OBSERVER'S REPORT:

COMPLIANCE TEST

for

PARTICULATE

Facility:	VALLEY ASPALT # 20 CAMP DENNISON, Ohio
Premise Number:	1431453448
Source:	P901 ASPHALT BATCH PLANT
Conducted On:	SEPT. 23 + 24, 1992
Test Firm:	RAMCO ENVIRONMENTAL CORP.
Observed By:	Trent Lewis, ETI;
Prepared By:	Trent Lewis, ETI LeRoy Gruber, AQE
Date Prepared:	DECEMBER 1, 1992

DEPARTMENT OF ENVIRONMENTAL SERVICES
AIR QUALITY PROGRAMS
1632 CENTRAL PARKWAY
CINCINNATI, OHIO 45210

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IP FILE COPY
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APPENDIX K

OEPA STACK TEST REVIEW SUMMARY FORM

APPLICATION NUMBER 1431453448

FACILITY NAME Valley Asphalt #20

SOURCE DESCRIPTION (OR SCC CODE) SN: P901 - Asphalt Batch Plant

CONTROL EQUIPMENT Baghouse

DATE(S) OF TEST September 23 & 24, 1992

FINAL TEST REPORT RECEIVED ON October 20, 1992

POLLUTANT(S) TESTED Particulate

TEST METHOD U.S. EPA Test Method 5

TEST FIRM Ramcon

EMISSION RATES*:

[ ](lb(s)/MMBtu)

ACTUAL [X] (lb(s)/hr) 5.77 ALLOWABLE** 10.4

OPERATING RATES*:

DURING TEST** 245.5 tons MAXIMUM** 300 tons

EMISSION FACTOR***

COMMENTS 5.77 lbs/hour is protated from 5.26 lbs per hour because test capacity was not met.

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 DEMONSTATION OF CONFORMANCE WITH THE APPROVED TESTING METHODOLOGY.

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

12/1/92 PREPARED BY: Trent R. Lewis II, ET 1

DATE OF REVIEW REVIEWED BY: LeRoy R. Gruber, AQE

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

On September 23 + 24, 1992 testing for particulate matter was conducted at Valley Asphalt Plant #20. This is a new source and is required to meet NSPS standards Subpart I (Particulate Matter is not to exceed .04 grain/dscf).Testing was conducted by Ramcon Environmental Inc., under the supervision of team leader Alan Turner. Two runs were conducted on the 23rd. The second run had a leak check rating of .027cfm and this is to be corrected with a correction factor. A third run had been attempted, however, a failure in the sampling equipment caused sampling to be discontinued. The fourth run of testing was conducted on 9-24-92.

Production levels and emission rates are shown in the following table.

RUN #	TONS PER HOUR PRODUCTION**	GR./DSCF	LBS./HR. EMISSIONS
1	257.6	.0369	8.89
2	237.2	.0159	3.52
4	241.7	.01496	3.37
total	245.5	.0226	5.26

(RUN 2 IS A CORRECTED VALUE CAUSED BY A FAILED LEAK CHECK)

** TONS OF PRODUCTION WAS SUPPLIED BY DATA PROVIDED BY VALLEY ASPHALT.

The tons per hour production averaged represents 82% of the rated capacity of 300 tons per hour. A standard 90% (or greater) of operation capacity is required during testing. If the sampling results are prorated to the minimum "worst case" standard of 90% , the average would be 5.773 lbs./hr.

Stack conditions averaged: carbon dioxide = 4.5%, oxygen = 14.8%, Nitrogen = 80.7%, DSCFM =26708, and Percent moisture avg. = 12.25%.

Method 9 for visible emissions was also conducted and no violations were found. It should be noted that a particulate leak was observed at the vibratory screen, at a level of opacity ranging between 5-10%.

Quality assurance measures included: sampling train leak checks (sampling and pitot lines), proper documentation, nozzle diameter measurements, pitot tube/dry gas meter/thermocouple calibrations. Verification calculations were executed by D.O.E.S. staff, and found to be of sufficent accuracy.

PN: 1431453448
SN: P901

In conclusion, the data received by this agency was of sufficent accuracy and precision to determine compliance. At 43% of allowable emission rate, testing at permit renewal is recommended, sooner if visible emissions of greater value than noted are observed.

EPA METHOD 5 STACK TEST ANALYSIS

FACILITY NAME: VALLEY ASPHALT #10
PERMIT & APP #: 14-019
SOURCE DESCRIPTION: ASPHALT BATCH PLANT P901

REVIEWER: TRL
TEST DATE: 5-23-92
PRINTED: 11-27-1992

INPUT DATA:

	RUN #1	RUN #2	RUN #3
METER VOLUME (ACF)........................	45.775	39.925	44.1
METER CORRECTION..........................	1.02	1.02	1.02
BAROMETRIC PRESSURE (IN HG)...............	30.1	30.1	30.1
ORIFICE PRESSURE (IN H2O).................	1.756	1.5425	1.558
METER TEMPERATURE (F).....................	73.500	77.206	77.8735
VOLUME WATER (ML H2O).....................	257.1	255	264.7
CO2 IN STACK GAS (%)......................	4.5	4.5	4.5
O2 IN STACK GAS (%).......................	14.8	14.8	14.8
N2 IN STACK GAS (%).......................	80.7	80.7	80.7
CO IN STACK GAS (%).......................	0	0	0
PITOT COEFFICIENT.........................	.84	.84	.84
AVERAGE SQUARE ROOT VELOCITY PRESS........	.5896	.5501	.5551
STACK TEMPERATURE (F).....................	229.75	222.71	220.88
STACK PRESSURE (IN HG)....................	30.11	30.11	30.11
STACK DIAMETER (IN).......................	60	60	60
STACK AREA (SQ FT)........................	19.63496	19.63496	19.63496
PARTICULATE CATCH (MG)....................	10.5	40.9	43.2
NOZZLE DIAMETER (IN)......................	.315	.315	.315
NOZZLE AREA (SQ FT).......................	0.000541	0.000541	0.000541
TEST LENGTH (MIN).........................	60	50	60

TEST RESULTS:

	RUN #1	RUN #2	RUN #3
METER VOLUME @STP (DSCF)...............	46.1579	39.6635	44.5732
VOLUME OF WATER VAPOR @STP (SCF)........	%12.101700	%12.002850	%12.454450
MOLE FRACTION OF WATER IN STACK GAS...	0.207700	0.232315	0.218462
DRY MOLECULAR WEIGHT OF STACK GAS.....	29.3120	29.3120	29.3120
MOLECULAR WEIGHT OF STACK GAS..........	26.9633	26.6841	26.8408
STACK GAS VELOCITY (FT/SEC)............	39.0259	36.6130	36.5368
STACK GAS FLOW (DRY STD FT3/HR).........	%1683708.0	%1346314.0	%1577406.0
PARTICULATE CONCENTRATION (GR/DSCF)....	0.003509	0.015911	0.014955
ISOKINETIC RATIO........................	99.5075	93.1049	102.5670
MASS RATE OF EMISSIONS (LB/HR)..........	6.8849	3.5148	3.3694

STACK TEST COMMENTS:

RUN 2 IS A CORRECTED SAMPLE GAS VOLUME REQUIRED BECAUSE OF A FAILED LEAK CHECK.

