AP42 Section: 11.1

Reference Number: 319

Title: Source Sampling For Particulate Emissions, Valley Asphalt Corp., Plant #6, Dayton, OH,

Ramcon Environmental Corp., Memphis, TN,

May 11, 1993.

AP-42 Section 11.1
Reference
Report Sect. 4
Reference ~~318~~ 319

APPENDIX K

OEPA STACK TEST REVIEW SUMMARY FORM

APPLICATION NUMBER 0857101849 P001
FACILITY NAME Valley Asphalt Plant #6
SOURCE DESCRIPTION (OR SCC CODE) AZTEC ASPHALTIC CONCRETE PRODUCTION ASPHALT PLANT #6
CONTROL EQUIPMENT ASTEC BAGHOUSE

DATE(S) OF TEST 5-11-93
FINAL TEST REPORT RECEIVED ON 6-24-93
POLLUTANT(S) TESTED PARTICULATE & LEAD
TEST METHOD M5, M12
TEST FIRM RAMCON
EMISSION RATES*:
ACTUAL (lb(s)/hr) 1.51 ALLOWABLE** 15.4
OPERATING RATES*: (TONS PER HOUR)
DURING TEST** 270 - 275 TPH MAXIMUM** 300 TPH
EMISSION FACTOR***
COMMENTS:

I HEREBY VERIFY THAT THE INFORMATION CONTAINED WITHIN THE STACK TEST REPORT HAS BEEN REVIEWED AND IT HAS BEEN DETERMINED THAT THE TEST PROCEDURES, ANALYSES AND CALCULATIONS ARE:

[X] AN ACCEPTABLE DEMONSTRATION OF CONFORMANCE WITH THE APPROVED TESTING METHODOLOGY.

[ ] AN UNACCEPTABLE DEMONSTRATION OF CONFORMANCE WITH THE APPROVED TESTING METHODOLOGY.

7/16/93
DATE OF REVIEW

Jeffrey W. Adams
REVIEWED BY

* BASED ON 3 RUN AVERAGE
** SPECIFY APPLICABLE UNITS
*** SPECIFY IN UNITS OF MASS/INPUT

CONTACT REPORT

FACILITY: Valley Asphalt, Plant #6

CONTACT: Kenny Eakins, Plant Superintendent

RAPCA: Chris Hockett & Jeff Adams

DATE: May 17, 1993

The purpose of the visit was to observe and record process parameters during stack emissions tests for P001. P001, Aztec Asphalt Batch, has maximum hourly production capacity of 300 TPH. Consequently, hourly production was maintained at or above 270 TPH during each of the three test runs.

Waste oil was burned during the test, therefore samples were collected by Valley Asphalt personnel every 15 minutes during each run.

Visible emission observations were recorded and our attached to this report.

The following is a list of process parametes recorded during the test:

	Run #1	Run #2	Run #3
Start	9:56	12:27	3:01
Stop	11:05	1:43	4:17
Production	275 TPH	275 TPH	270 TPH
Baghouse ΔP	4.5"	4.5"	4.5"
Cleaning Cycle	5 Sec.Interval	5 Sec.Interval	5 Sec.Interval

/bw

Visible Emission Observation Form

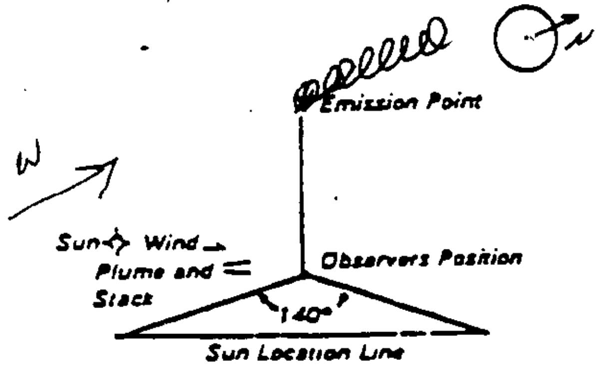
SOURCE NAME	Valley Asphalt
ADDRESS	1901 Dryden Rd
CITY	Dayton
STATE	Oh
ZIP	
PHONE	
SOURCE ID NUMBER	P001
PROCESS EQUIPMENT	asphalt Plant
OPERATING MODE	see report
CONTROL EQUIPMENT	baghouse
OPERATING MODE	see report
DESCRIBE EMISSION POINT	START Round Metal Stack STOP ⟵
HEIGHT ABOVE GROUND LEVEL	START ~40' STOP ⟵
HEIGHT RELATIVE TO OBSERVER	START ~40' STOP ⟵
DISTANCE FROM OBSERVER	START ~125' STOP ⟵
DIRECTION FROM OBSERVER	START NW STOP ⟵
DESCRIBE EMISSIONS	START Lacey Plume STOP ⟵
EMISSION COLOR	START Gray/brown 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 One Stack diameter above stack exit STOP ⟵
DESCRIBE BACKGROUND	START Sky STOP ⟵
BACKGROUND COLOR	START Gray STOP ⟵
SKY CONDITIONS	START Cloudy STOP ⟵
WIND SPEED	START ~10 MPH STOP ⟵
WIND DIRECTION	START SW STOP ⟵
AMBIENT TEMP.	START ~85°F STOP ⟵
WET BULB TEMP.	
RH, percent	

OBSERVATION DATE	START TIME	STOP TIME
5-11-93	3:43 PM	

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

Source Layout Sketch

Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT)	Chris Hockett
OBSERVER'S SIGNATURE Chris Hockett	DATE 5-11-93
ORGANIZATION	
CERTIFIED BY	DATE
VERIFIED BY	DATE

COMMENTS
no sun positions determined due to cloudy conditions

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

Visible Emission Observation Form

SOURCE NAME: Valley Asphalt

ADDRESS: 1901 Dryden Rd

CITY: Dayton | STATE: Ohio | ZIP:

PHONE: | SOURCE ID NUMBER: P001

PROCESS EQUIPMENT: Asphalt Kiln | OPERATING MODE: see report

CONTROL EQUIPMENT: Baghouse | OPERATING MODE: see report

DESCRIBE EMISSION POINT
START Round Metal Stack STOP ✓

HEIGHT ABOVE GROUND LEVEL: START ~40' STOP ✓ | HEIGHT RELATIVE TO OBSERVER: START ~40' STOP ✓

DISTANCE FROM OBSERVER: START ~125' STOP ✓ | DIRECTION FROM OBSERVER: START NW STOP ✓

DESCRIBE EMISSIONS
START Fogging Gray Plume STOP ✓

EMISSION COLOR: START Gray 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 One stack diameter above stack opening STOP ✓

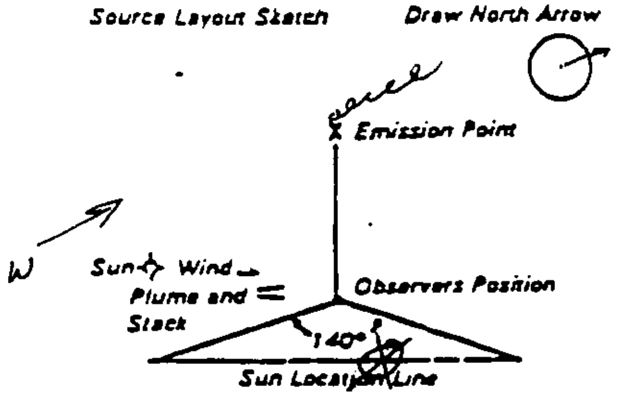
DESCRIBE BACKGROUND
START Sky STOP ✓

BACKGROUND COLOR: START gray STOP ✓ | SKY CONDITIONS: START PC STOP ✓

WIND SPEED: START ~5MPH STOP ✓ | WIND DIRECTION: START SW STOP ✓

AMBIENT TEMP.: START ~82°F STOP ✓ | WET BULB TEMP. | RH.percent

Source Layout Sketch | Draw North Arrow



OBSERVATION DATE: 5-11-93 | START TIME: 12:37 | STOP TIME: 12:55

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

AVERAGE OPACITY FOR HIGHEST PERIOD: | NUMBER OF READINGS ABOVE % WERE:

RANGE OF OPACITY READINGS: MINIMUM Ø MAXIMUM

OBSERVER'S NAME (PRINT): Chris Hockett

OBSERVER'S SIGNATURE: Chris Hockett | DATE 5-11-93

ORGANIZATION: RAPCA

CERTIFIED BY: KJA | DATE 3-93

VERIFIED BY: | DATE

COMMENTS: Run #2

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

Visible Emission Observation Form

SOURCE NAME: Valley Asphalt #6

ADDRESS: 1901 Dryden Rd

CITY: Dayton | STATE: Oh | ZIP:

PHONE: | SOURCE ID NUMBER: P001

PROCESS EQUIPMENT: asphalt Plant | OPERATING MODE: see report

CONTROL EQUIPMENT: Baghouse | OPERATING MODE: see report

DESCRIBE EMISSION POINT
START Round Metal Stack STOP ✓

HEIGHT ABOVE GROUND LEVEL: START ~40' STOP ✓ | HEIGHT RELATIVE TO OBSERVER: START ~40' STOP ✓

DISTANCE FROM OBSERVER: START ~125' STOP ✓ | DIRECTION FROM OBSERVER: START NW STOP ✓

DESCRIBE EMISSIONS
START Looping Plume STOP ✓

EMISSION COLOR: START Gray 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 One Stack diameter above stack opening STOP ✓

DESCRIBE BACKGROUND
START Sky STOP ✓

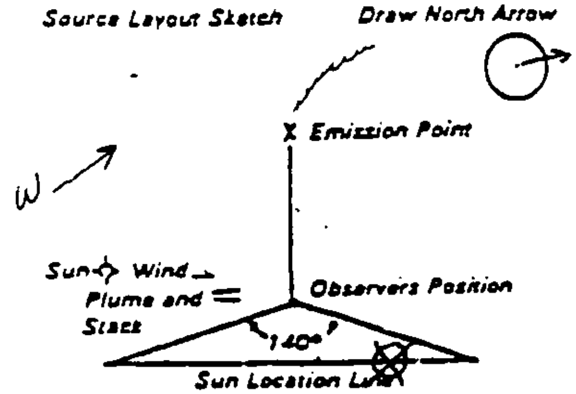
BACKGROUND COLOR: START Gray STOP ✓ | SKY CONDITIONS: START PC STOP ✓

