AP42 Section: 11.1

Reference Number: 325

Title: Source Sampling For Particulate Emissions, Blue Top Grading, Colorado Springs, CO,

WV Air Pollution Control Commission, Charleston, WV,

May 14-15, 1986.

AP-42 Section 11.1
Reference
Report Sect. 4
Reference ~~324~~ 325

Ohio - West Virginia Excavating Co.

P.O. BOX 8 • McMECHEN, WV 26040 • 304-233-6505

February 27, 1989

Mr. Robert L. Weser, Chief
Compliance Division
WV Air Pollution Control Commission
1558 Washington St., E.
Charleston, WV 25311

Dear Mr. Weser:

Enclosed find copy of Stack Emissions Survey as compiled by Western Enviornmental Services & Testing, Inc. for the Barber Greene DM 55 Drum Mix Plant which we recently purchased from Blue Top Grading.

We hope this information will be satisfactory for the processing of our West Virginia Air Pollution Control Permit.

If you have any further questions or require additional information, feel free to contact me at your convenience.

Sincerely,

Roger Lewis
Vice President of Operations

RL/nl

cc: Tim J. Carroll
Northern Panhandle Regional Office

STACK EMISSIONS SURVEY
BLUE TOP GRADING
ASPHALT CONCRETE DRUM-MIX PLANT
COLORADO SPRINGS, COLORADO

MAY 1986

FILE NUMBER 8610-111

Prepared By:

Western Environmental Services and Testing, Inc.
6756 West Uranium Road
Casper, Wyoming 82604
(307) 234-5511

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STACK EMISSIONS SURVEY
BLUE TOP GRADING
ASPHALT CONCRETE DRUM-MIX PLANT
COLORADO SPRINGS, COLORADO

INTRODUCTION

Western Environmental Services and Testing, Inc. (WEST, Inc.) of Casper, Wyoming, conducted a Stack Emissions Survey at the Blue Top Grading Company's asphalt concrete drum-mix plant located in Colorado Springs, Colorado, on May 14 and 15, 1986. The purpose of this survey was to determine emissions of particulate matter from the Exhaust Stack of the rotary drying kiln while being fired with Number 2 Diesel.

Sampling followed the procedures set forth in the "Colorado Air Quality Control Act", Colorado Department of Health, Air Pollution Control Division, and the Code of Federal Regulations, Title 40, Part 60, Appendix A, July 1, 1985.

SUMMARY OF RESULTS

The principal conclusions are:

1. The emissions of particulate matter from the stack were equal to 1.79 pounds per hour (0.0182 grains per dry standard cubic foot), based on averaging the three tests using the "front-half" collections of the EPA-type sampling train.

2. The allowable particulate emission rate is 0.04 grains per dry standard cubic foot, as stated in the "New Source Performance Standards" for asphalt concrete plants, outlined in the Code of Federal Regulations, Title 40, Part 60, Subpart I, July 1, 1985. The actual emissions were 45.4 percent of the permitted emissions.

SUMMARY OF RESULTS

Run Number	1
Stack Flow Rate - ACFM	20613 20649
Stack Flow Rate - DSCFM*	11802 11779
% Water Vapor - % Volume	18.21 18.20
% CO_2 - % Volume	5.2
% O_2 - % Volume	13.9
% Excess Air At Sampling Point	----
Particulates	
Probe, Cyclone & Filter Catch (C_{an}) grains/dscf*	.0334 0.0333
grains/cf at Stack Conditions (C_{at})	0.0190
lbs/hr (C_{aw})	3.368 3.369
Total Catch grains/dscf* (C_{ao})	----
grains/cf at Stack Conditions (C_{au})	----
lbs/hr (C_{ax})	----
Production Rate - Tons/hr	140

* 68°F., 29.92 "Hg (20°C., 760 mm Hg)

8610-111

DISCUSSION OF RESULTS

The three tests for particulates taken on the stack appeared to be valid representations of the actual emissions during the testing. The indicative parameters calculated from the field data were in close agreement. The moisture percentages were within 12.5 percent of the mean value. The measured flow rates (Q_s) were within 4.4 percent of the mean value. The rates of sampling for the three tests were within the specified limits of the isokinetic rate, the greatest deviation being 8.19 percent.

The calculated "front-half" emissions (pounds per hour) of particulates from the three tests showed a range of -46.9 percent to +88.0 percent variation from the mean value.

DESCRIPTION OF PROCESS OPERATION

The Blue Top Grading Company's asphalt concrete drum-mix plant is a Barber Greene DM 55 with a Venturi wet scrubber.

In an asphalt concrete drum-mix plant, sand, gravel, and coarse aggregate are conveyed into a rotary drying kiln. The kiln is heated with a continuous flame. Asphalt is added in the rotary kiln where it is mixed with the hot, dry aggregate. Any dust and fine particles that are not entrained in the asphalt mix are channeled along with the dryer exhaust by an induced draft fan through a wet scrubber. After passing through the wet scrubber, the exhaust is emitted into the atmosphere via a stack. The asphalt is conveyed to a bin where it is stored until the asphalt can be transported to the paving site by truck.

DESCRIPTION OF SAMPLING LOCATION

The sampling ports are located on the rectangular dryer exhaust stack approximately 25 feet above the ground. The sampling was done from five ports on the rectangular stack located 11 feet (5.1 stack diameters) downstream of the stack inlet, and 3 feet (1.4 stack diameters) upstream of the stack outlet. The area of the stack is 672 square inches. Port and wall thick thickness is 1 inch.

