RAMCON

ENVIRONMENTAL CORPORATION

RAMCON BUILDING □ 223 SCOTT ST. □ MEMPHIS, TN. 38112 □ 901/458-7000

RAMCON

ENVIRONMENTAL CORPORATION

September 26, 1988

RECEIVED
SEP 28 1988
AIR QUALITY TECH SERVICES

Mr. Michael Y. Aldridge
N.C. Dept. of NRCD
DEM - Air Quality
P. O. Box 27687
Raleigh, North Carolina 27611-7687

Dear Mr. Aldridge:

I appreciate your letter of September 14, 1988. The points you have made are well taken and I will answer your questions here.

Item 1: Apparently when the report was bound we inadvertently inserted the wrong pre-test calibration. The correct calibration is available. I have enclosed a copy for reference. When I reviewed the report I failed to notice that we had switched pages. Actually, the correct calibration factor to use in the calculations was the 1.003 since it gives the lowest value for Vm std. But, as you pointed out, there is no significant difference in any of these test results.

Item 2: We have made the change and will use a separate form for Method 3.

Item 3: Our "Equipment Used" section is preprinted and is intended to be generic. There are times when we do use both Fyrites as some states actually require its use while others, as you indicated, prefer the nomographs for calculating O_2. In this instance you were correct in assuming both instruments were used. Again, this is of small consequence in this instance and nomographs will be used in the future.

I appreciate your taking the time to write me personally about these matters and enclosing the copy of the North Carolina Code. We will always attempt to perform in a professional manner and follow State guidelines.

Sincerely,

G. Sumner Buck, III
President

GSBIII/mew

METER BOX CALIBRATION DATA AND CALCULATION FORM

(English units)

Date 5-27-88 Meter box number 14810 C-124

Barometric pressure, P_b = 30.10 in. Hg Calibrated by KBA

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	894.83 / 900.27	71.6	104 / 106	82 / 82	94	27.16	1.0007	1.65
1.0	5	885.45 / 890.64	71.6	108 / 108	82 / 82	95	8:52	1.0016	1.69
1.5	10	873.34 / 883.64	71.6	108 / 110	82 / 82	95.5	14:40	1.0054	1.73
2.0	10	860.53 / 871.16	71.6	110 / 110	80 / 82	95.5	12:38	1.0075	1.71
3.0	10								
4.0	10								
							Avg	1.0038	1.695

ΔH, in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6}) (t + 460)}$	$\Delta H@_i = \frac{0.0317\ \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\ \theta}{V_w} \right]^2$
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.

State of North Carolina
Department of Natural Resources and Community Development
Mooresville Regional Office

James G. Martin, Governor
S. Thomas Rhodes, Secretary

Albert F. Hilton, Regional Manager
DIVISION OF ENVIRONMENTAL MANAGEMENT

August 23, 1988

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Allen C. Johnson, President
Superior Paving Company
Route 14, Box 27
Statesville, N. C. 28677

Subject: Permit Modification Request
Superior Paving Company
Iredell County, N. C.

Dear Mr. Johnson:

This Office received on July 18, 1988, two copies of a report on the results of an emissions test performed on June 14, 1988, on the exhaust of a drum mix asphalt plant operated by Superior Paving Company located in Statesville, Iredell County, North Carolina. The test was performed as required by Stipulation No. 5 of Air Permit No. 3939R4 in order to demonstrate compliance with the emission standard promulgated by 40 CFR Part 60, Subpart I, Standards of Performance for Asphalt Concrete Plants.

A review of the results of the test has been completed by the Stationary Source Compliance Unit of the Air Quality Section. The test methods have been found to be acceptable and the results as submitted by Superior Paving Company indicate that compliance with the applicable particulate emission limitation was being achieved during the aforementioned test. However, on the day of the test the plant was operating at approximately 315 tons per hour which is considerably less than the 615 tons per hour maximum permitted capacity. Permit No. 3939R4 was issued to Superior Paving Company on March 22, 1988, based upon information received in a completed application received on December 23, 1987.

Before the test was conducted on June 14, 1988, Personnel of this Office discussed this matter with Mr. John Otone of Superior Paving Company and Mr. Otone stated that the plant could only operate at about 400 tons per hour maximum. Mr. Otone was informed that it would be necessary to permit the

facility based upon the operating capacity during the test. The 315 ton-per-hour operating rate during the test should be sufficient to cover a permitted rate in the range of 315 to 400 tons per hour.

Therefore, it is suggested that Superior Paving Company request that Air Permit No. 3939R4 be modified to reflect a maximum operating rate of 400 tons per hour or less. The request should be received on or before October 4, 1988, to satisfy the NSPS requirements which requires that a performance test be conducted with results submitted within 180 days of initial start-up.

The fee for processing the permit revision is $100.00. A check or money order should accompany the permit modification request and should be made payable to the North Carolina Department of Natural Resources and Community Development.

If you have any questions in regards to the above matter, please do not hesitate to contact Mr. Bernie Pittman or me at (704) 663-1699.

Sincerely,

B. Keith Overcash, P. E.
Environmental Regional Supervisor
Air Quality Section

cc: Mike Aldridge

BOP:pb

SUPERIOR PAVING COMPANY
BUFFALO SHOLES ROAD PLANT - STATESVILLE N.C.
DRUM MIX PLANT / BAGHOUSE
TEST DATE: JUNE 14, 1988

REVIEWED 08/10/88
MICHAEL Y. ALDRIDGE

	RUN NUMBER	1	2	3
	RUN DATE	6/14/88	6/14/88	6/14/88
	RUN START TIME	931	1122	1257
	RUN FINISH TIME	1053	1229	1407
N	NUMBER OF SAMPLE POINTS	30	30	30
Theta	TEST RUN TIME, MINUTES	60	60	60
Dn	NOZZLE DIAMETER, INCHES	0.250	0.250	0.250
An	NOZZLE AREA, SQ. IN.	0.0491	0.0491	0.0491
Cp	PITOT TUBE COEFFICIENT	0.800	0.800	0.800
Y	GAS METER CAL. FACTOR	1.019	1.019	1.019
Pbar	BAROMETRIC PRESSURE, IN. HG	29.72	29.72	29.72
Delta H	AVG. PRESS. DIFFERENTIAL OF ORIFICE METER, IN. H2O	1.420	1.370	1.370
Vm	ACTUAL METERED GAS VOL. CF	37.509	39.532	37.098
TmF	GAS METER TEMP,. DEG. F	108	118	118
Vm(std)	METERED GAS VOLUME AT DRY STANDARD CONDITIONS, DSCF	35.402	36.662	34.404
Vwc	VOLUME OF WATER COLLECTED IN IMPINGERS & DESICCANT, ML	371.0	388.0	365.0
Vwc(std)	VOLUME OF WATER VAPOR, SCF	17.463	18.263	17.181
%M	MOISTURE, % BY VOLUME	33.0	33.3	33.3
fm	MOLE FRACTION OF DRY GAS	0.670	0.667	0.667
%CO2	CO2, % BY VOLUME, DRY	7.0	4.0	3.0
%O2	O2, % BY VOLUME, DRY	10.5	15.0	18.0
%CO	CO, % BY VOLUME, DRY	0.0	0.0	0.0
%N2	N2, % BY VOLUME, DRY	82.5	81.0	79.0
Md	DRY MOLECULAR WT., #/#-MOLE	29.54	29.24	29.20

SUPERIOR PAVING COMPANY
BUFFALO SHOLES ROAD PLANT - STATESVILLE N.C.
DRUM MIX PLANT / BAGHOUSE
TEST DATE: JUNE 14, 1988

REVIEWED 08/10/88
MICHAEL Y. ALDRIDGE

	RUN NUMBER	1	2	3
Ms	WET MOLECULAR WT., #/#-MOLE	25.73	25.50	25.47
Pstatic	GAS STATIC PRESS,. IN. H20	0.05	0.05	0.05
Ps	ABSOLUTE GAS PRESS, IN. HG.	29.72	29.72	29.72
TsF	STACK GAS TEMP., DEG. F	340	337	319
SSR DP	SUM OF SQUARE ROOTS OF VELOCITY PRESS. VALUES	29.4467	28.8178	29.3271
vs	FLUE GAS VELOCITY, FT/SEC	68.7	67.4	67.8
Ds	DUCT DIAMETER, INCHES			
As	DUCT AREA, SQUARE INCHES	1648.4	1648.4	1648.4
AsF	DUCT AREA, SQUARE FEET	11.447	11.447	11.447
Qs	GAS FLOW RATE, WET ACFM	47152	46261	46574
Qstd	GAS FLOW RATE, DRY SCFM	20695	20314	20907
mn	SAMPLE WEIGHT, GRAMS	0.0922	0.0864	0.0860
cs	PART. CONCENTRATION GR/DSCF	0.0402	0.0364	0.0386
pmrc	POLLUTANT MASS RATE CALC. FROM CONCENTRATION, #/HR	7.13	6.33	6.91
pmra	POLLUTANT MASS RATE CALC. FROM AREA RATIO, #/HR	6.83	6.40	6.37
%I	% ISOKINETIC	95.7	101.0	92.1
pmr avg	AVERAGE OF pmra & pmrc	6.98	6.37	6.64

