9/4/90

COMMONWEALTH of VIRGINIA

Department of Air Pollution Control
VALLEY OF VIRGINIA REGIONAL OFFICE
SUITE D, EXECUTIVE OFFICE PARK
5338 PETERS CREEK ROAD
ROANOKE, VIRGINIA 24019
703 857-7328
FAX 703 857-7577
TDD 804 371-8471

DONALD L. SHEPHERD
REGIONAL DIRECTOR

October 11, 1990

Mr. E. C. Bunch
President
[redacted] Incorporated
Route 5, Box 108-B
[redacted], Virginia 24401

Dear Mr. Bunch:

We have reviewed the results of the [redacted] at your [redacted]. The test results indicate that the facility may operate in compliance with the [redacted] at the average process rate during the test [redacted].

However, the testing was done at significantly below rated [redacted] and the results do not demonstrate that emissions standards can be met at higher production rates. We are inclined to believe that the [redacted] the tested capacity, or up to 221 ton/hr. This determination is based on many variables that may allow the emissions controls to perform equally well at higher loads, such as the moisture content of the stone and the content of recycled asphalt in the mix.

Should you choose to operate the Stuarts Draft facility above a process rate of 221 tons/hr, additional compliance testing may be required. If you have any questions concerning the emissions test, you may contact me of Andy Hetz of my staff.

Sincerely,

Donald L. Shepherd

Donald L. Shepherd
Director, Region II

[redacted]

9/4/90

COMMONWEALTH OF VIRGINIA
Department of Air Pollution Control
INTRA-AGENCY MEMORANDUM

TO: File

FROM: Andy Hetz, Environmental Engineer AAH

SUBJECT: B & S CONTRACTING, STUARTS DRAFT - REGISTRATION NO. 21125 - SEPTEMBER 4, 1990 STACK TEST RESULTS

DATE: October 5, 1990

Introduction

Results have been received for the September 4, 1990 stack test at B & S Contracting's Stuart's Draft location. Testing for particulate and visible emissions evaluations were required by an March 30, 1990 State/NSPS permit. Ramcon Environmental Corporation performed the test, which was witnessed by the DAPC. For additional information not addressed in this memorandum, please consult the stack test report and my September 6, 1990 memo to file.

Equipment

The equipment tested was an Astec continuous drum mix asphalt plant, rated at 285 tons/hr capacity and equipped to burn No. 2 diesel fuel oil. B&S had originally planned to burn natural gas with No 2 oil as backup fuel. Problems with the installation of a gas line have presently made No 2 oil the primary fuel. The plant is also equipped to use recycled asphalt.

Particulate emissions from the drum mixer were controlled by a baghouse. Fugitive dust emissions were controlled by paving and wet suppression.

Operating Conditions During Test

The plant was operating using recycled asphalt - the recycle content averaged about 20 percent during the day. In addition, hydrated lime was being added to the mix. Surface mix was being produced at the following rates.

	Run #1	Run #2	Run #3	Average
Time :	09:00-10:06	11:00-12:06	12:54-14:00	
Aggregate :	132 tons/hr	137 tons/hr	136 tons/hr	135 tons/hr
Hydrated Lime :	1 ton/hr	1 ton/hr	1 ton/hr	1 ton/hr
Recycled Asphalt:	39 tons/hr	38 tons/hr	37 tons/hr	38 tons/hr
Liquid Asphalt :	10 tons/hr	10 tons/hr	10 tons/hr	10 tons/hr
Total Production:	182 tons/hr	186 tons/hr	184 tons/hr	184 tons/hr

Test Results

	Run #1	Run #2	Run #3	Average
TSP Grain Loading (grains/dscf)	0.0065	0.0031	0.0040	0.0045
TSP Weight Rate (lbs/hr)	1.0	0.5	0.6	0.7

Visible Emissions: 0% averaged opacity with no condensing plume. Readings taken by A. A. Hetz of the DAPC.

Permit Requirements (10/11/88 permit)

TSP Grain Loading:	0.04	grains/dscf
TSP Weight Rate :	9.3	lbs/hr
Opacity :	5	% (six minute average)

Conclusions

The plant tested in compliance with the permit requirements. However, the process rate during the test was significantly less than the permitted rated capacity (testing was done at a throughput of 184 tons/hr - rated capacity is 285 tons/hr). Thus, the tests indicate compliance for process rates up to 184 tons/hr. With consideration for variations in the material feed (such as the moisture content of stone and the amount of recycled asphalt in the mix) we would not require a second stack test unless production rate exceeded the average during the test by more than 20 percent, or 221 tons/hour. A letter to this effect has been sent to B&S Contracting (see Attachments).

Attachments - Stack Test Report
cc: Division of Technical Services

COMMONWEALTH of VIRGINIA

Department of Air Pollution Control
VALLEY OF VIRGINIA REGIONAL OFFICE
SUITE D, EXECUTIVE OFFICE PARK
5338 PETERS CREEK ROAD
ROANOKE, VIRGINIA 24019
703 857-7328
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TDD 804 371-8471

DONALD L. SHEPHERD
REGIONAL DIRECTOR

October 11, 1990

Mr. E. C. Bunch
President
B&S Contracting, Incorporated
Route 5, Box 108-B
Staunton, Virginia 24401

Dear Mr. Bunch:

We have reviewed the results of the September 4, 1990 particulate emissions testing at your Stuarts Draft facility. The test results indicate that the facility may operate in compliance with the permit issued March 30, 1990 at the average process rate during the test - 184 tons/hr.

However, the testing was done at significantly below rated capacity (285 tons/hr) and the results do not demonstrate that emissions standards can be met at higher production rates. We are inclined to believe that the test results are representative for as much as 20 percent above the tested capacity, or up to 221 ton/hr. This determination is based on many variables that may allow the emissions controls to perform equally well at higher loads, such as the moisture content of the stone and the content of recycled asphalt in the mix.

Should you choose to operate the Stuarts Draft facility above a process rate of 221 tons/hr, additional compliance testing may be required. If you have any questions concerning the emissions test, you may contact me of Andy Hetz of my staff.

Sincerely,

Donald L. Shepherd

Donald L. Shepherd
Director, Region II

cc: Division of Technical Evaluation

RAMCON

ENVIRONMENTAL CORPORATION

SOURCE SAMPLING
for
PARTICULATE EMISSIONS
B & S CONTRACTING COMPANY
STUARTS DRAFT, VIRGINIA
September 4, 1990

Ed Bunch
B & S Contracting Company

G. Sumner Buck, III
President

Dave Armstrong
Team Leader

RAMCON BUILDING, 223 SCOTT STREET, MEMPHIS, TENNESSEE 38112
TELEPHONE 800/458-4567 IN TENNESSEE 901/458-7000 FAX 901-458-3868

RAMCON
ENVIRONMENTAL CORPORATION

September 17, 1990

Mr. Ed Bunch
B & S Contracting Company
Route 5, Box 108-B
Staunton, VA 24401

Re: Particulate Emissions Test: Stuarts Draft, Virginia

Dear Mr. Bunch:

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 Virginia. 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. Andy Hetz
Virginia Department of Air Pollution Control
5338 Peters Creed Road #A
Roanoke, VA 24019

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, 223 SCOTT STREET, MEMPHIS, TENNESSEE 38112
TELEPHONE 800/458-4567 IN TENNESSEE 901/458-7000 FAX 901-458-3868

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I. INTRODUCTION

On September 4, 1990 personnel from RAMCON Environmental Corporation conducted a source emissions test for particulate emissions compliance at B&S Contracting Company's Astec drum mix asphalt plant located in Stuarts Draft, Virginia. RAMCON personnel conducting the test were Dave Armstrong, Team Leader, and Billy Lockett. Raymond Jenkins 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. Armstrong and Mr. Jenkins.

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 Virginia.

II. 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 Virginia are the same as those set by EPA.

Billy Lockett of RAMCON Environmental conducted the opacity test which was 0% on all three runs and therefore meets N.S.P.S. requirements.

TABLE I

SUMMARY OF TEST RESULTS

September 4, 1990

Test Run	Time	Grain Loading	Isokinetic Variation	Actual Emissions
1	09:00 to 10:06	0.0065 gr/DSCF	99.4%	1.0 lbs/hr
2	11:00 to 12:06	0.0031 gr/DSCF	99.1%	0.5 lbs/hr
3	12:54 to 13:59	0.0040 gr/DSCF	102.5%	0.6 lbs/hr
	Average:	0.0045 gr/DSCF		0.7 lbs/hr

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 Virginia. Therefore, the plant is operating in compliance with State and Federal Standards.