SAMPLING AND ANALYTICAL PROCEDURES

The sampling and analytical procedures used followed the procedures outlined in the "Colorado Air Quality Control Act", Colorado Department of Health, Air Pollution Control Division, and the Code of Federal Regulations, Title 40, Part 60, July 1, 1985.

A preliminary velocity traverse was performed at each of the five ports in order to determine the uniformity of flow in the stack. Particulate samples of 3-minute duration at each of the four traverse points were taken from each of the five ports using an EPA-type, heated, glass-lined probe. A total of 20 points were sampled.

Before each test, the sampling train was leak-checked at 15 inches of mercury at the nozzle. After each test, the train was again leak-checked at the highest recorded vacuum reading during the test. Final leak-checking was performed in order to predetermine the possibility of a diluted sample.

Before and after each test period, the pitot tubes were checked for leaks under both a vacuum and pressure. Also, the lines were checked for clear-

ance and the zero manometer reading verified before and after each test.

The particulate emissions ere calculated from gravimetric analysis using the "front-half" collections of the EPA-type sampling train in accordance with the EPA "New Source Performance Standards".

Orsat analyses were provided for each test using a grab-type sample.

DESCRIPTION OF TESTS

Personnel from WEST, Inc. arrived at the plant at 1600 hours on Tuesday, May 13, 1986. After meeting with plant personnel, the equipment was moved onto the stack by 1800 hours. The equipment was secured for the night.

On Wednesday, May 14, the testing crew arrived at the plant at 0700 hours. The equipment was readied for testing by 0730 hours. The testing began at 0902 hours and continued until interruption of the third test at 1404 hours, due to the plant running out of asphalt, causing a postponement of testing until the next morning.

A final leak check problem encountered at the end of test two left some doubt as to whether the results would be valid numbers.

Upon examination and comparison of moisture percentages and particulate grain loadings for tests 1, 2 and 4 it is the opinion of WEST, Inc. personnel that the nozzle was bumped on the stack wall upon removal from the last test port at the end of the test causing the faulty leak check. WEST, Inc. personnel believe test two to be a valid representation of actual plant emissions.

Personnel from WEST, Inc. arrived at the plant at 0600 hours on Thursday, May 15, 1986, and were ready to test by 0700 hours. There was a delay in the start of test four due to a clogged oil line in the plant. Testing began at 0918 hours and continued until completion of the fourth test at 1057 hours.

Testing at Blue Top Grading Company's asphalt concrete drum-mix plant located at Colorado Springs, Colorado, was completed at 1200 hours on Thursday, May 15, 1986.

James E. Meador, Jr.
Vice President

Russ F. Mason
Field Testing Supervisor

8610-111

APPENDICES

A. Location of Sampling Points

B. Source Emission Calculations

C. Calibration of Equipment

D. Field Testing Data

E. Analytical Data

F. Plant Production Data

G. Chain of Custody and Analysis Request

H. Resumes of Test Personnel

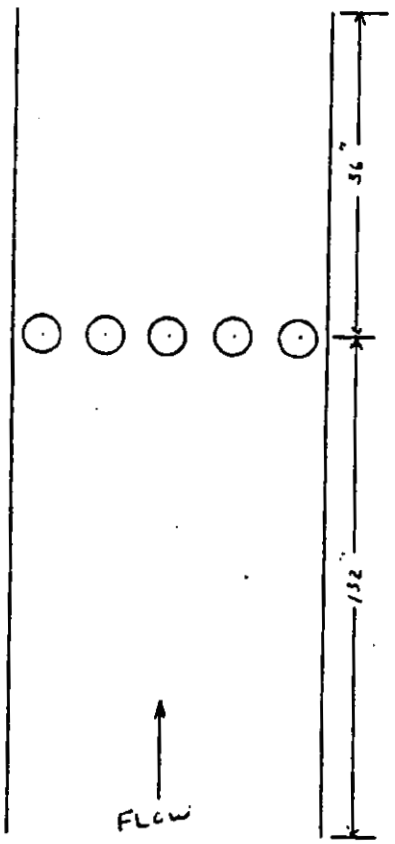
APPENDIX A

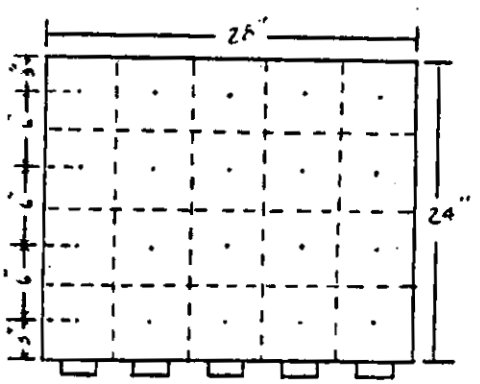
Location of Sampling Points

APPENDIX A

Location of Sampling Points
Drum Kiln Exhaust Stack

The sampling ports are located on the rectangular dryer exhaust stack approximately 25 feet above the ground. The sampling was done from five ports on the rectangular stack located 11 feet (5.1 stack diameters) downstream of the stack inlet, and 3 feet (1.4 stack diameters) upstream of the stack outlet. The area of the stack is 672 square inches. The locations of the sampling points were calculated as follows:





LOOKING INTO FLOW

APPENDIX B

Source Emission Calculations

STACK EMISSIONS SURVEY
BLUE TOP GRADING
ASPHALT CONCRETE DRUM-MIX PLANT
COLORADO SPRINGS, COLORADO

MAY 1986

FILE NUMBER 8610-111

Symbol	Description	Units	KILN	KILN	KIL
Run No.			1	2	4
Date			05/14/86	05/14/86	05/15/86
Begin			0902 MDT	1200 MDT	0918 MDT
End			1006 MDT	1304 MDT	1057 MDT
P_b	barometric pressure	"Hg Abs. (mm Hg)	23.70 601.98	23.70 601.98	23.70 601.98
P_m	orifice pressure drop	"H_2O (mm H_2O)	1.64 41.63	1.68 42.72	1.72 43.79
V_m	volume dry gas sampled @ meter conditions	$ft.^3$ (m^3)	50.649 1.434	51.776 1.466	51.162 1.449
T_m	avg. gas meter temp	°F (°C)	86 30	84 29	71 21
$V_{m_{std}}$	volume dry gas sampled @ standard conditions*	dscf (dscm)	39.008 1.105	39.989 1.132	40.544 1.148
V_w	total H_2O collected, impingers & silica gel	ml	184	243	241.1
$V_{w_{gas}}$	volume water vapor collected @ standard conditions*	scf (scm)	8.685 .246	11.47 .325	11.38 .322
%M	moisture in stack gas by volume	%	18.21	22.29	21.92

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

Source Emission Calculations

BLUE TOP GRADING
FILE NUMBER 8610-111

Symbol	Description	Units	KILN 1	KILN 2	KI
M_d	mole fraction of dry gas	-----	.8179	.7771	.78
CO_2		%	5.2	6.1	
O_2		%	13.9	13	13
N_2		%	80.9	80.9	80.
%EA	excess air @ sampling point	%	---	---	--
MW_d	molecular weight of dry stack gas	lb/lb-mole (g/g-mole)	29.39 29.39 29.39	29.50 29.50	29. 29.
MW	molecular weight of stack gas	lb/lb-mole (g/g-mole)	27.31 27.32 27.31	26.93 26.93	26. 26.
ΔP_s	velocity head of stack gas	"H_2O (mm H_2O)	1.202 30.53	1.125 28.58	1.14 29.1
T_s	stack temperature	°F (°C)	141 61	144 63	13 5
P_s	stack pressure	"Hg Abs. (mm Hg)	23.75 603.29	23.75 603.29	23.7 603.
V_s	stack velocity @ stack conditions	fpm (m/sec)	4417 ~~4415~~ 4421 22.44	4352 22.11	432 21.9
A_s	stack area	$in.^2$ (m^2)	672 0.43	672 0.43	67 0.4
Q_s	dry stack volume @ standard conditions*	DSCFM (dscm/hr)	11802 11779 20051.57	10991 18674.34	1110 18872.6
Q_a	actual stack gas volume @ stack conditions	ACFM (m^3/hr)	20613 20619 35020.99	20307 34502.23	2019 34306.9

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

Source Emission Calculations

BLUE TOP GRADING
FILE NUMBER 8610-111

Symbol	Description	Units	KILN 1	KILN 2	KILN 4
T_t	net time of test	min.	60	60	60
D_n	sampling nozzle diam.	in. (m)	.227 .006	.227 .006	.227 .006
%I	percent isokinetic	%	91.81 91.29	101.06 102.47	101.38
m_f	particulate - probe, cyclone and filter	mg	84.3	29	26.3
m_t	particulate - total	mg	---	---	---
C_{an}	particulate - probe, cyclone and filter	gr/dscf* (g/dscm)	.0333 .0763	.0112 .0256	.01 .0229
C_{ao}	particulate - total	gr/dscf* (g/dscm)	--- ---	--- ---	--- ---
C_{at}	particulate - probe, cyclone and filter @ stack conditions	gr/cf (g/m^3)	.019 .0435	.006 .0137	.0055 .0126
C_{au}	particulate total @ stack conditions	gr/cf (g/m^3)	--- ---	--- ---	--- ---
C_{aw}	particulate - probe, cyclone and filter	lbs/hr (kg/hr)	3.368 1.528	1.055 .479	.952 .432
C_{ax}	particulate - total	lbs/hr (kg/hr)	--- ---	--- ---	--- ---

* 68°F, 29.92 "Hg (20°C, 760 mm Hg)

APPENDIX C

Calibration of Equipment

APPENDIX C

Calibration Data

January 24, 1986

PITOT TUBES

Pitot Length (effective length)	Calibration Factor		Pitot Length (effective length)	Calibration Factor	
28-1	High	0.839	96-1	High	0.842
	Low	0.830		Low	0.820
32-1	High	0.830	122-1	High	0.842
	Low	0.831		Low	0.832
32-2	High	0.823	128-1	High	0.827
	Low	0.822		Low	0.833
46-1	High	0.830	132-1	High	0.832
	Low	0.829		Low	0.837
49-1	High	0.838	132-2	High	0.829
	Low	0.830		Low	0.838
49-2	High	0.829	156-1	High	0.812
	Low	0.834		Low	0.816
72-1	High	0.812	156-2	High	0.820
	Low	0.817		Low	0.826
72-2	High	0.818			
	Low	0.823			
73-1	High	0.838			
	Low	0.828			
74-1	High	0.826			
	Low	0.845			