AVERAGE PARTICULATE CONCENTRATION GR/DSCF: 0.0384

AVERAGE PARTICULATE EMISSION RATE CALCULATED FROM CONCENTRATION #/HR: 6.7929

AQ-16 Revised 3/1/84

NORTH CAROLINA DIVISION OF ENVIRONMENTAL MANAGEMENT

Air Quality Action Request

Computer ____

Name	Location	Reg/Co./Prem. No.
Superior Paving Company	Statesville/Iredell County	03/49/0080

Contact: John Otone — Telephone:

Type Action: CI ___ EE X SR ___ PC ___ VE ___ PI ___ Other Stack Test

Air Program Status 03 93 ____ ____ ____ Class A1A Chg ____

Action Requested By: — Address/Phone — Rec'd Date

Last Insp. Date ____ Action Date 6/14/88 Next Insp. Date 7/1/89

Permit # 3939R4 Issued 3/22/88 Expires 10/31/91 Stip. # ____ Met Y/N ____

Recommendations:

Signature: Bernie Pittman — Bernie Pittman — Date: 6/28/88

Dist: Yellow (Central File) - Blue (Region) - White (Opt.) Specify ____

1. This facility produces hot-mix asphalt.

2. The facility operates a No.2/No.4 fuel oil fired, hot-mix asphalt plant (113 million BTU per hour maximum permitted heat input rate) which replaced a previously operated 250 ton/hr plant. The plant is rated at 615 tons per hour maximum capacity. However, according to Mr. Otone, the plant can only operate around 400 plus tons/hr. at capacity. During the stack test, the plant was operating around 315 tons/hr. Mr. Otone was advised that the facility would have to be permitted based on the operating capacity during the test. For example, if the maximum capacity were 300 tons/hr. during the test, the facility could be permitted at 375 tons/hr. (The plant would have to test at 80 percent of capacity.)

3. The facility is equipped with a cyclone which is vented to a bagfilter (10,842 square feet of filter area) to control particulate and visible emissions.

4. There were 0 to 5 percent emissions observed for 30 minutes during the first run of the test. (See attached AQ-23)

5. The test was conducted by Ramcon Environmental Corporation and appeared to be performed in accordance with EPA method 5. (See attached AQ-92)

6. The operational start-up date was April 4, 1988. The plant is an NSPS source and was required to conduct a performance test within 60 days of maximum operation or 180 days of initial start-up.

7. The facility is considered to be in compliance by inspection. Results of the stack test should confirm this compliance status.

RAMCON
ENVIRONMENTAL CORPORATION

SOURCE SAMPLING
for
PARTICULATE EMISSIONS
SUPERIOR PAVING COMPANY
STATESVILLE, NORTH CAROLINA
June 14, 1988

Allen Johnson
Superior Paving Company

G. Sumner Buck, III
President

Ken Allmendinger
Team Leader

RAMCON BUILDING, 223 SCOTT STREET, MEMPHIS, TENNESSEE 38112

RAMCON
ENVIRONMENTAL CORPORATION

June 28, 1988

Mr. Allen Johnson
Superior Paving Company
Route 14, Box 27
Statesville, NC 28677

Re: Particulate Emissions Test - Statesville, North Carolina

Dear Mr. Johnson:

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

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

Mr. Keith Overcash
North Carolina DNR
P. O. Box 950
Mooresville, NC 28115

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

We certainly have enjoyed working with you and we look forward to serving you again in the future.

Sincerely,

G. Sumner Buck, III
President

GSBIII:mew

Enclosures

TABLE OF CONTENTS

I. INTRODUCTION

On June 14, 1988, personnel from RAMCON Environmental Corporation (REC) conducted a source emissions test for particulate emissions compliance at Superior Paving Company's Astec drum mix asphalt plant located in Statesville, North Carolina. RAMCON personnel conducting the test were Ken Allmendinger, Team Leader, and Kevin Powell. Kim Rea was responsible for the particulate 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. Allmendinger and Ms. Rea.

The purpose of the test was to determine if the rate of particulate from the plant's baghouse and the total contaminants by weight (grain loading) is below the allowable N.S.P.S. limits set by the State of North Carolina.

II. TEST RESULTS

Table I summarizes the test results. The grain loading limitation for EPA is specified in 39 FR 9314, March 8, 1974, 60.92 Standards for Particulate Matter (1), as amended. The allowable N.S.P.S. particulate emissions for EPA and the State of North Carolina is .04 gr/dscf.

The visible emissions test (Reference Method 9) was conducted by Kevin Powell. The opacity on all three test runs ranged from 0% to 5%; therefore, this plant meets N.S.P.S. requirements.

TABLE I

SUMMARY OF TEST RESULTS
June 14, 1988

Test Run	Time	Grain Loading	Isokinetic Variation	Actual Emissions
1	09:31 to 10:52	0.0407 gr/DSCF	95.5%	7.1 lbs/hr
2	11:22 to 12:28	0.0369 gr/DSCF	99.9%	6.4 lbs/hr
3	12:57 to 14:06	0.0391 gr/DSCF	90.8%	7.0 lbs/hr
	Average:	0.0389 gr/DSCF		6.8 lbs/hr

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

III. TEST PROCEDURES

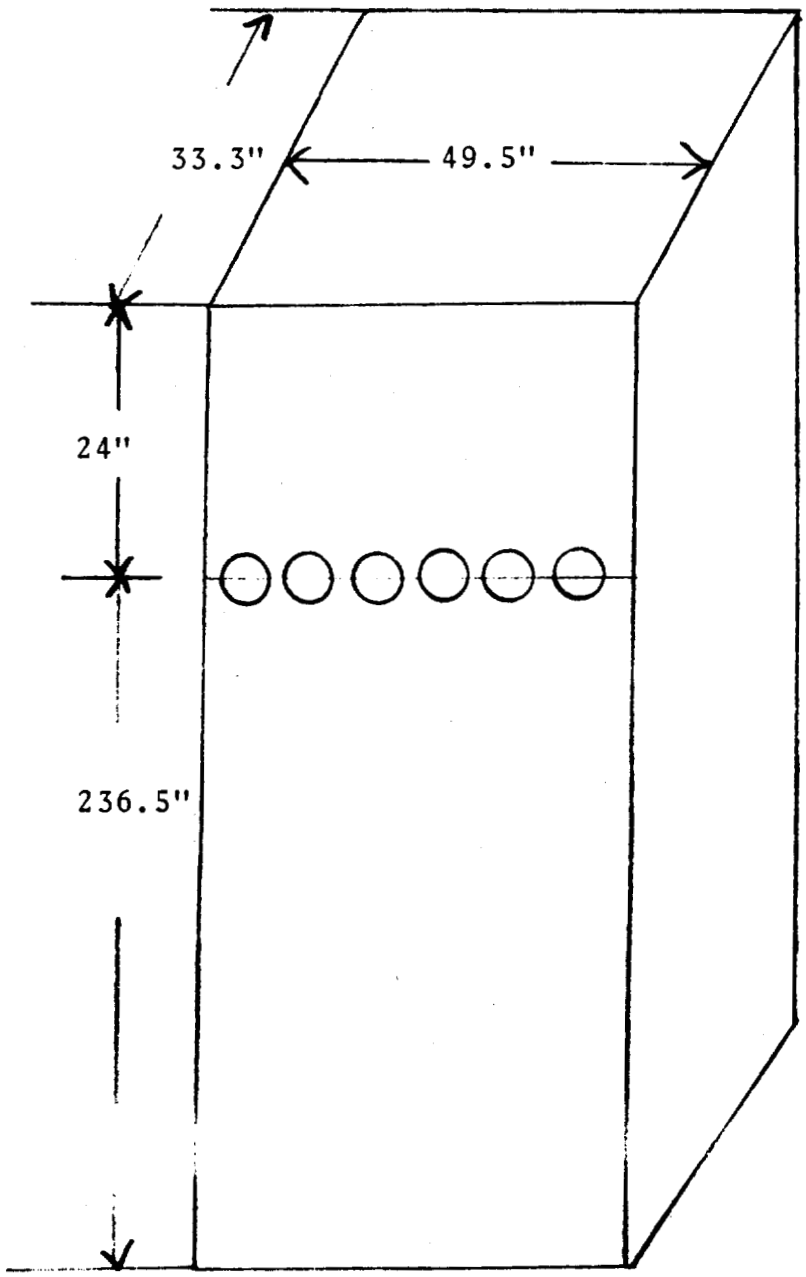
A. Method Used: The source sampling was conducted in accordance with requirements of the U.S. Environmental Protection Agency as set forth in 39 FR 9314, March 8, 1974, 60.93, as amended.

