State of Ohio Environmental Protection Agency

PERMIT TO OPERATE AN AIR CONTAMINANT SOURCE

Date of Issuance 02/25/94

Application No. 0857781770P001

Effective Date 02/25/94

Permit Fee $000

This document constitutes issuance to:

VALLEY ASPHALT CORPORATION #18
ST. RT. 741 & 725
DAYTON OHIO 45439

of a permit to operate for:

PORTABLE BITUMINOUS CONCRETE DRUM MIX ASPHALT PLNT
VALLEY ASPHALT CORP. PLANT #18

The following terms and conditions are hereby expressly incorporated into this permit to operate:

1. This permit to operate shall be effective until 02/24/97
You will be contacted approximately six months prior to this date regarding the renewal of this permit. If you are not contacted, please write to the appropriate Ohio EPA field office.
2. The above-described source is and shall remain in full compliance with all applicable State and federal laws and regulations and the terms and conditions of this permit.
3. Prior to any modification of this source, as defined in rule 3745-31-01 of the Ohio Administrative Code (OAC), a permit to install must be granted by the Ohio EPA pursuant to OAC Chapter 3745-31.
4. The Director of the Ohio EPA or an authorized representative may, subject to the safety requirements of the permit holder, enter upon the premises of this source at any time for purposes of making inspections, conducting tests, examining records or reports pertaining to any emission of air contaminants, and determining compliance with any applicable State and federal air pollution laws and regulations and the terms and conditions of this permit.
5. A permit fee in the amount specified above must be remitted within 15 days from the issuance date of this permit.
6. Any transferee of this permit shall assume the responsibilities of the prior permit holder. The appropriate Ohio EPA field office must be notified in writing of any transfer of this permit.
7. This source and any associated air pollution control system(s) shall be maintained regularly in accordance with good engineering practices in order to minimize air contaminant emissions. Any malfunction of this source or any associated air pollution control system(s) shall be reported immediately to the appropriate Ohio EPA field office in accordance with OAC rule 3745-15-06. Except as provided in that rule, any scheduled maintenance or malfunction necessitating the shutdown or bypassing of any air pollution control system(s) shall be accompanied by the shutdown of this source.
8. Any unauthorized or emergency release of an air contaminant from this source which, due to the toxic or hazardous nature of the material, may pose a threat to public health, or otherwise endanger the safety or welfare of the public, shall be reported immediately to the appropriate Ohio EPA field office (during normal business hours) or to the Ohio EPA's Emergency Response Group (1-800-282-9378). (Additional reporting may be required pursuant to the federal Comprehensive Environmental Response, Compensation, and Liability Act.)
9. The appropriate Ohio EPA field office is:

REGIONAL AIR POLLUTION CONTROL AGENCY
451 W. THIRD ST.
DAYTON, OH 45422 (513) 225-4437

10. [X] If this term and condition is checked, the permit holder is subject to the attached special terms and conditions.

OHIO ENVIRONMENTAL PROTECTION AGENCY

Donald R Schregardus
Director

EPA 3834
Revised 9-90

State of Ohio Environmental Protection Agency

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DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

OFFICE OF AIR MANAGEMENT

OFFICE MEMORANDUM

To: Herm Carney
From: Dave Cline
Subject: Valley Asphalt Plant #18
Source ID No. None Assigned Yet

Date: 6/14/94
Thru: E. Surla. *[initials] 6/20*
D. Dubenetzky *DD 6/21*

The subject company has submitted a report concerning particulate testing of their number 18 plant formerly located in Piketon Ohio. The original test protocol and the actual test observation were completed by the Ohio EPA. The plant is relocating to Dearborn County. The testing took place in Ohio on August 3, 1993, and was conducted by Ramcon Environmental Corporation. The purpose of the testing was to determine compliance with the Ohio EPA's operating permit conditions. I have reviewed this report and determined that the sampling procedures used and the results obtained are conditionally acceptable to this office relative to demonstrating initial compliance with the particulate NSPS standard. An initial site inspection by D.J. Knotts will be conducted on this plant to determine it's compliance status. Based upon the results of this inspection, a retest may be requested by the Air Compliance Section should conditions warrant it. A copy of the original test report is filed in the Compliance Data Section. The following is a summary of the test results:

PLANT #18

Maximum Permitted Rate:	350TPH
Average Rate During Test:	280TPH
Average Measured Emissions:	.016gr/dscf
Allowable Emissions:	.04gr/dscf
Average Measured Opacity:	3%
Allowable Opacity:	20%
Type of Fuel:	No. 4 Fuel Oil

STATUS: CONDITIONAL (at 80% of maximum rated capacity)

cc: N. Landau
D. Cline
General File Dearborn County

SOURCE TESTED:	Valley Asphalt Plant 18
TESTING COMPANY:	Ramcon Env Corp.
DATE OF TEST:	8/3/93
RUN NO.:	1

Molecular Weight of Stack Gas, Dry Basis, Md

%CO2	=	6.1	6.1
%O2	=	12.2	12.2
Md	=	29.464	

Volume of Water Vapor Collected @ STD. COND., Vwv

Vlc	=	358.4
Vw(std)	=	16.85914

Volume of Dry Gas Collected @ STD. COND., Vm(std)

Tm	=	81.2333333	541.233333	121.7308
Vm	=	46.62		100.7308
Pb	=	29.5		
delta H	=	1.944		
gamma	=	1.008		
Vm(std)	=	45.58		

RUN 1

Moisture Content of Stack Gas, Bwo

Bwo	=	27.00%
1-Bwo	=	73.00%

Molecular Weight of Stack Gas, Ms

Ms	=	26.37

Area of Stack (enter diameter in inches), As

L	=	28
W	=	75
diameter		0
No. of Stacks	=	1
As(L*W)	=	14.5833333
As(dia.)	=	0

Static Pressure, Ps

Static	=	0.02
Ps	=	29.50

Stack Gas Velocity, Vs, fps

Cp	=	0.84	
sqr(delta p)	=	0.78353968	0.6756875
Ts	=	295.733333	
Vs	=	55.45	

Stack Gas Flowrate, Qs, acfm

As = 14.5833333

Qs = 48521.15 2911268.74

Stack Gas Flowrate ● STD. COND., Dry Basis, Qstd.

Qstd. = 24487.58 1469254.76

Velocity at the Nozzle, Vn

Dia. of Nozzle= 0.275 An : 0.00041247

Time of Run = 60

Vn = 60.84

% Isokinetic, %I

%I = 109.72

% Isokinetic measured from intermediate values

%I = 110.14303

Pollutant Mass Emission Rate, PMR, lbs./hr.

Mn = 0.0368

PMR = 2.6127

Grains per acf

gr/acf = 0.0086

Grains per dscf

gr/dscf = 0.0125

Concentration, mg/dcsf

mg/dscf : 0.807346

Particulate Emissions Rate

F factor = no f factor with oil

lb/MMBtu = #VALUE!

SOURCE TESTED:	Valley Asphalt Plant 18
TESTING COMPANY:	Remcon Env Corp
DATE OF TEST:	8/3/93
RUN NO.:	2

Molecular Weight of Stack Gas, Dry Basis, Md

%CO2	=	6.6	6.6
%O2	=	12	12
Md	=	29.536	

Volume of Water Vapor Collected @ STD. COND., Vwv

Vlc	=	348.9
Vw(std)	=	16.41226

Volume of Dry Gas Collected @ STD. COND., Vm(std)

Tm	=	93.5	553.5	121.7308
Vm	=	38.132		100.7308
Pb	=	29.5		
delta H	=	1.41866667		
gamma	=	1.008		
Vm(std)	=	36.41		

Moisture Content of Stack Gas, Bwo

Bwo	=	31.07%
1-Bwo	=	68.93%

Molecular Weight of Stack Gas, Ms

Ms	=	25.95

Area of Stack (enter diameter in inches), As

L	=	28
W	=	75
diameter		0
No. of Stacks	=	1
As(L*W)	=	14.5833333
As(dia.)	=	0

Static Pressure, Ps

Static	=	0.02
Ps	=	29.50

Stack Gas Velocity, Vs, fps

Cp	=	0.84	
sqr(delta p)	=	0.72930323	0.6756875
Ts	=	293.533333	
Vs	=	51.95	

Stack Gas Flowrate, Qs, acfm

As	=	14.5833333	
Qs	=	45457.69	2727461.24

Stack Gas Flowrate ● STD. COND., Dry Basis, Qstd.

Qstd.	=	21725.33	1303519.51

Velocity at the Nozzle, Vn

Dia. of Nozzle=	0.275	An	: 0.00041247
Time of Run =	60		
Vn =	51.32		

% Isokinetic, %I

%I = 98.78

% Isokinetic measured from intermediate values

%I = 99.164112

Pollutant Mass Emission Rate, PMR, lbs./hr.