Source Valley Asphalt #20

Premise No. App 14-2291 P901

By TRL

Date 11-27-92

DATA SHEET

Examples			corrected	
38.847	Vm(dcf)	45.275	41.545 39.925	44.1
1.01	Y	1.02	1.02	1.02
27.93	Pbar(inHg)	30.1	30.1	30.1
2.35	DHP(H2O)	1.756	1.5425	1.558
96°	Tm, °F	73.503	87.208	77.8735
78.5	Vlc(ml)	257.1	255	264.7
12.0	CO2(percent)	4.5	4.5	4.5
08.7	O2	14.8	14.8	14.8
80.8	N	80.7	80.7	80.7
00.1	CO	0	0	0
.84	Cp	.84	.84	.84
.4201	SQPD avg.	.5896	.5531	.5551
230	Ts(°F)	229.75	222.71	220.88
27.91	Ps(in,Hg.Pb+Ps)	30.11	30.11	30.11
21"	Stack diam	60"	60"	60"
110.6	Mn(mg.)	110.5	40.9	43.2
.25"	Dn(in)	.315	.315	.315
72	Theta(min)	60	60	60
9820	F (Optional)			
4	H			
70	C			
10	S			
14	N			
6	O			
	Allowable GCV (Optional) BTU/lb.			

RAMCON
ENVIRONMENTAL CORPORATION

SOURCE SAMPLING
for
PARTICULATE EMISSIONS
VALLEY ASPHALT CORPORATION, PLANT #20
CAMP DENNISON, OHIO
September 23-24, 1992

Fred Bremmer
Valley Asphalt Corporation

G. Sumner Buck, III
President

RAMCON BUILDING, 6707 FLETCHER CREEK COVE, MEMPHIS, TENNESSEE 38134
TELEPHONE 800/458-4567 IN TENNESSEE 901/387-0500 FAX 901/387-0400

RAMCON
ENVIRONMENTAL CORPORATION

October 5, 1992

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

Re: Particulate Emissions Test: Camp Dennison, Ohio - Plant #20

Dear Mr. Bremmer:

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

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

Mr. Lee Gruber
Ohio EPA
Air Quality Bureau
1632 Central Parkway
Cincinnati, OH 45210

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,

G. Sumner Buck, III
President

GSBIII:djb

Enclosures

RAMCON BUILDING, 6707 FLETCHER CREEK COVE, MEMPHIS, TENNESSEE 38134
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 September 23-24, 1992 personnel from RAMCON Environmental Corporation conducted a source emissions test for particulate emissions compliance at Valley Asphalt Corporation's Barber-Greene batch mix asphalt plant located in Camp Dennison, Ohio. RAMCON personnel conducting the test were Allen Turner, Team Leader, and Chuch Hughes. Thomas 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 N.S.P.S. 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.

Mr. Trent Lewis of Ohio's Air Pollution Control Agency observed the testing conducted by RAMCON Environmental.

SUMMARY OF TEST RESULTS

TABLE I

September 23-24, 1992

Test Run	Time	Grain Loading gr/DSCF	Isokinetic Variation	Emissions Lbs/Hr
				8.88
1	08:36 - 09:40	0.0369	99.4%	3.39
2	11:00 - 12:22	0.0153	96.6%	3.39
3	11:31 - 13:26	0.0149	101.7%	5.22
	Average:	0.0224		

On the basis of these test results, the average grain loading of the three test runs was 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

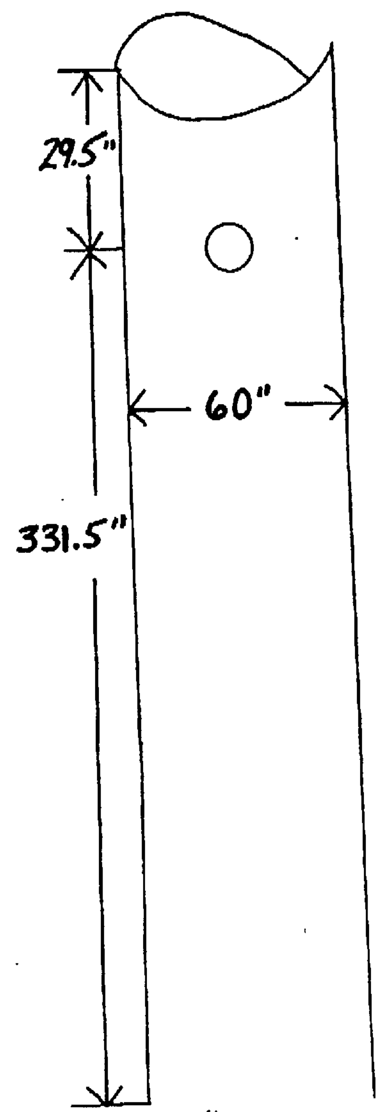
(a) Method Used: Method 5 source sampling was conducted in accordance with requirements of the U.S. Environmental Protection Agency as set forth in 39 FR 9314, March 8, 1974, 60.93, as amended.

(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 60". The sampling ports were placed 90° apart, 29.5" down (0.5 diameters upstream) from the top of the stack and 331.5" up (5.5 diameters downstream) from the last flow disturbance. Twenty four points were sampled, twelve through each traverse for 2.5 minutes each for a total testing time of 60 minutes.

Points on a Diameter	Probe Mark
1	*7.26"
2	10.02"
3	13.08"
4	16.62"
5	21.00"
6	27.30"
7	44.70"
8	51.00"
9	55.38"
10	58.92"
11	61.98"
12	64.74"

*Measurements include a 6" standoff.



SECTION B:

THE SOURCE

B. THE SOURCE

Valley Asphalt Corporation (Plant #20) employs a Barber-Greene 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 #2 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 Barber-Greene. 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.

Form REC#03

TODAY'S DATE: ____________

DATA ON FACILITY BEING STACK TESTED

COMPANY NAME ____________ COMPANY REP. ____________ PHONE ( ) ____________

LOCATION OF FACILITY ____________ ORIGINAL START-UP DATE ____________ DESIGNED CAPACITY ____________

OEM ____________ MODEL NO. ____________ TYPE ____________ AC TYPE ____________

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: 2 #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
8:40		96%		258	—	4.5	323	290	5.3	N/A	60%		92
8:55		98%		260	—	4.49	318	280	5.6	N/A	60%		94
9:10		82%		250	—	4.34	320	290	5.2	N/A	60%		92
9:25		96%		258	—	4.46	309	285	5.2	N/A	65%		92
9:40		96%		262	—	4.5	302	285	6.1	N/A	65%		94
10:40		76%		257	—	4.43	315	285	5.4	N/A	65°		92
11:15		75%		220	—	4.51	310	270	5.8	N/A	65°		93
11:30		90%		243	—	4.43	306	280	6.2	N/A	65%		98
11:45		71%		230	—	4.38	321	290	6.0	N/A	65°		94
12:00		64%		237		4.42	307	270	5.8	N/A	65°		92
12:15		96%		256		4.49	303	290	6.0	N/A	65°		95
1:55		85%		249		4.44	304	290	5.8	N/A	70%		94
2:10		96%		254		4.45	296	290	5.7	N/A	70%		94