B. Problems Encountered: No problems were encountered that affected testing.

C. Sampling Site: The emissions test was conducted after a baghouse on a rectangular stack measuring 33.3" x 49.5" with an equivalent diameter of 39.8". Six sampling ports were placed 24" down (.60 diameters upstream) from the top of the stack and 236.5" up (5.9 diameters downstream) from the last flow disturbance. Thirty points were sampled, five through each port for two minutes each for a total test time of sixty minutes per test run.

Points on a Diameter	Probe Mark
1	*8.8"
2	15.4"
3	22.1"
4	28.8"
5	35.4"

*Measurements include a 5.5" standoff.



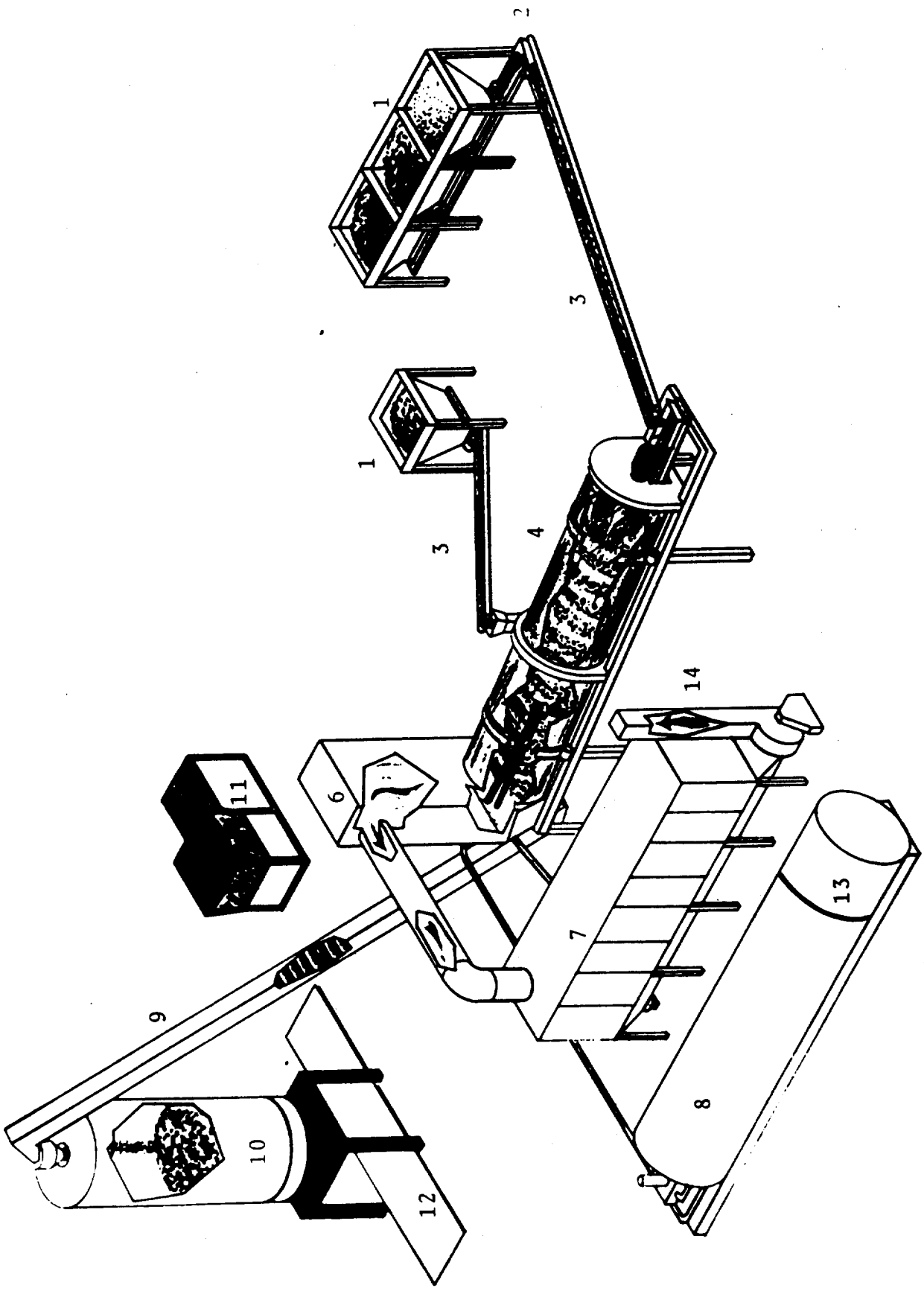
IV. THE SOURCE

IV. THE SOURCE

Superior Paving Company employs an Astec 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 and 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 four 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. 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 conveyor. The hot asphalt mix is then discharged from the storage silo through a slide gate into waiting dump trucks, which transport 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 fuel oil to heat air to dry the aggregate, and the motion of the rotating drum to blend the aggregate and hot asphalt oil thoroughly. The air is drawn into the system via an exhaust fan. After passing through the burner and the mixing drum, the exhaust gasses pass through a baghouse. The baghouse is manufactured by Astec. The exhaust gasses are drawn through the baghouse and discharged to the atmosphere through a stack. The design pressure drop across the tube-sheet is 1 - 6 inches of water. The particulate matter, which is removed by the baghouse, is reinjected into the drum mixer.



ASTEC - DRUM MIX BAGHOUSE

1. Aggregate bins: Virgin aggregate is fed individually into each of four bins by type. It is metered onto a conveyor belt running under the bins to a shaker screen. The proporation of 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 this drum. Hot liquid asphalt is injected approximately one-third of the way down the inclined 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 baffleing: A baffeling 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 project.

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 loading scale which tells the plant operator the amount of asphalt that is being trucked on each individual load.

13. Fuel Storage

PLANT DATA

COMPANY NAME Superior Paving Co.

COMPANY REP. _____ DATE 6-14-88 PHONE # 872-6556

DATA SOURCE _____

PLANT LOCATION Buffalo Shoals Rd. Statesville NC. 28677

PLANT MFG. Astec PLANT MODEL # Double BOB PLANT TYPE Drum Mix

MIX SPECIFICATION # _____ OIL SPECIFICATION # _____

Time 24 Hour	___ Fuel Oil ✓ ___ Nat. Gas ___ Propane ___ Coal ___	Burner Setting	Aggregate TPH	Recycle TPH	Liquid Asphalt TPH	Mix Temp. °F	___ Venturi ___ Baghouse Pressure Drop Inches Water
0855		50%	141.34	70.40	8.95	295	
							2 ½
0910		61%	170	83.44	10.71	296	2 ½
0925		78.%	182.05	94.02	11.64	290	2 ¼
0940		98 %	198.15	98.95	12.46	285	2
0955		97.%	196.01	99.34	15.79	283	1 ½
1015		86 %	189.85	95.15	15.63	291	½
1040		82 %	198.17	97.11	12.49	302	1
1055		80 %	198.44	99.49	12.33	303	1
1215		66 %	200.17	100.32	12.65	306	½
1235		70 %	203.76	101.95	12.74	306	½
1300		51 %	176.87	88.69	11.03	304	½
1330		62 %	177.17	87.92	10.93	302	¼
1350		62%	175.44	89.98	14.19	291	¼
1405		67 %	171.67	88.27	13.96	293	¼

V. EQUIPMENT USED

V. EQUIPMENT USED

Equipment used on conducting the particulate emissions test was:

A. The Lear Siegler PM-100 stack sampler with appropriate auxillary equipment and glassware. The train was set up according to the schematic on the nex 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 mady 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 $\leq$ .001.

VI. LABORATORY PROCEDURES & 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 dessicator to dry for at least 24 hours. Clean plastic petri dishes, also numbered, top and bottom, are placed in the dessicator with the filters. After dessication, 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 book. 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 (175°C for two hours). The open jars are removed and placed in a dessicator until cool (2 hours) and then tightly sealed. The jars are then numbered and weighed on the triple beam balance to the closest tenth of a gram, and 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 dessicator for at least 24 hours. Then, the filters are weighed continuously every 6 hours until a constant weight is achieved. All data is recorded on the laboratory forms that will be bound in the test report.

Alternately, the test team may opt to oven dry the filters at 220°F for two to three hours, weigh the sample, and use this weight as a final weight.

