D.C.

OFFICE OF AIR MANAGEMENT

OFFICE MEMORANDUM
TO: Bob Simmons
FROM: Dave Cline DC

DATE: APRIL 13, 1993
THRU: Ed Surla 4-26

SUBJECT: Walsh & Kelly Co, Port of Indiana.
SOURCE ID NO. 127-03214

The subject company has submitted a report concerning particulate testing of their asphalt mix operation. The test was conducted on October 31, 1991 by Ramcon Environmental Corp. The purpose of the test was to determine compliance status of the facility with operating permit 127-03214. I have reviewed this report and found the sampling procedures used and the results obtained to be acceptable to this office. A copy of the test report is filed in the Compliance Data Section. The following is a summary of the test results.

PARTICULATE TEST RESULT SUMMARY

Maximum Permitted Rate	350 Tph
Average Run During Test	306 Tph
Average Measured Emissions	.01 gr/dscf
	2.2 lbs/hr
Allowable Emissions	.04 gr/dscf
	17 lbs/hr
Highest Six Minute Opacity	7%
Average Opacity	3%
Type of Fuel	Natural Gas

STATUS: IN COMPLIANCE (at 87% capacity)

*Note: During this test, Walsh and Kelly used limestone and passed easily. During a previous test they used slag and failed. It should be noted though that they still intend to run slag at other times and this could well change their compliance status.

cc: Nancy Landau
Dave Cline
Bob Simmons
General File Porter County

RAMCON

ENVIRONMENTAL CORPORATION

RECEIVED

NOV 27 1991

State Of Indiana
Department of Environmental Manageme
Office of Air Management

SOURCE SAMPLING
for
PARTICULATE EMISSIONS
WALSH & KELLY
PORT OF INDIANA, INDIANA
October 31, 1991

Rich Wise
Walsh & Kelly

G. Sumner Buck, III
President

Billy Lockett
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

November 18, 1991

Mr. Rich Wise
Walsh & Kelly
1700 Main Street
Griffith, IN 46319

Re: Particulate Emissions Test: Port of Indiana, Indiana

Dear Mr. Wise:

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 Indiana. 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. Ed Surla
Indiana Department of Environmental Management
Air Quality Division
105 South Meridian
Indianapolis, IN 46206

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

TABLE OF CONTENTS

I. INTRODUCTION

On October 31, 1991 personnel from RAMCON Environmental Corporation conducted a source emissions test for particulate emissions compliance at Walsh & Kelly's CMI drum mix asphalt plant located in Port of Indiana, Indiana. RAMCON personnel conducting the test were Billy Lockett, Team Leader, and Jeff Shrader. Tim Huey 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. Lockett and Mr. Huey.

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 Indiana.

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 Indiana are the same as those set by EPA.

Mr. David McIver of Indiana Department of Environmental Management observed the testing conducted by RAMCON Environmental. Jeff Shrader of RAMCON Environmental Corporation conducted the opacity test which ranged from 0% to 10% on all three runs and therefore meets N.S.P.S. requirements.

SUMMARY OF TEST RESULTS

TABLE I

October 31, 1991

Test Run	Time	Grain Loading gr/DSCF	Isokinetic Variation	Emissions Lbs/Hr
1	08:37 - 09:53	0.0123	98.7%	3.07
2	11:10 - 12:20	0.0091	97.1%	2.24
3	13:12 - 14:19	0.0050	99.5%	1.20
	Average:	0.0088		2.17

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

III. TEST PROCEDURES

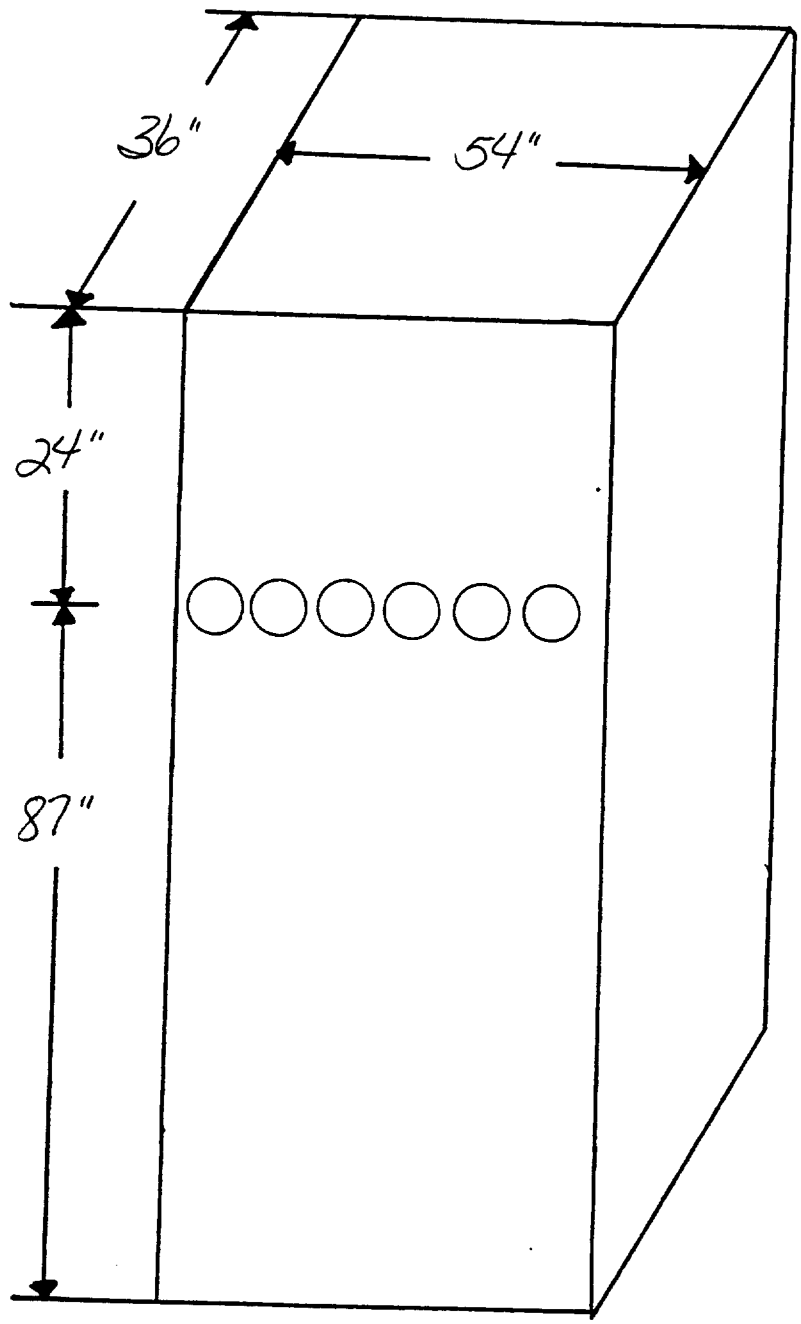
A. Method Used: Method 5 source sampling was conducted in accordance with requirements of the U.S. Environmental Protection Agency as set forth in 39 FR 9314, March 8, 1974, 60.93, as amended.