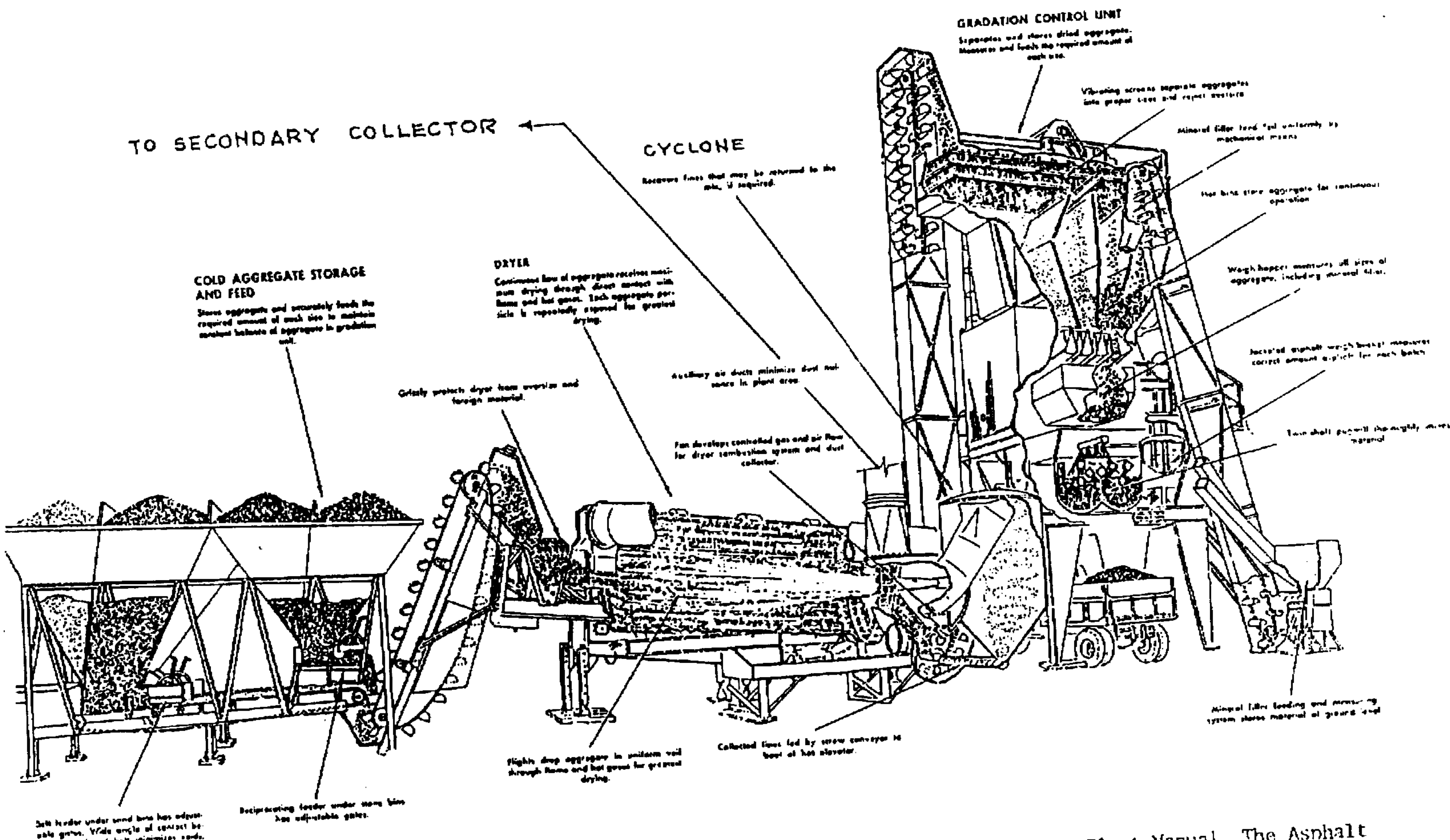
Form REC#04

PAGE ___ OF ___

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	2 Fuel Use 2 #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
2:45		97		286	—	4.40	295	285	5.7	—	70%	—	94%
12:20		71		240	—	4.35	320	280	6.4	—	70		95%
1235		95											
1:05		45		230		4.5	333	270	5.6	—	70		89
1:20		70		255		4.4	319	280	5.8		70		92

Figure 4-1

ASPHALT BATCH MIX PLANT - AN EXPLODED VIEW



Source: Asphalt Plant Manual, The Asphalt Institute, 1967

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 on conducting the particulate emissions test was:

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

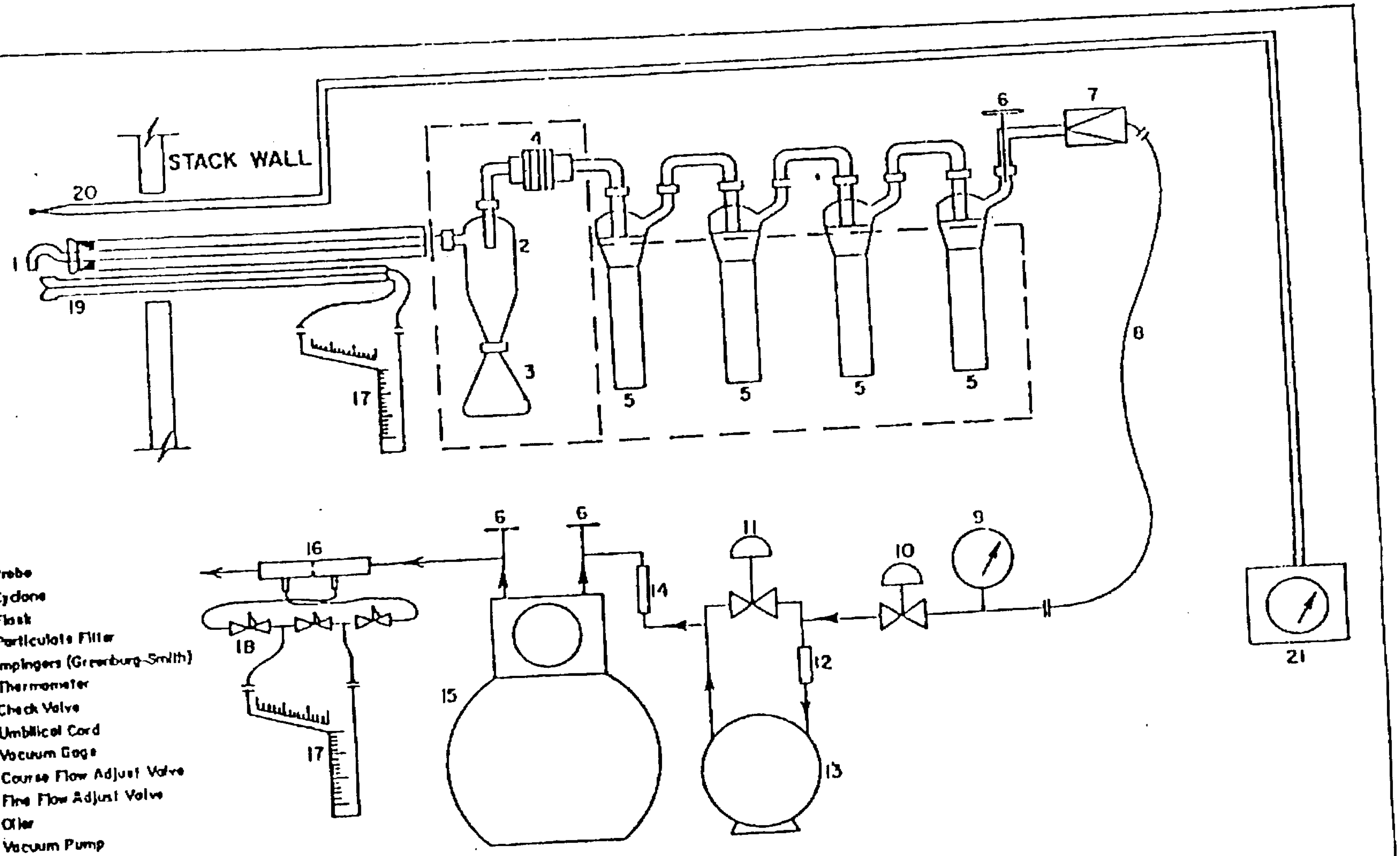
B. An Airguide Instruments Model 211-B (uncorrected) aneroid barometer was used to check the barometric pressure.