APPENDIX C

Calibration Data

January 24, 1986

NOZZLES

Set #A

Nozzle No.	Diameter (inches)
1A	0.197
2A	0.228
3A	0.253
4A	0.301
5A	0.356
6A	0.378
7A	0.443
8A	0.492
9A	0.496
10A	0.573

Set #B

Nozzle No.	Diameter (inches)
1B	0.126
2B	0.176
3B	0.238
4B	0.302
5B	0.356
6B	0.364
7B	0.490

Set I

Nozzle No.	Diameter (inches)
I-1	0.124
I-2	0.190
I-3	0.242
I-4	0.307
I-5	0.363
I-6	0.419
I-7	0.485
I-8	0.575
I-9	0.610

Set II

Nozzle No.	Diameter (inches)
II-1	0.122
II-2	0.196
II-3	0.247
II-4	0.312
II-5	0.375
II-6	0.435
II-7	0.495
II-8	0.561
II-9	0.608

Set III

Nozzle No.	Diameter (inches)
III-1	0.130
III-2	0.242
III-3	0.245
III-4	0.367
III-5	0.365
III-6	0.439
III-7	0.499
III-8	0.560
III-9	0.610

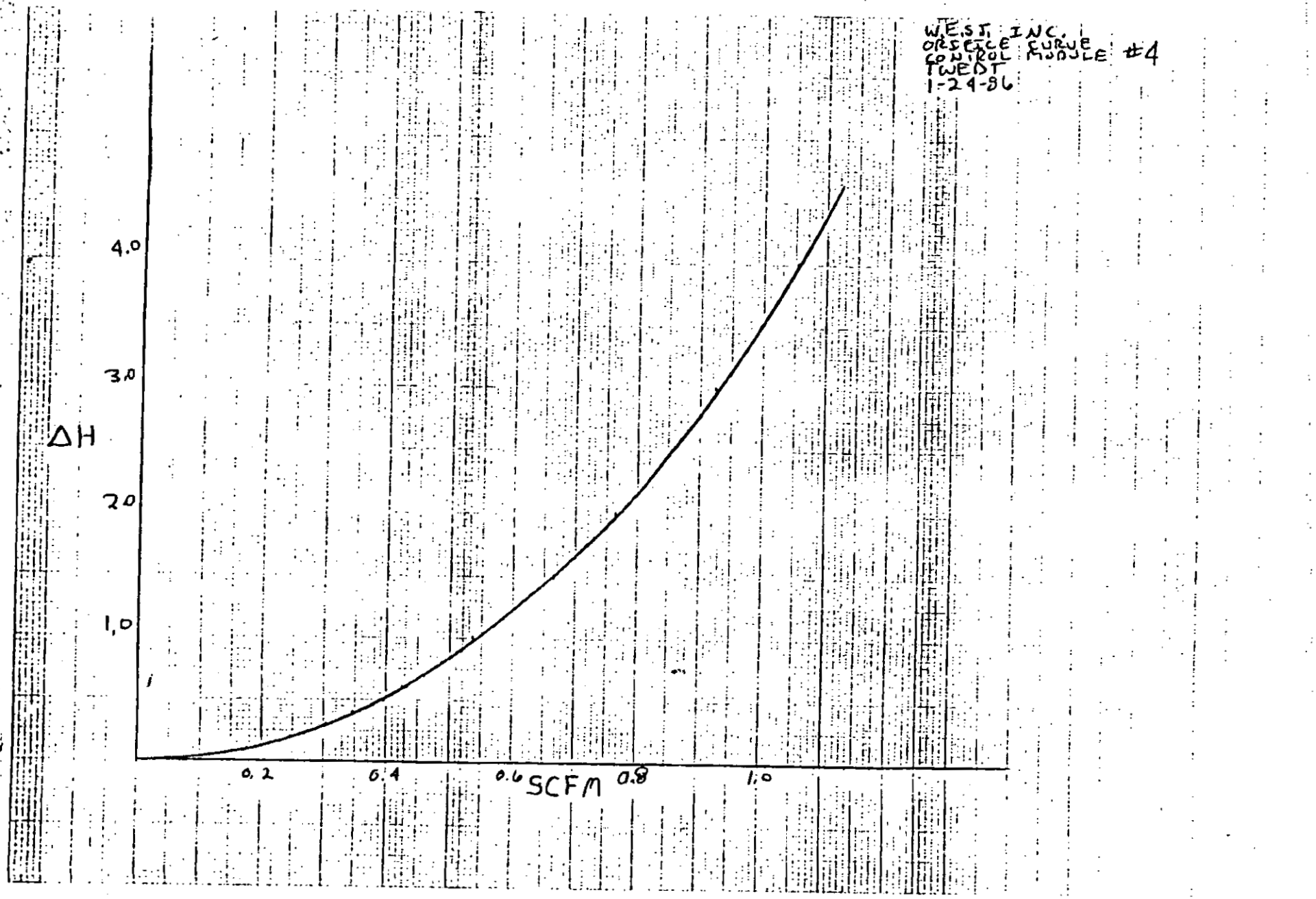
APPENDIX C

Calibration Data

January 24, 1986

DRY GAS METERS

Unit Number	Calibration Factor
1	1.009
2	0.989
3	1.004
4	1.013


W.E.S.T. INC.
ORIFICE CURVE
CONTROL MODULE #4
TWEDT
1-24-86
4.0
3.0
2.0
1.0
ΔH
0.2
0.4
0.6
SCFM
0.8
1.0

APPENDIX D

Field Testing Data

Job No. 8610-111 — PART FIELD DATA — Nomograph Setting ΔP 1.00 ΔH 1.38

Job Name Blue Top Grading — Ambient Temp. °F 70

Run No. 1 — Assumed Moisture % 20

Location Kiln — Probe Length 32" — Read and Record at the Start of Each Test Point.