III. TEST PROCEDURES

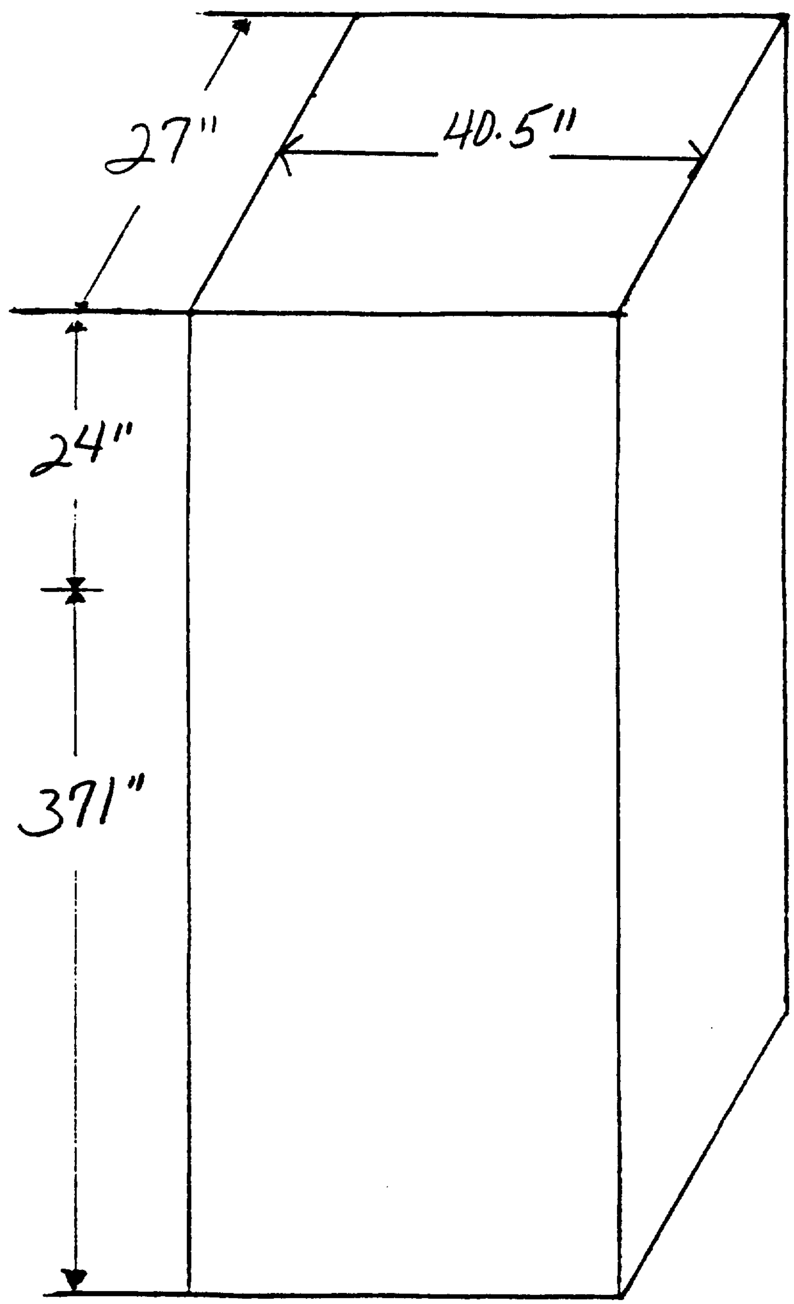
A. Method Used: Method 5 source sampling was conducted in accordance with requirements of the U.S. Environmental Protection Agency as set forth in 39 FR 9314, March 8, 1974, 60.93, as amended.

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

C. Sampling Site: The emissions test was conducted after a baghouse on a rectangular stack measuring 27" x 40.5" with an equivalent diameter of 32.4". Five sampling ports were placed 24" down (0.7 diameters upstream) from the top of the stack and 371" up (11.5 diameters downstream) from the last flow disturbance. The ports were evenly spaced on 8.1" centers. The two outside ports are 4.0" from the side walls of the stack. Thirty points were sampled, six through each port for two minutes each.

Points on a Diameter	Probe Mark
1	*8.3"
2	12.8"
3	17.3"
4	21.8"
5	26.3"
6	30.8"

*Measurements include a 6" standoff.



IV. THE SOURCE

IV. THE SOURCE

B & S Contracting 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 then compacted with a heavy roller to produce the final product.

The following to 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^{o}F. When recycled asphalt mix is used, it is added halfway down the drum through a separate conveyor. The required amount of hot asphalt oil is then injected onto and mixed into the dried aggregate. The now newly formed hot asphalt mix is pulled to the top of a storage silo by a conveyor. The hot asphalt mix is then discharged from the storage silo through a slide gate into waiting dump trucks which transports the material to a final destination for spreading. The rated capacity of the plant will vary with each aggregate mix and moisture content with a 5% surface moisture removal.

The drum mixer uses a burner fired with #2 fuel oil to heat air to dry the aggregate, and the motion of the rotating drum to blend the aggregate. The air is drawn into the system via an exhaust fan. After passing through the gas burner and the mixing drum, the air passes through a baghouse. The baghouse is manufactured by Astec. The exhaust gasses are drawn through the baghouse and discharged to the atmosphere through the stack. The design pressure drop across the tube sheet is 2-6 inches of water. The particulate matter, which is removed by the baghouse, is reinjected into the drum mixer.

DATA SUMMARY ON STACK BEING TESTED

AGGREGATE

1. Name/type of mix S M-2C
2. Name/type of 2nd mix (If used) ________
3. Type/temperature of Liquid Asphalt AC30 / 300 °F
4. Sieve/Screening analysis: ________ % Passing:

	1st mix / 2nd mix		1st mix / 2nd mix		1st mix / 2nd mix
1"	100 /	3/8"	93 /	#	/
3/4"	100 /	#200	6 /	#	/
1/2"	100 /	#	/	#	/

CONTROL SYSTEM

Manufacturer Astec

A. Baghouse:

1. Type of bags Nomex 16oz. # of bags 324 Sq. ft. of bags 7125
2. Air to cloth ratio 5.5 to 1 Designed ACFM 39000
3. Type of cleaning - pulse jet ✓ reverse air ____ plenum pulse ____ other ____
4. Cleaning cycle time .3Sec Interval between cleaning cycle 6Sec.
5. Pulse pressure on cleaning cycle 90 psi