Mn	=	0.0381
PMR	=	3.0044

Grains per acf

gr/acf = 0.0111

Grains per dscf

gr/dscf = 0.0161

Concentration, mg/dcsf

mg/dscf : 1.04645107

Particulate Emissions Rate

F factor = 0 no f factor on this one

lb/MMBtu = 0.0000

SOURCE TESTED	Valley Asphalt Plant 18
TESTING COMPANY:	Ramcon Env Corp
DATE OF TEST:	8/3/93
RUN NO.:	3

Molecular Weight of Stack Gas, Dry Basis, Md

%C02	=	6.1	6.1	
%02	=	12	12	
Md	=	29.456		

Volume of Water Vapor Collected @ STD. COND., Vwv

Vlc	=	357.4		
Vw(std)	=	16.81210		

Volume of Dry Gas Collected @ STD. COND., Vm(std)

Tm	=	95.6666667	555.666667	121.7308
Vm	=	38.97		100.7308
Pb	=	29.5		
delta H	=	1.89866667		
gamma	=	1.008		
Vm(std)	=	37.11	RUN 3	

Moisture Content of Stack Gas, Bwo

Bwo	=	31.18%
1-Bwo	=	68.82%

Molecular Weight of Stack Gas, Ms

Ms	=	25.88

Area of Stack (enter diameter in inches), As

L	=	28
W	=	75
diameter		
No. of Stacks	=	1
As(L*W)	=	14.5833333
As(dia.)	=	0

Static Pressure, Ps

Static	=	0.02
Ps	=	29.50

Stack Gas Velocity, Vs, fps

Cp	=	0.84	
sqr(delta p)	=	0.70865585	0.6756875
Ts	=	288	
Vs	=	50.36	

Stack Gas Flowrate, Qs, acfm

As = 14.5833333

Qs = 44065.63 2643937.87

Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd.

Qstd. = 21182.52 1270950.93

Velocity at the Nozzle, Vn

Dia. of Nozzle= 0.275 An : 0.00041247

Time of Run = 60

Vn = 52.00

% Isokinetic, %I

%I = 103.26

% Isokinetic measured from intermediate values

%I = 103.65848

Pollutant Mass Emission Rate, PMR, lbs./hr.

Mn = 0.0457

PMR = 3.4475

Grains per acf

gr/acf = 0.0132

Grains per dscf

gr/dscf = 0.0190

Concentration, mg/dcsf

mg/dscf : 1.2315402

Particulate Emissions Rate

F factor = 0 no f factor with oil

lb/MMBtu = 0.0000

REVIEW SUMMARY

SOURCE TESTED: Valley Asphalt Plant 18
TESTING COMPANY: Ramcon Env Corp.
DATE OF TEST: 8/3/93

Average Stack Gas Velocity, Vs, fps	52.588
Average Stack Gas Flowrate, Qs, acfm	46014.821
Average Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd.	22465.14
Average % Isokinetic, %I	103.92293
Average % Isokinetic measured from intermediate values	104.32187
Average Pollutant Mass Emission Rate, PMR, lbs./hr.	3.0215214
Average Grains per acf	0.0109688
Average Grains per dscf	0.0158689
Average Concentration, mg/dcsf	1.0284458
Average Particulate Emissions Rate, lb/MMBtu	#VALUE!
Average Stack Temperature, °F	292.42222

RAMCON
ENVIRONMENTAL CORPORATION

Source Sampling for
Particulate and Lead Emissions

Plant No. 18

VALLEY ASPHALT CORPORATION
PIKETON, OHIO
August 3, 1993

Fred Brammer
Valley Asphalt Corporation

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

September 2, 1993

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

RE: Particulate Emissions Test: August 3, 1993

Dear Mr. Bremmer:

Enclosed you will find five (5) copies of our report on the particulate and lead emissions test we conducted at your asphalt plant no. 18 located in Piketon, Ohio.

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

Mr. Fred Klingelhafer
Air Pollution Control
Ohio Environmental Protection Agency
2195 Front Street
Logan, Ohio 43138

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

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1. INTRODUCTION
2. TEST RESULTS
3. TEST PROCEDURES

SECTION A.

1. INTRODUCTION

On August 3, 1993 personnel from RAMCON Environmental Corporation conducted a source emissions test for particulate and lead emissions compliance at Valley Asphalt Corporation's Barber-Greene drum-mix asphalt plant no. 18 located in Piketon, Ohio. RAMCON personnel conducting the test were Allen Turner, Team Leader, and Earl Crook. 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. Turner and Mr. South.

The purpose of the test was to determine if the rate of particulate 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 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.

Earl Crook of RAMCON Environmental conducted the opacity test which ranged from zero (0) to five (5) percent on all three (3) runs and therefore meets N.S.P.S. requirements.

SUMMARY OF TEST RESULTS

TABLE I

August 3, 1993

Test Run	Time	Isokinetic Variation, %	Concentration, gr/dscf		Emission, lb/hr	
			PM	Lead	PM	Lead
1	07:56 - 09:06	111.9	0.0123	1.83×10^{-5}	2.56	0.0038
2	09:57 - 11:03	106.1	0.0151	1.07×10^{-5}	2.90	0.0020
3	11:34 - 12:41	106.1	0.0183	1.16×10^{-5}	3.35	0.0021
Avg:			0.0152	1.35×10^{-5}	2.94	0.0026

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 standards.

3. TEST PROCEDURES

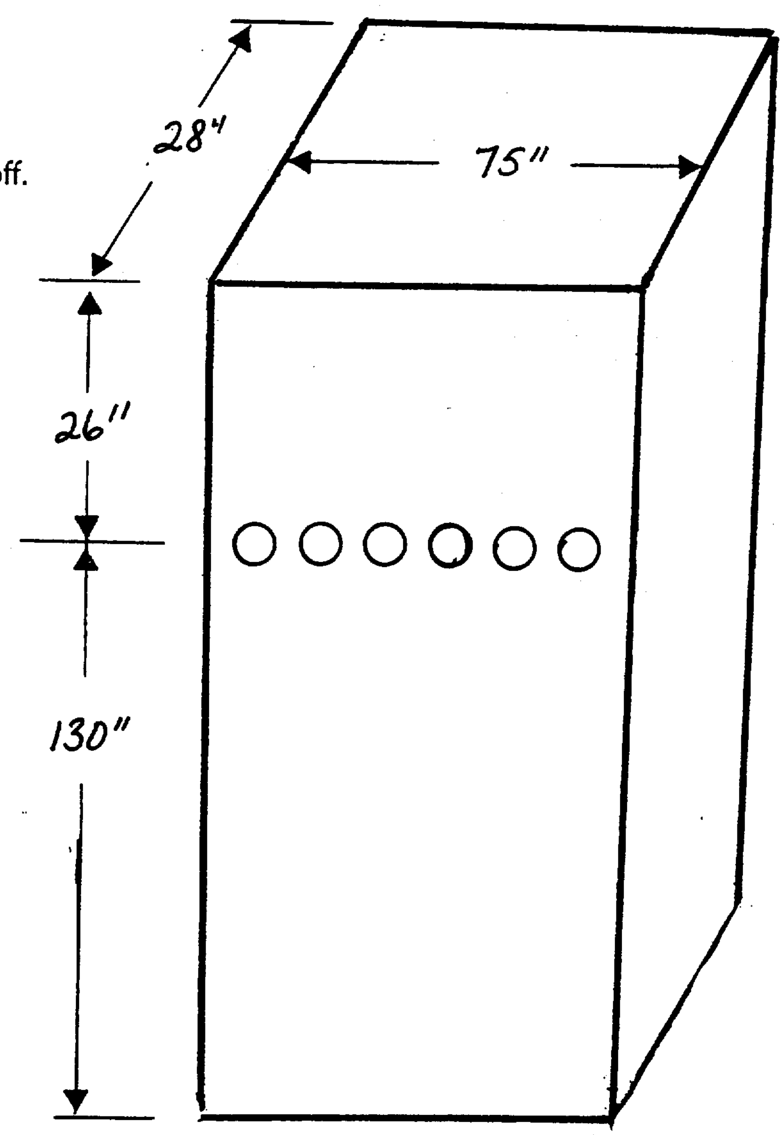
(a) Method Used: Method 12 source sampling was conducted in accordance with requirements of the U.S. Environmental Protection Agency as set forth in 39 FR 9314, March 8, 1974, 60.93, as amended.

(b) Problems Encountered: Run 1 was sampled at an isokinetic rate slightly above that allowed by the Method and high isokinetics tend to cause a low bias. However, since all three test runs were substantially below the allowable emissions limit, RAMCON Environmental Corporation recommends accepting all three test runs as demonstration of compliance with emissions limitations.

(c) Sampling Site: The emissions test was conducted after a baghouse on a rectangular stack measuring 28" x 75" with an equivalent diameter of 40.8". Six (6) sampling ports were placed 26" down (.63 diameters upstream) from the top of the stack and 130" up (3.19 diameters downstream) from the last flow disturbance. The ports were evenly spaced on 12.5" centers. The two outside ports are 6.3" from the side walls of the stack. Thirty (30) points were sampled, five (5) through each port for two (2) minutes each for a total testing time of sixty (60) minutes.

Points on a Diameter	Probe Mark*
1	7.8"
2	12.8"
3	17.8"
4	22.8"
5	27.8"

* Measurements include a 5" standoff.