Date 5-14-86 — Pitot Tube Leak Check initial OK final OK

Operator Mason - Vincent — Initial Leak @ 15.0 "Hg = 0.000 cfm

Sample Box No. 5 — Meter Box No. 4 — Final Leak @ 7.5 "Hg = 0.000 cfm

ΔPs — Pm — Ts — Tm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
A 4	0902	341.201	1.35	1.85	1.85	4.5	135	234	267	81	84	83	
3	5	343.90	1.35	1.85	1.85	4.5	138	240	271	79	83	83	82.83
2	8	346.57	1.40	1.40	1.40	4.5	139	257	270	70	82	82	
1	11	349.20	1.10	1.50	1.50	4.0	139	260	260	75	83	83	
end	0919	351.672	—	—	—	—	—	—	—	—	—	—	
B 4	0915	351.672	1.70	2.30	2.30	5.5	139	257	255	83	83	83	
3	18	354.65	1.70	2.30	2.30	5.5	139	253	259	82	84	83	83.88
2	21	357.66	1.60	2.20	2.20	5.5	141	255	258	80	85	84	
1	24	360.68	1.20	1.65	1.65	4.0	139	254	255	77	85	84	
end	0927	363 253	—	—	—	—	—	—	—	—	—	—	
C 4	0928	363.253	1.60	2.20	2.20	5.5	140	260	260	77	87	85	
3	31	366.19	1.40	1.40	1.90	4.5	140	259	258	75	88	85	86.63
2	34	368.92	1.25	1.70	1.70	4.5	142	241	260	75	89	85	
1	37	371.54	1.10	1.50	1.50	4.0	142	237	262	77	89	85	
end	0940	373.995	—	—	—	—	—	—	—	—	—	—	
D 4	0941	373.995	1.20	1.65	1.65	4.0	143	232	255	78	89	85	
3	44	376.55	1.10	1.50	1.50	4.0	143	253	250	79	89	85	86.5
2	47	379.12	1.00	1.40	1.40	3.5	144	260	250	73	90	86	

Pitot Tube Calibration Factor C_p 0.824 — Pitot Tube No. 32-2

Volume Collected V_m 50.649 ft^3 — %CO_2 5.2 — %CO 0.0

Water Collected V_w 184.0 ml — %O_2 13.9 — %N_2 80.9

Time of Test T_t 60 min — Area Stack A_2 672 in^2

Baro. Press. P_b 23.70 "Hg — Stack Press. +0.70 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. 2A — Probe Tip Dia. 0.227 in

V_m = Dry Gas Meter Calibration Factor 1.005 X 50.397

Dry Gas Meter Reading ____ ft^3 − (T_t ____ min x Leak Rate ____ cfm)

= 50.3

Run No. 1

Location Kiln 1

Date 5-14-86

PARTICULATE FIELD DATA

Point	Clock Time	Dry Gas Meter, CF	ΔPs Pitot in. H_2O	Pm Orifice ΔH in. H_2O Desired	Pm Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Ts Stack Temp °F	Ts Probe Temp °F	Ts Oven Temp °F	Ts Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Remarks
1	0950	381.32	0.75	1.00	1.00	3.0	142	255	252	73	90	86	
Ind	0953	383.263	—	—	—	—	—	—	—	—	—	—	
Pt	0954	383.263	0.88	1.20	1.20	3.5	142	254	247	75	90	86	
3	57	385.44	0.83	1.10	1.10	3.0	143	253	247	73	90	87	88.163
2	1000	387.60	0.80	1.10	1.10	3.0	145	254	254	72	91	87	
1	3	389.65	0.72	0.98	0.98	3.0	144	255	255	71	91	87	
End	1006	391.598	—	—	—	—	—	—	—	—	—	—	

IMPINGER CATCH

SAMPLE NO.: 1

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	MODIF	Final 657.6 Initial 549.0 Wt. Gain 108.6
2	DI	100	G. Smith	Final 622.2 Initial 575.8 Wt. Gain 46.4
3	DRY	—	MODIF	Final 493.1 Initial 484.6 Wt. Gain 8.5
4	SILICA GEL	—	MODIF	Final 793.4 Initial 772.9 Wt. Gain 20.5
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask				Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 164.0

DATE: 5-14-86

SIGNATURE: Russ F. Mason

ORSAT ANALYSIS RESULTS

Gas Fractional Part

CO_2 5.2 %

O_2 13.9 %

CO 0.0 %

N_2 80.9 %

SIGNATURE: Russ F. Mason DATE: 5-14-86

Job No. 8610-111 — PART FIELD DATA — Nomograph Setting ΔP 1.00 ΔH 1.50

Job Name Blue Top Grinding — Ambient Temp. °F 75

Run No. 2 — Assumed Moisture % 20

Location Kiln — Read and Record at the Start of Each Test Point. — Probe Length ~~28"~~ used ~~found~~