C. Weston dial thermometers are used to check meter temperatures. An Analogic Model 2572 Digital Thermocouple is used for stack temperatures.

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

E. Filters are made by Schleicher and Schuell and are type 1-HV with a porosity of .03 microns.

F. The acetone is reagent grade or ACS grade with a residue of ≤ .001.



SAMPLING TRAIN
USED FOR ISOKINETIC SAMPLING

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.

Form REC#8

SAMPLE ANALYTICAL DATA FORM

Company Name VALLEY PLANT #20

Sample Location ____

Blank Volume (V_a) 100 ml

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

Date/Time wt. blank 10/2 3:00P

Relative Humidity in Lab 50 %

Density of Acetone (ρ_a) .7857 mg/ml

Gross wt. 98.6774 g

Gross wt. 98.6774 g

Ave. Gross wt. 98.6774 g

Tare wt. 98.6773 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. 10/2 8:00A Gross wt.	g	99.5440	99.9700	99.8194
Date/Time of wt. 10/2 3:00P Gross wt.	g	99.5440	99.9701	99.8194
Average Gross wt.	g	99.5440	99.9701	99.8194
Tare wt.	g	99.4589	99.9331	99.7910
Less Acetone blank wt. (W_a)	g	.0002	.0002	.0002
Weight of particulate in acetone rinse (m_a)	g	.0849	.0368	.0282

Filter Numbers	#	TS6404	TS6512	TS6513
Date/Time of wt. 10/2 8:00A Gross wt.	g	.5817	.5625	.5706
Date/Time of wt. 10/2 3:00P Gross wt.	g	.5815	.5626	.5706
Average Gross wt.	g	.5816	.5626	.5706
Tare wt.	g	.5560	.5585	.5556

Weight of particulate on filter (m_f)	g	.0256	.0041	.0150
Weight of particulate in acetone rinse (m_a)	g	.0849	.0368	.0282
Total weight of particulate (m_n)	g	.1105	.0409	.0432

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 [signature]

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Valley #20
Company Name

9-23-92
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:	$CO_{2\%}$	4.5	$CO_{2\%}$	4.5	$CO_{2\%}$	4.5	AVG.	4.5
	$O_{2\%}$	14.8	$O_{2\%}$	14.8	$O_{2\%}$	14.8	AVG.	14.8
	$N_{2\%}$		$N_{2\%}$		$N_{2\%}$		AVG.	80.7
RUN 2:	$CO_{2\%}$	4.5	$CO_{2\%}$	4.5	$CO_{2\%}$	4.5	AVG.	4.5
	$O_{2\%}$	14.8	$O_{2\%}$	14.8	$O_{2\%}$	14.8	AVG.	14.8
	$N_{2\%}$		$N_{2\%}$		$N_{2\%}$		AVG.	80.7
RUN 3:	$CO_{2\%}$	4.5	$CO_{2\%}$	4.5	$CO_{2\%}$	4.5	AVG.	4.5
	$O_{2\%}$	14.8	$O_{2\%}$	14.8	$O_{2\%}$	14.8	AVG.	14.8
	$N_{2\%}$		$N_{2\%}$		$N_{2\%}$		AVG.	80.7

OHIO BACK-HALF ANALYSIS

EVAPORATION

Plant Location VALLEY PLANT #20

Sample Location OHIO

Blank Volume (V_{wb}) 200 mℓ

Date/Time wt. blank 10/7 8:00A

Date/Time wt. blank 10/8 1:30P

Date 10/5/92

Relative Humidity in lab 52 %

Density of Water (ρ_w) = 1.0

Gross wt. 175.2107 g

Gross wt. 175.2105 g

Ave. Gross wt. 175.2106 g

Tare wt. 175.2104 g

Weight of blank (m_{wb}) .0002 g

Water blank residue concentration (C_w) $(C_w) = (M_{wb}) / (V_{wb}) (\rho_w)$ = (.000001 mg/g)

Weight of blank residue in impinger rinse: $W_w = C_w V_w$

		Run #1	Run #2	Run #3
Impinger rinse volume (V_w)	mℓ	460	460	450
Date/Time of wt 10/7 8:30A Gross wt	g	177.4861	168.3940	126.4400
Date/Time of wt 10/8 1:30P Gross wt	g	177.4861	168.3944	126.4402
Average Gross wt	g	177.4861	168.3942	126.4401
Tare wt	g	177.4761	168.3836	126.4270
Less Water blank wt (W_w)	g	.0005	.0005	.0005
Wt of particulate in impinger rinse (m_w)	g	.0095	.0101	.0126

Remarks: ______

Signature of Analyst Thomas Smith

Signature of Reviewer [signature]

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SECTION E:

CALCULATIONS

VALLEY ASPHALT CORP. - PLANT #20
CAMP DENNISON, OHIO

SUMMARY OF TEST DATA

		09-23-92 RUN #1	09-23-92 RUN #2	09-24-92 RUN #3
SAMPLING TRAIN DATA				
	start	08:36	11:00	11:31
	finish	09:40	12:22	13:26
1. Sampling time, minutes	Θ	60.0	60.0	60.0
2. Sampling nozzle diameter, in.	D_n	.3150	.3150	.3150
3. Sampling nozzle cross-sect. area, ft^2	A_n	.000541	.000541	.000541
4. Isokinetic variation	I	99.4	96.6	101.7
5. Sample gas volume - meter cond., cf.	V_m	45.275	41.545	44.100
6. Average meter temperature, ^oR	T_m	534	547	538
7. Avg. oriface pressure drop, in. H_2O	dH	1.76	1.54	1.56
8. Total particulate collected, mg.	M_n	110.50	40.90	43.20
VELOCITY TRAVERSE DATA				
9. Stack area, ft^2	A	19.63	19.63	19.63
10. Absolute stack gas pressure, in. Hg.	P_s	30.10	30.10	30.10
11. Barometric pressure, in. Hg.	P_{bar}	30.10	30.10	30.10
12. Avg. absolute stack temperature, R^o	T_s	689	683	681
13. Average -\/vel. head, (C_p= .84)	-\/dP	0.59	0.55	0.56
14. Average stack gas velocity, ft./sec.	V_s	39.04	36.36	36.91
STACK MOISTURE CONTENT				
15. Total water collected by train, ml.	V_{ic}	257.10	253.00	264.10
16. Moisture in stack gas, %	B_{ws}	20.79	22.37	21.77
EMISSIONS DATA				
17. Stack gas flow rate, dscf/hr.(000's)	Q_{sd}	1684	1551	1591
18. Stack gas flow rate, cfm	acfm	45981	42825	43473
19. Particulate concentration, gr/dscf	C_s	0.0369	0.0153	0.0149
20. Particulate concentration, lb/hr	E	8.88	3.39	3.39
21. Particulate concentration, lb/mBtu	E'	0.00000	0.00000	0.00000
ORSAT DATA				
22. Percent CO_2 by volume	CO_2	4.50	4.50	4.50
23. Percent O_2 by volume	O_2	14.80	14.80	14.80
24. Percent CO by volume	CO	.00	.00	.00
25. Percent N_2 by volume	N_2	80.70	80.70	80.70

Format: summryR3

VALLEY ASPHALT CORP. - PLANT #20
CAMP DENNISON, OHIO

Dry Gas Volume

$$V_{m(std)} = V_m \left[\frac{T_{(std)}}{T_m}\right]\left[\frac{P_{bar} + \frac{dH}{13.6}}{P_{(std)}}\right] = 17.64 \frac{{}^{o}R}{in.Hg} Y V_m \left[\frac{P_{bar} + \frac{dH}{13.6}}{T_m}\right]$$

Where:

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

V_m = Dry Gas Volume measured by meter, cu. ft.