WIND SPEED: START ~5MPH STOP ✓ | WIND DIRECTION: START SW STOP ✓

AMBIENT TEMP.: START ~80°F STOP ✓ | WET BULB TEMP. | RH, percent

Source Layout Sketch

Draw North Arrow



OBSERVATION DATE: 5-11-93 | START TIME: 10:07 AM | STOP TIME: 10:27 AM

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

AVERAGE OPACITY FOR HIGHEST PERIOD | NUMBER OF READINGS ABOVE 20 % WERE Ø

RANGE OF OPACITY READINGS: MINIMUM Ø MAXIMUM 5

OBSERVER'S NAME (PRINT): Chris Hockett

OBSERVER'S SIGNATURE: Chris Hockett | DATE 5-11-93

ORGANIZATION: RAPCA

CERTIFIED BY: ETA | DATE 3-93

VERIFIED BY | DATE

COMMENTS: Run #1

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

TITLE | DATE

==

PARTICULATE EMISSION TEST DATA

FACILITY :VALLEY ASPHALT #6
PROCESS/RUN NUMBER :
SOURCE/RUN :1
TEST DATE :05-11-93

****

VOLUME METERED AT STD. CONDITIONS	= 42.88689209757976 DSCF
VOLUME WATER COLLECTED AT STP.	= 13.090167 SCF
PERCENT MOISTURE BY VOLUME	= 23.38487803937876 %
MOLECULAR WEIGHT OF STACK GAS	= 26.55024761080533 LB/LB-MOL
PERCENT EXCESS AIR	= 145.8707360861759 %
AVERAGE STACK GAS VELOCITY	= 72.21761047763533 FT/SEC
ABSOLUTE STACK PRESSURE	= 29.95073529411765 IN. HG
STACK FLOW RATE AT ACTUAL COND.	= 54442.60334964238 ACFM
STACK FLOW RATE AT STD. COND.	= 30789.17800171738 DSCFM
STACK EMISSIONS	= 9.048918702642492E-003 GR/DSCF .0088
	= 1.293090482607612E-006 LB/DSCF
STACK EMISSION RATE	= 2.388791582479945 LB/HR 2.34
ISOKINETIC VARIATION	= 101.1023228333243 % 102.5

****

TIME OF TEST	= 60 MIN
VOLUME METERED	= 43.753 CU.FT
DRY GAS METER CALB. FACT.	= 1.006
TEST BAR. PRESSURE	= 29.95 IN HG
AVERAGE DELTA H	= 1.43
AVG. METER TEMP.	= 84.125 DEG. F
VOL. H2O (IMPINGERS)	= 270 ML
WEIGHT GAIN OF SILICA GEL	= 8.1 GM
%CO2	= 4 %
%CO	= 0 %
%O2	= 13 %
%N2	= 83 %
STATIC P OF STACK	= 1E-002 IN. H2O
STACK TEMP.	= 255.75 DEG. F
PITOT COEFFICIENT	= .84
AVG. ROOT DELTA P	= 1.06
STACK DIAMETER	= 48 IN.
MASS PARTICULATE	= 25.2 MG
NOZZLE DIAMETER	= .23 IN

****

==

PARTICULATE EMISSION TEST DATA

FACILITY :VALLEY ASPHALT #6
PROCESS/RUN NUMBER :
SOURCE/RUN :2
TEST DATE :5/11/93

****

VOLUME METERED AT STD. CONDITIONS	= 42.20262702351375 DSCF
VOLUME WATER COLLECTED AT STP.	= 12.80304 SCF
PERCENT MOISTURE BY VOLUME	= 23.2758562759124 %
MOLECULAR WEIGHT OF STACK GAS	= 26.59310409709781 LB/LB-MOL
PERCENT EXCESS AIR	= 183.0543933054393 %
AVERAGE STACK GAS VELOCITY	= 71.86600109856913 FT/SEC
ABSOLUTE STACK PRESSURE	= 29.95073529411765 IN. HG
STACK FLOW RATE AT ACTUAL COND.	= 54177.53600897699 ACFM
STACK FLOW RATE AT STD. COND.	= 30700.88749367738 DSCFM
STACK EMISSIONS	= 4.086949371751207E-003 GR/DSCF .0040
	= 5.840250652232474E-007 LB/DSCF
STACK EMISSION RATE	= 1.075805269254391 LB/HR 1.06
ISOKINETIC VARIATION	= 99.77531239242158 % 100.9

****

TIME OF TEST	= 60 MIN
VOLUME METERED	= 43.689 CU.FT
DRY GAS METER CALB. FACT.	= 1.006
TEST BAR. PRESSURE	= 29.95 IN HG
AVERAGE DELTA H	= 1.42
AVG. METER TEMP.	= 92.125 DEG. F
VOL. H2O (IMPINGERS)	= 266 ML
WEIGHT GAIN OF SILICA GEL	= 6 GM
%CO2	= 4 %
%CO	= 0 %
%O2	= 14 %
%N2	= 82 %
STATIC P OF STACK	= 1E-002 IN. H2O
STACK TEMP.	= 255.33 DEG. F
PITOT COEFFICIENT	= .84
AVG. ROOT DELTA P	= 1.056
STACK DIAMETER	= 48 IN.
MASS PARTICULATE	= 11.2 MG
NOZZLE DIAMETER	= .23 IN

****

==

PARTICULATE EMISSION TEST DATA

FACILITY :VALLEY ASPHALT #6
PROCESS/RUN NUMBER :
SOURCE/RUN :3
TEST DATE :5/11/93

****

VOLUME METERED AT STD. CONDITIONS	= 42.64316768992306 DSCF
VOLUME WATER COLLECTED AT STP.	= 11.739258 SCF
PERCENT MOISTURE BY VOLUME	= 21.58649205339742 %
MOLECULAR WEIGHT OF STACK GAS	= 26.75094748684085 LB/LB-MOL
PERCENT EXCESS AIR	= 145.8707360861759 %
AVERAGE STACK GAS VELOCITY	= 71.6546671984697 FT/SEC
ABSOLUTE STACK PRESSURE	= 29.95073529411765 IN. HG
STACK FLOW RATE AT ACTUAL COND.	= 54018.21797530971 ACFM
STACK FLOW RATE AT STD. COND.	= 31283.73686369417 DSCFM
STACK EMISSIONS	= 4.225295862403253E-003 GR/DSCF .0041
	= 6.037947787374249E-007 LB/DSCF
STACK EMISSION RATE	= 1.133337418661643 LB/HR 1.12
ISOKINETIC VARIATION	= 98.93811576717775 % 99.5

****

TIME OF TEST	= 60 MIN
VOLUME METERED	= 44.245 CU.FT
DRY GAS METER CALB. FACT.	= 1.006
TEST BAR. PRESSURE	= 29.95 IN HG
AVERAGE DELTA H	= 1.42
AVG. METER TEMP.	= 93.375 DEG. F
VOL. H2O (IMPINGERS)	= 240 ML
WEIGHT GAIN OF SILICA GEL	= 9.4 GM
%CO2	= 4 %
%CO	= 0 %
%O2	= 13 %
%N2	= 83 %
STATIC P OF STACK	= 1E-002 IN. H2O
STACK TEMP.	= 255.35 DEG. F
PITOT COEFFICIENT	= .84
AVG. ROOT DELTA P	= 1.056
STACK DIAMETER	= 48 IN.
MASS PARTICULATE	= 11.7 MG
NOZZLE DIAMETER	= .23 IN

****

PARTICULATE EMISSION TEST REVIEW SHEET

1. Facility Name: [illegible]
2. Run Number: 1 2 3
3. Test Date: [illegible]
4. Time of Test: [illegible] (min)
5. Volume Metered: 43.753 43.089 44.545 (ft^3)
6. Dry Gas Meter Calb. Factor: [illegible]
7. Test Barometric Pressure: [illegible] (in. Hg)
8. Avg. Delta H: 1.43 1.42 1.42 (in. H_2O)
9. Avg. Meter Temp: [illegible] [illegible] 93.375 (Deg. F)
10. Volume H_2O (Impingers): 270 [illegible] 210 (ML)
11. Weight Gain of Silica Gel: [illegible] [illegible] 7.4 (GM)
12. % CO_2: [illegible]
13. % CO: [illegible]
14. % O_2: [illegible]
15. % N_2: 83 [illegible] [illegible]
16. Static Pressure of Stack: [illegible] (in. H_2O)
17. Stack Temp: [illegible] (Deg. F)
18. Pitot Coefficient: [illegible]
19. Avg. Root Delta P: 1.06 1.056 1.056
20. Stack Diameter: [illegible] (in.)
21. Mass Particulate: [illegible] (mg)
22. Nozzle Diameter: [illegible] (in.)

Coal Data

1. % Hydrogen: ______
2. % Carbon: ______
3. % Sulfur ______
4. % Nitrogen: ______
5. % Oxygen: ______
6. F Factor: ______
7. Gross Calorific Value: ______

RAMCON

ENVIRONMENTAL CORPORATION

RECEIVED

JUN 24 1993

REGIONAL AIR POLLUTION
CONTROL AGENCY

SOURCE SAMPLING FOR
PARTICULATE AND LEAD EMISSIONS

VALLEY ASPHALT CORPORATION
PLANT NO. 6
DAYTON, OHIO
May 11, 1993

Fred Bremmer
Fred Bremmer
Valley Asphalt Corporation

W J Sewell
William Joseph Sewell, II
Vice President
RAMCON Environmental Corporation

RAMCON BUILDING, 6707 FLETCHER CREEK COVE, MEMPHIS, TENNESSEE 38133
TELEPHONE 800/458-4567 IN TENNESSEE 901/387-0500 FAX 901/387-0400

RAMCON

ENVIRONMENTAL CORPORATION

June 14, 1993

Mr. Fred Bremmer
Valley Asphalt Corporation
11641 Mosteller Road
Cincinnati, Ohio 45421

RE: Particulate Emissions Test — Plant No. 6: May 11, 1993

Dear Mr. Bremmer:

Enclosed you will find four copies (4) copies of our report on the particulate and lead emissions test we conducted at your asphalt plant located near Dayton, Ohio. Based on our test results, the average grain loading of the three test runs do pass the standards set both EPA New Source Performance Standards and those set by the State of Ohio for particulate matter. Therefore, the plant is operating in compliance with State standards.

You will want to sign the report covers and send two copies to:

Mr. Thurman D. Smith
Regional Air Pollution Control
Agency — Ohio
P. O. Box 972
Dayton, Ohio 45422

You will need to keep one copy of the report at the plant.

We certainly have enjoyed working with you. Please let us know if we can be of further assistance.

Sincerely,

William Joseph Sewell, II
Vice President

WJSii:wpc
Enclosures

RAMCON BUILDING, 6707 FLETCHER CREEK COVE, MEMPHIS, TENNESSEE 38133
TELEPHONE 800/458-4567 IN TENNESSEE 901/387-0500 FAX 901/387-0400

TABLE OF CONTENTS

SECTION A.

1. INTRODUCTION

On May 11, 1993 personnel from RAMCON Environmental Corporation conducted a source emissions test for particulate and lead emissions compliance at Valley Asphalt Corporation's Astec batch-mix asphalt plant (Plant No. 6) located in Dayton, Ohio. RAMCON personnel conducting the test were Chuck Hughes, Team Leader, and Bobby Coleman. Tommy South was responsible for the laboratory analysis including taring the beakers and filters and recording final data in the laboratory record books. Custody of the samples was limited to Mr. Hughes and Mr. South.

The purpose of the test was to determine if the rate of particulate and lead emissions from this plant's baghouse is below or equal to the allowable emissions limit set by US EPA and the State of Ohio.

2. TEST RESULTS

Table I summarizes the test results. The particulate grain loading limitation for EPA is .04 gr/dscf as specified in 39 FR 9314, March 8, 1974, 60.92 Standards for Particulate Matter (1), as amended. The allowable emissions for the State of Ohio are the same as those set by EPA.