SECTION B:

THE SOURCE

THE SOURCE

Valley Asphalt Corporation's plant no. 18 employs a Barber-Greene drum 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 halfway down the drum through a separate conveyor. The required amount of hot asphalt oil is then injected onto and mixed into the dried aggregate. The now newly formed hot asphalt mix is pulled to the top of a storage silo by a conveyor. 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 drum mixer uses a burner fired with no. 4 fuel oil to heat air to dry the aggregate, and the motion of the rotating drum to blend the aggregate. The air is drawn into the system via an exhaust fan. After passing through the gas burner and the mixing drum, the air passes through a baghouse. The baghouse is manufactured by Barber-Greene. The exhaust gases are 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 drum mixer.

DATA ON FACILITY BEING STACK TESTED 280 TPH

COMPANY NAME Valley AsPHalt COMPANY REP. ____ PHONE (___) ____

LOCATION OF FACILITY PikTon ORIGINAL START-UP DATE ____ DESIGNED CAPACITY ____

OEM ____ MODEL NO. ____ TYPE ____ AC TYPE ____

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	2 Fuel Use (#Fuel Oil, Nat. Gas, Propane, Coal, other)	3 Burner Setting	4 Blower Pressure	5 Production Rate 236 dry / 27 — Mix Aggregate TPH	5 Production Rate — RAP TPH	6 Asphalt Cement %	7 Mix Temp. °F	8 Exhaust Gas Temp. °F	9 Venturi Scrubber / Baghouse — Pressure Drop in w.g.	9 Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
~~7:15~~	[illegible]	80%		~~243~~	~~27~~		~~295~~		~~5~~				
~~7:30~~	#4	65%		~~228~~	~~26~~		~~300~~		~~5~~				
8:15	#4	80%		245	25		290		5				
8:30	#4	80%		243	27		290		5		72°		open
8:45	#4	80%		244	29		290		5		"		open
9:00	#4	80%		247	28		295		5		74°		open
9:15	#4	80%		246	27		290		5		"		open
											74°		open
10:00	#4	90%		242	29		290		5				
10:15	#4	90%		243	28		280		5		74°		open
10:30	#4	90%		243	28		285		5		75°		open
10:45	#4	95%		230	26		310		5		76°		open
11:00	#4	95%		229	27		305		5		78°		open
											78°		open
11:40	#4	100%		218	25		295		5				
11:55	#4	100%		220	26		290		5		82°		open
12:10	#4	100%		223	26		300		5		84°		open
12:25	#4	100%		225	25		300		5		84		open
2:40	#4	100%		231	26		300		5		84		open
											86		open

DATA SUMMARY ON STACK BEING TESTED

AGGREGATE

1. Name/type of mix 446 TY 2
2. Name/type of 2nd mix (if used) ____
3. Type/temperature of Liquid Asphalt A.C. 201 300 °F
4. Sieve/Screening analysis: 2" % Passing;

	1st mix / 2nd mix		1st mix / 2nd mix		1st mix / 2nd mix
1"	100 /	3/8"	/	#	/
3/4"	97 /	#200	/	#	/
1/2"	51 /	#	/	#	/

CONTROL SYSTEM

Manufacturer Baghouse Barber Green

A. Baghouse:

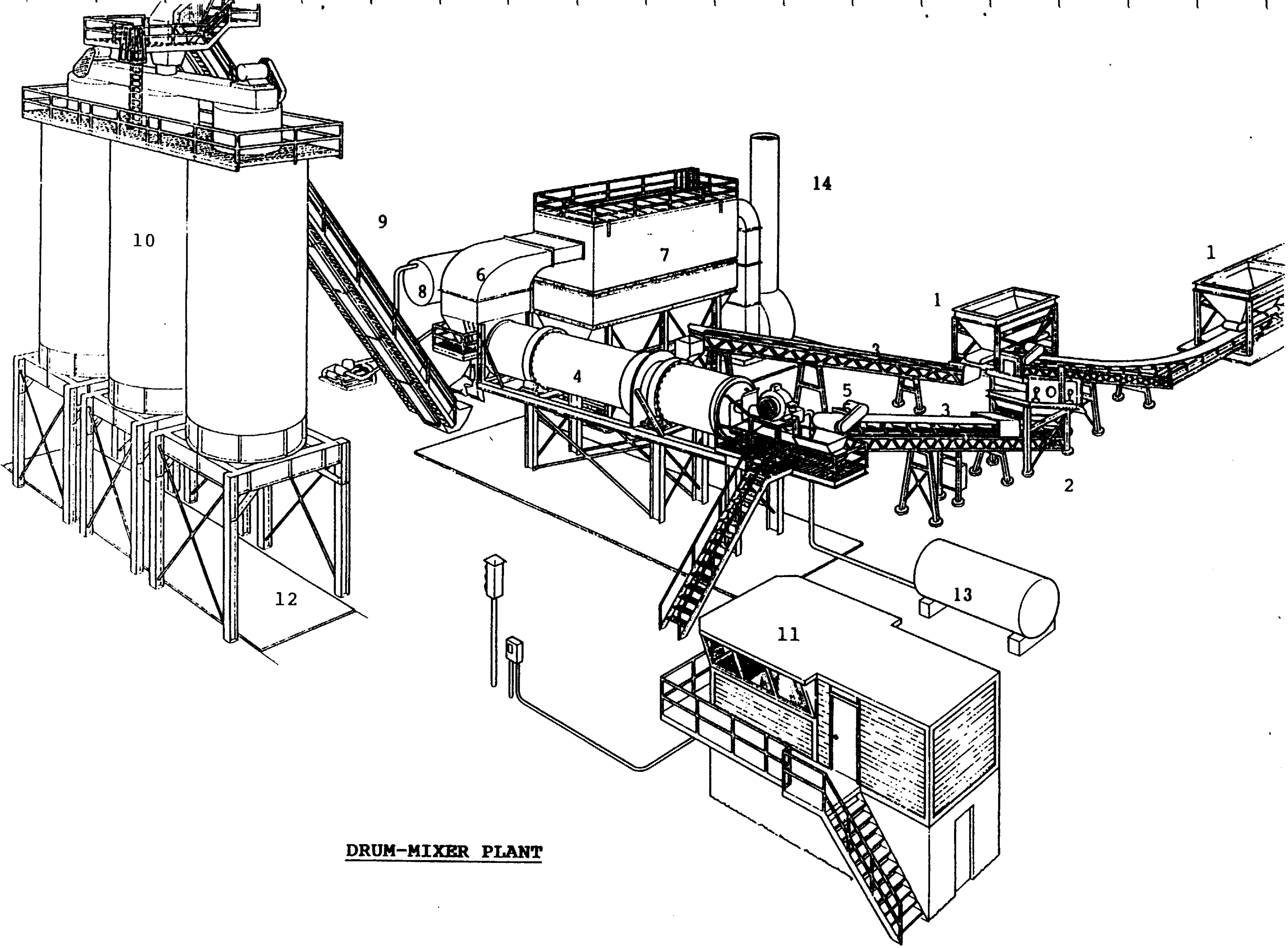
1. Type of bags Nomax # of bags 640 Sq. ft. of bags 7,536
2. Air to cloth ratio ____ Designed ACFM ____
3. Type of cleaning - pulse jet ✓ reverse air ____ plenum pulse ____ other ____
4. Cleaning cycle time ____ Interval between cleaning cycle 12 seconds
5. Pulse pressure on cleaning cycle 85 psi

B. Scrubber:

1. Type - Venturi ____ Wet Washer ____
   Spray Booth ____ Other ____
2. Gallons per minute through system ____
3. Water source ____ (i.e., pond, lagoon, etc.)
4. Number of spray nozzles ____

Company Name Valley Asphalt Corp Date 8-3-93

Company Representative Ed McLain



DRUM-MIXER PLANT

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

SECTION C:

EQUIPMENT USED

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 $\leq$ .001.

SECTION D:

LABORATORY PROCEDURES AND RESULTS

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 #18
Company Name

8-3-93
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:	$CO_{2\%}$	6.0	$CO_{2\%}$	6.2	$CO_{2\%}$	6.2	AVG.	
	$O_{2\%}$	12.0	$O_{2\%}$	12.4	$O_{2\%}$	12.2	AVG.	
	$N_{2\%}$		$N_{2\%}$		$N_{2\%}$		AVG.	
RUN 2:	$CO_{2\%}$	~~12.0~~ 6.8	$CO_{2\%}$	~~12.4~~ 6.8	$CO_{2\%}$	~~12.2~~ 6.2	AVG.	
	$O_{2\%}$	12.0	$O_{2\%}$	11.8	$O_{2\%}$	12.2	AVG.	
	$N_{2\%}$		$N_{2\%}$		$N_{2\%}$		AVG.	
RUN 3:	$CO_{2\%}$	6.0	$CO_{2\%}$	6.2	$CO_{2\%}$	6.2	AVG.	
	$O_{2\%}$	11.8	$O_{2\%}$	11.8	$O_{2\%}$	12.4	AVG.	
	$N_{2\%}$		$N_{2\%}$		$N_{2\%}$		AVG.	