P_{bar} = Barometric pressure at oriface meter, in. Hg.

P_{std} = Standard absolute pressure,(29.92 in. Hg.).

T_m = Absolute temperature at meter ${}^{o}R$.

T_{std} = Standard absolute temperature ($528^{o}R$).

dH = Average pressure drop across oriface meter, in. H_2O.

Y = Dry gas meter calibration factor.

13.6 = Inches water per inches Hg.

RUN 1:

$$V_{m(std)} = (17.64)(1.020)(\ 45.275) \left[\frac{(30.10) + \frac{1.76}{13.6}}{534}\right] = 46.115 \text{ dscf}$$

RUN 2:

$$V_{m(std)} = (17.64)(1.020)(\ 41.545) \left[\frac{(30.10) + \frac{1.54}{13.6}}{547}\right] = 41.288 \text{ dscf}$$

RUN 3:

$$V_{m(std)} = (17.64)(1.020)(\ 44.100) \left[\frac{(30.10) + \frac{1.56}{13.6}}{538}\right] = 44.563 \text{ dscf}$$

Format: dgmR3

VALLEY ASPHALT CORP. - PLANT #20
CAMP DENNISON, OHIO

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:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{110.50}{46.115}\right] = 0.0369 \text{ gr./dscf.}$$

Run 2:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{40.90}{41.288}\right] = 0.0153 \text{ gr./dscf.}$$

Run 3:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{43.20}{44.563}\right] = 0.0149 \text{ gr./dscf.}$$

Format: csR3

VALLEY ASPHALT CORP./PLANT #20 -BACKHALF
CAMP DENNISON, OHIO

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:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{9.50}{46.115}\right] = 0.0032 \text{ gr./dscf.}$$

Run 2:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{10.10}{41.288}\right] = 0.0038 \text{ gr./dscf.}$$

Run 3:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{12.60}{44.563}\right] = 0.0044 \text{ gr./dscf.}$$

Format: csR3

VALLEY ASPHALT CORP. - PLANT #20
CAMP DENNISON, OHIO

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:

$$M_d = 0.44(4.50\%) + 0.32(14.80\%) + 0.28(.00\% + 80.70\%) = 29.31 \frac{lb}{lb\text{-}mole}$$

Run 2:

$$M_d = 0.44(4.50\%) + 0.32(14.80\%) + 0.28(.00\% + 80.70\%) = 29.31 \frac{lb}{lb\text{-}mole}$$

Run 3:

$$M_d = 0.44(4.50\%) + 0.32(14.80\%) + 0.28(.00\% + 80.70\%) = 29.31 \frac{lb}{lb\text{-}mole}$$

Format: mdR3

VALLEY ASPHALT CORP. - PLANT #20
CAMP DENNISON, OHIO

Water Vapor Condensed

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

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

Where:

0.04707 = Conversion factor, $ft.^3/ml.$

0.04715 = Conversion factor, $ft.^3/g.$

$V_{wc_{std}}$ = Volume of water vapor condensed (standard conditions), scf.

$V_{wsg_{std}}$ = 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)(^oR).

M_w = Molecular weight of water vapor, 18.0 lb/lb-mole.

T_{std} = Absolute temperature at standard conditions, 528^oR.

P_{std} = Absolute pressure at standard conditions, 29.92 inches Hg.

Run 1:

$V_{wc(std)}$ = (0.04707) (250.0) = 11.8 cu.ft
$V_{wsg(std)}$ = (0.04715) (7.1) = 0.3 cu.ft

Run 2:

$V_{wc(std)}$ = (0.04707) (250.0) = 11.8 cu.ft
$V_{wsg(std)}$ = (0.04715) (3.0) = 0.1 cu.ft

Run 3:

$V_{wc(std)}$ = (0.04707) (260.0) = 12.2 cu.ft
$V_{wsg(std)}$ = (0.04715) (4.1) = 0.2 cu.ft

Format: vaporR3

VALLEY ASPHALT CORP. - PLANT #20
CAMP DENNISON, OHIO

Moisture Content of Stack Gases

$$B_{ws} = \frac{V_{wc_{std}} + V_{wsg_{std}}}{V_{wc_{std}} + V_{wsg_{std}} + V_{m_{std}}} \times 100$$

Where:

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

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

$V_{wc_{std}}$ = Volume of water vapor condensed corrected to standard conditions (scf).

$V_{wsg_{std}}$ = Volume of water vapor collected in silica gel corrected to standard conditions (scf).

Run 1:

$$B_{ws} = \frac{11.8 + 0.3}{11.8 + 0.3 + 46.115} \times 100 = 20.79\ \%$$

Run 2:

$$B_{ws} = \frac{11.8 + 0.1}{11.8 + 0.1 + 41.288} \times 100 = 22.37\ \%$$

Run 3:

$$B_{ws} = \frac{12.2 + 0.2}{12.2 + 0.2 + 44.563} \times 100 = 21.77\ \%$$

Format: bwsR3

VALLEY ASPHALT CORP. - PLANT #20
CAMP DENNISON, OHIO

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 = 29.31 (1 - 20.79) + 18 (20.79) = 26.96 (lb./lb.-mole)

Run 2:

M_s = 29.31 (1 - 22.37) + 18 (22.37) = 26.78 (lb./lb.-mole)

Run 3:

M_s = 29.31 (1 - 21.77) + 18 (21.77) = 26.85 (lb./lb.-mole)

VALLEY ASPHALT CORP. - PLANT #20
CAMP DENNISON, OHIO

Stack Gas Velocity

$$V_s = K_p\, C_p \left[\sqrt{dP} \right] \text{avg.} \sqrt{\frac{T_{s(avg.)}}{P_s \quad M_s}}$$

Where:

V_s	=	Average velocity of gas stream in stack, ft./sec.
K_p	=	85.49 ft/sec $\left[\frac{(g/g\text{-mole})\text{-}(mm\ Hg)}{(^{o}K)(mm\ H_2O)}\right]^{1/2}$
C_p	=	Pitot tube coefficient, (dimensionless).
dP	=	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, (^{o}f).
T_s	=	Absolute stack temperature, (^{o}R). = 460 + t_s.
M_s	=	Molecular weight of stack gas, wet basis, (lb/lb-mole).

Run 1:

$$V = (85.49)\ (\ .84)\ (\ 0.59) \sqrt{\frac{689}{(30.10)(26.96)}} = 39.04 \text{ ft/sec.}$$

Run 2:

$$V = (85.49)\ (\ .84)\ (\ 0.55) \sqrt{\frac{683}{(30.10)(26.78)}} = 36.36 \text{ ft/sec.}$$

Run 3:

$$V = (85.49)\ (\ .84)\ (\ 0.56) \sqrt{\frac{681}{(30.10)(26.85)}} = 36.91 \text{ ft/sec.}$$

Format: vsR3

VALLEY ASPHALT CORP. - PLANT #20
CAMP DENNISON, OHIO

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_s = Stack temperature, (^{o}f).