The lead analysis results yielded values below the detection limit of the analysis procedure. The calculations are based on the detection limit and therefore represent the worst case scenario.

Mr. Jeff Adams of Ohio's Regional air Pollution Control Agency observed the testing conducted by RAMCON Environmental Corporation.

SUMMARY OF TEST RESULTS

TABLE I

May 11, 1993

Test Run	Time	Conc. Emissions gr/dscf	Lead Conc., gr/dscf	Isokinetic Variation	Particulate Emissions lbs/hr	Lead Emissions lb/hr
1	09:55 - 11:05	0.0088	<0.000007	102.5%	2.34	<0.0019
2	12:37 - 13:42	0.0040	<0.000007	100.9%	1.06	<0.0019
3	15:01 - 16:05	0.0041	<0.000007	99.5%	1.12	<0.0019
	Average:	0.0056	<0.000007		1.51	<0.0019

On the basis of these test results, the average grain loading of the three test runs is below the .04 gr/DSCF allowable emissions limitation set by EPA and the State of Ohio. Therefore, the plant is operating in compliance with State and Federal standards.

3. TEST PROCEDURES

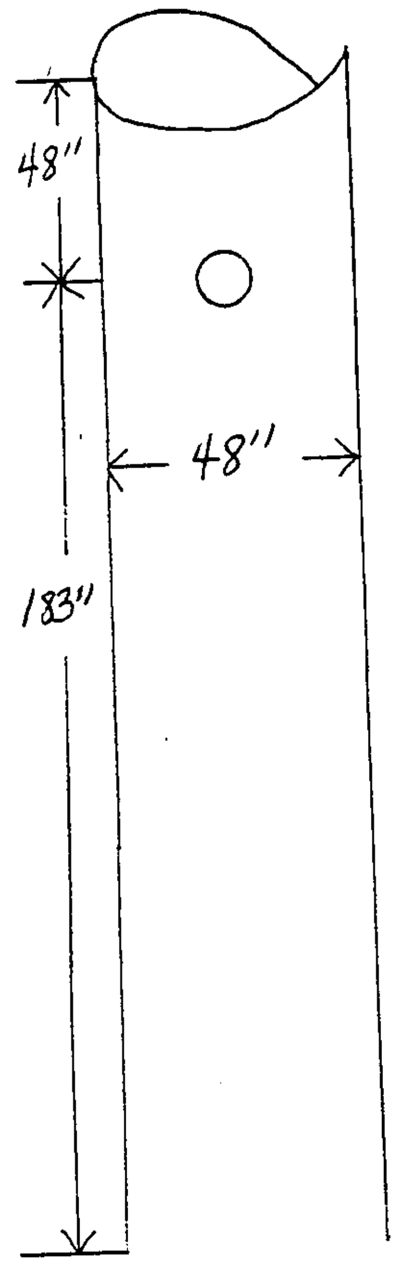
(a) Method Used: Method 5/12 source sampling was conducted in accordance with requirements of the U.S. Environmental Protection Agency as set forth in 39 FR 9314, March 8, 1974, 60.93, as amended.

(b) Problems Encountered: No problems were encountered that affected testing.

(c) Sampling Site: The emissions test was conducted after a baghouse on a round stack with a diameter of 48". The sampling ports were placed 90° apart, 48" down (1.0 diameters upstream) from the top of the stack and 183" up (3.8 diameters downstream) from the last flow disturbance. Twenty-four (24) points were sampled, twelve (12) through each port for two and one-half (2½) minutes each for a total testing time of sixty (60) minutes.

Points on a Diameter	Probe Mark*
1	6.0"
2	8.2"
3	10.7"
4	13.5"
5	17.0"
6	22.0"
7	36.0"
8	41.0"
9	44.5"
10	47.3"
11	49.8"
12	52.0"

*Measurements include a 5" standoff.



B. <u>THE SOURCE</u>

Valley Asphalt Corporation employs an Astec batch mix asphalt plant which is used to manufacture hot mix asphalt for road pavement. The process consists of blending prescribed portions of cold feed materials (sand, gravel, screenings, chips, etc.) uniformly and adding sufficient hot asphalt oil to bind the mixture together. After the hot asphalt mix is manufactured at the plant, it is transported to the location where it is to be applied. The hot asphalt mix is spread evenly over the surface with a paver then compacted with a heavy roller to produce the final product.

The following is a general description of the plant's manufacturing process: The cold feed materials (aggregate) are dumped into separate bins which in turn feed a common continuous conveyor. The aggregate is dispensed from the bins in accordance with the desired formulation onto the cold feed system conveyor, to an inclined weigh conveyor, then to a rotating drum for continuous mixing and drying at approximately 300°F. When recycled asphalt mix is used, it is added directly into the pugmill. The dried aggregate is pulled by a bucket elevator to the top of a gradation control unit which separates and stores the aggregate by size. The required amount of each aggregate is dispensed into a weigh-hopper and from there into a pugmill where the hot liquid asphalt pavement is mixed thoroughly with the aggregate. The hot asphalt mix is then discharged from the storage silo through a slide gate into waiting dump trucks which transports the material to a final destination for spreading. The rated capacity of the plant will vary with each aggregate mix and moisture content with a 5% surface moisture removal.

The mixer uses a burner fired with No. 4 fuel oil to heat air to dry the aggregate. The air is drawn into the system via an exhaust fan. After passing through the gas burner, the air passes through a baghouse. The baghouse is manufactured by Astec. The exhaust gas is drawn through the baghouse and discharged to the atmosphere through the stack. The design pressure drop across the tube sheet is 2 - 6 inches of water. The particulate matter, which is removed by the baghouse, is reinjected into the pugmill.

rm ;#0

DATA ON FACILITY BEING STACK TESTED

TODAY'S DATE: 5-11-93

COMPANY NAME: Valley Asphalt COMPANY REP.: Kenny Eakins PHONE (513) 299-3216

LOCATION OF FACILITY: 11901 Dryden Rd. ORIGINAL START-UP DATE: 6-88 DESIGNED CAPACITY: 5 Ton Batch/300 Ton/Hr

OEM: Astec MODEL NO.: 20176 TYPE: Batch Plant AC TYPE: 20

1	2	3	4	5		6	7	8	9		10	11	12
Time (24 HR) NOTE: check small box in column when moisture sample is taken	Fuel Use: 4 #Fuel Oil ___ Nat. Gas ___ Propane ___ Coal ___ other	Burner Setting	Blower Pressure	Production Rate: ___ Mix ___ Aggregate TPH	___ RAP TPH	Asphalt Cement %	Mix Temp. °F	Exhaust Gas Temp. °F	___ Venturi Scrubber ___ Baghouse: Pressure Drop in w.g.	Water Pressure psi	Ambient Temp. °F	Relative Humidity %	Exhaust Damper Position
9:55		45	~~[illegible]~~	275			335		4		70°		75%
10:10		35	~~[illegible]~~	275			360		4		70°		75%
10:25		45	~~[illegible]~~	275			355		3.5		70°		75%
10:40		45	~~[illegible]~~	275			355		3.5		70°		75%
10:55		40		275			360		3.5		70°		75%
11:10		53		275			350		3.0		70°		75%
12:30		40		275			380		4.0		70°		75%
12:45		50		275			370		3.5		70°		75%
13:00		35		275			385		3.5		70°		75%
13:15		35		275			380		3.5		70°		75%
13:30		40		275			375		4.0		70°		75%
13:45		40		275			375		3.5		70°		75%

ɔrm: C#0

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	2 Fuel Use 4 #Fuel Oil __ Nat. Gas __ Propane __ Coal __ ____ other	3 Burner Setting	4 Blower Pressure	5 Production Rate __ Mix __ Aggregate TPH	__ RAP TPH	6 Asphalt Cement %	7 Mix Temp. °F	8 Exhaust Gas Temp. °F	9 __ Venturi Scrubber __ Baghouse Pressure Drop in w.g.	Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
15:03		48		270			370		4.5		70°		75%
15:18		45		270			371		4.0		70°		75%
15:33		42		270			375		3.5		70°		75%
15:48		45		270			370		3.5		70°		75%
16:03		40		270			376		3.5		70°		75%
16:18		35		270			375		3.5		70°		75%

1. Aggregate bins: Virgin aggregate is fed individually into bins by type. It is metered onto a conveyor belt running under the bins to a shaker screen. The proportion to each aggregate type is determined by the job mix formula and pre-set to be metered out to meet these specifications.

2. Preliminary oversize screen: The aggregate is fed through a shaker screen where oversize rocks and foreign material is screened out of the mix.

3. Weigh conveyor belt: The aggregate is conveyed to the rotary drum dryer on a conveyor belt which weighs the material. The production rate is determined by this weight reading.

4. Rotary drum/dryer mixer: The aggregate is fed into the rotary drum dryer where it is tumbled by flighting into a veil in front of a flame which drives off the moisture. Further mixing is also accomplished in an outer shell of this drum. Hot liquid asphalt is injected in the outer shell of the drum where it is mixed with the aggregate.

5. Burner: The fuel fired burner is used to provide the flame which drys the aggregate.

6. Knock off baffling: A baffling plate is inserted in the "dirty" side plenum as a knock out for heavy particles in the air stream. These particles fall to the bottom of the baghouse.

7. Baghouse: The hot gases are pulled through the bags into the clean air plenum. The solid particulate matter is trapped on the dust coat buildup on the bags. A bag cleaning cycle consisting of jet burst of air from the inside (or clean air side) of the bags sends a large bubble of air down the inside of the bags shaking loose buildup on the bag surface. This particulate matter is collected at the bottom of the baghouse and reinjected into the drum mixer where it is used as part of the finished product.

8. Liquid asphalt storage: The liquid asphalt is stored in this heated tank until it is needed in the mixer. The amount of asphalt content and its temperature are pre-set for each different type job.

9. Conveyor to surge/storage bin: The finished product of aggregate mixed with liquid asphalt is conveyed to a surge bin.

10. Surge/Storage bin: The asphaltic cement is dumped into this surge bin and metered out to dump trucks which pull underneath a slide gate at the bottom of the bin.

11. Control/operators house: The entire plant operation is controlled from this operator's house.

12. Truck loading scale: As the trucks receive the asphalt from the storage/surge bin, they are weighed on the lading scale which tells the plant operator the amount of asphalt that is being trucked on each individual load.

13. Fuel storage..

14. Stack

EQUIPMENT USED

Equipment used to conduct the particulate emissions test was:

A. A Lear Siegler PM-100 stack sampler with appropriate auxiliary equipment and glassware (with train set up according to the schematic on the next page).