Form REC#8

SAMPLE ANALYTICAL DATA FORM

Company Name Valley #18 5 & RM12 P.W

Sample Location Piketon, OHio

Blank Volume (V_a) 100 ml

Date/Time wt. blank 8/10 8:00Am

Date/Time wt. blank 8/10 2:00p

Relative Humidity in Lab 50 %

Density of Acetone (ρ_a) .7857 mg/ml

Gross wt. 100.1772 g

Gross wt. 100.1771 g

Ave. Gross wt. 100.1772 g

Tare wt. 100.1771 g

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

Acetone blank residue concentration (C_a) : (C_a) = (m_{ab}) / (V_a) (ρ_a) = (.000001 mg/g)

Acetone Blank Wt. : $W_a = C_a V_{aw} \rho_a$ = (.000001)(300)(.7857) = (.0002 g)

		Run # 1	Run # 2	Run # 3
Acetone rinse volume (V_{aw})	ml	300	300	300
Date/Time of wt. 8/10 8:00A Gross wt.	g	171.2183	170.7430	165.7167
Date/Time of wt. 8/10 2:00P Gross wt.	g	171.2180	170.7426	165.7163
Average Gross wt.	g	171.2182	170.7428	165.7165
Tare wt.	g	171.2014	170.7258	165.6863
Less Acetone blank wt. (W_a)	g	.0002	.0002	.0002
Weight of particulate in acetone rinse (m_a)	g	.0166	.0168	.0300

Filter Numbers	#	TS 00331	TS00258	TS00259
Date/Time of wt. 8/10 8:00A Gross wt.	g	1.6852	1.6822	1.7107
Date/Time of wt. 8/10 2:00P Gross wt.	g	1.6852	1.6821	1.7106
Average Gross wt.	g	1.6852	1.6822	1.7107
Tare wt.	g	1.6650	1.6609	1.6950

Weight of particulate on filter (m_f)	g	0.0202	0.0213	0.0157
Weight of particulate in acetone rinse (m_a)	g	0.0166	0.0168	0.0300
Total weight of particulate (m_n)	g	0.0368	0.0381	0.0457

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]

Signature of Analyst ______________ Signature of Reviewer [signature]

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

August 24, 1993

ATTN: Mr. Joe Sewell

Control No. 3574

Sample Description: Three (3) impinger solution and three (3) filter received on 8/11/93
Re: Valley #18, Asphalt
P.O. No. 080496

Result:

Sample Identification	Lead, mg
Run 1	0.055
Run 2	0.027
Run 3	0.029

Method: EPA Method 12

Enclosure: Analysis Protocol

SL/tj

RECEIVED AUG 26 1993

AMERICAN INTERPLEX CORPORATION

By Steven Lovell
Steven Lovell
Technical Director

SECTION E:

CALCULATIONS

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

SUMMARY OF TEST DATA

			08-03-93	08-03-93	08-03-93
			Run #1	Run #2	Run #3
		start	07:56	09:57	11:34
	SAMPLING TRAIN DATA	finish	09:06	11:03	12:41
1.	Sampling time, minutes	Θ	60.00	58.00	60.00
2.	Sampling nozzle diameter, inches	D_n	0.275	0.275	0.275
3.	Sampling nozzle cross-section area, ft^2	A_n	0.000412	0.000412	0.000412
4.	Isokinetic variation	I	111.9	106.1	106.1
5.	Sample gas volume — meter condition, cf	V_m	47.420	40.732	40.570
6.	Average meter temperature, °R	T_m	541	553	556
7.	Average orifice pressure drop, inches H_2O	ΔH	1.91	1.46	1.36
8.	Total particulate collected, mg.	M_n	36.80	38.10	45.70
	VELOCITY TRAVERSE DATA				
9.	Stack area, ft^2	A	14.58	14.58	14.58
10.	Absolute stack gas pressure, inches Hg.	P_s	29.50	29.50	29.50
11.	Barometric pressure, inches Hg.	P_{bar}	29.50	29.50	29.50
12.	Average absolute stack temperature, R°	T_s	756	754	748
13.	Average $\sqrt{}$vel. head, (C_p = .84)	$\sqrt{dP}$	0.78	0.74	0.71
14.	Average stack gas velocity, ft/second	V_s	55.19	52.58	50.38
	STACK MOISTURE CONTENT				
15.	Total water collected by train, ml	V_{lc}	358.40	348.90	357.40
16.	Moisture in stack gas, percent (%)	B_{ws}	26.78	29.72	30.43
	EMISSIONS DATA				
17.	Stack gas flow rate, dscf/hr	Q_{sd}	1,460,871.6	1,339,444.5	1,280,625.9
18.	Stack gas flow rate, cfm	acfm	48,290	46,006	44,081
19.	Particulate concentration, gr/dscf	C_s	0.0123	0.0151	0.0183
20.	Particulate concentration, lb/hr	E	2.56	2.90	3.35
	ORSAT DATA				
21.	Percent CO_2 by volume	CO_2	6.1	6.6	6.1
22.	Percent O_2 by volume	O_2	12.2	12.0	12.0
23.	Percent CO by volume	CO	0.0	0.0	0.0
24.	Percent N_2 by volume	N_2	81.7	81.4	81.9

Format: summryR3/19-000

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

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:

$$V_{m(std)} = (17.64)\ (1.008)\ (47.420) \left[\frac{(29.50) + \frac{1.91}{13.6}}{541}\right] = 46.196 \quad \text{dscf}$$

Run #2:

$$V_{m(std)} = (17.64)\ (1.008)\ (40.732) \left[\frac{(29.50) + \frac{1.46}{13.6}}{553}\right] = 38.777 \quad \text{dscf}$$

Run #3:

$$V_{m(std)} = (17.64)\ (1.008)\ (40.570) \left[\frac{(29.50) + \frac{1.36}{13.6}}{556}\right] = 38.404 \quad \text{dscf}$$

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

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 matter in stack gas, dry basis, corrected to standard conditions, gr/dscf.
- M_n = Total amount of particulate matter collected, mg.
- $V_{m(std)}$ = Dry gas volume through meter at standard conditions, cu. ft.

Run #1:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{36.80}{46.196}\right] = 0.0123\ \text{gr/dscf}$$

Run #2:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{38.10}{38.777}\right] = 0.0151\ \text{gr/dscf}$$

Run #3:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{45.70}{38.404}\right] = 0.0183\ \text{gr/dscf}$$

Format: csR3/03-004

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

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 collected, mg.

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

Run #1:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{0.055}{46.196}\right] = 1.83 \times 10^{-5}\ \text{gr/dscf}$$

Run #2:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{0.027}{38.777}\right] = 1.07 \times 10^{-5}\ \text{gr/dscf}$$

Run #3:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{0.029}{38.404}\right] = 1.16 \times 10^{-5}\ \text{gr/dscf}$$

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

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:

$$M_d = 0.44\ (6.1\%) + 0.32\ (12.2\%) + 0.28\ (.00\% + 81.7\%) = 29.47\ \frac{lb}{lb\text{-}mole}$$

Run #2:

$$M_d = 0.44\ (6.6\%) + 0.32\ (12.0\%) + 0.28\ (.00\% + 81.4\%) = 29.54\ \frac{lb}{lb\text{-}mole}$$

Run #3:

$$M_d = 0.44\ (6.1\%) + 0.32\ (12.0\%) + 0.28\ (.00\% + 81.9\%) = 29.46\ \frac{lb}{lb\text{-}mole}$$

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

WATER VAPOR CONDENSED

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

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

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:

$$V_{wc(std)} = (0.04707)\ (\ 350.00\ ) = 16.5\ \text{cu. ft}$$
$$V_{wsg(std)} = (0.04715)\ (\ 8.40\ ) = 0.4\ \text{cu. ft}$$

Run #2:

$$V_{wc(std)} = (0.04707)\ (\ 342.00\ ) = 16.1\ \text{cu. ft}$$
$$V_{wsg(std)} = (0.04715)\ (\ 6.90\ ) = 0.3\ \text{cu. ft}$$

Run #3: ~

$$V_{wc(std)} = (0.04707)\ (\ 350.00\ ) = 16.5\ \text{cu. ft}$$
$$V_{wsg(std)} = (0.04715)\ (\ 7.40\ ) = 0.3\ \text{cu. ft}$$

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

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:

$$B_{ws} = \frac{16.5 + 0.4}{16.5 + 0.4 + 46.196} \times 100 = 26.78\ \%$$

Run #2:

$$B_{ws} = \frac{16.1 + 0.3}{16.1 + 0.3 + 38.777} \times 100 = 29.72\ \%$$

Run #3:~

$$B_{ws} = \frac{16.5 + 0.3}{16.5 + 0.3 + 38.404} \times 100 = 30.43\ \%$$

Format: bwsR3/19-001

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

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:

$$M_s = 29.47\,(1 - 0.2678) + 18\,(0.2678) = 26.40\ \frac{lb}{lb\text{-}mole}$$

Run #2:

$$M_s = 29.54\,(1 - 0.2972) + 18\,(0.2972) = 26.11\ \frac{lb}{lb\text{-}mole}$$

Run #3:

$$M_s = 29.46\,(1 - 0.3043) + 18\,(0.3043) = 25.97\ \frac{lb}{lb\text{-}mole}$$

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

STACK GAS VELOCITY

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

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:

$$V = (85.49)\;(0.84)\;(0.78)\;\sqrt{\frac{756}{(29.50)\;(26.40)}} = 55.19 \text{ ft/sec}$$