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 in sealed mason jars to the laboratory 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: Conduct a blank analysis of acetone from the one gallon glass container. This acetone will be used in the field for rinsing the probe, nozzle, and top half of the filter holder. Performing such a blank analysis prior to testing will insure that the quality of the acetone to be used will not 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. The net weight is the same and no particulate is lost. 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 "zero" position. The beam arrest lever (on the lower left hand side toward the rear of the balance) is then slowly pressed downward to full release position. The lighted vernier scale on the front of the cabinet should align 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 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 the 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

Plant Location Superior Paving — Relative humidity in lab 45 %

Sample Location hot mix asphalt plant — Density of Acetone (pa) .7853 mg/ml

Blank volume (V_a) 200 ml

Date/Time wt. blank 6/20/88 — Gross wt. 101.0396 mg

Date/Time wt. blank 6/21/88 — Gross wt. 101.0395 mg

Ave. Gross wt. 101.0396 mg

Tare wt. 101.0393 mg

Weight of blank (m_{ab}) .0003 mg

Acetone blank residue concentration (C_a) $(C_a) = (M_{ab}) / (V_a)(p_a) = (.0000019$ mg/g)

Weight of residue in acetone wash: $W_a = C_a V_{aw} p_a = (.0000019)(200)(.7853) = (.0003)$

		Run # 1	Run # 2	Run #3
Acetone rinse volume (V_{aw})	ml	200	200	200
Date/Time of wt 6/20/88 4:30 PM — Gross wt	g	157.9139	153.2246	160.8925
Date/Time of wt 6/21/88 9:10 AM — Gross wt	g	157.9136	153.2244	160.8920
Average Gross wt	g	157.9138	153.2245	160.8923
Tare wt	g	157.8802	153.1412	160.8204
Less acetone blank wt (W_a)	g	.0003	.0003	.0003
Wt of particulate in acetone rinse (m_a)	g	.0333	.0830	.0716

Filter Numbers	#	SG-2676	SG-2667	SG-2677
Date/Time of wt 6/20/88 4:30 PM — Gross wt	g	.5930	.5380	.5460
Date/Time of wt 6/21/88 9:10 AM — Gross wt	g	.5926	.5379	.5463
Average Gross wt	g	.5928	.5380	.5462
Tare wt	g	.5339	.5346	.5318

Weight of particulate on filters(s) (m_f)	g	.0589	.0034	.0144
Weight of particulate in acetone rinse	g	.0333	.0830	.0716
Total weight of particulate (m_n)	g	.0922	.0864	.0860

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 Kim Rea — Signature of reviewer

VII. CALCULATIONS

SUPERIOR PAVING COMPANY
STATESVILLE, NORTH CAROLINA
6/14/88

SUMMARY OF TEST DATA

		RUN #1	RUN #2	RUN #3
SAMPLING TRAIN DATA				
	start	09:31	11:22	12:57
	finish	10:52	12:28	14:06
1. Sampling time, minutes	θ	60.0	60.0	60.0
2. Sampling nozzle diameter, in.	D_n	.2500	.2500	.2500
3. Sampling nozzle cross-sect. area, ft^2	A_n	.000341	.000341	.000341
4. Isokinetic variation	I	95.5	99.9	90.8
5. Sample gas volume - meter cond., cf.	V_m	37.509	39.532	37.098
6. Average meter temperature, ^oR	T_m	568	578	578
7. Avg. oriface pressure drop, in. H_2O	dH	1.42	1.37	1.37
8. Total particulate collected, mg.	M_n	92.20	86.40	86.00
VELOCITY TRAVERSE DATA				
9. Stack area, ft^2	A	11.40	11.40	11.40
10. Absolute stack gas pressure, in. Hg.	P_s	29.72	29.72	29.72
11. Barometric pressure, in. Hg.	P_{bar}	29.72	29.72	29.72
12. Avg. absolute stack temperature, R^o	T_s	800	797	779
13. Average $-\sqrt{\text{vel. head}}$, (C_p= .80)	$-\sqrt{dP}$	0.98	0.96	0.98
14. Average stack gas velocity, ft./sec.	V_s	68.71	67.38	68.05
STACK MOISTURE CONTENT				
15. Total water collected by train, ml.	V_{ic}	381.00	388.00	365.00
16. Moisture in stack gas, %	B_{ws}	34.06	33.65	33.68
EMISSIONS DATA				
17. Stack gas flow rate, dscf/hr.(000's)	Q_{sd}	1219	1207	1246
18. Stack gas flow rate, cfm	acfm	46998	46088	46546
19. Particulate concentration, gr/dscf	C_s	0.0407	0.0369	0.0391
20. Particulate concentration, lb/hr	E	7.09	6.36	6.97
21. Particulate concentration, lb/mBtu	E'	0.00000	0.00000	0.00000
ORSAT DATA				
22. Percent CO_2 by volume	CO_2	7.00	4.00	3.00
23. Percent O_2 by volume	O_2	10.50	15.00	18.00
24. Percent CO by volume	CO	.00	.00	.00
25. Percent N_2 by volume	N_2	82.50	81.00	79.00

Format: summryR3

NAME: SUPERIOR PAVING COMPANY (14)
LOCATION: STATESVILLE, NORTH CAROLINA
TEST DATE: 6/14/88

Dry Gas Volume

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

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 ^oR.

T_{std} = Standard absolute temperature (528^oR).

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:

$$V_{m(std)} = (17.64)(1.003)(37.509)\left[\frac{(29.72) + \frac{1.42}{13.6}}{\frac{568}{108}}\right] = 34.846 \text{ dscf}$$

RUN 2:

$$V_{m(std)} = (17.64)(1.003)(39.532)\left[\frac{(29.72) + \frac{1.37}{13.6}}{\frac{578}{118}}\right] = 36.086 \text{ dscf}$$

RUN 3:

$$V_{m(std)} = (17.64)(1.003)(37.098)\left[\frac{(29.72) + \frac{1.37}{13.6}}{\frac{578}{118}}\right] = 33.864 \text{ dscf}$$

Format: dgmR3

NAME: SUPERIOR PAVING COMPANY
LOCATION: STATESVILLE, NORTH CAROLINA
TEST DATE: 6/14/88 **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:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{92.20}{34.846}\right] = 0.0407 \text{ gr./dscf.}$$

Run 2:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{86.40}{36.086}\right] = 0.0369 \text{ gr./dscf.}$$

Run 3:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{86.00}{33.864}\right] = 0.0391 \text{ gr./dscf.}$$

NAME: SUPERIOR PAVING COMPANY
LOCATION: STATESVILLE, NORTH CAROLINA
TEST DATE: 6/14/88

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:

$$M_d = 0.44(\ 7.00\%) + 0.32(10.50\%) + 0.28(\ .00\% + 82.50\%) = 29.54 \ \frac{lb}{lb\text{-mole}}$$

Run 2:

$$M_d = 0.44(\ 4.00\%) + 0.32(15.00\%) + 0.28(\ .00\% + 81.00\%) = 29.24 \ \frac{lb}{lb\text{-mole}}$$

Run 3:

$$M_d = 0.44(\ 3.00\%) + 0.32(18.00\%) + 0.28(\ .00\% + 79.00\%) = 29.20 \ \frac{lb}{lb\text{-mole}}$$

NAME: SUPERIOR PAVING COMPANY (17)
LOCATION: STATESVILLE, NORTH CAROLINA
TEST DATE: 6/14/88

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) (365.0) = 17.2 cu.ft
$V_{wsg(std)}$ = (0.04715) (16.0) = 0.8 cu.ft

Run 2:

$V_{wc(std)}$ = (0.04707) (375.0) = 17.7 cu.ft
$V_{wsg(std)}$ = (0.04715) (13.0) = 0.6 cu.ft

Run 3:

$V_{wc(std)}$ = (0.04707) (350.0) = 16.5 cu.ft
$V_{wsg(std)}$ = (0.04715) (15.0) = 0.7 cu.ft

NAME: SUPERIOR PAVING COMPANY
LOCATION: STATESVILLE, NORTH CAROLINA
TEST DATE: 6/14/88

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:

$$B_{ws} = \frac{17.2 + 0.8}{17.2 + 0.8 + 34.846} \times 100 = 34.06\ \%$$

Run 2:

$$B_{ws} = \frac{17.7 + 0.6}{17.7 + 0.6 + 36.086} \times 100 = 33.65\ \%$$

Run 3:

$$B_{ws} = \frac{16.5 + 0.7}{16.5 + 0.7 + 33.864} \times 100 = 33.68\ \%$$

NAME: SUPERIOR PAVING COMPANY (19)
LOCATION: STATESVILLE, NORTH CAROLINA
TEST DATE: 6/14/88

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:

$M_s = 29.54 (1 - 34.06) + 18 (34.06) = 25.61$ (lb./lb.-mole)

Run 2:

$M_s = 29.24 (1 - 33.65) + 18 (33.65) = 25.46$ (lb./lb.-mole)

Run 3:

$M_s = 29.20 (1 - 33.68) + 18 (33.68) = 25.43$ (lb./lb.-mole)

NAME: SUPERIOR PAVING COMPANY (20)
LOCATION: STATESVILLE, NORTH CAROLINA
TEST DATE: 6/14/88

Stack Gas Velocity

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

Where:

V_s = Average velocity of gas stream in stack, ft./sec.

