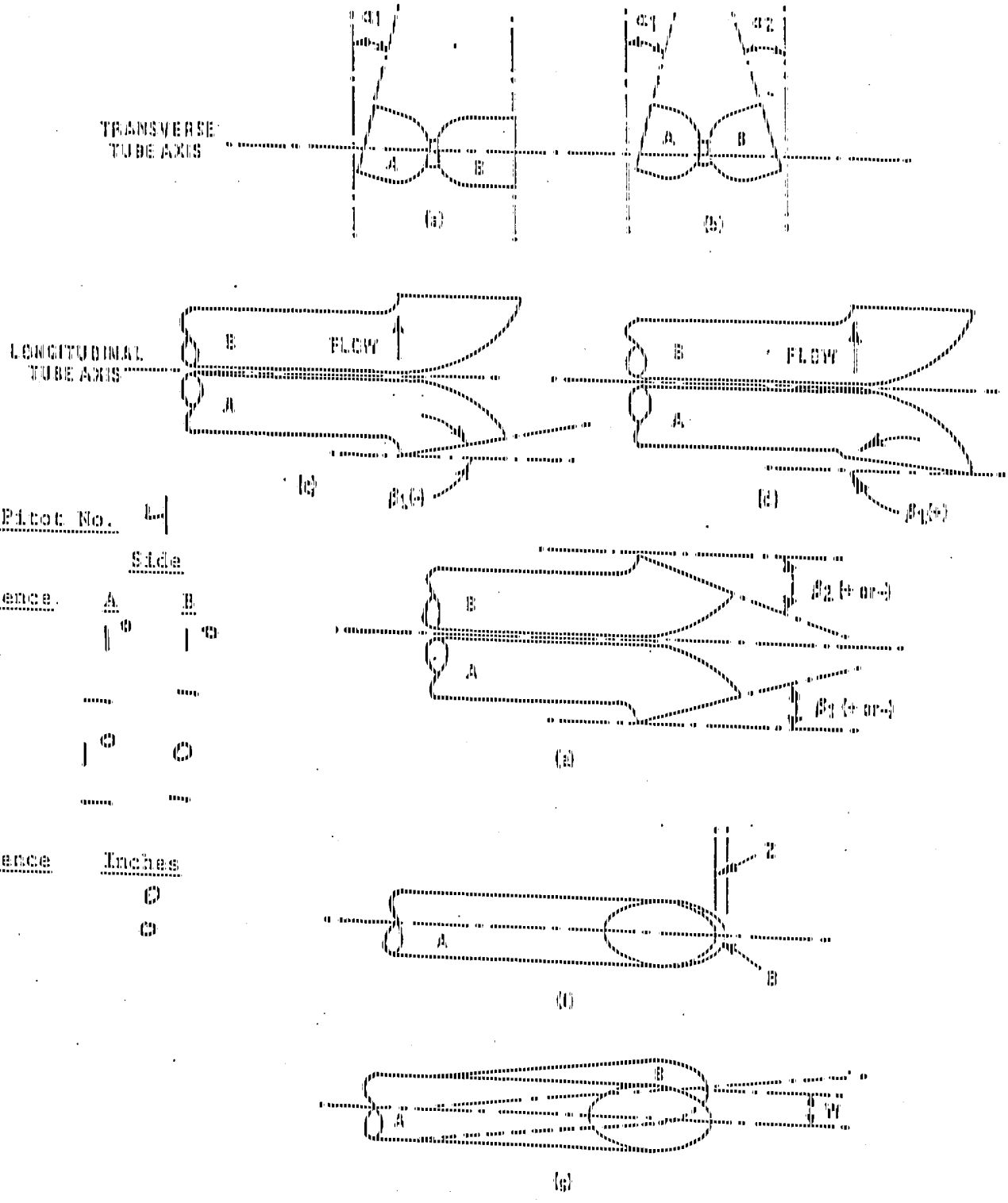

Figure 2-3. Types of face-opening misalignment that can result from field use or improper construction of Type S pitot tubes. These will not affect the baseline value of $C_p(s)$ so long as α_1 and $\alpha_2 < 10^\circ$, β_1 and $\beta_2 < 5^\circ$, $z < 0.32$ cm (1/8 in.) and $w < 0.08$ cm (1/32 in.) (citation 11 in Section 6).

APPENDIEK G

SAMPLE EQUATIONS

SPOTTS, STEVENS AND McCOY, INC.
AIR PROGRAM
ISOKINETIC SAMPLING EQUATIONS

1. Y = Meter Calibration Factor

2. BP = Barometric Pressure, Inches Hg

3. DN = Nozzle Diameter, Inches

4. TT = Net Sampling Time, Minutes

5. AS = Sampling Locaton Area, Square Inches

6. VM = Sample Gas Meter Volume, Cu.Ft.

7. PM = Average Orifice Pressure Drop, Inches H2O

8. TM = Average Dry Gas Meter Temperature, F

9. VW = Total Moisture Collected, ml

10. PST = Static Pressure, Inches H2O

    PS = Stack Pressure, Inches Hg

11. PS = (PST/13.6) + BP

12. TS = Sampling Location Temperature

13. VMSTD = Volume Of Dry Gas Sampled At Standard Conditions, DSCF

$$VMSTD = \frac{17.65 * VM * Y * (BP * (PM/13.6))}{(TM + 460)}$$

14. VW gas = Volume Of Water At Standard Conditions

    VW gas = (0.0471 * VW)

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APPENDIX H

STANDARD TEST METHODS