B. Scrubber:

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

Company Name ________ Date ________

Company Representative ________

Form REC#03

DATA ON FACILITY BEING STACK TESTED

COMPANY NAME B&S Contracting COMPANY REP. ____ PHONE ( ) ____

LOCATION OF FACILITY Stuarts Draft, VA. ORIGINAL START-UP DATE ____ DESIGNED CAPACITY ____

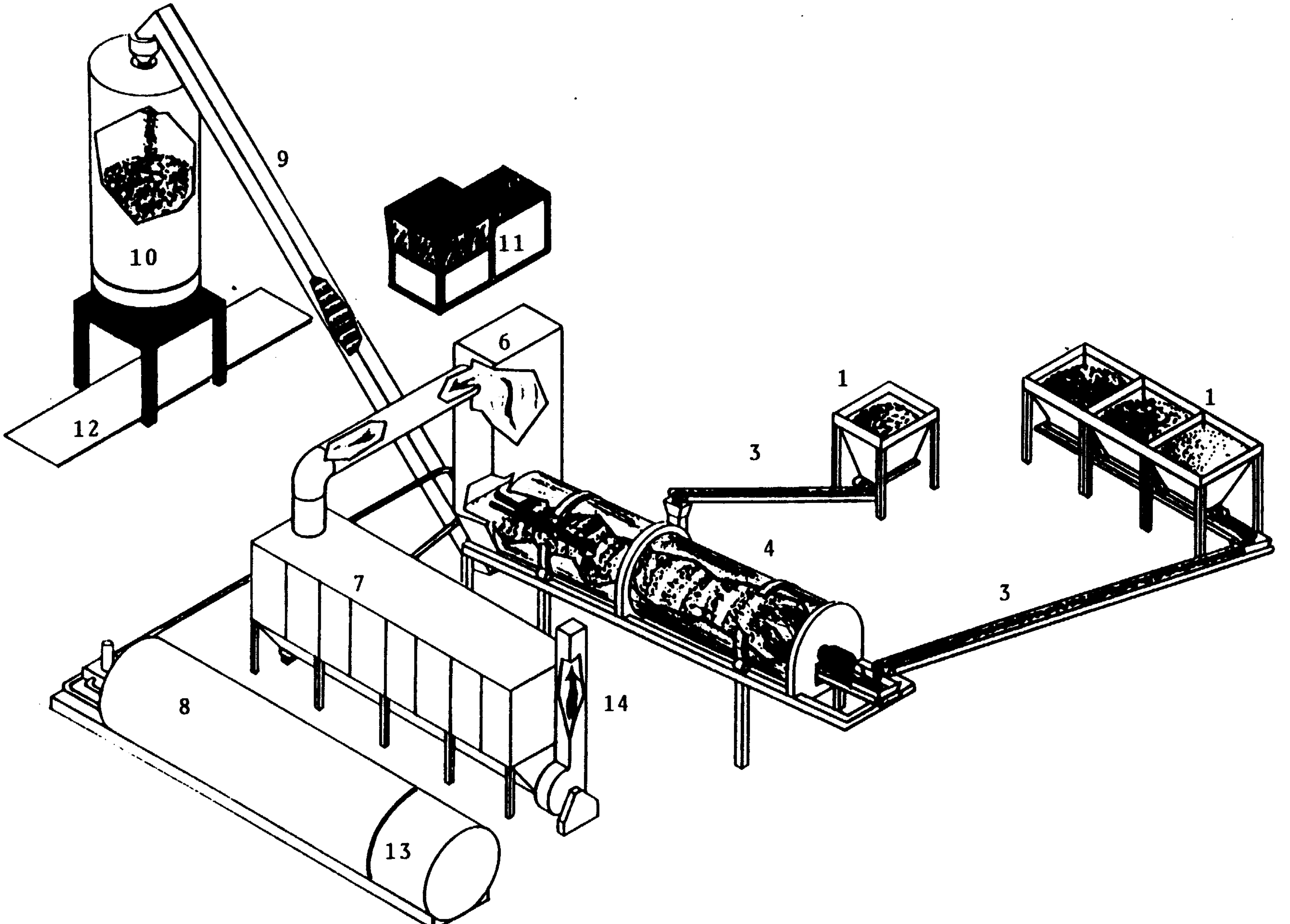
OEM ____ MODEL NO. ____ TYPE ____ AC TYPE ____

1	2	3	4	5		6	7	8	9		10	11	12
Time (24 HR)	Fuel Use			Production Rate					__Venturi Scrubber __Baghouse		Ambient Temp.	Relative Humidity	
NOTE: check small box in column when moisture sample is taken	Z #Fuel Oil __ Nat. Gas __ Propane __ Coal __ other	Burner Setting	Blower Pressure	__Mix __Aggregate TPH	__RAP TPH	Asphalt Cement %	Mix Temp. °F	Exhaust Gas Temp. °F	Pressure Drop in w.g.	Water Pressure psi	°F	%	Exhaust Damper Position
09:00		49		132	42	5.46	306		2.5				.50
09:15		52		133	39	5.49	308		2.5				.50
09:30		44		136	39	5.34	314		2.5				.49
09:45		48		135	40	5.46	295		2.5				.49
10:00		43		136	40	5.39	300		2.5				.50
10:15		46		137	37	5.42	302		2.5				.50
10:30		48		135	38	5.40	294		2.5				.51
10:45		42		134	39	5.26	304		2.5				.49
11:00		49		140	38	5.38	294		2.5				.41
11:15		45		137	39	5.37	297		2.5				.46
11:30		43		138	39	5.47	299		2.5				.52
11:45		49		138	40	5.41	289		2.5				.50
12:00		47		137	39	5.23	290		2.5				.45
12:15		49		137	40	5.44	295		2.5				.44
12:30		48		138	39	5.41	288		2.5				.48
12:45		47		134	41	5.22	293		2.5				.46
13:00		43		139	40	5.44	300		2.5				.48
13:15		48		137	38	5.43	295		2.5				.52

Form REC#04

PAGE 2 OF ___

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	✓ RAP	Asphalt Cement	Mix Temp.	Exhaust Gas Temp.	__ Venturi Scrubber / __ Baghouse: Pressure Drop	Water Pressure	Ambient Temp.	Relative Humidity	Exhaust Damper Position
				TPH	TPH	%	°F	°F	in w.g.	psi	°F	%	
13:30		45		139	41	5.43	297		2.5				.54
13:45		46		137	40	5.45	294		2.5				.62
14:00		46		137	40	5.47	299		2.5				.64



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

14. [illegible]

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 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.

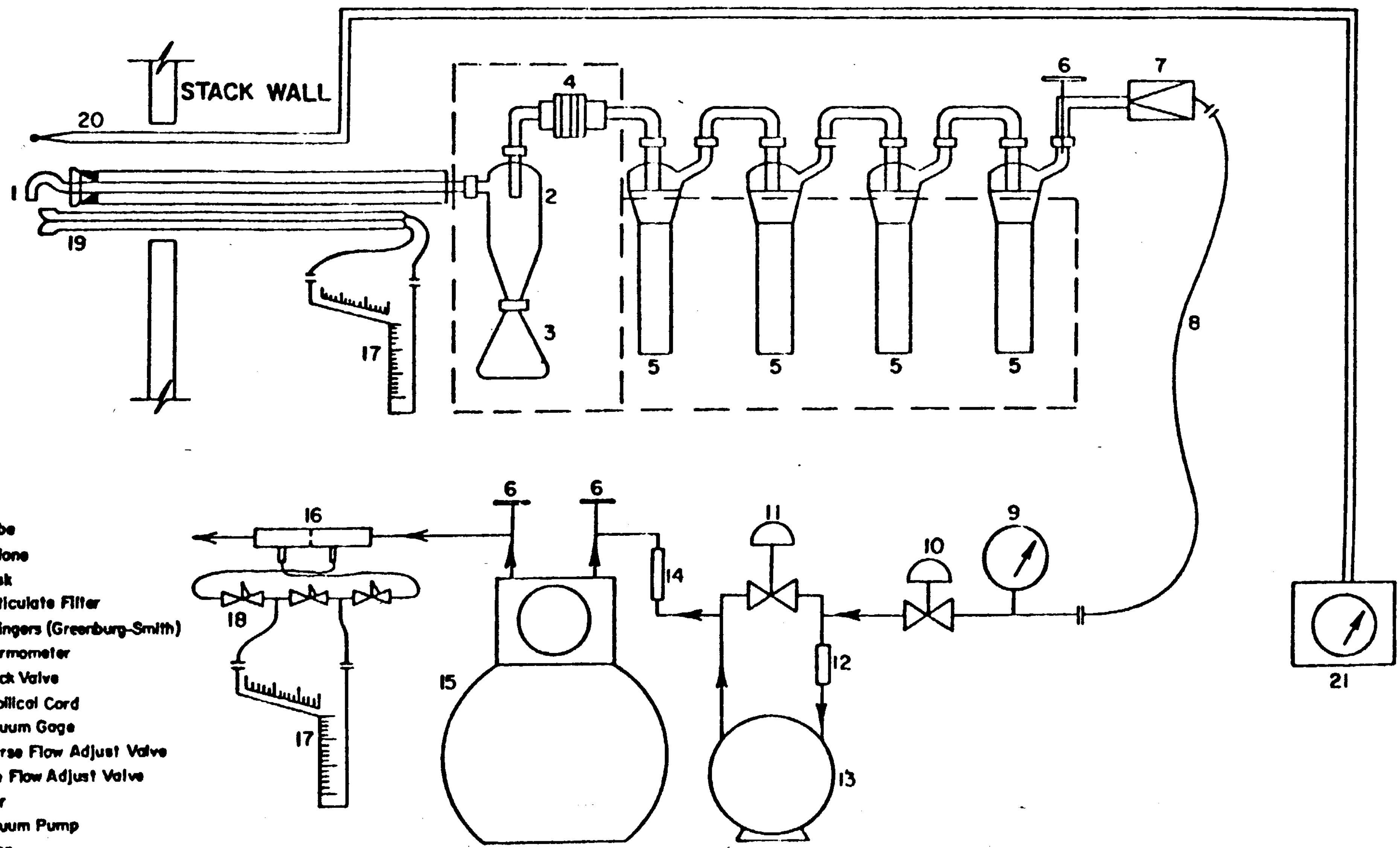
C. PROBE RINSINGS: In all tests where a probe washout analysis is necessary, this is accomplished in accordance with procedures specified in "EPA Reference Method 5". These samples are returned to the lab in sealed mason jars for analysis. The front half of the filter holder is washed in accordance with 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.