T_s = Absolute stack temperature, (^{o}R).

T_{std} = Standard absolute temperature, (528^{o}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:

$$Q_{sd}=3600(1- \quad .2079 \quad)(\ 39.04)(\ 19.63) \left[\frac{528}{689} \right] \left[\frac{30.10}{29.92} \right] = \quad 1684737.5 \ \frac{dscf}{hr}$$

Run 2:

$$Q_{sd}=3600(1- \quad .2237 \quad)(\ 36.36)(\ 19.63) \left[\frac{528}{683} \right] \left[\frac{30.10}{29.92} \right] = \quad 1551295.0 \ \frac{dscf}{hr}$$

Run 3:

$$Q_{sd}=3600(1- \quad .2177 \quad)(\ 36.91)(\ 19.63) \left[\frac{528}{681} \right] \left[\frac{30.10}{29.92} \right] = \quad 1591592.5 \ \frac{dscf}{hr}$$

Format: qR3

VALLEY ASPHALT CORP. - PLANT #20
CAMP DENNISON, OHIO

Emissions Rate from Stack

$$E = \frac{(C_s)\ (Q_{sd})}{7000\ \text{gr./lb.}} = \text{lb. / hr.}$$

Where:

E = Emissions rate, lb/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:

$$E = \frac{(0.0369)\ (1684737.5)}{7000} = 8.88\ \text{lb. / hr.}$$

Run 2:

$$E = \frac{(0.0153)\ (1551295.0)}{7000} = 3.39\ \text{lb. / hr.}$$

Run 3:

$$E = \frac{(0.0149)\ (1591592.5)}{7000} = 3.39\ \text{lb. / hr.}$$

Format: eR3

VALLEY ASPHALT CORP./PLANT #20 -BACKHALF
CAMP DENNISON, OHIO

Emissions Rate from Stack

$$E = \frac{(C_s)(Q_{sd})}{7000 \text{ gr./lb.}} = \text{lb. / hr.}$$

Where:

E = Emissions rate, lb/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:

$$E = \frac{(0.0032)(1684737.5)}{7000} = 0.77 \text{ lb. / hr.}$$

Run 2:

$$E = \frac{(0.0038)(1551295.0)}{7000} = 0.84 \text{ lb. / hr.}$$

Run 3:

$$E = \frac{(0.0044)(1591592.5)}{7000} = 1.00 \text{ lb. / hr.}$$

Format: eR3

VALLEY ASPHALT CORP. - PLANT #20
CAMP DENNISON, OHIO

Isokinetic Variation

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

Where:

I	=	Percent isokinetic sampling.
100	=	Conversion to percent.
T_s	=	Absolute average stack gas temperature, ^oR.
0.002669	=	Conversion factor, Hg - ft^3/ml - ^oR.
V_{ic}	=	Ttl vol of liquid collected in impingers and silica gel, ml.
T_m	=	Absolute average dry gas meter temperature, ^oR.
P_{bar}	=	Barometric pressure at sampling site, (in. Hg).
dH	=	Av pressure differential across the oriface 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, ft^2.

Run 1:

$$I = (100)(689) \left[\frac{(0.002669)(257.1) + \frac{45.275}{534} \boxed{30.10 + \frac{1.76}{13.6}}}{60\ (60.0)\ (39.04)\ (30.10)\ (.000541)} \right] = 99.4\%$$

Run 2:

$$I = (100)(683) \left[\frac{(0.002669)(253.0) + \frac{41.545}{547} \boxed{30.10 + \frac{1.54}{13.6}}}{60\ (60.0)\ (36.36)\ (30.10)\ (.000541)} \right] = 96.6\%$$

Run 3:

$$I = (100)(681) \left[\frac{(0.002669)(264.1) + \frac{44.100}{538} \boxed{30.10 + \frac{1.56}{13.6}}}{60\ (60.0)\ (36.91)\ (30.10)\ (.000541)} \right] = 101.7\%$$

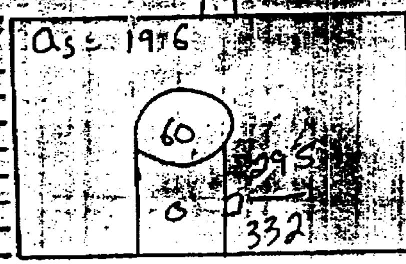
Format: iR3

SECTION F:

FIELD DATA

RAMCON ENVIRONMENTAL CORPORATION

Plant: Valley / # 20
Location: Cincinnati, Ohio
Operator: [illegible]
Date: 9-23-92
Run No.: 1
Sample Box No.: 1
Meter Box No.: C-282
Meter H @: 1.505
C Factor: 1.02
Pitot Tube Coefficient Cp: .84



Schematic of Stack Cross-Section

Ambient Temperature: 60
Barometric Pressure: 30.10
Assumed Moisture, %: 18
Probe Length, m(ft): 6 ft
Nozzle Identification No.: 000541
Avg. Calibrated Nozzle Dia., (in.): .315/.315/.315
Probe Heater Setting: 4
Leak Rate, m^3/min. (cfm): .005 at 12 in Hg
Probe Liner Material: stainless steel
Static Pressure, mm Hg (in. Hg): +.01
Filter No.: TS-6404

	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL	450	605.7
INITIAL	200	598.6
DIFFERENCE	250	7.1

TRAV. PT. [redacted]	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP. (Ts) [redacted]	VELOCITY HEAD (P_s) [redacted]	PRESSURE DIFF. ORF. MTR [redacted]	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F [redacted]	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	8:36 / 8:38-30	2	220	.30	1.5	976.9 / 978.5	62	50	245	55
2	8:41	2	219	.22	1.1	979.6	76	50	250	53
3	8:43-30	2	232	.40	2.0	981.5	84	50	255	52
4	8:46	4	234	.43	2.1	984.5	86	50	258	50
5	8:48-30	6	234	.45	2.2	986.8	90	52	255	50
6	8:51	6	235	.40	2.0	988.3	90	52	255	50
7	8:53-30	8	234	.45	2.2	989.6	90	52	242	50
8	8:56	8	233	.45	2.2	991.9	90	54	243	57
9	8:58-30	5	232	.40	2.0	994.1	90	54	244	59
10	9:01	3	230	.35	1.7	996.3	90	54	240	59
11	9:03-30	3	230	.35	1.7	998.3	90	54	240	57
12	9:06	2	230	.30	1.5	1000.00	94	56	240	56
B 1	9:10-30 / 9:13	2	230	.20	.98	001.9	82	60	238	56

Valley 20

Form #REC-05

Form ..EC-..