Date 5-11-86 — Pitot Tube Leak Check ~~OK~~ OK ~~OF~~

Operator Mason - Vincent — Initial Leak @ 15.0 "Hg = 0.000 cfm

Sample Box No. 6 — Meter Box No. 4 — Final Leak @ X.0 "Hg = NO Good cfm

ΔPs — Pm — Ts — Tm

Point	Clock Time	Dry Gas Meter, CF 392.182	Pitot in. H_2O	Orifice ΔH in. H_2O Desired	Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F Inlet	Dry Gas Temp °F Outlet	Remarks
E 4	1200	~~391.452~~	0.70	1.05	1.05	2.0	140	245	232	76	83	85	
3	3	394.30	0.70	1.05	1.05	2.0	144	241	245	70	82	85	
2	6	396.40	0.65	0.98	0.98	2.0	142	246	252	67	82	85	
1	9	398.34	0.50	0.75	0.75	2.0	142	258	252	65	82	85	
end	1212	400.156	—	—	—	—	—	—	—	—	—	—	
D 4	1213	400.156	0.94	1.40	1.40	3.0	146	229	252	65	82	85	
3	16	402.06	0.88	1.30	1.30	2.0	141	271	253	62	82	84	
2	19	404.35	0.78	1.15	1.15	2.0	142	250	252	61	82	84	
1	22	406.49	0.60	0.91	0.91	2.0	140	261	258	61	83	84	
end	1225	408.453	—	—	—	—	—	—	—	—	—	—	
C 4	1226	408.453	1.40	2.10	2.10	2.5	142	251	259	63	84	84	
3	29	411.28	1.15	1.70	1.70	2.5	143	269	268	62	84	83	
2	32	413.90	1.10	1.65	1.65	2.5	143	232	270	63	84	83	
1	35	416.51	1.00	1.50	1.50	2.5	144	231	271	64	85	83	
end	1238	419.090	—	—	—	—	—	—	—	—	—	—	
B 4	1239	419.090	1.50	2.25	2.25	3.0	145	264	264	62	86	83	
3	42	422.37	1.50	2.25	2.25	3.0	147	269	263	58	87	83	
2	45	425.35	1.50	2.25	2.25	3.0	149	260	265	59	88	83	

Pitot Tube Calibration Factor C_p ~~0.838~~ 0.824 — Pitot Tube No. ~~S2-2~~ S2-1

Volume Collected V_m 51.776 ft^3 — $\%CO_2$ 6.1 — %CO 0.0

Water Collected V_w 243.0 ml — $\%O_2$ 13.0 — $\%N_2$ 80.9

Time of Test T_t 60 min — Area Stack A_2 672 in^2

Baro. Press. P_b 23.70 "Hg — Stack Press ~~+0.70~~ in H_2O

Sample Purge: Initial ——— Final ———

Probe Tip No. 2A — Probe Tip Dia. 0.227 in

V_m = Dry Gas Meter Calibration Factor 1.005 X 51.519

Dry Gas Meter Reading ft^3 - (T_t ____ min x Leak Rate ____ cfm)

Run No. 2

Location Kiln 1

Date 5-14-86

PARTICULATE FIELD DATA

Point	Clock Time	Dry Gas Meter, CF	ΔPs Pitot in. H_2O	Pm Orifice ΔH in. H_2O Desired	Pm Orifice ΔH in. H_2O Actual	Pump Vacuum In. Hg Gauge	Ts Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Tm Dry Gas Temp °F Inlet	Tm Dry Gas Temp °F Outlet	Remarks
B1	1248	428.40	1.10	1.65	1.65	2.5	147	259	258	56	88	84	
ind	1251	431.000	—	—	—	—	—	—	—	—	—	—	
Aft	1252	431.000	1.75	2.60	2.60	3.5	147	257	251	58	89	84	
3	55	434.42	1.75	2.60	2.60	3.5	144	266	252	54	89	85	
2	58	437.67	1.70	2.55	2.55	3.5	145	231	250	53	89	83	
1	1301	440.86	1.30	1.95	1.95	3.0	147	250	251	54	90	83	
Bn Aft	1304	443.701	—	—	—	—	—	—	—	—	—	—	

IMPINGER CATCH

SAMPLE NO.: 2

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	MODIF	Final 758.6 Initial 572.1 Wt. Gain 186.5
2	DI	100	G. SMITH	Final 654.3 Initial 616.3 Wt. Gain 38.0
3	Dry	—	MODIF	Final 473.8 Initial 468.7 Wt. Gain 5.1
4	SILICA GEL	—	MODIF	Final 822.3 Initial 808.9 Wt. Gain 13.4
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask				Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 243.0

DATE: 5-14-86

SIGNATURE: Ruth F. Mason

ORSAT ANALYSIS RESULTS

Gas Fractional Part

CO_2 6.1 %

O_2 13.0 %

CO 0.0 %

N_2 80.9 %

SIGNATURE: Ruth F. Mason DATE: 5-14-86

Job No. 8610-111

Job Name Blue Tops Grading

Run No. 4

Location KILN

Date 5-15-86

Operator MASON - Vincent

Sample Box No. 7 Meter Box No. 4

PART FIELD DATA

Read and Record at the Start of Each Test Point.