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

SAMPLING TRAIN
USED FOR ISOKINETIC SAMPLING

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

Plant Location B+S Construction　　Relative humidity in lab 50 %

Sample Location ______　　Density of Acetone (pa) .7843mg/ml

Blank volume (V_a) 250 ml

Date/Time wt. blank 9-11-90/900　　Gross wt. 123.7004 mg

Date/Time wt. blank 9-11-90/230　　Gross wt. 123.7005 mg

Ave. Gross wt. 123.7005 mg

Tare wt. 123.7003 mg

Weight of blank (m_{ab}) .0002 mg

Acetone blank residue concentration (C_a)　　(C_a) = (M_{ab}) / (V_a) (P_a) = .000001 mg/g)

Weight of residue in acetone wash: $W_a = C_a V_{aw} P_a$ = (.00000)(250)(.7843) = (.0002)

		Run # 1	Run # 2	Run # 3
Acetone rinse volume (V_{aw})	ml	250	250	250
Date/Time of wt 9-11-90/8:30 Gross wt	g	126.4407	134.7799	164.0491
Date/Time of wt 9-11-90/2:30 Gross wt	g	126.4412	134.7803	164.0496
Average Gross wt	g	126.4409	134.7801	164.0493
Tare wt	g	126.4267	134.7722	164.0418
Less acetone blank wt (W_a)	g	0.0002	0.0002	0.0002
Wt of particulate in acetone rinse (m_a)	g	0.0140	0.0077	0.0073

Filter Numbers	#	RJ4493	RJ4497	RJ4500
Date/Time of wt 9-10-90/10:30 Gross wt	g	0.5923	0.5817	0.6032
Date/Time of wt 9-11-90/08:30 Gross wt	g	0.5923	0.5815	0.6027
Average Gross wt	g	0.5923	0.5816	0.6030
Tare wt	g	0.5879	0.5802	0.5980

Weight of particulate on filters(s) (m_f)	g	0.0044	0.0014	0.0050
Weight of particulate in acetone rinse	g	0.0140	0.0077	0.0073
Total weight of particulate (m_n)	g	0.0184	0.0091	0.0123

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 [signature]　　Signature of reviewer [signature]

B&S [illegible] (15) [illegible] GRAB SAMPLE

Run # 1 Collection Method Continuous/Grab GAS	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net	[illegible]
CO_2	5.0						
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	[illegible]						
CO (Net is actual CO reading minus actual O_2 reading)							
N_2 (Net is 100 minus actual CO reading)							[illegible]

Run # 2 Collection Method Continuous/Grab GAS	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net	[illegible]
CO_2	5.0						[illegible]
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	12.0						[illegible]
CO (Net is actual CO reading minus actual O_2 reading)							
N_2 (Net is 100 minus actual CO reading)							[illegible]

Run # 3 Collection Method Continuous/Grab GAS	Actual Reading	Net	Actual Reading	Net	Actual Reading	Net	[illegible]
CO_2	[illegible]						
O_2 (Net is actual O_2 reading minus actual CO_2 reading)	[illegible]						
CO (Net is actual CO reading minus actual O_2 reading)							
N_2 (Net is 100 minus actual CO reading)							

VII. CALCULATIONS

B & S CONTRACTING COMPANY
STUARTS DRAFT, VIRGINIA

SUMMARY OF TEST DATA

		9-4-90 RUN #1	9-4-90 RUN #2	9-4-90 RUN #3
SAMPLING TRAIN DATA				
	start	09:00	11:00	12:54
	finish	10:06	12:06	13:59
1. Sampling time, minutes	θ	60.0	60.0	60.0
2. Sampling nozzle diameter, in.	D_n	.2400	.2400	.2400
3. Sampling nozzle cross-sect. area, ft^2	A_n	.000314	.000314	.000314
4. Isokinetic variation	I	99.4	99.1	102.5
5. Sample gas volume - meter cond., cf.	V_m	47.510	50.030	51.720
6. Average meter temperature, ^oR	T_m	558	564	562
7. Avg. oriface pressure drop, in. H_2O	dH	2.17	2.29	2.35
8. Total particulate collected, mg.	M_n	18.40	9.10	12.30
VELOCITY TRAVERSE DATA				
9. Stack area, ft^2.	A	7.60	7.60	7.60
10. Absolute stack gas pressure, in. Hg.	P_s	28.80	28.80	28.80
11. Barometric pressure, in. Hg.	P_{bar}	28.80	28.80	28.80
12. Avg. absolute stack temperature, R^o	T_s	722	729	727
13. Average $-\sqrt{\text{vel. head}}$, (C_p= .82)	$-\sqrt{dP}$	1.07	1.11	1.12
14. Average stack gas velocity, ft./sec.	V_s	73.32	76.38	76.99
STACK MOISTURE CONTENT				
15. Total water collected by train, ml.	V_{ic}	310.00	306.00	328.00
16. Moisture in stack gas, %	B_{ws}	25.19	24.16	24.72
EMISSIONS DATA				
17. Stack gas flow rate, dscf/hr.(000's)	Q_{sd}	1056	1104	1108
18. Stack gas flow rate, cfm	acfm	33434	34829	35107
19. Particulate concentration, gr/dscf	C_s	0.0065	0.0031	0.0040
20. Particulate concentration, lb/hr	E	0.98	0.49	0.63
21. Particulate concentration, lb/mBtu	E'	0.00000	0.00000	0.00000
ORSAT DATA				
22. Percent CO_2 by volume	CO_2	3.00	2.50	2.80
23. Percent O_2 by volume	O_2	13.20	12.50	12.80
24. Percent CO by volume	CO	.00	.00	.00
25. Percent N_2 by volume	N_2	83.80	85.00	84.40

Format: summryR3

B & S CONTRACTING COMPANY
STUARTS DRAFT, VIRGINIA

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:

$$V_{m(std)} = (17.64)(.997)(47.510)\left[\frac{(28.80) + \frac{2.17}{13.6}}{558}\right] = 43.365 \text{ dscf}$$

RUN 2:

$$V_{m(std)} = (17.64)(.997)(50.030)\left[\frac{(28.80) + \frac{2.29}{13.6}}{564}\right] = 45.193 \text{ dscf}$$

RUN 3:

$$V_{m(std)} = (17.64)(.997)(51.720)\left[\frac{(28.80) + \frac{2.35}{13.6}}{562}\right] = 46.893 \text{ dscf}$$

Format: dgmR3

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:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{18.40}{43.365}\right] = 0.0065 \text{ gr./dscf.}$$

Run 2:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{9.10}{45.193}\right] = 0.0031 \text{ gr./dscf.}$$

Run 3:

$$C_s' = \left[0.0154 \frac{gr}{mg}\right] \left[\frac{12.30}{46.893}\right] = 0.0040 \text{ gr./dscf.}$$

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

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:

$$M_d = 0.44(3.00\%) + 0.32(13.20\%) + 0.28(.00\% + 83.80\%) = 29.01 \frac{lb}{lb\text{-}mole}$$

Run 2:

$$M_d = 0.44(2.50\%) + 0.32(12.50\%) + 0.28(.00\% + 85.00\%) = 28.90 \frac{lb}{lb\text{-}mole}$$

Run 3:

$$M_d = 0.44(2.80\%) + 0.32(12.80\%) + 0.28(.00\% + 84.40\%) = 28.96 \frac{lb}{lb\text{-}mole}$$

B & S CONTRACTING COMPANY
STUARTS DRAFT, VIRGINIA

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) (294.0) = 13.8 cu.ft
$V_{wsg(std)}$ = (0.04715) (16.0) = 0.8 cu.ft

Run 2:

$V_{wc(std)}$ = (0.04707) (292.0) = 13.7 cu.ft
$V_{wsg(std)}$ = (0.04715) (14.0) = 0.7 cu.ft

Run 3:

$V_{wc(std)}$ = (0.04707) (310.0) = 14.6 cu.ft
$V_{wsg(std)}$ = (0.04715) (18.0) = 0.8 cu.ft