Run #2:

$$V = (85.49)\;(0.84)\;(0.74)\;\sqrt{\frac{754}{(29.50)\;(26.11)}} = 52.58 \text{ ft/sec}$$

Run #3:

$$V = (85.49)\;(0.84)\;(0.71)\;\sqrt{\frac{748}{(29.50)\;(25.97)}} = 50.38 \text{ ft/sec}$$

Format: vsR3/19-003

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

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 (ft²).
- 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} =

$$3600 \; (1 - 0.2678) \; (55.19) \; (14.58) \left[\frac{528}{756} \right] \left[\frac{29.50}{29.92} \right] = 1{,}460{,}871.6 \; \frac{dscf}{hr}$$

Run #2: Q_{sd} =

$$3600 \; (1 - 0.2972) \; (52.58) \; (14.58) \left[\frac{528}{754} \right] \left[\frac{29.50}{29.92} \right] = 1{,}339{,}444.5 \; \frac{dscf}{hr}$$

Run #3: Q_{sd} =

$$3600 \; (1 - 0.3043) \; (50.38) \; (14.58) \left[\frac{528}{748} \right] \left[\frac{29.50}{29.92} \right] = 1{,}280{,}625.9 \; \frac{dscf}{hr}$$

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

EMISSIONS RATE FROM STACK

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

Where:

E = Emissions rate, lbs/hr.

C_s = Concentration of particulate matter 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:

$$E = \frac{(0.0123)\ (1{,}460{,}871.6)}{7000} = 2.56\ lb/hr$$

Run #2:

$$E = \frac{(0.0151)\ (1{,}339{,}444.5)}{7000} = 2.90\ lb/hr$$

Run #3:~

$$E = \frac{(0.0183)\ (1{,}280{,}625.9)}{7000} = 3.35\ lb/hr$$

NAME: Valley Asphalt Plant No. 18
LOCATION: Piketon, Ohio

DATE: August 3, 1993

LEAD
EMISSIONS RATE FROM STACK

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

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:

$$E = \frac{(1.83 \times 10^{-5}) \quad (1{,}460{,}871.6)}{7{,}000} = 0.0038 \text{ lbs/hr}$$

Run #2:

$$E = \frac{(1.07 \times 10^{-5}) \quad (1{,}339{,}444.5)}{7{,}000} = 0.0020 \text{ lbs/hr}$$

Run #3:

$$E = \frac{(1.16 \times 10^{-5}) \quad (1{,}280{,}625.9)}{7{,}000} = 0.0021 \text{ lbs/hr}$$

NAME: Valley Asphalt Plant No. 18 **DATE:** August 3, 1993
LOCATION: Piketon, Ohio

ISOKINETIC VARIATION

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

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_{ic} = 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.
- Y_i = Calibration factor.

Run #1:

$$\mathbf{I = (100)\ (756)} \left[\frac{(0.002669)\ (358.40) + \frac{(1.008)\ (47.420)}{541}\left[29.50 + \frac{1.91}{13.6}\right]}{60\quad (\ 60.00\ )\quad (\ 55.19\ )\quad (\ 29.50\ )\quad (\ 0.000412\ )} \right] = \mathbf{111.9\%}$$

Run #2:

$$\mathbf{I = (100)\ (754)} \left[\frac{(0.002669)\ (348.90) + \frac{(1.008)\ (40.732)}{553}\left[29.50 + \frac{1.46}{13.6}\right]}{60\quad (\ 58.00\ )\quad (\ 52.58\ )\quad (\ 29.50\ )\quad (\ 0.000412\ )} \right] = \mathbf{106.1\%}$$

Run #3:

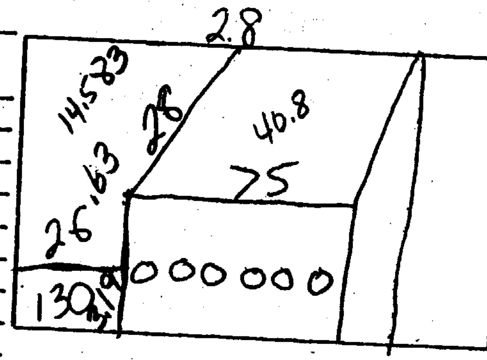
$$\mathbf{I = (100)\ (754)} \left[\frac{(0.002669)\ (357.40) + \frac{(1.008)\ (40.570)}{556}\left[29.50 + \frac{1.36}{13.6}\right]}{60\quad (\ 60.00\ )\quad (\ 50.38\ )\quad (\ 29.50\ )\quad (\ 0.000412\ )} \right] = \mathbf{106.1\%}$$

SECTION F:

FIELD DATA

RAMCON ENVIRONMENTAL CORPORATION

Plant: Valley / #18
Location: Pikeville, Ohio
Operator: [illegible]
Date: 8-3-93
Run No.: 1
Sample Box No.: 1
Meter Box No.: C-282
Meter H @: 1.53
C Factor: 1.008
Pitot Tube Coefficient Cp: .84



Schematic of Stack Cross Section

Ambient Temperature: 60
Barometric Pressure: 29.50
Assumed Moisture, %: 15
Probe Length, m(ft): 3 ft
Nozzle Identification No.: 0004125
Avg. Calibrated Nozzle Dia., (in.): .275/.275/.275
Probe Heater Setting: 2
Leak Rate, m^3/min. (cfm): .01 at 15 in Hg
Probe Liner Material: stainless steel
Static Pressure, mm Hg (in. Hg): +.02
Filter No.: TS-00331

	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL	550	336.3
INITIAL	200	327.9
DIFFERENCE	350	8.4

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	7:56 / 7:58	2	299	.15	.42	18.2 / 19.0	76	60	225	57
2	8:00	2	299	.15	.42	19.8	76	60	225	57
3	8:02	2	299	.15	.42	20.6	80	60	225	57
4	8:04	2	299	.15	.42	21.4	80	60	225	57
5	8:06	2	298	.15	.42	22.2	80	60	225	57
1	8:09 / 8:11	2	296	.20	.56	23.0	82	60	225	57
2	8:13	2	300	.25	.70	24.2	90	60	225	55
3	8:15	2	300	.35	.98	25.2	90	60	225	55
4	8:17	2	290	.35	.98	26.4	96	64	225	53
5	8:19	2	292	.38	1.1	27.8	96	64	225	53
1	8:21 / 8:23	2	292	.42	1.2	29.0	92	64	225	56
2	8:25	2	302	.53	1.5	30.2	100	66	225	54
3	8:27	2	302	.58	1.6	32.0	100	66	225	54

Form #REC-05

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 8-3-93 LOCATION Pikeboroki TEST NO. 1

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM in 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)
4	8:29	3	292	.63	1.8	33.5	104	68	228	55
5	8:31	3	292	.52	1.5	35.3	104	68	228	55
1	~~8:33~~ 8:35	4	292	.87	2.4	37.1	104	68	228	55
2	8:37	4	292	.87	2.4	38.9	104	68	228	55
3	8:39	4	292	.87	2.4	40.6	104	68	228	55
4	8:41	4	292	.85	2.4	43.1	104	68	228	55
5	8:43	4	292	.85	2.4	44.7	104	68	228	55
1	~~8:44~~ 8:46	5	298	1.1	3.1	47.1	104	68	248	63
2	8:48	5	298	1.1	3.1	48.5	104	70	248	64
3	8:50	5	312	1.0	2.8	50.7	104	70	248	64
4	8:52	5	300	1.0	2.8	52.5	104	70	260	64
5	8:54	5	300	1.0	2.8	54.7	106	70	260	64
1	~~8:55-30~~ 8:57-30	5	291	1.1	3.1	56.6	100	70	260	64
2	8:59-30	5	291	1.2	3.4	58.9	100	70	260	63
3	9:01-30	5	290	1.2	3.4	60.9	100	70	260	63
4	9:03-30	5	290	1.2	3.4	63.0	104	70	260	63
5	9:05-30	5	290	1.2	3.4	65.620	104	70	260	63

RAMCON ENVIRONMENTAL CORPORATION

Plant: Valley #18 — 2.4

Location: Piketon Ohio
Operator: Allen Turner
Date: 8-3-93
Run No.: 2
Sample Box No.: 1
Meter Box No.: C-282
Meter H @: 1.53
C Factor: 1.008
Pitot Tube Coefficient Cp: .84

Ambient Temperature: 60
Barometric Pressure: 29.50
Assumed Moisture, %: 15
Probe Length, m(ft): 3 ft
Nozzle Identification No.: .0004125
Avg. Calibrated Nozzle Dia., (in.): .275/.275/.275
Probe Heater Setting: 2
Leak Rate, m^3/min. (cfm): .005 at 9 in.
Probe Liner Material: stainless steel
Static Pressure, mm Hg (in. Hg): +.01
Filter No.: TS-00258

	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL	542	408.7
INITIAL	200	401.8
DIFFERENCE	342	6.9