Nomograph Setting ΔP 1.00 ΔH 1.50

Ambient Temp. °F 65

Assumed Moisture % 20

Probe Length 32" initial final

Pitot Tube Leak Check OK OK

Initial Leak @ 15.0 "Hg = 0.000 cfm

Final Leak @ 10.0 "Hg = 0.000 cfm

Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O		Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F		Remarks
				Desired	Actual						Inlet	Outlet	
E 4	0916	466.401	0.72	1.10	1.10	3.0	130	230	241	47	66	67	
3	21	466.63	0.74	1.10	1.10	2.5	133	239	242	44	66	67	
2	24	468.69	0.64	0.97	0.97	2.5	135	238	239	44	65	67	
1	27	470.62	0.57	0.86	0.86	2.5	135	233	237	44	65	67	
end	0930	473.085	—	—	—	—	—	—	—	—	—	—	
D 4	0931	473.055	1.15	1.70	1.70	3.5	134	240	235	46	67	68	
3	34	475.28	0.98	1.45	1.45	3.0	135	232	237	44	67	68	
2	37	477.50	0.84	1.25	1.25	3.0	135	241	240	45	67	68	
1	40	479.69	0.75	1.10	1.10	3.0	138	250	239	50	73	70	
end	0943	481.784	—	—	—	—	—	—	—	—	—	—	
C 4	0944	481.784	1.45	2.20	2.20	5.0	135	245	247	52	72	69	
3	47	484.86	1.30	2.10	2.10	5.0	136	241	244	49	72	69	
2	50	487.64	1.20	1.80	1.80	4.0	136	236	233	51	74	69	
1	53	490.23	0.95	1.40	1.40	3.5	136	237	237	51	74	69	
end	0956	492.627	—	—	—	—	—	—	—	—	—	—	
B 4	0957	492.627	1.70	2.55	2.55	5.5	141	240	242	53	75	70	
3	1000	495.92	1.60	2.40	2.40	5.5	140	240	241	53	75	70	
2	3	498.84	1.50	2.25	2.25	5.5	140	240	240	50	77	70	

Pitot Tube Calibration Factor C_p 0.824 Pitot Tube No. 32-1

Volume Collected V_m 51.162 ft^3

Water Collected V_w 244 ml

Time of Test T_t 60 min

Baro. Press. P_b 23.70 "Hg

$\%CO_2$ 4.0 %CO 0.0

$\%O_2$ 15.5 $\%N_2$ 80.5

Area Stack A_2 672 in^2

Stack Press. 40.70 in. H_2O

Sample Purge: Initial — Final —

Probe Tip No. 2A Probe Tip Dia. 0.227 in

V_m = Dry Gas Meter Calibration Factor 1.005 x 50.907

Dry Gas Meter Reading ____ ft^3 - (T_t ____ min x Leak Rate ____ cfm)

M_w = 26.3 M =

Run No. 4

Location Kiln

Date 5-15-86

PARTICULATE FIELD DATA

			Δ Ps	Pm			Ts				Tm		
Point	Clock Time	Dry Gas Meter, CF	Pitot in. H_2O	Orifice ΔH in. H_2O		Pump Vacuum In. Hg Gauge	Stack Temp °F	Probe Temp °F	Oven Temp °F	Effluent Temp °F	Dry Gas Temp °F		Remarks
				Desired	Actual						Inlet	Outlet	
1	1006	501.82	1.40	2.10	2.10	5.0	138	242	238	53	78	70	
Purge	1009	504.651	—	—	—	—	—	—	—	—	—	—	
A 4	1010	504.651	1.30	1.95	1.95	5.0	141	250	249	55	78	71	
3	13	507.608	1.30	1.95	1.95	5.0	140	251	248	55	79	72	off 1013 Cwll 5:30
2	5[illegible]	509.91	1.50	2.25	2.25	5.0	142	263	232	50	74	74	on 1048
1	5[illegible]	512.61	1.35	2.00	2.00	5.0	142	260	235	50	74	74	
Purge	10[illegible]	515.308	—	—	—	—	—	—	—	—	—	—	

WEST, Inc.

PARTICULATE ANALYSIS

Date 5-20-86

Job No. E610-111

Name BLUE TOP GRADING

Location KILN STACK

Run No. 1

	Filter No. N70	Front Wash 225 ml	Impinger 1	Impinger 2
Final	0.6826	109.1087		
Initial	0.6634	109.0428		
	0.0192 = 19.2 mg	0.0659 = 65.9 mg		
		−0.8 blank		
		65.1		

MF 84.3 mg MT _____ mg

Run No. 2

	Filter No. N71	Front Wash 225 ml	Impinger 1	Impinger 2
Final	0.6698	110.6011		
Initial	0.6563	110.5838		
	0.0135 = 13.5 mg	0.0173 = 17.3 mg		
		−0.8 blank		
		15.5 mg		

MF 30 ~~29.0~~ mg MT _____ mg

Run No. 4

	Filter No. N73	Front Wash 220 ml	Impinger 1	Impinger 2
Final	0.6644	105.5915		
Initial	0.6520	105.5768		
	0.0124 = 12.4 mg	0.0147 = 14.7 mg		
		−0.8 blank		
		13.9 mg		

MF 26.3 mg MT _____ mg

Acetone Blank:

Volume 200 ml

Final 108.7900

Initial 108.7893

Blank: 0.0035 mg/ml Total Weight 0.7 mg

FILTER BLANK

~~D.I. Water Blank~~

FILTER # N-74

~~Volume~~ ml

Final 0.6603 g

Initial 0.6601 g

Blank: _____ ~~mg/ml~~ Total Weight 0.0002 g

APPENDIX E

Analytical Data

APPENDIX F

Plant Production Data

Blue Top Grinding

OPERATIONAL LOG FOR ASPHALT PLANT SOURCE EMISSIONS TEST

TIME	AGG. TPH	AGG. % MOISTURE	REC. TPH	REC. % MOISTURE	FIL. TPH	ASPHALT TPH	TOTAL TPH	MIX TEMP °F	VENTURI PRESSURE DROP	WATER PRESSURE	HIGH STACK TEMP.	FAN RPM	FUEL PRESSURE
8:58	132					8.0	140	304	14	45	300		25
9:54	132					8.0	140	296	13	45	295		25
10:15	132					8.0	140	307	13	45	298		25
10:30	132					7.9	140	315	13	45	300		25
10:45	132					7.9	140	313	13	45	300		25
11:00	131					7.9	139	316	13	45	300		25
9:18	131					7.9	139	290	13	45	297		25
9:33	131					7.9	139	310	13	45	299		25
9:48	131					7.9	139	310	13	45	300		25
10:03	131					7.9	139	310	13	45	300		25

Fuel oil - #2 Diesel

APPENDIX G

Chain of Custody

and Analysis Request

WESTERN ENVIRONMENTAL SERVICES & TESTING

Chain of Custody and Analysis Request

Job Number 8610-111 Date(s) Sampled 5-14, 15-86

Job Name Bear Top Grinding Number of Runs 4

Source Location Colorado Springs, Colorado

Unit Tested Dryer Kiln Exhaust Stack

Absorbing Solution/Analysis For

Run	Filter Number	Imp 1	Imp 2	Imp 3	Imp 4	Probe Wash
1	N 70	DI / MOIST	DI / MOIST	DRY / MOIST	SILICA GEL / MOIST	ACETONE / PART.
2	N 71	"	"	"	"	"
3						
4	N 73	"	"	"	"	"

No_x: _____

Other _____

Total Number of Sample Bottles: 8

Total Number of Filters: 4

Comments: 1 acetone blank

1 filter blank

Person Responsible for Samples: R L Mason

Sample No.	Recovered by	Date	Time	Location
1	R Mason	5-14-86	1030	on Site
2	R Mason	5-14-86	1330	on Site
3				
4	R Mason	5-15-86	1115	on Site

Samples Received by R L Mason for transport Date: 5-15-86 Time: 1200

Samples Received at lab by Alan D. Rogers Date: 5-16-86 Time: 0800

Samples Analyzed by Harold Klein Date: 5-20-86 Time: —

IMPINGER CATCH

SAMPLE NO.: 4

IMPINGER NO.	SOLUTION USED	AMOUNT OF SOLUTION (ml)	IMP. TIP CONFIGURATION	WEIGHT (grams)
1	DI	100	MODIF	Final 761.1 Initial 563.7 Wt. Gain 197.4
2	DI	100	G. SMITH	Final 601.1 Initial 574.3 Wt. Gain 26.8
3	DRY	—	MODIF	Final 463.5 Initial 460.0 Wt. Gain 3.5
4	SILICA GEL	—	MODIF	Final 781.1 Initial 767.7 Wt. Gain 13.4
5				Final Initial Wt. Gain
6				Final Initial Wt. Gain
Flask				Final Initial Wt. Gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 241.1 —

DATE: 5-15-86

SIGNATURE: Russ L. Mason

ORSAT ANALYSIS RESULTS

Gas Fractional Part

CO_2 4.0%

O_2 15.5%

CO 0.0%

N_2 80.5%

SIGNATURE: Russ L. Mason DATE: 5-15-86

APPENDIX H

Resumes of Test Personnel

RUSSELL F. MASON

CURRENT:

1/1/86 to present	Field Testing Supervisor Western Environmental Services and Testing, Inc., Casper, Wyoming and Dallas, Texas; an environmental monitoring and consulting firm.
6/1/83 to 12/31/85	Senior Environmental Technician Western Environmental Services and Testing, Inc.
6/1/81 to 5/31/83	Environmental Technician Western Environmental Services and Testing, Inc.

PROFESSIONAL:

12/1/80 to 6/1/81	Environmental Technician Kumpe and Associates, P.C., Casper, Wyoming; an engineering and consulting firm

EDUCATION: Associate of Science in Physiology, Casper, College, Casper, Wyoming 1977. Two years of Environmental Biology, University of Wyoming, Laramie, Wyoming.

TECHNICAL EXPERIENCE: Conducted over 100 source emissions surveys in the western and southwestern United States; responsible for set up and maintenance of several ambient air networks; managed several ambient air studies in the past years.

CERTIFICATIONS: Visible emissions evaluator
Licensed Private Pilot - Single-Engine-land

PROFESSIONAL MEMBERSHIPS: Air Pollution Control Association
Society of Mining Engineers of A.M.E.

MARCELO A. VINCENT

CURRENT:	
October 1983 to present	Technician, Western Environmental Services and Testing, Inc., Casper, Wyoming and Dallas, Texas; an environmental monitoring and consulting firm.
PROFESSIONAL:	
3/15/83 to 7/15/83	Loss Prevention Agent, Internal Loss Investigations, J.W. Robinson Company, Pasadena, California
7/80 to 10/82	Security Officer, Casper, College, Casper, Wyoming
5/75 to 4/79	Law Enforcement Specialist, United States Air Force
EDUCATION:	Attended Los Angeles City College, Los Angeles, California and Casper, College, Casper, Wyoming, for 1½ years. Currently attending Casper College majoring in Criminal Justice.