B & S CONTRACTING COMPANY
STUARTS DRAFT, VIRGINIA

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:

$$B_{ws} = \frac{13.8 + 0.8}{13.8 + 0.8 + 43.365} \times 100 = 25.19\ \%$$

Run 2:

$$B_{ws} = \frac{13.7 + 0.7}{13.7 + 0.7 + 45.193} \times 100 = 24.16\ \%$$

Run 3:

$$B_{ws} = \frac{14.6 + 0.8}{14.6 + 0.8 + 46.893} \times 100 = 24.72\ \%$$

B & S CONTRACTING COMPANY
STUARTS DRAFT, VIRGINIA

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 = 29.01 (1 - 25.19) + 18 (25.19) = 26.24 (lb./lb.-mole)

Run 2:

M_s = 28.90 (1 - 24.16) + 18 (24.16) = 26.27 (lb./lb.-mole)

Run 3:

M_s = 28.96 (1 - 24.72) + 18 (24.72) = 26.25 (lb./lb.-mole)

B & S CONTRACTING COMPANY
STUARTS DRAFT, VIRGINIA

Stack Gas Velocity

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

Where:

V_s	=	Average velocity of gas stream in stack, ft./sec.
K_p	=	85.49 ft/sec $\left[(g/g\text{-mole})\text{-}(mm\ Hg) \,/\, (^{o}K)(\ mm\ H_2O \right]^{1/2}$
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:

$$V = (85.49)\ (\ .82)\ (\ 1.07) \sqrt{\frac{722}{(28.80)(26.24)}} = 73.32 \text{ ft/sec.}$$

Run 2:

$$V = (85.49)\ (\ .82)\ (\ 1.11) \sqrt{\frac{729}{(28.80)(26.27)}} = 76.38 \text{ ft/sec.}$$

Run 3:

$$V = (85.49)\ (\ .82)\ (\ 1.12) \sqrt{\frac{727}{(28.80)(26.25)}} = 76.99 \text{ ft/sec.}$$

B & S CONTRACTING COMPANY
STUARTS DRAFT, VIRGINIA

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:

$$Q_{sd}=3600(1- .2519)(73.32)(7.60)\left[\frac{528}{722}\right]\left[\frac{28.80}{29.92}\right] = 1056393.8 \frac{dscf}{hr}$$

Run 2:

$$Q_{sd}=3600(1- .2416)(76.38)(7.60)\left[\frac{528}{729}\right]\left[\frac{28.80}{29.92}\right] = 1104921.4 \frac{dscf}{hr}$$

Run 3:

$$Q_{sd}=3600(1- .2472)(76.99)(7.60)\left[\frac{528}{727}\right]\left[\frac{28.80}{29.92}\right] = 1108563.1 \frac{dscf}{hr}$$

B & S CONTRACTING COMPANY
STUARTS DRAFT, VIRGINIA

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:

$$E = \frac{(0.0065)(1056393.8)}{7000} = 0.98 \text{ lb. / hr.}$$

Run 2:

$$E = \frac{(0.0031)(1104921.4)}{7000} = 0.49 \text{ lb. / hr.}$$

Run 3:

$$E = \frac{(0.0040)(1108563.1)}{7000} = 0.63 \text{ lb. / hr.}$$

B & S CONTRACTING COMPANY
STUARTS DRAFT, VIRGINIA

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:

$$I = (100)(722) \left[\frac{(0.002669)(310) + \frac{47.510}{558} \left[28.80 + \frac{2.17}{13.6} \right]}{60\ (60.0)\ (73.32)\ (28.80)\ (.000314)} \right] = 99.4\%$$

Run 2:

$$I = (100)(729) \left[\frac{(0.002669)(306) + \frac{50.030}{564} \left[28.80 + \frac{2.29}{13.6} \right]}{60\ (60.0)\ (76.38)\ (28.80)\ (.000314)} \right] = 99.1\%$$

Run 3:

$$I = (100)(727) \left[\frac{(0.002669)(328) + \frac{51.720}{562} \left[28.80 + \frac{2.35}{13.6} \right]}{60\ (60.0)\ (76.99)\ (28.80)\ (.000314)} \right] = 102.5\%$$

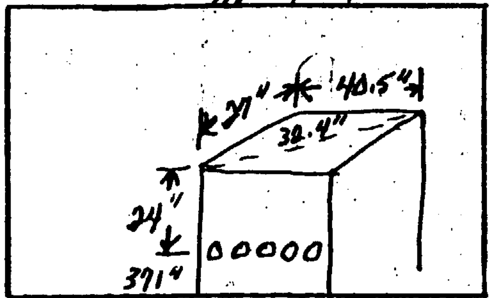
Format: iR3

VIII. FIELD DATA

RAMCON ENVIRONMENTAL CORPORATION

Plant: B+S CONST. (ASTEC)
Location:
Operator: D. ARMSTRONG
Date: 9-4-90
Run No.: 1
Sample Box No.: 1
Meter Box No.: 646882 / C-124
Meter H @: 2.11
C Factor: .997
Pitot Tube Coefficient Cp: .818

m = 1.87



Schematic of Stack Cross Section

Ambient Temperature: 74°F
Barometric Pressure: 28.80
Assumed Moisture, %: 25
Probe Length, ft: 32
Nozzle Identification No.: .0003142
Avg. Calibrated Nozzle Dia., (in.): .240/.240/.240
Probe Heater Setting: 5
Leak Rate, m³/min. (cfm): ±.004 @ 3"
Probe Liner Material: STAINLESS STEEL
Static Pressure, mm Hg (in. Hg): ±.05"
Filter No.: RJ-4493/0.5879

	IMPINGER VOLUME ml	SILICA GEL WEIGHT g
FINAL	494	548
INITIAL	200	532
DIFFERENCE	294	16

TRAV. PT NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME ft³	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	9:00 / 9:02	1.5	254	1.1	2.1	550.880 / 552.45	92	86	250	56
2	9:04	2	256	1.4	2.6	554.07	94	84	265	56
3	9:06	2	256	1.3	2.4	555.71	96	82	270	56
4	9:08	2	258	1.3	2.4	557.36	98	82	275	54
5	9:10	2	256	1.4	2.6	559.57	98	82	265	54
6	9:12	2	258	1.4	2.6	560.78	100	82	255	54
B 1	9:14 / 9:16	1.5	254	1.1	2.1	562.43	100	84	240	54
2	9:18	2	260	1.2	2.2	564.05	102	84	255	54
3	9:20	1.5	264	1.0	1.9	565.46	104	84	265	54
4	9:22	1.5	266	1.0	1.9	566.95	104	84	275	54
5	9:24	2	266	1.1	2.1	568.71	106	86	275	54
6	9:26	1.5	266	.98	1.8	569.92	108	86	270	54
C 1	9:27 / 9:29	1.5	264	1.0	1.9	571.59	104	86	265	54

Form #REC-06

RAMCON emissions test log sheet, cont. DATE 9-4-90 LOCATION ________ TEST NO. 1

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	9:31	2	266	1.1	2.1	573.17	108	90	265	54
3	9:33	2	266	1.2	2.2	574.64	110	90	270	54
4	9:35	2	268	1.2	2.2	576.35	110	90	275	54
5	9:37	2	266	1.4	2.6	577.87	110	90	275	54
6	9:39	2	264	1.2	2.2	579.42	110	90	275	54
D 1	9:40 / 9:42	2	262	1.0	1.9	581.01	110	90	270	54
2	9:44	2	264	1.1	2.1	582.54	112	92	260	54
3	9:46	2.5	266	1.3	2.4	584.22	112	92	260	54
4	9:48	2.5	266	1.3	2.4	585.86	112	92	255	54
5	9:50	2.5	266	1.3	2.4	587.46	114	94	250	54
6	9:52	2	266	1.0	1.9	589.95	114	94	250	54
E 1	9:54 / 9:56	2	256	1.0	1.9	590.64	110	94	260	54
2	9:58	2	260	1.1	2.1	592.17	112	96	265	54
3	10:00	2	264	1.1	2.1	593.65	114	96	270	54
4	10:02	2	264	1.1	2.1	595.28	116	96	275	54
5	10:04	2	264	1.0	1.9	596.80	116	96	265	54
6	10:06	2	264	1.0	1.9	598.325	116	96	265	54

RAMCON ENVIRONMENTAL CORPORATION

Plant R&S Const. (ASTEC) m=1.87

Location
Operator D. ARMSTRONG
Date 9-4-90
Run No. 2
Sample Box No. 2
Meter Box No. 646882 / C-124
Meter H @ 2.11
C Factor .997
Pitot Tube Coefficient Cp .818