RAMCON emissions test log sheet, cont. DATE 9.23.92 LOCATION Cin Ohio TEST NO. 1

TRAVERSE POINT [redacted]	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP [redacted]	VELOCITY HEAD [redacted]	ORFICE DIFF. PRESSURE [redacted]	GAS VOLUME Vm (ft^3)	GAS SAMPLE TEMP. (°F) [redacted]	[redacted]	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	9:15:30	2	215	.20	.98	1003.1	92	60	242	50
3	9:18	2	225	.20	.98	1004.3	94	60	244	50
4	9:20:30	4	229	.21	1.0	1006.0	96	60	246	50
5	9:23	4	231	.23	1.1	1007.3	94	60	245	49
6	9:25:30	4	232	.25	1.2	1008.8	96	60	243	48
7	9:28	8	233	.40	2.0	1010.6	98	60	241	48
8	9:30-30	8	234	.40	2.0	1012.7	98	60	238	47
9	9:33	8	234	.45	2.2	1015.2	98	60	232	46
10	9:35-30	8	231	.50	2.5	1017.2	100	60	225	46
11	9:38	5	229	.50	2.5	1019.4	100	60	217	46
12	9:40-30	5	228	.50	2.5	1021.675	100	60	217	46
							90.847	56.166		

RAMCON ENVIRONMENTAL CORPORATION

Plant Valley / # 20

4.9

Location [illegible]
Operator [illegible]
Date 9-23-92
Run No. 2
Sample Box No. 2
Meter Box No. [illegible]
Meter H @ 1.505
C Factor 1.03
Pitot Tube Coefficient Cp .84

95-19.6

Schematic of Stack Cross Section

Ambient Temperature 60
Barometric Pressure 30.10
Assumed Moisture, % 19
Probe Length, m(ft) 6
Nozzle Identification No. 000541
Avg. Calibrated Nozzle Dia., (in.) .315/.315/.315
Probe Heater Setting 4
Leak Rate, m^3/min, (cfm) .022 @ 15 in. Hg
Probe Liner Material stainless steel
Static Pressure, mm Hg (in. Hg) +.01
Filter No. TS-6513

	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL	450	386.3
INITIAL	200	373.3
DIFFERENCE	250	5.0

TRAV. PT.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts)	VELOCITY HEAD (Ps)	PRESSURE DIFF. ORF. MTR	GAS SAMPLE VOLUME ft³	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	11:00 / 11:02-30	2	225	.20	.98	22[illegible] / 23.6	88	60	232	60
2	11:20-30 / 11:23	2	225	.20	.98	25.1	92	80	263	57
3	11:25-30	2	228	.22	1.1	26.9	100	72	259	58
4	11:28	12	211	.25	1.2	28.4	100	70	257	61
5	11:30-30	12	213	.25	1.2	29.7	98	70	249	58
6	11:33	12	211	.25	1.2	31.3	98	70	247	58
7	11:35-30	12	211	.35	1.7	33.7	100	70	247	58
8	11:38	13	215	.35	1.7	34.6	98	70	247	58
9	11:40-30	13	221	.40	2.0	36.5	98	70	246	58
10	11:43	13	225	.45	2.2	38.5	100	70	246	58
11	11:45-30	5	228	.48	2.4	40.8	102	70	245	58
12	11:48	4	230	.40	2.0	43.0	110	70	245	61
B 1	11:52-30 / 11:55	2	224	.18	.88	44.3	100	70	245	61

Valley 20

ABEC 05

Form ...EC-...

RAMCON emissions test log sheet, cont. DATE 9-23-92 LOCATION Cravatta ... TEST NO. 2

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD	ORFICE DIFF PRESSURE	GAS VOLUME Vm (ft³)	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	11:57:30	2	200	.20	.98	45.9	109	72	216	60
3	12:00	2	216	.22	1.1	47.4	108	72	216	60
4	12:02:30	2	227	.22	1.1	49.2	110	70	217	61
5	12:05	3	229	.32	1.6	50.6	110	70	225	61
6	12:07:30	13	229	.35	1.7	52.5	110	74	233	61
7	12:10	10	229	.25	1.2	54.3	108	74	233	59
8	12:12:30	12	229	.38	1.9	56.8	108	74	237	59
9	12:15	12	229	.40	2.0	58.0	108	79	237	59
10	12:17:30	12	229	.45	2.2	60.[illegible]	108	79	239	59
11	12:20	9	230	.42	2.1	62.3	108	79	231	60
12	12:22:30	14	231	.32	1.6	63.645	108	79	225	57

RAPCON ENVIRONMENTAL CORPORATION

49

Plant	Valley #20
Location	[illegible]
Operator	[illegible]
Date	9-24-99
Run No.	3
Sample Box No.	
Meter Box No.	C-292
Meter $H_{\Delta@}$	1.504
C Factor	1.02
Pitot Tube Coefficient Cp	.84

Schematic of Stack Cross Section

Ambient Temperature	70		IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
Barometric Pressure	30.0	FINAL	460	414.9
Assumed Moisture, %	18	INITIAL	200	410.8
Probe Length, m(ft)	6 ft	DIFFERENCE	260	4.1
Nozzle Identification No.	0005411			
Avg. Calibrated Nozzle Dia., (in.)	.315/.313/.315			
Probe Heater Setting	4			
Leak Rate, m^3/min. (cfm)	.001 at 4 in.			
Probe Liner Material	[illegible]			
Static Pressure, mm Hg (in. Hg)	-.01			
Filter No.	TS-6512			

TRAV. PT.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts)	VELOCITY HEAD (ΔPs) in. H2O	PRESSURE DIFF. ORF. MTR in. H2O	GAS SAMPLE VOLUME ft³	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	10:31 / 10:33:30	2	216	.16	.78	726 / 79.3	72	50	223	60
2	10:36	2	218	.18	.88	80.3	90	52	222	60
3	10:38:30	2	216	.30	1.5	82.6	92	52	223	60
4	10:41	2	209	.27	1.3	84.1	86	54	234	60
5	10:43:30	3	219	.32	1.6	86.2	90	56	232	60
6	10:46	3	226	.35	1.7	87.6	92	58	231	52
7	10:48:30	3	231	.40	2.0	89.9	92	58	229	52
8	10:51	3	232	.45	2.2	91.6	94	60	227	52
9	11:53:30	3	228	.43	2.1	93.8	94	60	228	52
10	12:26 / 12:28:30	4	220	.45	2.2	96.2	90	62	225	49
11	12:31	3	223	.43	2.1	98.3	98	60	251	49
12	12:33:30	3	222	.32	[illegible]	100.3	96	62	237	50
[illegible]	12:36:30 / [illegible]	3	[illegible]	.15	[illegible]	101.9	96	62	240	50

Valley 20

Form RRC-05

Form #BQ

RAMCON emissions test log sheet, cont. DATE 9-24-92 LOCATION [illegible] Ohio TEST NO. 3

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP	VELOCITY HEAD	ORFICE DIFF. PRESSURE	GAS VOLUME Vm (ft.³)	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	12:59 / 1:01-30	2	209	.17	.93	103.3	90	68	249	55
3	1:04	2	215	.20	.98	104.7	92	64	259	55
4	1:06-30	2	217	.17	.93	106.2	96	64	262	54
5	1:09	3	223	.22	1.3	107.7	100	66	262	57
6	1:11-30	2	224	.21	1.0	109.3	100	66	261	57
7	1:14	3	224	.26	1.3	111.0	100	66	259	52
8	1:16-30	4	224	.38	1.9	113.2	102	70	252	52
9	1:19	4	222	.42	2.1	115.2	104	70	254	51
10	1:21-30	4	223	.40	2.0	117.4	104	70	253	51
11	1:24	4	224	.40	2.0	119.4	106	70	244	45
12	1:26-30	4	227	.40	2.0	121.70	106	70	243	45
							93.667	62.08		

SECTION G:

CALIBRATION

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test number ____________ Date 9-25-92 Meter box number C-282 Plant ____________

Barometric pressure, P_b = 29.90 in. Hg Dry gas meter number 147810 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	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$ 532
5.198	1	~~10~~ 5	166.639 / 171.857	72	90 / 104	73 / 74	546.3	8.40	1	.99	1.550
10.276	2	10	173.426 / 183.702	72	96 / 111	74 / 75	549	11.92	1	1.0	1.553
10.12	3	10	155.047 / 165.167	72	100 / 111	71 / 73	548.8	9.58	1	1.01	1.505
										Y = 1.0	1.536

[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 ±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 9-18-92 Meter box number C-282 Plant ________

Barometric pressure, P_b = 29.7 in. Hg Dry gas meter number ________ 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	10	[illegible] / 965.330	[illegible]	[illegible] / [illegible]	94 / 95	101	4.32	1	[illegible]	[illegible]
2	10	97.176 / [illegible]	[illegible]	[illegible] / 129	94 / 97	102	11.72	1	1.03	[illegible]
3	10	[illegible] / [illegible]		[illegible]	10 / 93	100.3	9.55	1	1.03	1.499
									Y = 1.0[illegible]	

[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 ± 0.05Y.