K_p = 85.49 ft/sec $\left[\frac{(g/g\text{-mole})\text{-}(mm\ Hg)}{(^oK)(mm\ H_2O)} \right]^{1/2}$

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, (^of).

T_s = Absolute stack temperature, (^oR). = 460 + t_s.

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

Run 1:

$$V = (85.49)\ (\ .80)\ (\ 0.98) \sqrt{\frac{800\quad 340}{(29.72)(25.61)}} = 68.71 \text{ ft/sec.}$$

Run 2:

$$V = (85.49)\ (\ .80)\ (\ 0.96) \sqrt{\frac{797\quad 337}{(29.72)(25.46)}} = 67.38 \text{ ft/sec.}$$

Run 3:

$$V = (85.49)\ (\ .80)\ (\ 0.98) \sqrt{\frac{779\quad 319}{(29.72)(25.43)}} = 68.05 \text{ ft/sec.}$$

Format: vsR3

NAME: SUPERIOR PAVING COMPANY
LOCATION: STATESVILLE, NORTH CAROLINA
TEST DATE: 6/14/88

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:

$$Q_{sd}=3600(1-\ .3406\ )(\ 68.71)(\ 11.40)\left[\frac{528}{800}\right]\left[\frac{29.72}{29.92}\right] = 1219010.4\ \frac{dscf}{hr}$$

Run 2:

$$Q_{sd}=3600(1-\ .3365\ )(\ 67.38)(\ 11.40)\left[\frac{528}{797}\right]\left[\frac{29.72}{29.92}\right] = 1207374.8\ \frac{dscf}{hr}$$

Run 3:

$$Q_{sd}=3600(1-\ .3368\ )(\ 68.05)(\ 11.40)\left[\frac{528}{779}\right]\left[\frac{29.72}{29.92}\right] = 1246992.0\ \frac{dscf}{hr}$$

NAME: SUPERIOR PAVING COMPANY
LOCATION: STATESVILLE, NORTH CAROLINA
TEST DATE: 6/14/88

Emissions Rate from Stack

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

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:

$$E = \frac{(0.0407)\ (1219010.4)}{7000} = 7.09 \text{ lb. / hr.}$$

Run 2:

$$E = \frac{(0.0369)\ (1207374.8)}{7000} = 6.36 \text{ lb. / hr.}$$

Run 3:

$$E = \frac{(0.0391)\ (1246992.0)}{7000} = 6.97 \text{ lb. / hr.}$$

NAME: SUPERIOR PAVING COMPANY
LOCATION: STATESVILLE, NORTH CAROLINA
TEST DATE: 6/14/88

Isokinetic Variation

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

Where:

I	=	Percent isokinetic sampling.
100	=	Conversion to percent.
T_s	=	Absolute average stack gas temperature, ^{o}R.
0.002669	=	Conversion factor, Hg - ft^3/ml - ^{o}R.
V_{ic}	=	Ttl vol of liquid collected in impingers and silica gel, ml.
T_m	=	Absolute average dry gas meter temperature, ^{o}R.
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:

$$I = (100)\left(\frac{800}{60\ (\ 60.0\ )\ (\ 68.71\ )\ (\ 29.72\ )\ (\ .000341\ )}\right)\left[(0.002669)(381.00) + \frac{37.509}{568}\left[29.72 + \frac{1.42}{13.6}\right]\right] = 95.5\%$$

Run 2:

$$I = (100)\left(\frac{797}{60\ (\ 60.0\ )\ (\ 67.38\ )\ (\ 29.72\ )\ (\ .000341\ )}\right)\left[(0.002669)(388.00) + \frac{39.532}{578}\left[29.72 + \frac{1.37}{13.6}\right]\right] = 99.9\%$$

Run 3:

$$I = (100)\left(\frac{779}{60\ (\ 60.0\ )\ (\ 68.05\ )\ (\ 29.72\ )\ (\ .000341\ )}\right)\left[(0.002669)(365.00) + \frac{37.098}{578}\left[29.72 + \frac{1.37}{13.6}\right]\right] = 90.8\%$$

VIII. FIELD DATA

RAMCON ENVIRONMENTAL CORPORATION

Plant Superior Paving

Location Stateville Nc

Operator K. Allen/KS

Date 6-14-88

Run No. 1

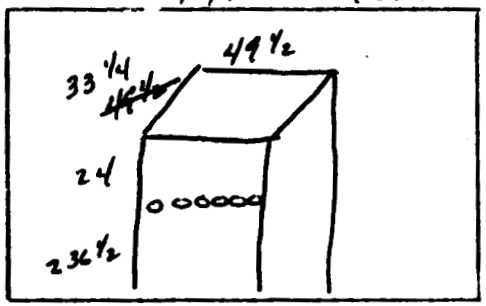
Sample Box No. 1

Meter Box No. C124 14781C

Meter H @ 1.63

C Factor 1.003

Pitot Tube Coefficient Cp .80



Schematic of Stack Cross Section

		IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
Ambient Temperature	78		
Barometric Pressure	29.72 FINAL	555	44
Assumed Moisture, %	30 INITIAL	200	42.6
Probe Length, m(ft)	4 DIFFERENCE	355	1.4

Nozzle Identification No. .000340 9

Avg. Calibrated Nozzle Dia., (in.) .250/.250/.25

Probe Heater Setting 4.5

Leak Rate, m^3/min. (cfm) .001 @ 13"

Probe Liner Material 316 Stainless

Static Pressure, mm Hg (in. Hg) .05

Filter No. SG-2676

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Ps) in H2O	PRESSURE DIFF. ORF. MTR in H_2O	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
A) 1	9:31:30 / 9:33	7	320	1.3	2.0	449.41 / 449.01	100	95	230	60
2	9:35	8	335	1.3	2.0	449.88	100	90	230	60
3	9:37	8	335	1.3	2.0	450.73	105	90	230	60
4	9:39	8	335	1.1	1.6	451.55	105	90	230	60
5	9:41:30	8	340	1.1	1.6	452.36	105	90	230	60
B) 1	9:43:40 / 9:45:40	8	320	.70	.97	452.81	100	90	230	60
2	9:55:30 / 10:01	9	345	1.5	2.9	454.18	110	100	235	60
3	10:03	10	345	1.5	2.1	455.63	110	100	235	60
4	10:05	10	345	1.5	2.1	457.19	110	95	235	60
5	10:07:30	10	345	1.2	1.7	458.76	110	95	235	60
C) 1	10:09 / 10:11	7	340	.75	1.0	460.15	115	100	240	60
2	10:13	9	345	1.2	1.7	461.78	115	95	240	60
3	10:15	9	345	1.5	2.1	463.34	115	95	245	60

(74)

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 6-14-88 LOCATION Statesville TEST NO. 1

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F)		SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
							in	out		
4	10:17	8	345	1.5	2.1	464.97	115	95	245	60
5	10:19	8	345	1.5	2.1	466.63	115	95	245	60
D) 1	~~10:20:30~~ 10:22	4	320	.25	.35	467.75	115	100	245	60
2	10:24	5	320	.60	.83	468.95	120	100	250	60
3	10:26	7	345	.93	1.3	470.21	125	100	250	60
4	10:28	8	345	1.2	1.7	471.84	125	100	250	60
5	10:30:20	8	350	1.2	1.7	473.27	125	100	250	60
E) 1	~~10:31:40~~ 10:33	5	340	.40	.56	474.45	120	100	250	60
2	10:35	5	345	.56	.78	475.58	125	100	250	60
3	10:37	5	345	.70	.97	476.86	125	100	250	60
4	10:39	6	345	.97	1.3	478.14	130	100	250	60
5	10:41:40	6	345	.97	1.3	479.35	130	100	250	60
F) 1	~~10:42:45~~ 10:44	4	335	.40	.56	480.43	125	105	250	60
2	10:46	4	345	.63	.88	481.55	125	105	250	60
3	10:48	5	345	.73	1.0	482.77	130	105	250	60
4	10:50	5	345	.80	1.1	483.95	130	105	250	60
5	10:52:45	5	345	.80	1.1	485.15	130	105	250	60

$\sqrt{\Delta P}$ = 29.4467

RAMCON ENVIRONMENTAL CORPORATION

Plant Superior Asphalt Paving

Location Statesville NC
Operator K Edwards
Date 6-14-88
Run No. 2
Sample Box No. 2
Meter Box No. C124 1.47810
Meter H @ 1.63
C Factor 1.003
Pitot Tube Coefficient Cp .80