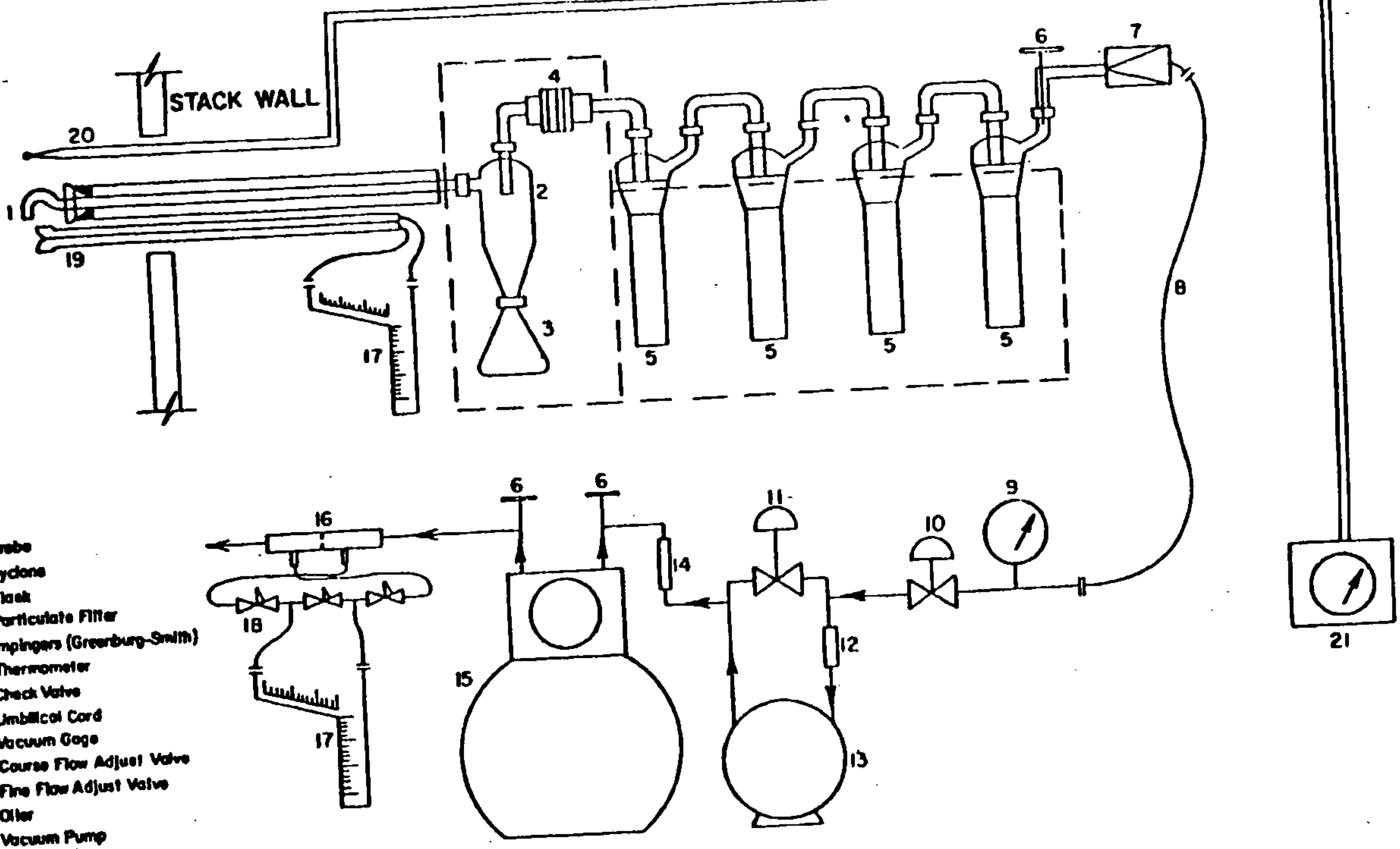
B. An Airguide Instruments Model 211-B (uncorrected) aneroid barometer for checking the barometric pressure.

C. Weston dial thermometers to check meter temperatures or an Analogic Model 2572 Digital Thermocouple to check stack temperatures.

D. A Hays 621 Analyzer to measure the oxygen, carbon dioxide and carbon monoxide content of the stack gases or, for non-combustion sources, a Bacharach Instrument Company Fyrite for gas analysis.

E. Schleicher and Schuell Type 1-HV filters with a porosity of .03 microns.

F. Reagent- or ACS-grade acetone with a residue of ≤ .001.



SAMPLING TRAIN
USED FOR ISOKINETIC SAMPLING

1) Probe
2) Cyclone
3) Flask
4) Particulate Filter
5) Impingers (Greenburg-Smith)
6) Thermometer
7) Check Valve
8) Umbilical Cord
9) Vacuum Gage
10) Course Flow Adjust Valve
11) Fine Flow Adjust Valve
12) Oiler
13) Vacuum Pump
14) Filter
15) Dry Gas Meter
16) Orifice Tube
17) Incline Manometer
18) Solenoid Valves
19) Pitot
20) Thermocouple
21) Pyrometer

LABORATORY PROCEDURES FOR PARTICULATE SAMPLING

I. Field Preparation

A. FILTERS: Fiberglass 4" sampling filters are prepared as follows:

Filters are removed from their box and numbered on the back side with a felt pen. The numbering system is continuous from job to job. The filters are placed in a desiccator to dry for at least 24 hours. Clean plastic petri dishes, also numbered, top and bottom, are placed in the desiccator with the filters. After desiccation, the filters are removed, one at a time, and weighed on the Sartorius analytical balance then placed in the correspondingly numbered petri dish. Weights are then recorded in the lab record books. Three filters are used for each complete particulate source emissions test and there should be several extra filters included as spares.

B. SILICA GEL: Silica Gel used for the test is prepared as follows:

Approximately 200 g of silica gel is placed in a wide mouth "Mason" type jar and dried in an oven at 175°C for two hours. The open jars are removed and placed in a desiccator until cool for two hours and then tightly sealed. The jars are then numbered and weighed on the triple beam balance to the closest tenth of a gram. This weight is recorded for each sealed jar. The number of silica gel jars used is the same as the number of filters. Silica gel should be indicating type, 6-16 mesh.

II. Post - Testing Lab Analysis

A. FILTERS: The filters are returned to the lab in their sealed petri dishes. In the lab, the dishes are opened and placed into a desiccator for at least 24 hours. Then the filters are weighed continuously every six hours until a constant weight is achieved. All data is recorded on the laboratory forms that will be bound in the test report.

B. SILICA GEL: The silica gel used in the stack test is returned to the appropriate mason jar and sealed for transport to the laboratory where it is reweighed to a constant weight on a triple beam balance to the nearest tenth of a gram.

C. PROBE RINSINGS: In all tests where a probe washout analysis is necessary, this is accomplished in accordance with procedures specified in "EPA Reference Method 5". These samples are returned to the lab in sealed mason jars for analysis. The front half of the filter holder is washed in accordance with the same procedures and included with the probe wash. Reagent or ACS grade acetone is used as the solvent. The backhalf of the filter holder is washed with deionized water into the impinger catch for appropriate analysis.

D. IMPINGER CATCH: In some testing cases, the liquid collected in the impingers must be analyzed for solid content. This involves a similar procedure to the probe wash solids determination, except that the liquid is deionized water.

E. ACETONE: A blank analysis of acetone is conducted from the one gallon glass container used in the field preparation. This acetone was used in the field for rinsing the probe, nozzle, and top half of the filter holder. A blank analysis is performed prior to testing on all new containers of acetone received from the manufacturer to insure that the quality of the acetone used will be exceed the .001% residual purity standard.

SPECIAL NOTE

When sampling sources high in moisture content, (such as asphalt plants) the filter paper sometimes sticks to the filter holder. When removing the filter, it may tear. In order to maintain control of any small pieces of filter paper which may be easily lost, they are washed with acetone into the probe washing. This makes the filter weight light (sometimes negative) and the probe wash correspondingly heavier. this laboratory procedure is taught by EPA in the "Quality Assurance for Source Emissions Workshop" at Research Triangle Park and is approved by EPA.

WEIGHING PROCEDURE - SARTORIUS ANALYTICAL BALANCE

The Sartorius balance is accurate to 0.1 mg and has a maximum capacity of 200 grams. The balance precision (standard deviation) is 0.05 mg. Before weighing an item, the balance should first be zeroed. This step should be taken before every series of weighings. To do this, the balance should have all weight adjustments at the "zero" position. The beam arrest lever (on the lower left hand side toward the rear of the balance) is then slowly pressed downward to the full release position. The lighted vernier scale on the front of the cabinet should align with the "zero" with the mark on the cabinet. If it is not so aligned, the adjustment knob on the right hand side (near the rear of the cabinet) should be turned carefully until the marks align. Now return the beam arrest to the horizontal arrest position. The balance is now "zeroed".

To weigh an item, it is first placed on the pan. And the sliding doors are closed to avoid air current disturbance. The weight adjustment knob on the right hand side must be at "zero". The beam arrest is then slowly turned upward. The lighted scale at the front of the cabinet will now indicate the weight of the item in grams. If the scale goes past the divided area, the item then exceeds 100 g weight (about 3 1/2 ounces) and it is necessary to arrest the balance (beam arrest lever) and move the lever for 100 g weight away from you. It is located on the left hand side of the cabinet near the front, and is the knob closest to the side of the cabinet. The balance will not weigh items greater than 200 grams in mass, and trying to do this might harm the balance. Remember, this is a delicate precision instrument.

After the beam is arrested in either weight range, the procedure is the same. When the weight of the item in grams is found, "dial in" that amount with the two knobs on the left hand side (near the 100 g lever) color coded yellow and green. As you dial the weight, the digits will appear on the front of the cabinet. When the proper amount is dialed, carefully move the arrest lever down with a slow, steady turn of the wrist. The lighted dial will appear, and the right hand side knob (front of cabinet) is turned to align the mark with the lower of the two lighted scale divisions which the mark appears between. when these marks are aligned, the two lighted digits along with the two indicated on the right hand window on the cabinet front are fractional weight in grams (the decimal would appear before the lighted digits) and the whole number of grams weight is the amount "dialed in" on the left.

In general, be sure that the beam is in "arrest" position before placing weight on or taking weight off of the pan. Don't "dial in" weight unless the beam is arrested. The balance is sensitive to even a hand on the table near the balance, so be careful and painstaking in every movement while weighing.

Valley # 6
Company Name

5-11-93
Date

REFERENCE METHOD 3: GAS ANALYSIS BY FYRITE

FUEL	**F_o FACTORS**
WOOD	1.0540
BARK	1.0830
ANTHRACITE	1.0699
BITUMINOUS	1.1398
LIGNITE	1.0761
OIL	1.3465
GAS	1.7489
PROPANE	1.5095
BUTANE	1.4791

$$O_2\% = 20.9 - [F_o \times CO_2\%]$$

RUN #1: ____ = 20.9 - [____ x ____]

RUN #2: ____ = 20.9 - [____ x ____]

RUN #3 ____ = 20.9 - [____ x ____]

RUN 1:	CO_{2x}	4	CO_{2x}	4	CO_{2x}	4	AVG.	4
	O_{2x}	13	O_{2x}	13	O_{2x}	13	AVG.	13
	N_{2x}		N_{2x}		N_{2x}		AVG.	
RUN 2:	CO_{2x}	4	CO_{2x}	4	CO_{2x}	4	AVG.	4
	O_{2x}	14	O_{2x}	13	O_{2x}	14	AVG.	14
	N_{2x}		N_{2x}		N_{2x}		AVG.	
RUN 3:	CO_{2x}	4	CO_{2x}	4	CO_{2x}	4	AVG.	4
	O_{2x}	13	O_{2x}	13	O_{2x}	14	AVG.	13
	N_{2x}		N_{2x}		N_{2x}		AVG.	