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 H2O	PRESSURE DIFF. ORF. MTR in H2O	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	9:57 / 9:59	3	320	1.1	2.4	66.5 / 69.1	94	78	225	65
2	10:01	3	320	1.1	2.4	70.6	104	78	225	65
3	10:03	3	320	1.1	2.4	72.1	104	78	225	65
4	10:05	3	318	1.0	2.4	73.4	108	78	225	65
5	10:07	3	312	.80	1.9	75.6	108	78	225	65
1	10:08:30 / 10:10:30	3	300	1.0	2.4	77.1	100	78	240	68
2	10:12:30	3	300	.98	2.4	79.1	100	80	240	65
3	10:14-30	3	299	.98	2.4	80.8	100	80	240	65
4	10:16-30	3	298	.98	2.4	82.8	100	80	240	65
5	10:18:30	3	298	.98	2.4	84.9	106	80	254	62
1	10:20 / 10:22	2	298	.25	1.8	86.5	106	80	244	62
2	10:24	2	290	.80	1.9	88.0	110	80	244	62
3	10:26	2	280	.80	1.9	89.5	110	80	244	62

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 8-3-93 LOCATION P-k-ly Glen TEST NO. 2

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM in Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME Vm (ft^3)	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
5	10:28	2	285	.85	2.0	91.7	110	80	250	61
1	~~10:30-30~~ 10:32-30	2	285	.45	1.1	92.5	106	80	251	66
2	10:34-30	2	285	.48	1.2	94.7	110	80	265	64
3	10:36-30	2	280	.52	1.2	96.1	110	80	265	64
4	10:38-30	2	280	.52	1.2	97.3	112	80	265	64
5	10:40-30	2	282	.43	1.0	98.7	114	x80	265	64
1	~~10:42~~ 10:44	2	282	.18	.36	99.4	106	80	260	64
2	10:46	2	293	.20	.48	100.4	110	80	260	64
3	10:48	2	293	.30	.72	101.3	110	80	254	64
4	10:50	2	285	.30	.72	102.3	112	80	254	64
5	10:52	2	285	.30	.72	103.6	112	80	253	61
1	~~10:53~~ 10:55	2	288	.15	.36	104.5	110	80	253	61
2	10:57	2	288	.15	.36	105.1	110	80	253	61
3	10:59	2	288	.15	.36	105.2	110	80	253	61
4	11:01	2	288	.15	.36	106.5	110	80	253	61
5	11:03	2	288	.15	.36	107.232	110	80	253	61

RAMCON ENVIRONMENTAL CORPORATION

Plant: Valley II 18
Location: Piketon Ohio
Operator: Allen Jones
Date: 8-3-93
Run No.: 13
Sample Box No.: 1
Meter Box No.: C-282
Meter H @: 1.53
C Factor: 1.006
Pitot Tube Coefficient Cp: .84

2.4

Schematic of Stack Cross Section

Ambient Temperature: 60
Barometric Pressure: 29.50
Assumed Moisture, %: 15
Probe Length, m(ft): 3 ft
Nozzle Identification No.: 0004125
Avg. Calibrated Nozzle Dia., (in.): .275/.275/.275
Probe Heater Setting: 2
Leak Rate, m^3/min.(cfm): 0 at 9 in Hg
Probe Liner Material: stainless steel
Static Pressure, mm Hg(in.Hg): +.02
Filter No.: TS-00259

	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL	550	460.2
INITIAL	200	452.8
DIFFERENCE	350	7.4

TRAV. PT NO.	SAMPLING TIME (θ)min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Ps) in H2O	PRESSURE DIFF. ORF. MTR in H2O	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	11:34 / 11:36	4	280	.95	2.3	102.4 / 109.0	102	80	225	63
2	11:38	4	285	.95	2.3	111.1	102	80	225	63
3	11:40	4	285	.95	2.3	112.5	106	80	230	63
4	11:42	4	285	.95	2.3	114.3	108	80	230	63
5	11:44	4	290	1.0	2.4	116.4	110	80	230	63
1	11:45 / 11:47	4	288	.95	2.3	118.5	110	80	230	63
2	11:49	4	288	.90	2.2	120.3	110	80	230	63
3	11:51	4	299	.90	2.2	121.5	112	80	230	63
4	11:53	4	299	.90	2.2	123.5	112	80	230	63
5	11:55	4	299	.90	2.2	125.4	112	80	230	63
1	11:56:30 / 11:58:30	4	301	.75	1.8	127.0	112	80	230	63
2	12:00:30	4	301	.75	1.8	128.6	116	80	230	63
3	12:02:30	4	301	.75	1.8	130.3	116	80	230	63

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 8-3-93 LOCATION [illegible] TEST NO. 3

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM in 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)
4	12:04-30	4	300	.25	1.8	131.9	116	80	225	60
5	12:06-30	4	300	.70	1.7	133.6	116	80	225	60
1	~~12:08~~ 12:10	3	290	.48	.96	134.7	112	80	250	60
2	12:12	3	285	.47	1.1	136.1	112	80	254	63
3	12:14	3	283	.47	1.1	137.4	112	80	254	63
4	12:16	3	283	.50	1.2	138.6	112	80	254	63
5	12:18	3	283	.50	1.2	140.1	112	80	254	63
1	~~12:19-30~~ 12:21-30	3	283	.15	.36	141.0	112	80	254	63
2	12:23-30	3	283	.16	.36	141.8	112	80	255	60
3	12:25-30	3	283	.15	.36	142.1	112	80	255	60
4	12:27-30	3	283	.15	.36	143.2	112	80	255	60
5	12:29-30	3	283	.15	.36	144.1	112	80	255	60
1	~~12:30-30~~ 12:32-30	3	280	.15	.36	144.7	112	80	255	60
2	12:34-30	3	280	.15	.36	145.5	112	80	256	60
3	12:36-30	3	280	.15	.36	146.4	112	80	255	60
4	12:38-30	3	280	.15	.36	147.0	112	80	255	60
5	12:40-30	3	280	.15	.36	147.970	112	80	255	60

SECTION G:

CALIBRATION

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

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. 34 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 $C_p(s)-\bar{C}_p(A)$
1	2.2	3.3	.837	.003
2	1.8	2.0	.837	.003
3	1.1	1.6	.829	.005
		$\bar{C}_p$ (SIDE A)	.834	

"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 $C_p(s)-\bar{C}_p(B)$
1	2.2	3.0	.837	.003
2	1.8	2.0	.837	.003
3	1.1	1.6	.829	.005
		$\bar{C}_p$ (SIDE B)	.834	

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

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

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

Form No. EED-17-1

RAMCON

Lear Siegler Stack Sampler

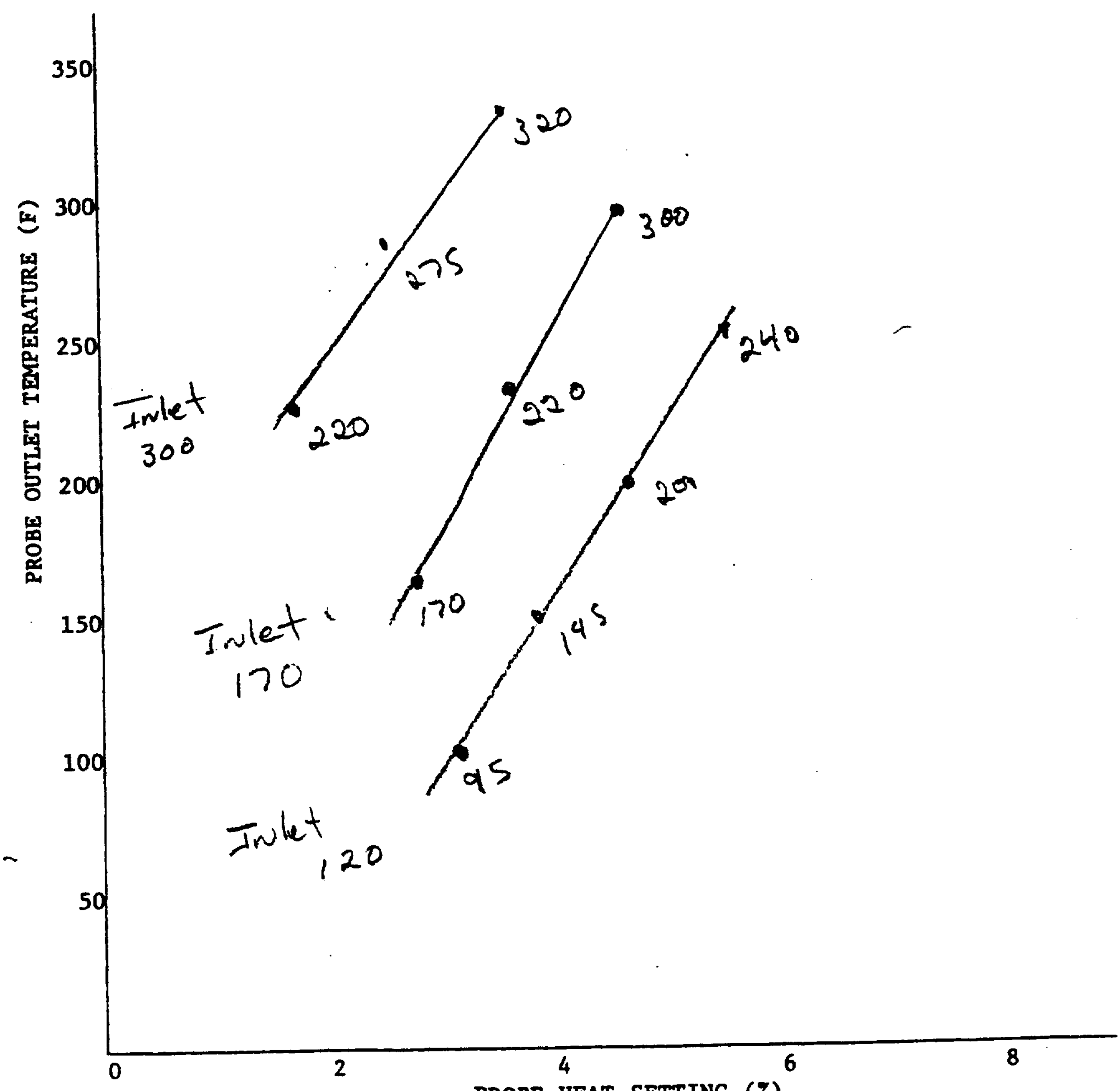
Heating Probe Calibration

Probe No. 34 Probe Length 3'