Ambient Temperature 85
Barometric Pressure 25.72
Assumed Moisture, % 20
Probe Length, m(ft) 4

	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL	565	526
INITIAL	200	513
DIFFERENCE	365	13

Nozzle Identification No. .000340 9
Avg. Calibrated Nozzle Dia., (in.) .254/.250/.250
Probe Heater Setting 4.5
Leak Rate, m^3/min. (cfm) .002 @ 13
Probe Liner Material 316 Stainless
Static Pressure, mm Hg (in. Hg) .05
Filter No. 56-2667

Schematic of Stack Cross Section Pre test leak check .00 @ 14"

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (Ts) °F	VELOCITY HEAD (Ps) in H_2O	PRESSURE DIFF. ORF. MTR in H_2O	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
A) 1	11:22:45 / 11:24	0	321	.27	.38	485.779 / 486.61	120	115	260	60
2	11:24	2	340	.60	.83	487.67	125	110	260	65
3	11:28	2	345	.60	.83	488.69	130	110	260	60
4	11:30	2	350	.60	.83	489.77	130	110	260	60
5	11:32:45	3	350	.83	1.2	491.01	130	105	260	60
B) 1	11:34:45 / 11:36	1	325	.38	.53	491.95	120	105	255	60
2	11:38	2	350	.58	.81	492.97	130	105	255	60
3	11:40	3	350	.80	1.1	494.19	130	105	255	60
4	11:42	3	350	1.0	1.4	495.56	130	105	255	60
5	11:44:45	3	345	1.0	1.4	496.89	130	105	250	60
C) 1	11:46 / 11:48	2	340	.50	.70	497.92	125	105	250	60
2	11:50	2	345	.67	.93	499.05	130	105	250	60
3	11:52	3	345	.90	1.3	500.34	130	105	250	60

CO_2 4.0
O_2 15.0

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 6-14-88 LOCATION Statesville TEST NO. 2

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F)		SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
							in	out		
4	11:54	4	345	1.3	1.8	501.89	130	105	250	60
5	11:56	4	345	1.3	1.8	503.42	130	105	250	60
D) 1	11:56:30 / 11:58	0	320	.20	.28	504.41	130	105	250	60
2	12:00	0	315	.23	.32	505.06	130	105	245	60
3	12:02	3	335	1.1	1.5	506.40	130	105	245	60
4	12:04	4	340	1.3	1.8	507.91	130	105	245	60
5	12:06:30	5	340	1.5	2.1	509.50	135	105	245	60
E) 1	12:08 / 12:10	3	330	.80	1.1	510.82	130	105	245	60
2	12:12	4	335	1.3	1.8	512.24	130	105	245	60
3	12:14	5	335	1.8	2.5	514.60	135	105	245	60
4	12:16	5	335	1.5	2.1	515.68	135	105	250	60
5	12:18	5	335	1.5	2.1	517.35	135	105	250	60
F) 1	12:18:30 / 12:20	5	320	1.3	1.8	518.92	130	105	250	60
2	12:22	5	330	1.5	2.1	520.58	135	105	250	60
3	12:24	5	330	1.5	2.1	522.18	135	105	250	60
4	12:26	5	330	1.3	1.8	523.77	135	105	250	60
5	12:28:45	5	330	1.3	1.8	525.311	135	105	250	60
			$\Sigma\sqrt{\Delta p} = 28.8178$							

RAMCON ENVIRONMENTAL CORPORATION

Plant Superior Paving

Location Statesville NC
Operator K. Helmuth
Date 6-14-88
Run No. 3
Sample Box No. 3
Meter Box No. C124 2478/0
Meter H @ 1.63
C Factor 1.003
Pitot Tube Coefficient Cp .80

Ambient Temperature 90
Barometric Pressure 29.72

	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL	550	530
INITIAL	200	515
DIFFERENCE	350	15

Assumed Moisture, % 30
Probe Length, m(ft) 4
Nozzle Identification No. 000349
Avg. Calibrated Nozzle Dia., (in.) .259/.250/.250
Probe Heater Setting 4.5
Leak Rate, m^3/min. (cfm) .01
Probe Liner Material 316 Stainless
Static Pressure, mm Hg (in. Hg) .05
Filter No. 56-2677

Schematic of Stack Cross Section Pre test leak check .004@14"

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
A) 1	12:57:10 / 12:59	5	310	1.0	1.4	525.872 / 527.24	115	110	240	65
2	1:01	7	320	1.6	2.2	528.87	125	110	240	65
3	1:03	7	325	1.6	2.2	530.63	130	110	240	65
4	1:05	7	325	1.5	2.1	531.92	130	110	245	65
5	1:07:10	7	320	1.5	2.1	532.85	125	105	245	65
B) 1	1:13 / 1:15	2	320	.43	.60	533.47	115	110	230	65
2	1:17	6	320	1.1	1.5	534.09	120	105	230	60
3	1:19	7	315	1.3	1.8	534.75	120	105	235	60
4	1:21	7	315	1.5	2.1	535.78	120	105	235	60
5	1:23	7	315	1.5	2.1	537.41	125	105	235	60
C) 1	1:24 / 1:26	5	305	1.1	1.5	538.92	125	105	235	60
2	1:28	4	310	.75	1.0	540.43	130	105	235	60
3	1:30	5	310	1.1	1.5	541.98	130	105	240	60

CO_2 3.0

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 6-14-88 LOCATION Statesville TEST NO. 3

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F)		SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
							in	out		
4	1:32	8	310	1.4	1.9	543.69	130	105	240	60
5	1:34	8	315	1.5	2.1	545.22	130	105	240	60
D) 1	1:35 / 1:37	6	315	.50	.70	546.56	125	110	240	60
2	1:39	5	315	.75	1.0	547.81	130	110	240	60
3	1:41	6	320	1.0	1.4	549.17	130	110	240	60
4	1:43	6	320	1.2	1.7	550.67	135	110	245	60
5	1:45	6	320	1.2	1.7	552.18	135	110	245	60
E) 1	1:45:40 / 1:47	3	315	.43	.60	553.12	130	110	245	60
2	1:49	4	325	.55	.76	554.14	130	110	245	60
3	1:51	5	325	.80	1.1	555.36	135	110	245	60
4	1:53	6	325	.95	1.3	556.62	135	110	245	60
5	1:55:40	6	320	.75	1.0	557.82	135	110	250	60
F) 1	1:56:20 / 1:58	2	315	.28	.39	558.56	130	110	250	60
2	2:00	3	320	.48	.67	559.49	130	110	250	60
3	2:02	5	330	.80	1.1	560.67	135	110	250	60
4	2:04	5	335	.80	1.1	561.88	135	110	250	60
5	2:06:20	4	325	.60	.83	562.97	135	110	250	60
			$\Sigma\sqrt{\Delta p} = 29.3271$							

IX. CALIBRATIONS

METER BOX CALIBRATION DATA AND CALCULATION FORM

(English units)

Date 7-4-88 Meter box number 147810 C-12,

Barometric pressure, P_b = 30.05 in. Hg Calibrated by KA

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	238.856 / 243.756	80.6	110 / 112	88 / 89	99.75	12:05	1.013	1.61
1.0	5	250.87 / 255.454	80.6	113 / 114	88 / 88	100.75	8:37	1.018	1.63
1.5	10	238.756 / 247.865	80.6	112 / 116	87 / 88	100.5	12:42	1.022	1.64
2.0	10	222.68 / 232.91	80.6	111 / 114	85 / 86	99	12:19	1.023	1.67
3.0	10								
4.0	10								
							Avg	1.019	1.638

ΔH, in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6}) (t + 460)}$	$\Delta H@_i = \frac{0.0317\ \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\ \Theta}{V_w} \right]^2$
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.

Quality Assurance Handbook M4-2.3A (front side)

Form #REC-02

METER BOX CALIBRATION DATA AND CALCULATION FORM

(English units)

Date 4-22-85 Meter box number 147810 C-124

Barometric pressure, P_b = 29.73 in. Hg Calibrated by KA

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	93.72 / 98.91	73.4	108 / 108	84 / 84	96	12:16	1.0030	1.643
1.0	5	87.34 / 92.357	73.4	110 / 111	84 / 84	97.25	8:46	1.0065	1.675
1.5	10	76.05 / 86.357	73.4	110 / 112	83 / 84	97.25	19:25	1.0069	1.698
2.0	10	64.27 / 75.571	73.4	110 / 112	80 / 83	96.25	13:43	1.0101	1.697
3.0	10								
4.0	10								
							Avg	1.0066	1.678

ΔH, in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6}) (t + 460)}$	$\Delta H@_i = \frac{0.0317\ \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$
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.