Ambient Temperature 78°F
Barometric Pressure 28.80
Assumed Moisture, % 25
Probe Length, m(ft) 32
Nozzle Identification No. .0003142
Avg. Calibrated Nozzle Dia., (in.) .240/.240/.240
Probe Heater Setting 5
Leak Rate, m³/min. (cfm) ±.003 @ 3"
Probe Liner Material STAINLESS STEEL
Static Pressure, mm Hg (in.Hg) ±.05
Filter No. RJ-4497/0.5802

	IMPINGER VOLUME ml	SILICA GEL WEIGHT g
FINAL	492	416.4
INITIAL	200	402.4
DIFFERENCE	292	14.0

Schematic of Stack Cross Section

TRAV. PT. NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H2O	PRESSURE DIFF. OF 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	11:00 / 11:02	1.5	270	1.2	2.2	598.959 / 600.91	100	96	275	54
2	11:04	2	274	1.3	2.4	602.63	104	96	275	54
3	11:06	2	276	1.3	2.4	604.20	108	96	275	54
4	11:08	2	272	1.2	2.2	605.76	110	96	270	54
5	11:10	2	270	1.2	2.2	607.53	110	98	260	54
6	11:12	2	268	1.1	2.1	609.04	112	98	255	54
B 1	11:13 / 11:15	2	264	1.1	2.1	610.88	108	98	260	54
2	11:17	2.5	272	1.4	2.6	612.64	110	98	265	54
3	11:19	2.5	272	1.5	2.8	614.50	110	96	270	54
4	11:21	3	272	1.5	2.8	616.13	112	96	275	54
5	11:23	2.5	268	1.5	2.8	617.77	112	96	275	54
6	11:25	2	268	1.2	2.2	619.38	112	96	270	54
C 1	11:26 / 11:28	2	258	1.2	2.2	621.16	108	96	270	54

Form #REC 05

RAMCON emissions test log sheet, cont. DATE 9-4-90 LOCATION ______ TEST NO. 2

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft.^{3})	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	11:30	2	268	1.2	2.2	622.84	110	96	260	52
3	11:32	2	270	1.5	2.8	624.36	114	96	255	52
4	11:34	2	268	1.5	2.8	626.03	114	96	250	52
5	11:36	2	270	1.5	2.8	627.64	116	96	255	52
6	11:38	2	272	1.2	2.3	629.38	114	96	260	52
1	11:40 / 11:42	2	270	1.2	2.2	631.51	110	96	265	52
2	11:44	2	270	1.3	2.4	632.96	114	96	270	52
3	11:46	2	270	1.3	2.4	634.63	114	96	275	52
4	11:48	2.5	270	1.4	2.6	636.27	116	96	275	52
5	11:50	2	270	1.2	2.2	638.25	116	96	275	52
6	11:52	1.5	268	.96	1.8	639.69	116	96	265	52
1	11:54 / 11:56	1.5	258	.90	1.7	641.15	110	96	260	52
2	11:58	2	264	1.0	1.9	642.70	112	96	255	52
3	12:00	2	266	1.1	2.1	644.49	114	96	260	52
4	12:02	2	268	1.1	2.1	645.96	114	96	265	52
5	12:04	2	268	1.0	1.9	647.55	116	96	270	52
6	12:06	1.5	264	.86	1.6	648.485	114	96	275	52

RAMCON ENVIRONMENTAL CORPORATION

Plant B&S Const. (ASTEC) m=1.87

Location
Operator D. Armstrong
Date 9-4-90
Run No. 3
Sample Box No. 1
Meter Box No. 646982 / C-124
Meter H @ 2.11
C Factor .997
Pitot Tube Coefficient Cp .818

Ambient Temperature 80°F
Barometric Pressure 28.8
Assumed Moisture, % 25
Probe Length, m(ft) 32
Nozzle Identification No. .0003142
Avg. Calibrated Nozzle Dia., (in.) .240/.240/.240
Probe Heater Setting 5
Leak Rate, m^3/min. (cfm) ±.000 @ 4"
Probe Liner Material Stainless Steel
Static Pressure, mm Hg (in. Hg) ±.05"
Filter No. RJ-4500 / 0.15980

	Impinger Volume ml	Silica Gel Weight g
Final	510	478.4
Initial	200	460.4
Difference	310	18

Schematic of Stack Cross Section

TRAV. PT. NO.	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H2O	PRESSURE DIFF. ORF. MTR in H2O	GAS SAMPLE VOLUME 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	12:54 / 12:56	2	260	1.1	2.1	649.33 / 650.98	98	92	260	60
2	12:58	2.5	268	1.3	2.4	652.55	104	90	265	60
3	13:00	2.5	270	1.3	2.4	654.04	106	90	270	58
4	13:02	2	268	1.1	2.1	655.73	108	90	275	58
5	13:04	2	264	1.1	2.1	657.51	110	90	275	58
6	13:06	2	262	1.2	2.2	659.06	110	90	270	56
B 1	13:07 / 13:09	2.5	264	1.4	2.6	660.94	104	90	265	56
2	13:11	2.5	266	1.5	2.8	662.78	108	90	260	56
3	13:13	2.5	268	1.5	2.8	664.79	110	90	250	56
4	13:15	2.5	268	1.5	2.8	667.01	110	90	250	56
5	13:17	2.5	270	1.4	2.6	668.44	110	92	255	56
6	13:19	2.5	272	1.3	2.4	670.91	110	92	270	56
C 1	13:20 / 13:20	2.6	268	1.3	2.4	672.30	110	92	275	54

Form #REC-05

RAMCON emissions test log sheet, cont. DATE 9-4-90 LOCATION ______ TEST NO. 3

TRAVERSE POINT	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP T_s (°F)	VELOCITY HEAD ΔP_s (in. H_2O)	ORFICE DIFF. PRESSURE ΔH (in. H_2O)	GAS VOLUME V_m (ft^3)	GAS SAMPLE TEMP. (°F) in	GAS SAMPLE TEMP. (°F) out	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
2	13:24	2	270	1.3	2.4	674.14	114	92	275	54
3	13:26	2.5	272	1.5	2.8	676.15	114	92?	275	54
4	13:28	2.5	274	1.5	2.8	678.19	114	92	275	54
5	13:30	2.5	270	1.5	2.8	679.32	114	92	270	54
6	13:32	2	266	1.2	2.2	680.75	116	92	260	54
1	13:34 / 13:36	2	260	1.0	1.9	682.27	114	92	255	54
2	13:38	2	266	1.2	2.2	683.93	114	92	260	54
3	13:40	3	268	1.4	2.6	685.76	114	92	265	54
4	13:42	3	268	1.3	2.4	687.46	116	92	270	54
5	13:44	3	270	1.2	2.2	689.16	116	92	275	54
6	13:46	2.5	274	.97	1.8	690.81	116	94	275?	54
1	13:47 / 13:49	2.5	262	1.1	2.1	692.66	112	94	265	54
2	13:51	2.5	268	1.1	2.1	694.42	112	94	260	54
3	13:53	2	266	1.2	2.2	696.01	114	94	260	54
4	13:55	2	266	1.2	2.2	697.60	114	94	265	54
5	13:57	2	268	1.2	2.2	699.33	114	94	270	54
6	13:59	2.0	268	.95	1.8	701.046	114	94	275	54

IX. CALIBRATION

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test number ______ Date 9-9-90 Meter box number C-124 Plant ______

Barometric pressure, P_b = 30.20 in. Hg Dry gas meter number 646882 Pretest Y .997

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	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
1.5	~~10~~ 5	930.200 / 935.340	81	102 / 104	88 / 90	96	7.51	2	.986	2.49
1.5	~~10~~ 5	939.000 / 944.000	81	104 / 104	90 / 90	97	8.03	2	1.01	2.84
1.5	~~10~~ 5	945.100 / 950.370	81	106 / 106	90 / 90	98	7.56	2	.994	2.52
									Y = .997	2.62

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

where

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

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

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

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

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

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

ΔH = Pressure differential across orifice, in. H_2O.

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

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

P_b = Barometric pressure, in. Hg.

Θ = Time of calibration run, min.