Form REC#8

SAMPLE ANALYTICAL DATA FORM

Company Name Valley asphalt #6

Sample Location

Blank Volume (V_a) 100 ml

Date/Time wt. blank 5/16 8:00p

Date/Time wt. blank 5/17 8:30A

Relative Humidity in Lab 48 %

Density of Acetone (ρ_a) .7857 mg/ml

Gross wt. 102.6924 g

Gross wt. 102.6922 g

Ave. Gross wt. 102.6923 g

Tare wt. 102.6922 g

Weight of blank (m_{ab}) .0001 g

Acetone blank residue concentration (C_a) : (C_a) = (m_{ab}) / (V_a) (ρ_a) = (.00000 / mg/g)

Acetone Blank Wt. : $W_a = C_a V_{aw} \rho_a$ = (.000001)(400)(.7857) = (.0003 g)

		Run # 1	Run # 2	Run # 3
Acetone rinse volume (V_{aw})	ml	400	400	400
Date/Time of wt. 5/16 8:00p Gross wt.	g	164.2602	165.9270	171.2092
Date/Time of wt. 5/17 8:30A Gross wt.	g	164.2600	165.9268	171.2092
Average Gross wt.	g	164.2601	165.9269	171.2092
Tare wt.	g	164.2384	165.9188	171.2017
Less Acetone blank wt. (W_a)	g	.0003	.0003	.0003
Weight of particulate in acetone rinse (m_a)	g	.0214	.0078	.0072

Filter Numbers	#	TS00255	TS00257	TS00267
Date/Time of wt. 5/16 8:00p Gross wt.	g	01.6936	01.6847	01.6800
Date/Time of wt. 5/17 8:30A Gross wt.	g	01.6937	01.6848	01.6798
Average Gross wt.	g	01.6937	01.6848	01.6799
Tare wt.	g	01.6899	01.6814	01.6754

Weight of particulate on filter (m_f)	g	.0038	.0034	.0045
Weight of particulate in acetone rinse (m_a)	g	.0214	.0078	.0072
Total weight of particulate (m_n)	g	.0252	.0112	.0117

NOTE: In no case should a blank residue greater than 0.01 mg/g (or 0.001% of the blank weight) be subtracted from the sample weight.

Remarks:

Signature of Analyst Thomas Smith Signature of Reviewer

D:\DONNA\FORMS\LAB\SAMPLE.TBL

AMERICAN INTERPLEX CORPORATION
LABORATORIES

8600 Kanis Road
Little Rock, AR 72204-2322
(501) 224-5060

Ramcon Environmental Corporation (C-488)
6707 Fletcher Creek Cove
Memphis, TN 38134

June 7, 1993

ATTN: Mr. Sumner Buck

Control No. 2280

Sample Description: Six (6) filter, Six (6) impinger solution, and Six (6) fuel oil received on 5/21/93
Re: Valley Asphalt
P.O. No. 080340

Result:

Sample Identification	FUEL OIL Lead, mg/kg	FILTERS/IMPINGER Lead, mg
Plant 6 Run 1	49	<0.02
Plant 6 Run 2	47	<0.02
Plant 6 Run 3	46	<0.02
Plant 7 Run 1	71	<0.02
Plant 7 Run 2	72	<0.02
Plant 7 Run 3	74	<0.02

Method: EPA 6010, 3040, Methodology for the determination of methods emissions in Exhaust hoses from stationary source comustion processes.

AMERICAN INTERPLEX CORPORATION

By Steven Lovell
Steven Lovell
Technical Director

SL/tm

☐ Chemistry — Materials Science — Environmental Analyses

NAME: VALLEY ASPHALT #6
LOCATION: DAYTON, OHIO

DATE: May 11, 1993

SUMMARY OF TEST DATA

			05-11-93	05-11-93	05-11-93
			Run #1	Run #2	Run #3
		start	09:55	12:37	15:01
		finish	11:05	13:42	16:05
	SAMPLING TRAIN DATA				
1.	Sampling time, minutes	Θ	60	60	60
2.	Sampling nozzle diameter, inches	D_n	0.230	0.230	0.230
3.	Sampling nozzle cross-section area, ft²	A_n	0.000289	0.000289	0.000289
4.	Isokinetic variation	I	102.5	100.9	99.5
5.	Sample gas volume — meter condition, cf	V_m	45.398	45.549	46.190
6.	Average meter temperature, °R	T_m	551	562	563
7.	Average orifice pressure drop, inches H_2O	dH	1.43	1.42	1.42
8.	Total particulate collected, mg.	M_n	25.20	11.20	11.70
	VELOCITY TRAVERSE DATA				
9.	Stack area, ft²	A	12.57	12.57	12.57
10.	Absolute stack gas pressure, inches Hg.	P_s	29.95	29.95	29.95
11.	Barometric pressure, inches Hg.	P_{bar}	29.95	29.95	29.95
12.	Average absolute stack temperature, R°	T_s	716	715	705 712
13.	Average $\sqrt{}$vel. head, (C_p = .84)	$\sqrt{dP}$	1.06	1.06	1.06
14.	Average stack gas velocity, ft/second	V_s	72.16	72.06	71.33
	STACK MOISTURE CONTENT				
15.	Total water collected by train, ml	V_{lc}	278.10	272.00	249.40
16.	Moisture in stack gas, percent (%)	B_{ws}	22.96	22.85	21.10 22.3
	EMISSIONS DATA				
17.	Stack gas flow rate, dscf/hr	Q_{sd}	1,856,977.8	1,859,649.4	1,909,268.7
18.	Stack gas flow rate, cfm	acfm	54,423	54,348	53,797
19.	Particulate concentration, gr/dscf	C_s	0.0088	0.0040	0.0041
20.	Particulate concentration, lb/hr	E	2.34	1.06	1.12
	ORSAT DATA				
21.	Percent CO_2 by volume	CO_2	4.0	4.0	4.0
22.	Percent O_2 by volume	O_2	13.0	14.0	13.0
23.	Percent CO by volume	CO	0.0	0.0	0.0
24.	Percent N_2 by volume	N_2	83.0	82.0	83.0

Format: summryR3

NAME: VALLEY ASPHALT #6
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: BAGHOUSE

DRY GAS VOLUME

$$V_{m(std)} =$$

$$V_m \left[\frac{T_{(std)}}{T_m}\right] \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{P_{std}}\right] = 17.64 \; \frac{°R}{\epsilon.\ Hg} \; Y \; V_m \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right]$$

Where:

$V_{m(std)}$	=	Dry gas volume through meter at standard conditions, ft^3.
V_m	=	Dry gas volume measured by meter, ft^3.
P_{bar}	=	Barometric pressure at orifice meter, in. Hg.
P_{std}	=	Standard absolute pressure, (29.92 in. Hg.).
T_m	=	Absolute temperature at meter, °R.
T_{std}	=	Standard absolute temperature, (528°R).
ΔH	=	Avg. pressure drop across orifice meter, in. H_2O.
Y	=	Dry gas meter calibration factor.
13.6	=	Inches of water per Hg.

Run #1:

$$V_{m(std)} = (17.64)\ (1.006)\ (45.398) \left[\frac{(29.95) + \frac{1.43}{13.6}}{551}\right] = 43.944 \quad \text{dscf}$$

Run #2:

$$V_{m(std)} = (17.64)\ (1.006)\ (45.549) \left[\frac{(29.95) + \frac{1.42}{13.6}}{562}\right] = 43.226 \quad \text{dscf}$$

Run #3:

$$V_{m(std)} = (17.64)\ (1.006)\ (46.190) \left[\frac{(29.95) + \frac{1.42}{13.6}}{563}\right] = 43.757 \quad \text{dscf}$$

NAME: VALLEY ASPHALT #6
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: BAGHOUSE

TOTAL CONTAMINANTS BY WEIGHT: GRAIN LOADING

Particulate Concentration: C_s' gr/dscf

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{M_n}{V_{m(std)}}\right]$$

Where:

C_s' = Concentration of particulate in stack gas, dry basis, corrected to standard conditions, gr/dscf.

M_n = Total amount of particulate collected, mg.

$V_{m(std)}$ = Dry gas volume through meter at standard conditions, cu. ft.

Run #1:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{25.20}{43.944}\right] = 0.0088\ \text{gr/dscf}$$

Run #2:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{11.20}{43.226}\right] = 0.0040\ \text{gr/dscf}$$

Run #3:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{11.70}{43.757}\right] = 0.0041\ \text{gr/dscf}$$

NAME: VALLEY ASPHALT CORPORATION
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: Plant No. 6 Baghouse

TOTAL CONTAMINANTS BY WEIGHT: GRAIN LOADING

Lead Concentration: $C_s^{`}$ gr/dscf

$$C_s^{`} = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{M_n}{V_{m(std)}}\right]$$

Where:

$C_s^{`}$ – *Concentration of lead in stack gas, dry basis, corrected to standard conditions, gr/dscf.*

M_n – *Total amount of lead matter collected, mg.*

$V_{m(std)}$ – Dry gas volume through meter at standard conditions, cu. ft.

Run #1:

$$C_s^{`} = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{<0.02}{43.944}\right] = <0.000007 \text{ gr/dscf}$$

#2: Run

$$C_s^{`} = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{<0.02}{43.226}\right] = <0.000007 \text{ gr/dscf}$$

#3: Run

$$C_s^{`} = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{<0.02}{43.757}\right] = <0.000007 \text{ gr/dscf}$$

NAME: VALLEY ASPHALT #6
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: BAGHOUSE

DRY MOLECULAR WEIGHT

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

Where:

M_d	-	Dry molecular weight, lb/lb-mole.
$\%CO_2$	-	Percent carbon dioxide by volume, dry basis.
$\%O_2$	-	Percent oxygen by volume, dry basis.
$\%N_2$	-	Percent nitrogen by volume, dry basis.
$\%CO$	-	Percent carbon monoxide by volume, dry basis.
0.264	-	Ratio of O_2 to N_2 in air, v/v.
0.28	-	Molecular weight of N_2 or CO, divided by 100.
0.32	-	Molecular weight of O_2 divided by 100.
0.44	-	Molecular weight of CO_2 divided by 100.