Quality Assurance Handbook M4-2.3A (front side)

Form #REC-02

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. 42 Date 2-4-88

Calibrated by: Sam O'T. Glenn

"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	0.98	1.55	.795	∠.01
2	0.85	1.35	.793	∠.01
3	0.64	1.00	.800	∠.01
		$\bar{C}_p$ (SIDE A)	.796	

"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	0.98	1.55	.795	∠.01
2	0.85	1.35	.793	∠.01
3	0.64	1.00	.800	∠.01
		$\bar{C}_p$ (SIDE B)	.796	

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

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

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

RAMCON

Lear Siegler Stack Sampler

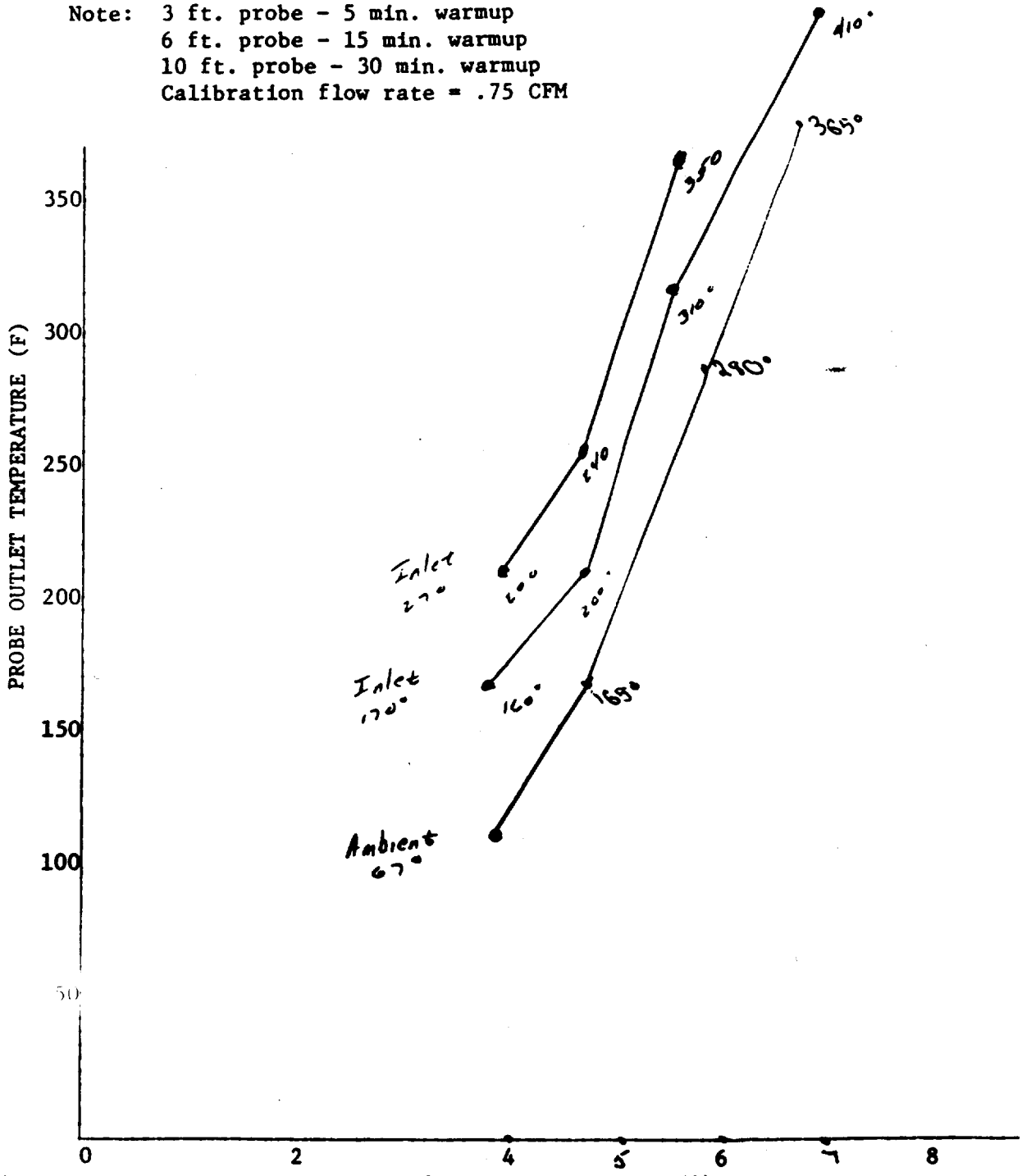
Heating Probe Calibration

Probe No. 42 Probe Length 4'

Date of Calibration 12-18-86 Signature K. B. Allen Jr

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



RAMCON ENVIRONMENTAL CORPORATION

Date 2-10-88 Thermocouple number 42

Ambient temperature 55°F ~~°C~~ Barometric pressure 29.87 in. Hg

Calibrator K. Allmending Reference: mercury-in-glass ✓

other _____

Reference point number[a]	Source[b] (specify)	Reference Thermometer Temperature, °C	Thermocouple Potentiometer Temperature, °C	Temperature Difference,[c] %
A	ICE WATER	34°F	33°F	.03%
B	Boiling WATER	212°F	210°F	.009%
C	OIL	379°F	376°F	.008%
D	Ambient	55°F	54°F	.02%
	6-14-88	76°F	76°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.

RAMCON ENVIRONMENTAL CORPORATION

Date 2-10-88 Thermocouple number Hotbox

Ambient temperature 24°C Barometric pressure 29.95 in. Hg

Calibrator S. Turner Reference: mercury-in-glass ✓

other _____

Reference point number[a]	Source[b] (specify)	Reference Thermometer Temperature, °C	Thermocouple Potentiometer Temperature, °C	Temperature Difference,[c] %
A	Boiling Water	100°C	100°C	0%
B	Ambient	24°C	24°C	0%
C	Ambient 6-14-88	75°F	75°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.

RAMCON ENVIRONMENTAL CORPORATION

Date 2-10-88 Thermocouple number Inlet/Outlet

Ambient temperature 24 °C Barometric pressure 29.95 in. Hg

Calibrator J. Turner Reference: mercury-in-glass ✓

other _____

Reference point number[a]	Source[b] (specify)	Reference Thermometer Temperature, °C	Thermocouple Potentiometer Temperature, °C	Temperature Difference,[c] %
A	Inlet Ambient	24°C	24°C	0%
B	Outlet Ambient	24°C	24°C	0%
C	Ambient 6-14-88	78°F	78°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.

X. RAMCON PERSONNEL

RAMCON Environmental Stack Test Team

Sumner Buck - President

Sumner Buck is the President of RAMCON Environmental. He is a graduate of the EPA 450 "Source Sampling for Particulate Pollutants" course and the 474 "Continuous Emissions Monitoring" course all given at RTP. Mr. Buck is a qualified V.E. reader with current certification. Mr. Buck has personally sampled over 300 stacks including over 200 asphalt plants. He is 43 years old and a graduate of the University of Mississippi with graduate studies at Memphis State University and State Technical Institute of Memphis.

Ken Allmendinger - Team Leader

Ken Allmendinger has been employed with RAMCON for three years. He has sampled over 100 asphalt plants with extensive training in Methods 1 through 5. He is qualified as a team leader and has current certification as a V.E. reader.

XI. VISIBLE EMISSIONS

SOURCE NAME: Superior Paving

ADDRESS:

CITY: Statesville | STATE: NC | ZIP:

PHONE: (704) 872 6556 | SOURCE ID NUMBER:

PROCESS EQUIPMENT: Drum mix | OPERATING MODE:

CONTROL EQUIPMENT: Baghouse | OPERATING MODE:

DESCRIBE EMISSION POINT: top of ten rectangular stack

HEIGHT ABOVE GROUND LEVEL: 32' | HEIGHT RELATIVE TO OBSERVER: 2'

DISTANCE FROM OBSERVER: 5' | DIRECTION FROM OBSERVER: SSW

DESCRIBE EMISSIONS: none

EMISSION COLOR: none | 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: top of stack

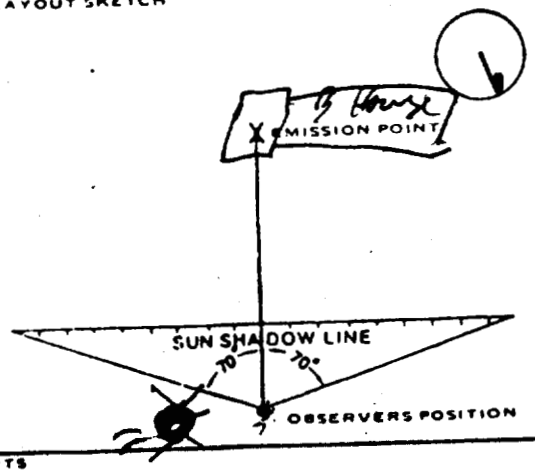
DESCRIBE BACKGROUND: blue sky / green tree top