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test number ______ Date 8-27-90 Meter box number C-124 Plant ______

Barometric pressure, P_b = 30.20 in. Hg Dry gas meter number 646882 Pretest Y 1.01

Orifice manometer setting, (ΔH), in. H_2O	Gas volume		Temperature				Time (θ), min	Vacuum setting, in. Hg	Y_i	Y_i
	Wet test meter (V_w), ft^3	Dry gas meter (V_d), ft^3	Wet test meter (t_w), °F	Dry gas meter						$\frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
				Inlet (t_{d_i}), °F	Outlet (t_{d_o}), °F	Average[a] (t_d), °F				
1.5	10 6	212.141 / 218.328	81	104 / 106	86 / 88	96	8.35	2	.993	2.[illegible] ΔH
1.5	10 5	220.70 / 225.887	81	106 / 106	88 / 88	97	8.01	2	.988	2.12
1.5	10 5	227.450 / 232.524	81	116 / 116	88 / 88	97	7.59	2	1.01	1.91
									Y = .997	(ΔH@) = 2.11

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

where

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

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

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

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

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

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

ΔH = Pressure differential across orifice, in. H_2O.

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

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

P_b = Barometric pressure, in. Hg.

θ = Time of calibration run, min.

(35)

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. 32 Date 5-9-90

Calibrated by: [signature]

"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	1.9	2.8	0.82	0.000
2	0.77	1.15	0.818	0.001
3	0.34	.51	0.816	0.003
		$\bar{C}_p$ (SIDE A)	0.8[illegible]	

"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	1.9	2.8	0.82	0.002
2	0.77	1.15	0.818	0.000
3	0.34	0.51	0.816	0.002
		$\bar{C}_p$ (SIDE B)	0.818	

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

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

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

Form No. EED-17-1

Date 5-8-90 Thermocouple number 32

Ambient temperature 68 °F Barometric pressure 29.96 in. Hg

Calibrator S Tuma Reference: mercury-in-glass ✓

other ______

Reference point number[a]	Source[b] (specify)	Reference Thermometer Temperature, °C	Thermocouple Potentiometer Temperature, °C	Temperature Difference,[c] %
Hot H2O		151°F	151°F	0
Boiling oil		418°F	419°F	-.24
Ice water		32°F	32°F	0
Ambient temp		68°F	68°F	0
9-4-90		74°F	74°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

Lear Siegler Stack Sampler

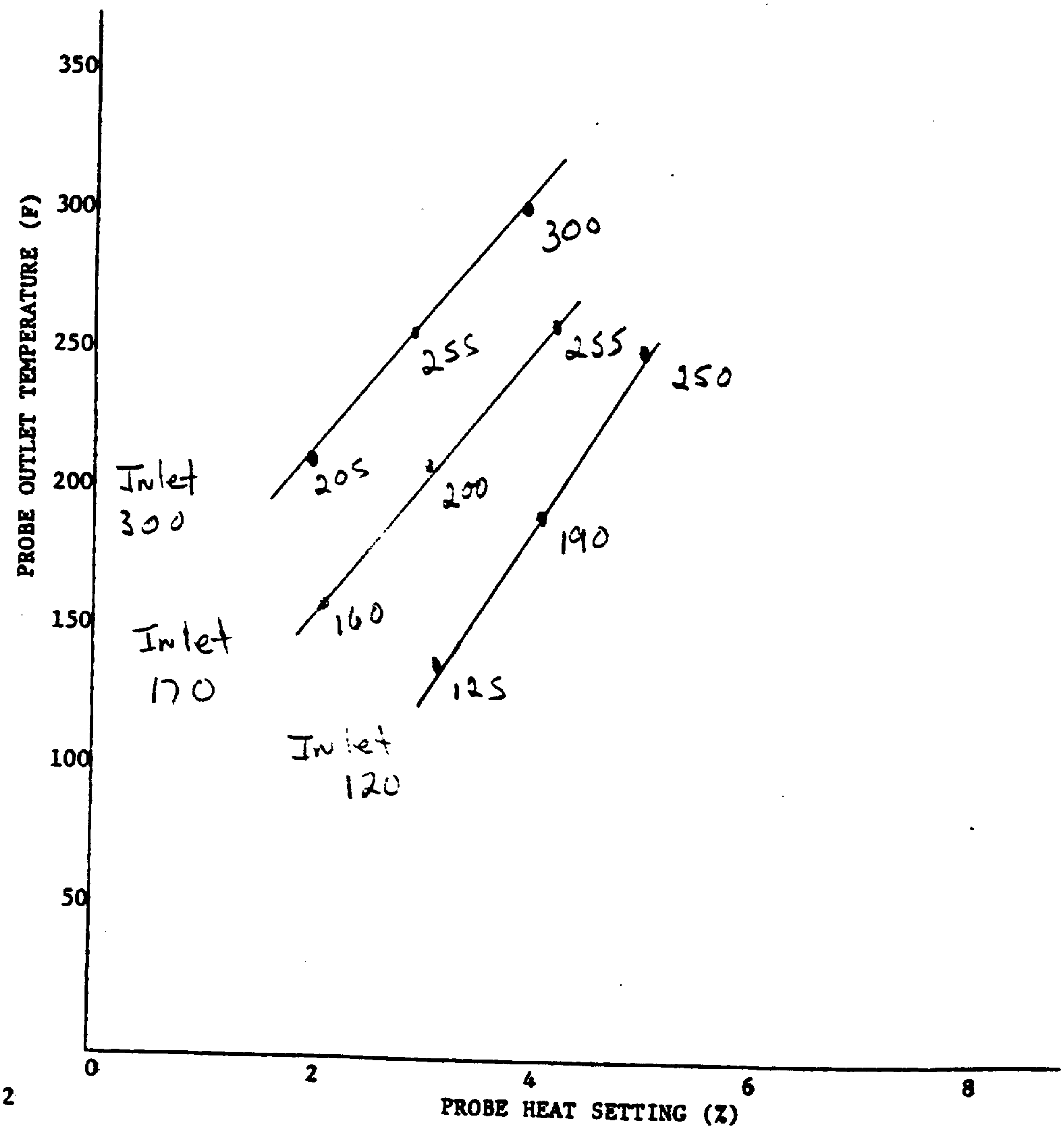
Heating Probe Calibration

Probe No. 32 Probe Length 3'

Date of Calibration 5-7-89 Signature Sam Chung

Name of Company to be tested ______

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



Form No. EED-17-2

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 4-5-89 Thermocouple number Hotbox

Ambient temperature 20 °C Barometric pressure 29.88 in. Hg

Calibrator 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	212	0
C	Boiling oil	381	381	0
D	Ambient			
	9-4-90	74	74	0

[a]Type of calibration system used.

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

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 4-5-89 Thermocouple number Inlet/Outlet

Ambient temperature 20 °C Barometric pressure 29.88 in. Hg

Calibrator Turner Reference: mercury-in-glass ✓

other ______

Reference point number	Source[a] (specify)	Reference thermometer temperature, °F	Thermocouple potentiometer temperature, °F	Temperature difference,[b] %
A	Ice Bath	32	32	0
B	Boiling oil	381	381	0
C	Boiling water	212	212	0
D	ambient 9-4-90	74	74	0

[a]Type of calibration system used.

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

X. RAMCON PERSONNEL

RAMCON Environmental Stack Test Team

Sumner Buck - President

Sumner Buck is the President of RAMCON Environmental Corporation. He is a graduate of the EPA 450 "Source Sampling for Particulate Pollutant's" course and the 474 "Continuous Emissions Monitoring" course all given at RTP. Mr. Buck is a certified V.E. reader with current certification. Mr. Buck has personally sampled over 400 stacks including over 300 asphalt plants. He is 47 years old and a graduate of the University of Mississippi with graduate studies at Memphis State University and State Technical Institute of Memphis.

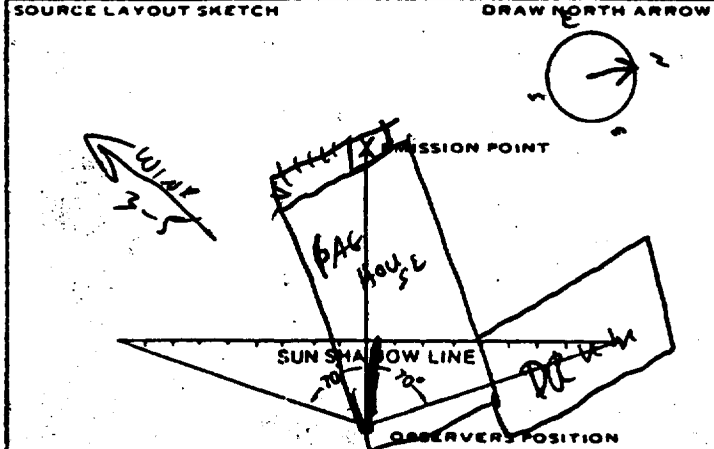
Dave Armstrong - Team Leader

Dave Armstrong has been with RAMCON Environmental for two years. He was promoted to Team Leader in 1988 and altogether has sampled almost 200 stacks of all types. Dave is a current V.E. reader and has extensive training in EPA Methods 1 - 9.