Run #1:

$$M_d = 0.44\ (4.0\%) + 0.32\ (13.0\%) + 0.28\ (.00\% + 83.0\%) = 29.16\ \frac{lb}{lb\text{-}mole}$$

Run #2:

$$M_d = 0.44\ (4.0\%) + 0.32\ (14.0\%) + 0.28\ (.00\% + 82.0\%) = 29.20\ \frac{lb}{lb\text{-}mole}$$

Run #3:

$$M_d = 0.44\ (4.0\%) + 0.32\ (13.0\%) + 0.28\ (.00\% + 83.0\%) = 29.16\ \frac{lb}{lb\text{-}mole}$$

NAME: VALLEY ASPHALT #6
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: BAGHOUSE

WATER VAPOR CONDENSED

$$V_{wc_{std}} = [V_f - V_i] \left[\frac{P_w \; R \; T_{(std)}}{M_w \quad P_{(std)}}\right] = 0.04707 \; [V_f - V_i]$$

$$V_{wsg_{std}} = [W_f - W_i] \left[\frac{R \quad T_{(std)}}{M_w \quad P_{(std)}}\right] = 0.04715 \; [W_f - W_i]$$

Where:

0.04707	=	Conversion factor, ft^3/ml.
0.04715	=	Conversion factor, ft^3/g.
Vwc_{std}	=	Volume of water vapor condensed (std. cond.), ml.
$Vwsg_{std}$	=	Volume of water vapor collected in silica gel (standard conditions), ml.
$V_f - V_i$	=	Final volume of impinger contents less initial volume, ml.
$W_f - W_i$	=	Final weight of silica gel less initial weight, g.
P_w	=	Density of water, 0.002201 lb/ml.
R	=	Ideal gas constant, 21.85 in.Hg. (cu.ft./lb-mole)(°R).
M_w	=	Molecular weight of water vapor, 18.0 lb/lb-mole.
T_{std}	=	Absolute temperature at standard conditions, 528°R.
P_{std}	=	Absolute pressure at standard conditions, 29.92 inches Hg.

Run 1:

$$V_{wc(std)} = (0.04707)\;(\;270.00) = 12.7 \text{ cu. ft}$$
$$V_{wsg(std)} = (0.04715)\;(\;8.10) = 0.4 \text{ cu. ft}$$

Run 2:

$$V_{wc(std)} = (0.04707)\;(\;266.00) = 12.5 \text{ cu. ft}$$
$$V_{wsg(std)} = (0.04715)\;(\;6.00) = 0.3 \text{ cu. ft}$$

Run 3:

$$V_{wc(std)} = (0.04707)\;(\;240.00) = 11.3 \text{ cu. ft}$$
$$V_{wsg(std)} = (0.04715)\;(\;9.40) = 0.3 \text{ cu. ft}$$

Format: vaporR3/24-001

NAME: VALLEY ASPHALT #6
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: BAGHOUSE

MOISTURE CONTENT OF STACK GASES

$$B_{ws} = \left[\frac{V_{wc_{std}} + V_{wsg_{std}}}{V_{wc_{std}} + V_{wsg_{std}} + V_{mstd}} \right] \times 100$$

Where:

B_{ws} = Proportion of water vapor, by volume, in the gas stream.

V_m = Dry gas volume measured by dry gas meter, dcf.

Vwc_{std} = Volume of water vapor condensed, corrected to standard conditions, scf.

$Vwsg_{std}$ = Volume of water vapor collected in silica gel corrected to std. cond., scf.

Run 1:

$$B_{ws} = \frac{12.7 + 0.4}{12.7 + 0.4 + 43.944} \text{ X } 100 = 22.96\ \%$$

Run 2:

$$B_{ws} = \frac{12.5 + 0.3}{12.5 + 0.3 + 43.226} \text{ X } 100 = 22.85\ \%$$

Run 3:

$$B_{ws} = \frac{11.3 + 0.4}{11.3 + 0.4 + 43.757} \text{ X } 100 = 21.10\ \%$$

NAME: VALLEY ASPHALT #6
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: BAGHOUSE

MOLECULAR WEIGHT OF STACK GASES

$$M_s = M_d (1 - B_{ws}) + 18 (B_{ws})$$

Where:

M_s = Molecular weight of stack gas, wet basis (lb./lb.-mole).

M_d = Molecular weight of stack gas, dry basis (lb./lb.-mole).

Run #1:

$$M_s = 29.16 (1 - 0.2296) + 18 (0.2296) = 26.60 \frac{lb}{lb\text{-}mole}$$

Run #2:

$$M_s = 29.20 (1 - 0.2285) + 18 (0.2285) = 26.64 \frac{lb}{lb\text{-}mole}$$

Run #3:

$$M_s = 29.16 (1 - 0.2110) + 18 (0.2110) = 26.81 \frac{lb}{lb\text{-}mole}$$

NAME: VALLEY ASPHALT #6
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: BAGHOUSE

STACK GAS VELOCITY

$$V_s - K_p \; C_p \; [\sqrt{\Delta P}] \text{ avg} \quad \sqrt{\frac{T_s(\text{avg})}{P_s \; M_s}}$$

Where:

V_s - Average velocity of gas stream in stack, ft/sec.
K_p - 85.49 ft/sec [(g/g-mole) - (mm Hg)/(°K)(mm H_2O)]$^{1/2}$
C_p - Pitot tube coefficient, dimensionless.
ΔP - Velocity head of stack gas, in. H_2O.
P_{bar} - Barometric pressure at measurement site, in. Hg.
P_g - Stack static pressure, in. Hg.
P_s - Absolute stack gas pressure, in. Hg. - $P_{bar} + P_g$
P_{std} - Standard absolute pressure, 29.92 in. Hg.
t_s - Stack temperature, °F.
T_s - Absolute stack temperature, °R. - 460 + t_s.
M_s - Molecular weight of stack gas, wet basis, lb/lb-mole.

Run #1:

$$V = (85.49)\;(0.84)\;(1.06)\sqrt{\frac{716}{(29.95)\;(26.60)}} = 72.16 \text{ ft/sec}$$

Run #2:

$$V = (85.49)\;(0.84)\;(1.06)\sqrt{\frac{715}{(29.95)\;(26.64)}} = 72.06 \text{ ft/sec}$$

Run #3:

$$V = (85.49)\;(0.84)\;(1.06)\sqrt{\frac{705}{(29.95)\;(26.81)}} = 71.33 \text{ ft/sec}$$

NAME: VALLEY ASPHALT CORPORATION
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: Plant No. 6 Baghouse

LEAD EMISSIONS RATE FROM STACK

$$E = \left[\frac{(C_s^{`})\ (Q_{sd})}{7{,}000\ gr/lb}\right]$$

Where:

E – Emissions rate, lbs/hr.

$C_s^{`}$ – Concentration of lead in stack gas, dry basis, corrected to standard conditions, gr/dscf.

Q_{sd} – Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr.

Run #1:

$$E = \frac{(<0.000007)\ (1{,}856{,}977.8)}{7{,}000} = <0.0019 \text{ lb/hr}$$

Run #2:

$$E = \frac{(<0.000007)\ (1{,}859{,}649.4)}{7{,}000} = <0.0019 \text{ lb/hr}$$

Run #3:

$$E = \frac{(<0.000007)\ (1{,}909{,}268.7)}{7{,}000} = <0.0019 \text{ lb/hr}$$

NAME: VALLEY ASPHALT #6
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: BAGHOUSE

STACK GAS FLOW RATE

$$Q_{sd} = 3600 \left[1 - B_{wc} \right] V_s \; A \left[\frac{T_{std}}{T_{stk}} \right] \left[\frac{P_s}{P_{std}} \right]$$

Where:

- Q_{sd} = Dry volumetric stack gas flow rate corrected to standard conditions (dscf/hr).
- A = Cross sectional area of stack (ft^2).
- 3600 = Conversion factor (sec/hr).
- T_{stk} = Absolute stack temperature (°R).
- T_{std} = Standard absolute temperature (528°R).
- P_{bar} = Barometric pressure at measurement site (in. Hg.).
- P_g = Stack static pressure (in. Hg.).
- P_s = Absolute stack gas pressure (in. Hg.) = $P_{bar} + P_g$
- P_{std} = Standard absolute pressure (29.92 in. Hg.).

Run #1: Q_{sd} =

$$\mathbf{3600 \; (1 - 0.2296) \; (72.16) \; (12.57) \left[\frac{528}{716} \right] \left[\frac{29.95}{29.92} \right] = 1{,}856{,}977.8 \; \frac{dscf}{hr}}$$

Run #2: Q_{sd} =

$$\mathbf{3600 \; (1 - 0.2285) \; (72.06) \; (12.57) \left[\frac{528}{715} \right] \left[\frac{29.95}{29.92} \right] = 1{,}859{,}649.4 \; \frac{dscf}{hr}}$$

Run #3: Q_{sd} =

$$\mathbf{3600 \; (1 - 0.2110) \; (71.33) \; (12.57) \left[\frac{528}{705} \right] \left[\frac{29.95}{29.92} \right] = 1{,}909{,}268.7 \; \frac{dscf}{hr}}$$

NAME: VALLEY ASPHALT #6
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: BAGHOUSE

EMISSIONS RATE FROM STACK

$$E - \left[\frac{(C_s)\quad(Q_{sd})}{7{,}000\ gr/lb}\right]$$

Where:

E - Emissions rate, lbs/hr.

C_s - Concentration of particulate in stack gas, dry basis, corrected to standard conditions, gr/dscf.

Q_{sd} - Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr.

Run #1:

$$E = \frac{(0.0088)\quad(1{,}856{,}977.8)}{7000} = 2.34\ lb/hr$$

Run #2:

$$E = \frac{(0.0040)\quad(1{,}859{,}649.4)}{7000} = 1.06\ lb/hr$$

Run #3:

$$E = \frac{(0.0041)\quad(1{,}909{,}268.7)}{7000} = 1.12\ lb/hr$$

Format: csR3/05-005

NAME: VALLEY ASPHALT #6
LOCATION: DAYTON, OHIO

DATE: May 11, 1993
SOURCE: BAGHOUSE

ISOKINETIC VARIATION

$$I - 100\ T_s \left[\frac{(0.002669)\ (V_{lc} + (V_m/T_m)\ (P_{bar} + \Delta H/13.6)}{60\quad \theta\quad V_s\quad P_s\quad A_n} \right]$$

Where:

I =	Percent isokinetic sampling.
100 =	Conversion to percent.
T_s =	Absolute average stack gas temperature, °R.
0.002669 =	Conversion factor, Hg - ft³/ml - °R.
V_{lc} =	Total volume of liquid collected in impingers and silica gel, ml.
T_m =	Absolute average dry gas meter temperature, °R.
P_{bar} =	Barometric pressure at sampling site, in. Hg.
ΔH =	Average pressure differential across the orifice meter, in. H_2O.
13.6 =	Specific gravity of mercury.
60 =	Conversion seconds to minutes.
Θ =	Total sampling time, minutes.
V_s =	Stack gas velocity, ft/sec.
P_s =	Absolute stack gas pressure, in. Hg.
A_n =	Cross sectional area of nozzle, ft².