Date of Calibration 5-5-89 Signature San 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

RAMCON ENVIRONMENTAL CORPORATION

Date 5-8-90 Thermocouple number 34

Ambient temperature 81 °F Barometric pressure 29.96 in. Hg

Calibrator Tommy Reference: mercury-in-glass ✓

other ______

Reference point number[a]	Source[b] (specify)	Reference Thermometer Temperature, °C	Thermocouple Potentiometer Temperature, °C	Temperature Difference,[c] %
Boiling H2O		212°F	212°F	0
Boiling OIL		413°F	410°F	0.73
Ice H2O		32°F	32°F	0
Ambient Temp		81°F	81°F	0

[a]Every 30°C (50°F) for each reference point.

[b]Type of calibration system used.

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

Figure 2.5 stack temperature sensor calibration data form.

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English Units)

Test No. ________ Date 7/31 Meter Box No. 0-282 Plant No. ________

Barometric Pressure P_b = 29.75 in.Hg Dry Gas Meter No. 147 810 Pretest Y ________

Orifice Manometer Setting (ΔH), in. H_2O	Gas Volume: Wet Test Meter (V_w) ft³	Gas Volume: Dry Gas Meter (V_d) ft³	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 Avg.† (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	1002.812 / 1017.995	90	125 / 132	96 / 96	112	8.2	5	1.001	1.515
2.0	~~10~~ 11	990.262 / 1001.475	90	122 / 128	88 / 88	106	12.8	5	1.004	~~[illegible]~~ 1.542
3.0	10	1001.844 / 1012.020	90	132 / 138	92 / 94	114	9.53	5	1.018	1.530
									Y = 1.008	1.53

† 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, ft³.
- V_d – Gas volume passing through the dry gas meter, ft³.
- 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 ± 0.05Y.
- P_b – Barometric pressure, in. Hg.
- Θ – Time of calibration run, minutes.

SECTION H:

RAMCON PERSONNEL

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English Units)

Test No. ______ Date 9-3-93 Meter Box No. C-282 Plant No. ______

Barometric Pressure P_b = 29.95 in.Hg Dry Gas Meter No. 147910 Pretest Y ______

	Orifice Manometer Setting (ΔH), in. H_2O	Gas Volume: Wet Test Meter (V_w) ft³	Gas Volume: Dry Gas Meter (V_d) ft³	Temperature: Wet Test Meter (t_w) °F	Dry Gas Meter: Inlet (t_{d_i}) °F	Dry Gas Meter: Outlet (t_{d_o}) °F	Dry Gas Meter: Avg.† (t_d) °F	Time (Θ) min	Vacuum Setting in. Hg	Y_i	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
0.216	3.0	10	682.358 / 692.574	78	108 / 112	80 / 80	97.5	9.71		1.00	ΔH@ 1.55
0.25	2.0	10	692.814 / 703.061	78	108 / 126	80 / 84	99.5	12.10		1.00	1.60
.195	1.0	~~10~~ 5	703.263 / 708.459	78	110 / 122	82 / 94	99.5	8.37		.998	1.53
										Y = .999	ΔH@ 1.56

† 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, ft³.
- V_d = Gas volume passing through the dry gas meter, ft³.
- 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 ± 0.05Y.
- P_b = Barometric pressure, in. Hg.
- Θ = Time of calibration run, minutes.

Name: Mr. Sumner Buck
Title: President

Qualifications: Mr. Buck is a graduate of the University of Mississippi with graduate studies at Memphis State University and State Technical Institute of Memphis. He is a graduate of the EPA 450 "Source Sampling for Particulate Pollutant's" course and the 474 "Continuous Emissions Monitoring" courses outlined by EPA at Research Triangle Park, N.C. He has been directly involved in conducting and supervising air emission testing for over 15 years. He has personally conducted over 400 air emission tests. He currently sponsors and directs visual emission certification schools for US EPA Method 9.

Project Duties: Mr. Buck is responsible for the overall supervision of each testing project. This includes the correspondence to the State Regulatory Agency and the plant personnel regarding scheduling, testing requirements, etc. He will assist in supervision of the project preparation for each team involved and the overall organization between the testing crew(s) and facility.

Name: Mr. Joe Sewell
Title: Vice President

Qualifications: Mr. Sewell is currently serving as the Vice President of RAMCON Environmental Corporation. Mr. Sewell is a graduate of Christian Brothers University in Memphis, Tennessee where he obtained a Bachelor of Science degree in Chemical Engineering. He has conducted and supervised air emissions testing projects ranging a broad spectrum of facility process categories. His accomplishments include the development of the instrumental branch of emissions testing utilizing continuous emission monitors and gas chromatography. Mr. Sewell performs a major role in the upgrading of testing capabilities and professional quality that RAMCON Environmental Corporation offers.

Project Duties: Mr. Sewell provides staff engineering and project administration to ensure the integrity of the requested services. He serves as the primary contact person for RAMCON Environmental Corporation handling all correspondence between the facility personnel involved in the project and respective state agency representative(s). He provides project leadership to

RAMCON Environmental Corporation field supervisors and managers involved in the testing project.

Name: Mr. Ray Jenkins
Title: Source Sampling Director

Qualifications: Mr. Jenkins is serving as the Source Sampling Director for RAMCON Environmental Corporation. He was promoted to this leadership position after gaining a significant amount of experience in conducting and providing field supervision of a variety of air testing projects. Mr. Jenkins has personally conducted and/or supervised all of the prevalent EPA approved procedures with expertise in the instrumental analyzer procedures. He graduated from Memphis State University obtaining a Bachelor of Science degree in Biology. He is also currently certified to conduct US EPA Reference Method 9 for the visual determination of emission opacity.

Project Duties: Mr. Jenkins provides project leadership to the Team Leaders and Field Technicians. He ensures the test crew(s) involved in the test project will be properly informed to his respective duties and responsibilities during the testing process. Mr. Jenkins also serves as the Quality Assurance/Quality Control Coordinator and provides guidance in QA/QC to each Team Leader with regard to sample integrity.

Name: Mr. Tommy South
Title: Laboratory Technician

Qualifications: Mr. South is currently serving as Laboratory Technician. He is proficient in conducting many analysis procedures such as front and back-half particulate analysis, titrations, extractions, etc.

Project Duties: Mr. South conducts the laboratory analysis on the particulate samples. He is also responsible for accepting the remaining field samples from the Field Sample Bank Manager and performing inspection as to integrity. He documents the transfer on the chain of custody forms and distributed the subcontracted samples to the respective laboratories.

Name: Mr. Allen Turner
Title: Team Leader

Qualifications: Mr. Turner has been employed with RAMCON Environmental Corporation for five years. Altogether, he has sampled approximately 300 stacks of all types. Mr. Turner became qualified for a Team Leader in 1988 and has served as such since that time. He is a current V.E. reader and continues his studies at State Technical Institute in Memphis, Tennessee. Mr. Turner has extensive experience in EPA Methods 1-9.

Project Duties: Mr. Turner is responsible for isokinetic sampling procedures, including but not limited to, Method 5 for particulate, multi-metals, PAH, calibration and cleaning of necessary equipment for his testing. His duties on-site include assembling the sample train, leak checking the system, operation of the train and recording the test data on the field data forms.