BACKGROUND COLOR: blue / green | SKY CONDITIONS: clear

WIND SPEED: 0-5 mph | WIND DIRECTION:

AMBIENT TEMPERATURE: 80° | RELATIVE HUMIDITY:

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



OBSERVATION DATE: June 14 1988 | START TIME: 9:28 | STOP TIME: 10:48:45

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

AVERAGE OPACITY FOR HIGHEST PERIOD: 0 | NUMBER OF READINGS ABOVE: 0 % WERE 0

RANGE OF OPACITY READINGS: 0 MINIMUM | 0 MAXIMUM

COMMENTS:

OBSERVER'S NAME (PRINT): Kevin A. Powell

OBSERVER'S SIGNATURE: Kevin A. Powell | DATE: June 14 1988

ORGANIZATION: RAMCON Environmental

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE | DATE

TITLE

CERTIFIED BY: State of Tennessee | DATE: June 8 1988

VERIFIED BY | DATE

REC#14

SOURCE NAME: Superior [redacted]g

ADDRESS: Route 14

P.O. Box 27

CITY: Statesville | STATE: NC | ZIP: 28677

PHONE: (704) 872-6556 | SOURCE ID NUMBER:

PROCESS EQUIPMENT: Drum mix | OPERATING MODE:

CONTROL EQUIPMENT: Baghouse | OPERATING MODE:

DESCRIBE EMISSION POINT: top of ten rectangular stack

HEIGHT ABOVE GROUND LEVEL: 32' | HEIGHT RELATIVE TO OBSERVER: 2'

DISTANCE FROM OBSERVER: 5' | DIRECTION FROM OBSERVER: SSW

DESCRIBE EMISSIONS: occasional puffs

EMISSION COLOR: white | 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: top of stack

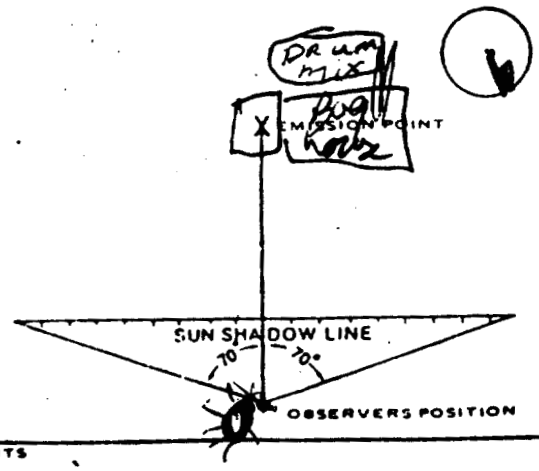
DESCRIBE BACKGROUND: blue sky / green tree top

BACKGROUND COLOR: blue / green | SKY CONDITIONS: clear

WIND SPEED: 0-5 mph | WIND DIRECTION:

AMBIENT TEMPERATURE: 83° | RELATIVE HUMIDITY:

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



OBSERVATION DATE: June 14, 1988 | START TIME: 11:18 | STOP TIME: 12:25

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

AVERAGE OPACITY FOR HIGHEST PERIOD: 0 | NUMBER OF READINGS ABOVE 10 % WERE 8

RANGE OF OPACITY READINGS: 0 MINIMUM | 5 MAXIMUM

COMMENTS:

OBSERVER'S NAME (PRINT): Kevin A. Powell

OBSERVER'S SIGNATURE: Kevin A. Powell | DATE: June 14, 1988

ORGANIZATION: RAMCON Environmental Corp

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE | TITLE | DATE

CERTIFIED BY: State of Tennessee | DATE: June 8, 1988

VERIFIED BY | DATE

SOURCE NAME: Superior Paving

ADDRESS:

CITY: Statesville | STATE: NC | ZIP:

PHONE: (704) 872-6556 | SOURCE ID NUMBER:

PROCESS EQUIPMENT: Drum Mix | OPERATING MODE:

CONTROL EQUIPMENT: Baghouse | OPERATING MODE:

DESCRIBE EMISSION POINT: top of tan rectangular stack

HEIGHT ABOVE GROUND LEVEL: 32' | HEIGHT RELATIVE TO OBSERVER: 2'

DISTANCE FROM OBSERVER: 5' | DIRECTION FROM OBSERVER: SSW

DESCRIBE EMISSIONS: occasional white puffs

EMISSION COLOR: white | 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: top of stack

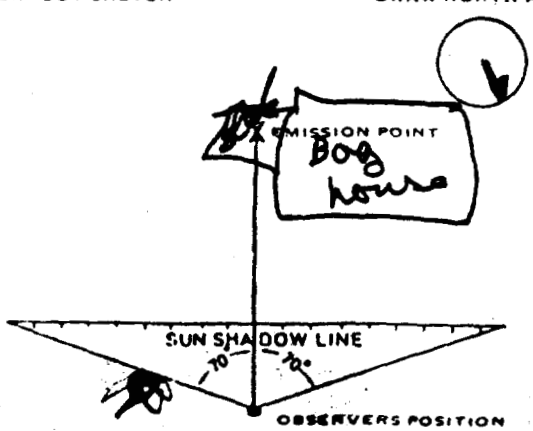
DESCRIBE BACKGROUND: blue sky / green tree tops

BACKGROUND COLOR: blue/green | SKY CONDITIONS: clear

WIND SPEED: 0-5 mph | WIND DIRECTION:

AMBIENT TEMPERATURE: 84° | RELATIVE HUMIDITY:

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



COMMENTS:

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE:

TITLE: | DATE:

OBSERVATION DATE: June 14 1988 | START TIME: 12:52 | STOP TIME: 2:03

SEC / MIN	0	15	30	45	SEC / MIN	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	5	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11:08	0	0	0	0	11:42	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	5	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	5	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
1:21	0	0	0	0	1:57	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	5	0	0	55	0	0	5	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	5	0	0
29	0	0	0	0	59	0	0	0	0
30	0	0	0	0	60	0	0	0	0

AVERAGE OPACITY FOR HIGHEST PERIOD: 0 | NUMBER OF READINGS ABOVE: 0 % WERE 7

RANGE OF OPACITY READINGS: 0 MINIMUM 5 MAXIMUM

OBSERVER'S NAME (PRINT): Kevin A. Powell

OBSERVER'S SIGNATURE: Kevin A. Powell | DATE: 6-14-88

ORGANIZATION: RAMCON Environmental

CERTIFIED BY: State of Tennessee | DATE: 6-9-1988

VERIFIED BY: | DATE:

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
CUSTOMS HOUSE
701 BROADWAY
NASHVILLE, TENNESSEE 37219-5403

JUN 2 1 1988

Kevin A. Powell
Ramcon
223 Scott Street
Memphis, TN 38112

RE: Certificate Number 1106

Dear Mr. Powell:

Enclosed you will find your certification card for successfully completing the June 7-9, 1988 Visible Emissions Evaluation School held in Memphis, Tennessee. In order to be certified as a qualified Visible Emissions Evaluator for all the methods approved by the Tennessee Air Pollution Control Board, one must meet an intensive array of criteria.

The individual reading criteria is as follows:

1. EPA Method 9 (6 Minute Average) requires a deviation of less than 7.5 on white and black smoke, and that the reader miss no reading by more than 15% opacity.

2. Tennessee Visible Emissions Evaluation Method 1 (Roads and Parking Areas) requires a worst-two-minute deviation of 8.8 or less.

3. TVEE Method 2 (Aggregate or Time Count) has the same criteria requirements as EPA Method 9.

4. TVEE Method 3 (Zero Percent Opacity) requires that the value assigned to a zero reading during a certification run shall not exceed 10% opacity, nor shall the combination of other zero readings exceed 10% opacity (i.e. two readings of five percent opacity).

5. TVEE Method 4 (Fugitive Dust Emissions from Non-Stack Emission Points) has the same criteria requirements as EPA Method 9.

Based on these criteria you are certified by the State of Tennessee to read EPA Method 9, and TVEE Methods 1, 2, 3, and 4.

This certification is valid until December 08, 1988.

You must complete the requirements for recertification prior to this expiration date to retain your status as a qualified Visible Emissions Evaluator.

It was a pleasure having your participation in our Visible Emissions School. The Tennessee Division of Air Pollution Control would welcome any comments, or suggestions you may have concerning the operation of the school. Please forward any comments to the Division at (615)741-3931 or at the above address.

Sincerely yours,

Carl Kountz

Visible Emissions Evaluation School
Division of Air Pollution Control

Enclosure