Run #1:

$$I = (100)\ (716) \left[\frac{(0.002669)\quad (278.10) + \frac{45.398}{551.0} \left[29.95 + \frac{1.43}{13.6} \right]}{60\quad (60)\quad (72.16)\quad (29.95)\quad (0.000289)} \right] = 102.5\%$$

Run #2:

$$I = (100)\ (715) \left[\frac{(0.002669)\quad (272.00) + \frac{45.549}{562.0} \left[29.95 + \frac{1.42}{13.6} \right]}{60\quad (60)\quad (72.06)\quad (29.95)\quad (0.000289)} \right] = 100.9\%$$

Run #3:

$$I = (100)\ (715) \left[\frac{(0.002669)\quad (249.40) + \frac{46.190}{563.0} \left[29.95 + \frac{1.42}{13.6} \right]}{60\quad (60)\quad (71.33)\quad (29.95)\quad (0.000289)} \right] = 99.5\%$$

RAMCON ENVIRONMENTAL CORPORATION

M12

Plant Valley Plant #6

Location Dayton, OH

Operator C. Hughes

Date 5-11-93

Run No. 1

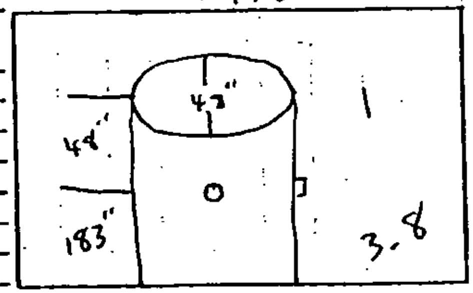
Sample Box No. 1

Meter Box No. C-185

Meter H @ 1.41

C Factor 1.006

Pitot Tube Coefficient Cp .84



Schematic of Stack Cross Section

Ambient Temperature 70°

Barometric Pressure 29.95

Assumed Moisture, % 1.18

Probe Length, m(ft) 5'

Nozzle Identification No. .0002885

Avg. Calibrated Nozzle Dia., (in.) .230/.230/.230

Probe Heater Setting 4

Leak Rate, m^3/min. (cfm) .011 @ 9"

Probe Liner Material Stainless

Static Pressure, mm Hg (in. Hg) +.01

Filter No. T500255

	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL	470	435.9
INITIAL	200	427.8
DIFFERENCE	270	8.1

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H20	PRESSURE DIFF. ORF. MTR in H20	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
1	0955 / 0957.30	5	240	.97	1.2	970.055 / 973.7	81	75	257	68
2	1000	7	244	1.2	1.5	976.6	88	75	259	68
3	1002.30	8	245	1.3	1.7	977.6	91	75	258	63
4	1005	8	245	1.3	1.7	979.7	92	75	259	65
5	1007.30	7	248	1.1	1.4	981.5	96	76	260	67
6	1010	6	252	1.0	1.3	983.4	98	76	263	68
7	1012.30	6	252	1.0	1.3	985.1	99	77	264	68
8	1015	7	253	1.1	1.4	987.0	100	78	265	68
9	1017.30	7	254	1.1	1.4	988.8	101	79	265	67
10	1020	7	255	1.1	1.4	990.7	102	80	266	67
11	1022.30	7	256	1.2	1.5	992.6	104	80	267	67
12	1025	6	256	1.0	1.3	994.4	105	81	267	67

Form #REC-05

Form #REC-06 13 4

RAMCON emissions test log sheet, cont. DATE 5-11-93 LOCATION Dayton, OH TEST NO. 1

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
~~1035:30~~ 1038	1	7	257	1.2	1.5	996.3	94	76	269	68
1040,30	2	7	258	1.2	1.5	998.2	101	85	266	61
1043	3	8	257	1.3	1.7	1000.3	104	85	265	59
1045,30	4	7	258	1.2	1.5	1002.2	106	85	262	59
1048	5	7	260	1.2	1.5	1004.2	107	85	260	60
1050,30	6	7	260	1.1	1.4	1006.1	108	86	259	61
1053	7	7	261	1.1	1.4	1008.0	108	86	259	62
1055,30	8	7	260	1.1	1.4	1009.9	109	86	260	61
1058	9	7	261	1.1	1.4	1011.8	110	86	261	60
1100,30	10	7	264	1.1	1.4	1013.7	110	86	259	60
1103	11	7	269	1.0	1.3	1015.5	110	87	258	60
1105,30	12	7	273	1.0	1.3	1017.453	110	87	258	61

RAMCON ENVIRONMENTAL CORPORATION

Plant Valley #6
Location Dayton, OH
Operator C. Hughes
Date 5-11-93
Run No. 2
Sample Box No. 1
Meter Box No. C-185
Meter H @ 1.41
C Factor 1.006
Pitot Tube Coefficient Cp .84

M12

Ambient Temperature 80'
Barometric Pressure 29.95
Assumed Moisture, % .22
Probe Length, m(ft) 5'
Nozzle Identification No. .0002885
Avg. Calibrated Nozzle Dia., (in.) .230/.230/.230
Probe Heater Setting 4
Leak Rate, m^3/min.(cfm) .019 @ 8"
Probe Liner Material Stainless
Static Pressure, mm Hg(in.Hg) +.01
Filter No. TS00257

	IMPINGER VOLUME ml	SILICA GEL WEIGHT g
FINAL	466	393.9
INITIAL	200	387.9
DIFFERENCE	266	6.0

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ)min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H20	PRESSURE DIFF. ORF. MTR in H20	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
1	1237.30 / 1240	6	247	1.1	1.4	019.640 / 021.5	97	90	225	68
2	1242.30	6	246	1.1	1.4	023.4	102	90	226	64
3	1245	7	247	1.2	1.5	025.3	106	89	235	63
4	1247.30	8	256	1.3	1.7	027.4	109	89	248	63
5	1250	7	264	1.2	1.5	029.3	110	89	252	64
6	1252.30	6	264	1.1	1.4	031.2	111	89	256	65
7	1255	6	263	1.0	1.3	033.1	112	90	257	65
8	1257.30	6	262	1.0	1.3	034.8	112	90	258	65
9	1300	6	260	1.1	1.4	036.7	112	91	262	65
10	1302.30	7	261	1.2	1.5	038.6	113	91	264	66
11	1305	6	259	1.1	1.4	040.6	114	92	265	66
12	1307.30	6	260	.98	1.2	042.4	115	92	266	67

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 5-11-93 LOCATION Dayton, OH TEST NO. 2

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
1	1312 / 1314.30	6	250	1.1	1.4	044.2	105	94	262	68
2	1317	6	253	1.1	1.4	046.1	111	94	259	66
3	1319.30	6	255	1.1	1.4	048.0	114	93	253	64
4	1322	8	256	1.3	1.7	050.0	115	93	247	63
5	1324.30	7	254	1.2	1.5	049.9	116	94	249	63
6	1327	7	254	1.2	1.5	053.9	116	94	254	64
7	1329.30	7	253	1.1	1.4	055.8	116	94	254	65
8	1332	6	253	1.0	1.3	057.8	117	94	255	67
9	1334.30	7	253	1.1	1.4	059.6	117	94	254	67
10	1337	7	252	1.1	1.4	061.5	117	95	253	67
11	1339.30	7	252	1.1	1.4	063.4	118	95	252	67
12	1342	6	252	1.0	1.3	065.189	118	95	254	67

RAMCON ENVIRONMENTAL CORPORATION

Plant: Valley #6
Location: Dayton, OH
Operator: C. Hughes
Date: 5-11-93
Run No.: 3
Sample Box No.: 1
Meter Box No.: C-185
Meter H @: 1.41
C Factor: 1.006
Pitot Tube Coefficient Cp: .84

M12

Ambient Temperature: 80°
Barometric Pressure: 29.95
Assumed Moisture, %: .22
Probe Length, m(ft): 5'
Nozzle Identification No.: 10002885
Avg. Calibrated Nozzle Dia., (in.): .230/.230/.230
Probe Heater Setting: 4
Leak Rate, m^3/min. (cfm): .019 @ 8"
Probe Liner Material: Stainless
Static Pressure, mm Hg (in. Hg): +.01
Filter No.: T5002167

	IMPINGER VOLUME ml	SILICA GEL WEIGHT g
FINAL	440	497.6
INITIAL	200	488.2
DIFFERENCE	240	9.4

Schematic of Stack Cross Section

TRAV. PT NO.	SAMPLING TIME (θ)min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H20	PRESSURE DIFF. ORF. MTR in H20	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	GAS SAMPLE TEMP. AT DRY GAS METER °F Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
1	1501 / 1503.30	6	240	1.1	1.4	065.655 / 067.6	98	91	255	68
2	1506	6	241	1.1	1.4	069.4	104	92	255	62
3	1508.30	6	240	1.2	1.5	071.4	107	92	252	61
4	1511	7	239	1.3	1.7	073.6	109	92	249	62
5	1513.30	6	239	1.2	1.5	075.6	110	91	244	62
6	1516	6	240	1.1	1.4	077.4	111	91	237	63
7	1518.30	6	242	1.1	1.4	079.4	112	92	238	63
8	1521	5	243	1.0	1.3	081.2	112	92	247	62
9	1523.30	5	244	1.0	1.3	083.0	113	92	252	62
10	1526	6	246	1.1	1.4	084.9	113	92	255	62
11	1528.30	6	248	1.1	1.4	086.8	114	92	261	63
12	1531	6	250	1.1	1.4	088.7	115	92	260	64

Form #RFC-05

13 4

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 5-11-93 LOCATION Dayton, OH TEST NO. 3

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
1	~~1535~~ 1537.30	6	246	1.1	1.4	090.6	107	94	245	67
2	1540	6	247	1.2	1.5	092.6	112	94	242	67
3	1542.30	6	247	1.2	1.5	094.5	114	95	243	66
4	1545	6	250	1.2	1.5	096.4	115	95	243	67
5	1547.30	6	252	1.2	1.5	098.4	116	95	246	67
6	1550	6	253	1.1	1.4	100.3	116	95	247	68
7	1552.30	6	254	1.0	1.3	102.2	117	95	242	67
8	1555	6	251	1.1	1.4	104.1	118	95	232	68
9	1557.30	6	247	1.1	1.4	106.0	118	95	240	64
10	1600	6	245	1.1	1.4	108.1	118	95	240	61
11	1602.30	6	244	1.1	1.4	109.9	118	96	247	60
12	1605	6	243	1.0	1.3	111.845	118	96	251	60

4A

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? ✓ yes ______ no

Pitot tube openings damaged? ______ yes (explain below) ✓ no

α_1 = 1.3 ° (<10°), α_2 = 0.8 ° (<10°), β_1 = 0.5 ° (<5°),
β_2 = 1.8 ° (<5°)

γ = 2.9 °, θ = 1.7 °, A = .97 cm (in.)

$z = A \sin \gamma$ = .05 cm (in.); <0.32 cm (<1/8 in.),
$w = A \sin \theta$ = .03 cm (in.); <.08 cm (<1/32 in.)

P_A .48 cm (in.) P_b .49 cm (in.)

D_t = .38 cm (in.)

Comments: ______

Calibration required? ______ yes ✓ no

4B

TYPE S PITOT TUBE INSPECTION DATA FORM

Pitot tube assembly level? ✓ yes ______ no

Pitot tube openings damaged? ______ yes (explain below) ______ no

α_1 = 2.3 ° (<10°), α_2 = .5 ° (<10°), β_1 = 1.8 ° (<5°),
β_2 = 1.8 ° (<5°)

γ = 3.2 °, θ = 1.0 °, A = .98 cm (in.)

z = A sin γ = .05 cm (in.); <0.32 cm (<1/8 in.),
w = A sin θ = .02 cm (in.); <.08 cm (<1/32 in.)

P_A .49 cm (in.) P_b .49 cm (in.)

D_t = .38 cm (in.)

Comments: ______

Calibration required? ______ yes ✓ no

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 5-5-89 Thermocouple number Hotbox

Ambient temperature 20 °C Barometric pressure 29.88 in. Hg

Calibrator S Turner Reference: mercury-in-glass ✓

other ______

Reference point number	Source[a] (specify)	Reference thermometer temperature, ~~°C~~ F	Thermocouple potentiometer temperature, ~~°C~~ F	Temperature difference,[b] %
A	ice bath	32	32	0
B	oven	200	200	0
C	oven	350	350	0
D	ambient			

[a]Type of calibration system used.