P_b = Barometric pressure, in. Hg.

Θ = Time of calibration run, min.

METER BOX CALIBRATION DATA AND CALCULATION FORM

(English units)

Date 2-13-92 — Meter box number C-282

Barometric pressure, P_b = 29.98 in. Hg — Calibrated by [illegible]

	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 Avg[a] (t_d), °F	Time (θ), min	Y_i	$\Delta H@_i$ in. H_2O
	0.5	5								
10.47	1.0	10	77.953 / 88.423	68	92 / 102	62 / 62	79.5	1201	.974	1.58
	1.5	10								
.369	2.0	10	67.120 / 77.489	68	92 / 106	62 / 64	81	1250	.983	1.70
.285	3.0	10	[illegible].541 / 26.826	68	96 / 108	[illegible] / 64	82.5	997	.991	1.62
	4.0	10								
								Avg	.983	1.63

ΔH, in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \dfrac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6})(t_w + 460)}$	$\Delta H@_i = \dfrac{0.0317\,\Delta H}{P_b (t_d + 460)} \left[\dfrac{(t_w + 460)\,\theta}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
1.5	0.110		
2.0	0.147		
3.0	0.221		
4.0	0.294		

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

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. 6-4 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	3.2	.829	.001
2	1.5	2.6	.832	.002
3	1.1	1.6	.829	.001
		$\bar{C}_p$ (SIDE A)	.830	

"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	3.2	.829	.001
2	1.5	2.6	.832	.002
3	1.1	1.6	.829	.001
		$\bar{C}_p$ (SIDE B)	.830	

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

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

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

Form No. EED-17-1

RAMCON

Lear Siegler Stack Sampler

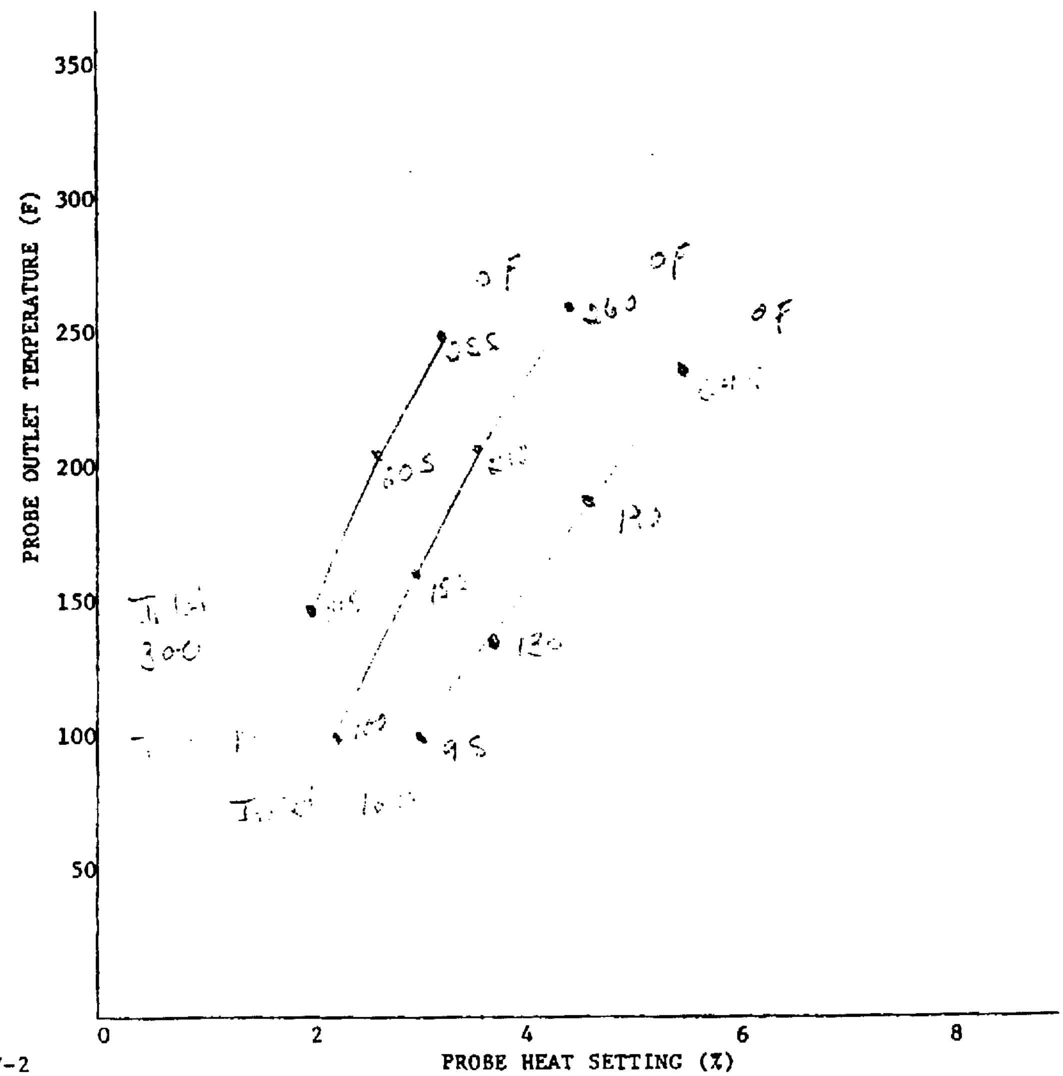
<u>Heating Probe Calibration</u>

Probe No. 64 Probe Length 6'

Date of Calibration 5-7-90 Signature Sam Curran

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



STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 5-5-90 Thermocouple number 64

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 bath	32	32	0
B	Boiling water	212	211	.005
C	Boiling oil	381	378	.002
D	Ice point			

[a]Type of calibration system used.

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

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

SECTION H:

RAMCON PERSONNEL

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

Name: **Mr. G. Sumner Buck, III**
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 Reference Method 9.

Project Duties: Mr. Buck will be responsible for the overall supervision of the project. He provided supervision for the project preparation, testing schedules for each team on-site, and overall organization between the testing crews 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 served 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 test 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 where he obtained 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 provided project leadership to the Team Leader Field Technicians. He ensured that the test crew(s) involved in the test project were properly informed to his respective duties and responsibilities during the testing process. Mr. Jenkins also serves as the Quality Assurance/Quality Control Coordinator and provided guidance in QA/QC to each Team Leader with regard to sample integrity.

Name: **Mr. Thomas 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. He received an Associate degree in Chemical Engineering from State Technical Institute in Memphis, Tennessee.

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.

<u>Name</u>: **Allen Turner**
<u>Title</u>: **Team Leader**

<u>Qualifications</u>: 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.

<u>Project Duties</u>: Mr. Turner is responsible for isokinetic sampling procedures, including but not limited to, Method 5 for particulate, multi-metals, PAH, calibration and cleaning of necessecary 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.