XI. VISIBLE EMISSIONS

SOURCE NAME	B & S CONSTRUCTION
ADDRESS	
CITY	
STATE	-
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	DRUM MIX
OPERATING MODE	
CONTROL EQUIPMENT	BAG HOUSE
OPERATING MODE	JET PULSE
DESCRIBE EMISSION POINT	RECTANGULAR STACK ON SOE of BAG HOUSE
HEIGHT ABOVE GROUND LEVEL	50'
HEIGHT RELATIVE TO OBSERVER	0'
DISTANCE FROM OBSERVER	25'
DIRECTION FROM OBSERVER	EAST
DESCRIBE EMISSIONS	DETATCHED STEAM WITH NO PART-
EMISSION COLOR	CLEAR
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	EXIT POINT OF STACK
DESCRIBE BACKGROUND	TOP OF TREE LINE
BACKGROUND COLOR	GREEN
SKY CONDITIONS	HAZY
WIND SPEED	0-3
WIND DIRECTION	FROM N, E
AMBIENT TEMPERATURE	
RELATIVE HUMIDITY	

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



COMMENTS

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

TITLE

DATE

OBSERVATION DATE	9-4-90
START TIME	
STOP TIME	

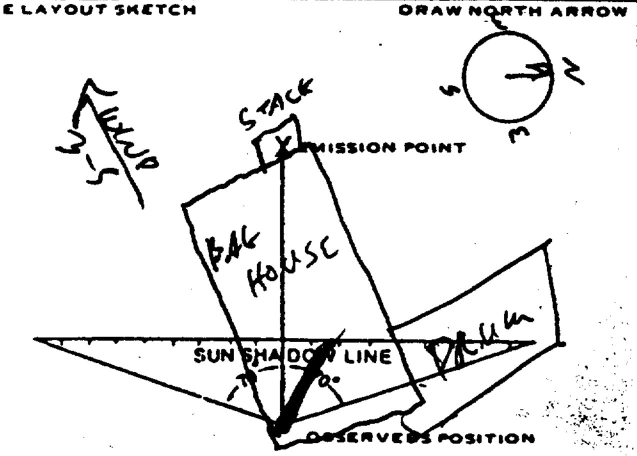
MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	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	0	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 [illegible] % WERE	0
RANGE OF OPACITY READINGS	MINIMUM 0 MAXIMUM 0
OBSERVER'S NAME (PRINT)	WILLIAM J. LOCKETT
OBSERVER'S SIGNATURE	William J. Lockett
DATE	9-4-90
ORGANIZATION	RAMCON ENVIRONMENTAL
CERTIFIED BY	STATE OF TN.
DATE	6-6-[illegible]
VERIFIED BY	
DATE	

#2

Field	Entry
SOURCE NAME	B+S Construction
ADDRESS	
CITY / STATE / ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	Drum mix
OPERATING MODE	
CONTROL EQUIPMENT	Bag House
OPERATING MODE	Jet Pulse
DESCRIBE EMISSION POINT	Rectangular Stack on W side of B.H.
HEIGHT ABOVE GROUND LEVEL	50'
HEIGHT RELATIVE TO OBSERVER	0'
DISTANCE FROM OBSERVER	25'
DIRECTION FROM OBSERVER	N.W.
DESCRIBE EMISSIONS	None
EMISSION COLOR	Clear
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	Exit Point of Stack
DESCRIBE BACKGROUND	Tree line
BACKGROUND COLOR	Green
SKY CONDITIONS	Cloudy
WIND SPEED	0-3
WIND DIRECTION	From N.E.
AMBIENT TEMPERATURE	
RELATIVE HUMIDITY	

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



COMMENTS

Field	Entry
OBSERVATION DATE	9-4-96
START TIME	
STOP TIME	

M \ SEC	0	15	30	45	M \ SEC	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	0	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	0	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

Field	Entry
AVERAGE OPACITY FOR HIGHEST PERIOD	0
NUMBER OF READINGS ABOVE [illegible] % WERE	0
RANGE OF OPACITY READINGS — MINIMUM	0
RANGE OF OPACITY READINGS — MAXIMUM	[illegible]
OBSERVER'S NAME (PRINT)	William J. Lockett
OBSERVER'S SIGNATURE	William J. Lockett (signature)
DATE	9-4-[illegible]
ORGANIZATION	Rawicon Environmental
CERTIFIED BY	State of TN
DATE	6-[illegible]
VERIFIED BY	
DATE	

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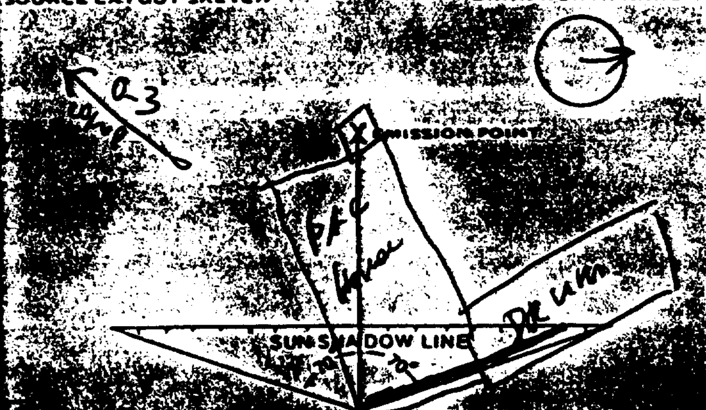
SIGNATURE	
TITLE	
DATE	

SOURCE NAME	[illegible]
ADDRESS	[illegible]
CITY	[illegible]
STATE	[illegible]
ZIP	[illegible]
PHONE	[illegible]
SOURCE ID NUMBER	[illegible]
PROCESS EQUIPMENT	Pres[illegible]
OPERATING MODE	[illegible]
CONTROL EQUIPMENT	BAG HOUSE
OPERATING MODE	PULSE JET
DESCRIBE EMISSION POINT	Pcc STACK on W. END of B.H.
HEIGHT ABOVE GROUND LEVEL	50
HEIGHT RELATIVE TO OBSERVER	0
DISTANCE FROM OBSERVER	[illegible]
DIRECTION FROM OBSERVER	W
DESCRIBE EMISSIONS	None
EMISSION COLOR	CLEAR
PLUME TYPE	CONTINUOUS ● FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT	[illegible] YES ☐
IS WATER DROPLET PLUME	ATTACHED ☐ DETACHED ☐
AT WHAT POINT IN THE PLUME WAS OPACITY DETERMINED	EXIT OF STACK
DESCRIBE BACKGROUND	TREE LINE
BACKGROUND COLOR	GREEN
SKY CONDITIONS	CLOUDY
WIND SPEED	3
WIND DIRECTION	from N.E.
AMBIENT TEMPERATURE	
RELATIVE HUMIDITY	

SOURCE LAYOUT SKETCH — DRAW NORTH ARROW



COMMENTS

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SIGNATURE

DATE

OBSERVATION DATE: [illegible] | START TIME: [illegible] | STOP TIME: [illegible]

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

AVERAGE OPACITY FOR HIGHEST PERIOD: [illegible]

NUMBER OF READINGS [illegible]

RANGE OF OPACITY READINGS: MINIMUM [illegible] MAXIMUM [illegible]

OBSERVER'S NAME (PRINT): William J. Locke[illegible]

OBSERVER'S SIGNATURE: [illegible]

ORGANIZATION: [illegible]

CERTIFIED BY: [illegible]

VERIFIED BY: [illegible]

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

JUN 2 9 1990

William J. Lockett
Ramcon
223 Scott
Memphis, TN 38112

RE: Certificate Number 1231

Dear Mr. Lockett:

Enclosed you will find your certification card for successfully completing the June 5-7, 1990 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 06, 1990.

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 Koontz

Carl Koontz, Instructor
Visible Emissions Evaluation School
Division of Air Pollution Control

Enclosure