[b] $\left[\frac{(\text{ref temp, °C} + 273) - (\text{test thermom temp, °C} + 273)}{\text{ref temp, °C} + 273}\right] 100 \leq 1.5\%.$

Quality Assurance Handbook M5-2.5

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 5-5-89 Thermocouple number Inlet [illegible]

Ambient temperature 30 °C Barometric pressure 29.85 in. Hg

Calibrator [illegible] Reference: mercury-in-glass ✓

other ______

Reference point number	Source[a] (specify)	Reference thermometer temperature, ~~°C~~ °F	Thermocouple potentiometer temperature, ~~°C~~ °F	Temperature difference,[b] %
A	Ice bath	32	32	0
B	oven	200	200	0
C	oven	350°F	350	0.
D	Ambient			

[a]Type of calibration system used.

[b]$\left[\frac{(\text{ref temp, °C} + 273) - (\text{test thermom temp, °C} + 273)}{\text{ref temp, °C} + 273}\right] 100 \leq 1.5\%.$

RAMCON ENVIRONMENTAL CORPORATION

Lear Siegler Stack Sampler

Nozzle Diameter Calibration

Date ________________ Signature ________________________

Nozzle No.	Average Diameter	Nozzle No.	Average Diameter
1		7	
2		8	
3		9	
4		10	
5		11	
6		12	

Pitot Tube Calibration (S Type)

Pitot Tube Identification No. 54 Date 6-9-91

Calibrated by: S Buck

"A" SIDE CALIBRATION

Run No.	Δp std cm H_2O (in. H_2O)	Δp (s) cm H_2O (in. H_2O)	$C_p(s)$	DEVIATION $C_{p(s)}-\overline{C}_p(A)$
1	2.2	3.1	.842	.006
2	1.8	2.5	.848	.000
3	1.1	1.5	.856	.008
		$\overline{C}_p$ (SIDE A)	.848	

"B" SIDE CALIBRATION

Run No.	Δp std cm H_2O (in. H_2O)	Δp(s) cm H_2O in. H_2O)	$C_p(s)$	DEVIATION $C_{p(s)}-\overline{C}_p(B)$
1	2.2	3.1	.842	.006
2	1.8	2.5	.848	.000
3	1.1	1.5	.856	.008
		$\overline{C}_p$ (SIDE B)	.848	

$$\text{AVERAGE DEVIATION} = \sigma(\text{A OR B}) = \frac{\sum_{1}^{3} |C_p(s) - \overline{C}_p(\text{A OR B})|}{3} \leftarrow \text{MUST BE} \leq 0.01$$

$$|\overline{C}_p(\text{SIDE A}) - \overline{C}_p(\text{SIDE B})| \leftarrow \text{MUST BE} \leq 0.01$$

$$C_{p(s)} = C_{p(std)} \sqrt{\frac{\Delta p\ std}{\Delta p_s}}$$

Form No. EED-17-1

RAMCON

Lear Siegler Stack Sampler

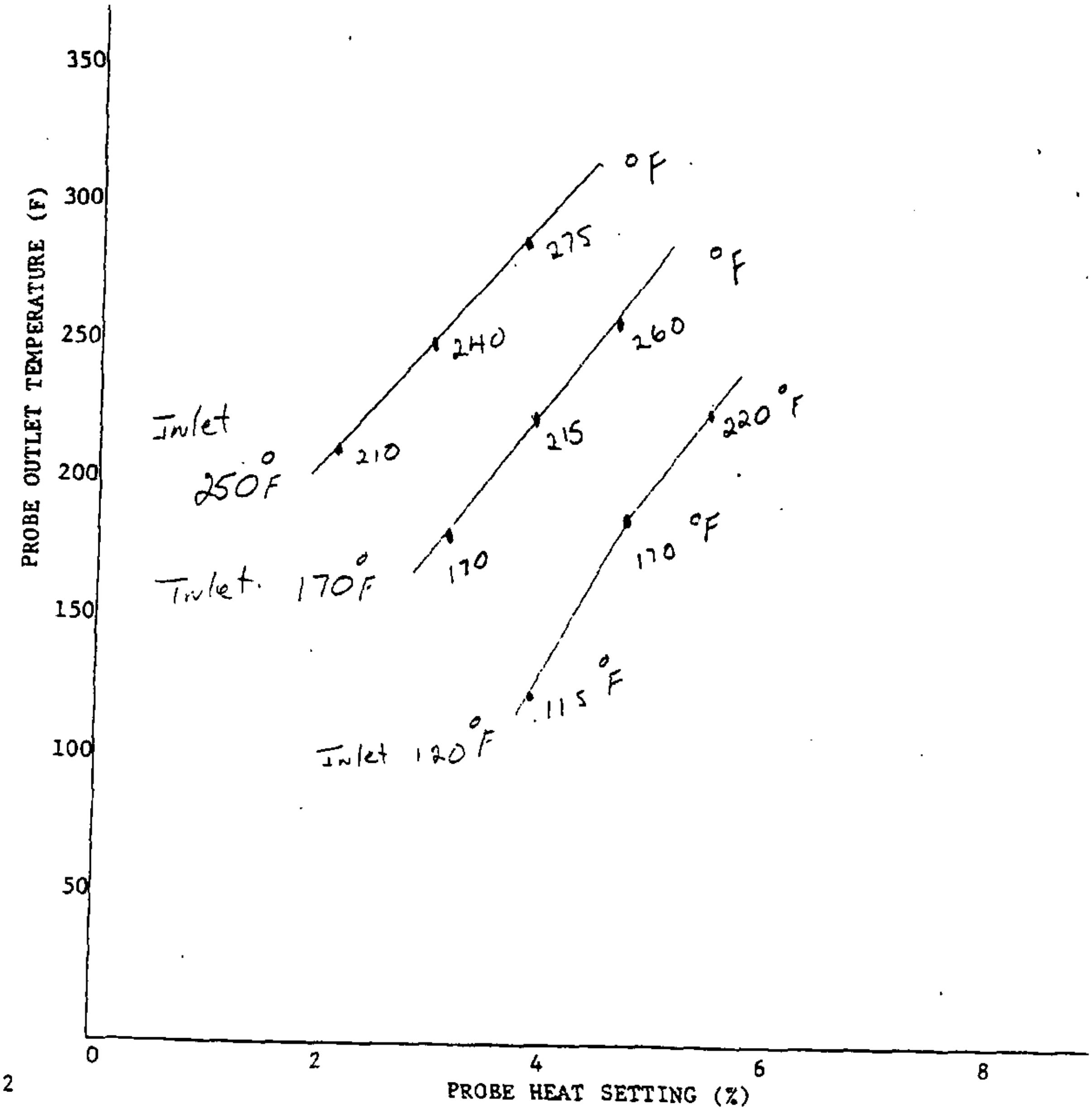
Heating Probe Calibration

Probe No. 54 Probe Length 5'

Date of Calibration 5-7-89 Signature SAM TURNER

Name of Company to be tested ______

Note: 3 ft. probe - 5 min. warmup
6 ft. probe - 15 min. warmup
10 ft. probe - 30 min. warmup
Calibration flow rate = .75 CFM



Form No. EED-17-2

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 5-13-90 Thermocouple number 54

Ambient temperature 20 °C Barometric pressure 29.88 in. Hg

Calibrator S Turner Reference: mercury-in-glass ✓

other ______

Reference point number	Source[a] (specify)	Reference thermometer temperature, °C	Thermocouple potentiometer temperature, °C	Temperature difference,[b] %
A	ice water	32 °F	32 °F	0 %
B	Boiling	212 °F	218 °F	.0 %
C	Boiling oil	381 °F	379 °F	.00
D	Ambient			

[a]Type of calibration system used.

[b]$\left[\frac{(\text{ref temp, °C} + 273) - (\text{test thermom temp, °C} + 273)}{\text{ref temp, °C} + 273}\right] 100 \leq 1.5\%$.

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test number ________ Date 4-30-93 Meter box number C-185 Plant ________

Barometric pressure, P_b = 29.94 in. Hg Dry gas meter number 638809 Pretest Y ________

Orifice manometer setting, (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Average (t_d),[a] °F	Time (θ), min	Vacuum setting, in. Hg	Y_i	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
1.0	10	965.463 / 970.456	70	62 / 64	78 / 84	72	6:03	8"	1.002	1.441
2.0	10	955.113 / 964.585	70	62 / 64	76 / 88	72.5	11:46	7"	1.026	1.467
3.0	~~10~~ 26	927.038 / 953.467	70	88 / 94	66 / 66	78.5	23:23	7"	.992	1.322
									Y = 1.006	1.41

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d

where

V_w = Gas volume passing through the wet test meter, ft^3.

V_d = Gas volume passing through the dry gas meter, ft^3.

t_w = Temperature of the gas in the wet test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry gas meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry gas meter, °F.

t_d = Average temperature of the gas in the dry gas meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in. H_2O.

Y_i = Ratio of accuracy of wet test meter to dry gas meter for each run.

Y = Average ratio of accuracy of wet test meter to dry gas meter for all three runs; tolerance = pretest Y $\pm$0.05Y.

P_b = Barometric pressure, in. Hg.

θ = Time of calibration run, min.

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test number ________ Date 5-18-93 Meter box number C 282 Plant ________

Barometric pressure, P_b = 30.06 in. Hg Dry gas meter number 142810 Pretest Y ________

Orifice manometer setting, (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter Inlet (t_{d_i}), °F	Temperature: Dry gas meter Outlet (t_{d_o}), °F	Temperature: Dry gas meter Average[a] (t_d), °F	Time (Θ), min	Vacuum setting, in. Hg	Y_i	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
1.0	10	816.987 / 827.035	76	108 / 112	74 / 76	92.5	19.93	8"	1.023	2.178
2.0	10	805.259 / 815.232	76	100 / 112	72 / 76	90	13.13	6"	1.013	1.899
3.0	10	795.365 / 805.584	76	93 / 108	72 / 74	88	10.9	10"	.993	1.87
									Y = 1.009	1.979

[a] If there is only one thermometer on the dry gas meter, record the temperature under t_d

where

V_w = Gas volume passing through the wet test meter, ft^3.

V_d = Gas volume passing through the dry gas meter, ft^3.

t_w = Temperature of the gas in the wet test meter, °F.

t_{d_i} = Temperature of the inlet gas of the dry gas meter, °F.

t_{d_o} = Temperature of the outlet gas of the dry gas meter, °F.

t_d = Average temperature of the gas in the dry gas meter, obtained by the average of t_{d_i} and t_{d_o}, °F.

ΔH = Pressure differential across orifice, in. H_2O.

Y_i = Ratio of accuracy of wet test meter to dry gas meter for each run.

Y = Average ratio of accuracy of wet test meter to dry gas meter for all three runs; tolerance = pretest Y $\pm$0.05Y.

P_b = Barometric pressure, in. Hg.

Θ = Time of calibration run, min.

Form #REC-01