SECTION I:

VISIBLE EMISSIONS

709 Run # 1

SOURCE NAME: Valley Asphalt Corp

ADDRESS: Plant # 18

CITY: Piketon **STATE:** Ohio **ZIP:**

PHONE: **SOURCE ID NUMBER:** -

PROCESS EQUIPMENT: Asphalt - Batch **OPERATING MODE:**

CONTROL EQUIPMENT: Baghouse **OPERATING MODE:**

DESCRIBE EMISSION POINT: Metal Stack (Rectangular)

HEIGHT ABOVE GROUND LEVEL: 35' **HEIGHT RELATIVE TO OBSERVER:** 35'

DISTANCE FROM OBSERVER: 169' **DIRECTION FROM OBSERVER:** WNW

DESCRIBE EMISSIONS: Lofting plume

EMISSION COLOR: Silver Gray **PLUME TYPE:** CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐

WATER DROPLETS PRESENT: NO ☒ YES ☐ **IS WATER DROPLET PLUME:** ATTACHED ☐ DETACHED ☒

AT WHAT POINT IN THE PLUME WAS OPACITY DETERMINED: Stack Outlet

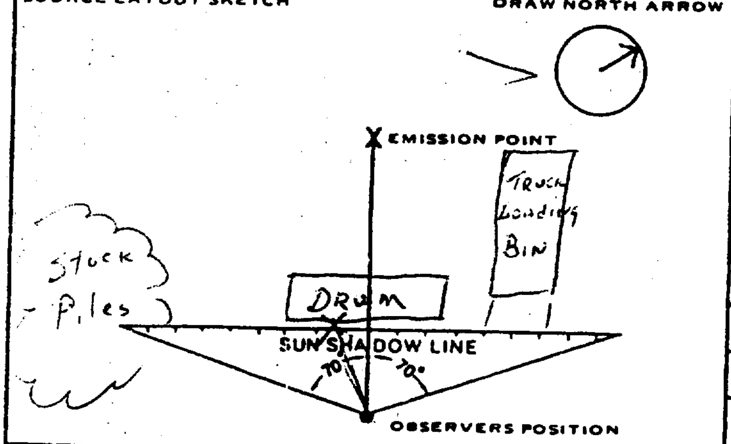
DESCRIBE BACKGROUND: Sky

BACKGROUND COLOR: Blue **SKY CONDITIONS:** Partly Cloudy

WIND SPEED: 3-5 mph **WIND DIRECTION:** SSW

AMBIENT TEMPERATURE: 64° F **RELATIVE HUMIDITY:**

SOURCE LAYOUT SKETCH **DRAW NORTH ARROW**



OBSERVATION DATE: Aug 3, 1993 **START TIME:** 8:00 AM **STOP TIME:** 9:00 AM

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

AVERAGE OPACITY FOR HIGHEST PERIOD: 3.13 **NUMBER OF READINGS ABOVE** 3.13 **% WERE** 15

RANGE OF OPACITY READINGS MINIMUM 0 MAXIMUM 5

COMMENTS: Sunglasses Worn

OBSERVER'S NAME (PRINT): Earl Crock

OBSERVER'S SIGNATURE: Earl Crock **DATE:** 8-3-93

ORGANIZATION:

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE:

TITLE: **DATE:**

CERTIFIED BY: **DATE:**

VERIFIED BY: **DATE:**

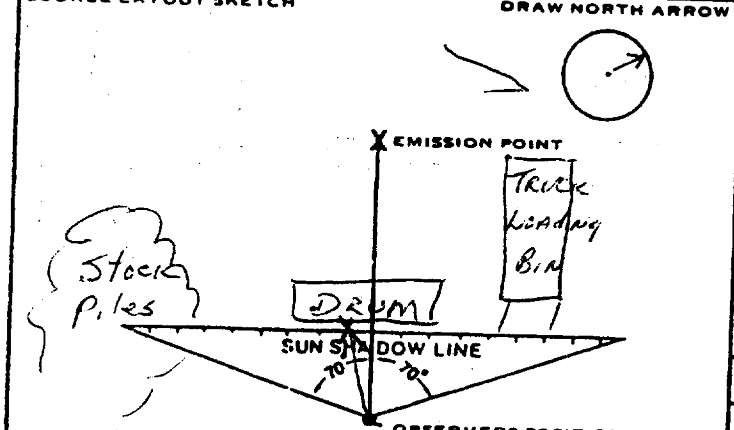
EPA 1R 0301

REC#14

RUN #2

Field	Entry
SOURCE NAME	Valley Asphalt Corp
ADDRESS	Plant #18
CITY	Piketon
STATE	Ohio
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	Asphalt - Batch
OPERATING MODE	
CONTROL EQUIPMENT	Baghouse
OPERATING MODE	
DESCRIBE EMISSION POINT	Metal Stack (Rectular)
HEIGHT ABOVE GROUND LEVEL	35'
HEIGHT RELATIVE TO OBSERVER	35'
DISTANCE FROM OBSERVER	169'
DIRECTION FROM OBSERVER	WNW
DESCRIBE EMISSIONS	Lofting Plume
EMISSION COLOR	Silver Gray
PLUME TYPE	CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT	NO ☒ YES ☐
IS WATER DROPLET PLUME	ATTACHED ☐ DETACHED ☒
AT WHAT POINT IN THE PLUME WAS OPACITY DETERMINED	Stack Outlet
DESCRIBE BACKGROUND	Overcast Sky
BACKGROUND COLOR	Gray
SKY CONDITIONS	Overcast Clouds
WIND SPEED	0-3 mph
WIND DIRECTION	SSW
AMBIENT TEMPERATURE	74° F
RELATIVE HUMIDITY	

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



COMMENTS: Sunglasses Worn

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TITLE

DATE

OBSERVATION DATE	START TIME	STOP TIME
Aug 3 1993	9:50 AM	10:50 AM

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

AVERAGE OPACITY FOR HIGHEST PERIOD: 2.92

NUMBER OF READINGS ABOVE 2.92 % WERE 14

RANGE OF OPACITY READINGS: MINIMUM 0 MAXIMUM 5

OBSERVER'S NAME (PRINT): Earl Crook

OBSERVER'S SIGNATURE: Earl Crook

DATE: 8-3-93

ORGANIZATION:

CERTIFIED BY: DATE:

VERIFIED BY: DATE:

EPA (illegible form number)

REC#14

RUN # 3

SOURCE NAME: Valley Asphalt Corp

ADDRESS: Plant # 18

CITY: Piketon | **STATE:** Ohio | **ZIP:**

PHONE: | **SOURCE ID NUMBER:**

PROCESS EQUIPMENT: Asphalt - Batch | **OPERATING MODE:**

CONTROL EQUIPMENT: Baghouse | **OPERATING MODE:**

DESCRIBE EMISSION POINT: Metal Stack

HEIGHT ABOVE GROUND LEVEL: 35' | **HEIGHT RELATIVE TO OBSERVER:** 35'

DISTANCE FROM OBSERVER: 169' | **DIRECTION FROM OBSERVER:** WNW

DESCRIBE EMISSIONS: Lofting Plume

EMISSION COLOR: Silver Gray | **PLUME TYPE:** CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐

WATER DROPLETS PRESENT: NO ☒ YES ☐ | **IS WATER DROPLET PLUME:** ATTACHED ☐ DETACHED ☒

AT WHAT POINT IN THE PLUME WAS OPACITY DETERMINED: Stack Outlet

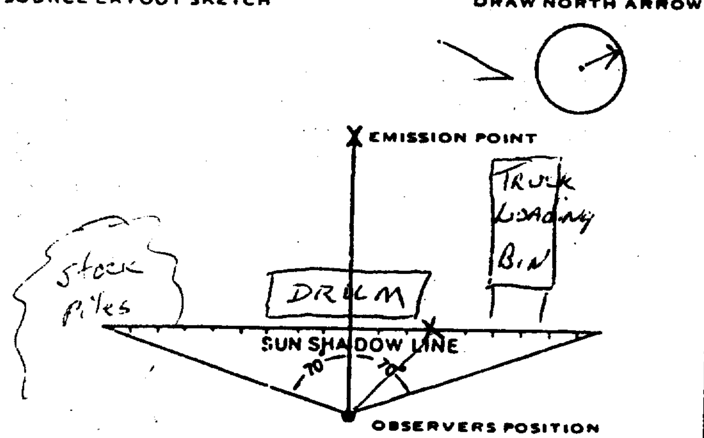
DESCRIBE BACKGROUND: Cloudy Sky

BACKGROUND COLOR: Stone Gray | **SKY CONDITIONS:** Mostly Cloudy

WIND SPEED: 10-12 mph | **WIND DIRECTION:** SSW

AMBIENT TEMPERATURE: 80° F | **RELATIVE HUMIDITY:**

SOURCE LAYOUT SKETCH | **DRAW NORTH ARROW**



OBSERVATION DATE: Aug 3 1993 | **START TIME:** 11:40 AM | **STOP TIME:** 12:40 PM

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

AVERAGE OPACITY FOR HIGHEST PERIOD: 2.5% | **NUMBER OF READINGS ABOVE** 2.5 **% WERE** 12

RANGE OF OPACITY READINGS: MINIMUM 0 MAXIMUM 5

COMMENTS: Sunglasses Worn

OBSERVER'S NAME (PRINT): Earl Crook

OBSERVER'S SIGNATURE: Earl Crook | **DATE:** 8-3-93

ORGANIZATION:

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SIGNATURE:

TITLE: | **DATE:**

CERTIFIED BY: | **DATE:**

VERIFIED BY: | **DATE:**

EPA 110(00)

REC#14

Visible Emissions Evaluator

This certifies that

EARL T. CROOK

Met the specifications of Federal Reference Method "9" and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by the Arkansas Department of Pollution Control and Ecology.

Mark A. [signature] — Field Instructor

James B. Jones Jr. [signature] FOR Director

GREAT SEAL OF THE STATE OF ARKANSAS

APRIL 21, 1993 — Date

LITTLE ROCK, AR — Location