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 36.0" x 54.0" with an equivalent diameter of 43.2". Six sampling ports were placed 24.0" down (0.6 diameters upstream) from the top of the stack and 87.0" up (2.0 diameters downstream) from the last flow disturbance. The ports were evenly spaced on 9.0" centers. The two outside ports are 4.5" from the side walls of the stack. Thirty points were sampled, five through each port for two minutes each.

Points on a Diameter	Probe Mark
1	*11.6"
2	18.8"
3	26.0"
4	33.2"
5	40.4"

*Measurements include a 8" standoff.



IV. THE SOURCE

IV. THE SOURCE

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

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

The drum mixer uses a burner fired with Natural Gas 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 CMI. 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 ON FACILITY BEING STACK TESTED

COMPANY NAME Walsh & Kelly COMPANY REP. Rich Wise PHONE (219) 924-5900

LOCATION OF FACILITY Port of In. ORIGINAL START-UP DATE ______ DESIGNED CAPACITY 350 TPH

OEM CMI MODEL NO. SUM-11 TYPE Drum AC TYPE AC-20

1 Time (24 HR) 15 min. NOTE: check small box in column when moisture sample is taken	2 Fuel Use #Fuel Oil / Nat. Gas X / Propane / Coal / other	3 Burner Setting	4 Blower Pressure	5 Production Rate X Mix Aggregate TPH	5 Production Rate RAP TPH	6 Asphalt Cement %	7 Mix Temp. °F	8 Exhaust Gas Temp. °F	9 Baghouse Pressure Drop in w.g.	9 Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
8:05		51%	27	324.8	-0-	4.8	278	280	3.9		48°		61%
8:20		51%		319.6	-0-	4.8	278	280	3.7		48		64%
9:35		51%		321.2	-0-	5.78	271	275	3.9		48		63%
8:50		53%		318.7	-0-	5.80	261	271	4.3		48		65%
9:05		53%		300.3	-0-	5.81	270	271	3.9		50		60%
9:20		53%		299.4	-0-	5.82	281	272	3.8		50		64%
9:35		48%		297.9	-0-	4.94	280	276	3.6		50		61%
9:50		48%		310.7	-0-	4.86	283	280	4.0		51°		60%
11:00		51%		317.8	-0-	4.76	286°	274°	4.0		51°		60%
11:15		49%		320.8	-0-	4.79	289	290	3.9		51°		60%
11:30		49%		310.4	-0-	4.80	270	290	3.8		52°		60%
11:45		48%		307.5	-0-	4.90	260	273	3.8		52°		61%
12:00		51%		301.5	-0-	5.76	257	272	4.1		52°		63%
12:15		51%		306.9	-0-	5.82	260°	276	3.9		52°		63%
13:00		55%		299.8	-0-	5.80	290	272	4.0		54°		65%
13:15		52%		296.6	-0-	5.81	285	284	3.9		54°		66%
13:30		50%		291.4	-0-	5.73	280	281	3.9		54°		59%
13:45		50%		287.4	-0-	5.79	285	287	4.1		54°		60%

(5)

Form REC#04

2

Wand K are run 306 TPH
88% max capacity

1 Time (24 HR) NOTE: check small box in column when moisture sample is taken	8 Exhaust Gas Temp. °F	9 __Venturi Scrubber __Baghouse Pressure Drop in w.g.	9 Water Pressure psi	10 Ambient Temp. °F	11 Relative Humidity %	12 Exhaust Damper Position
14:00	[illegible]0	4.0		54°		67%
14:15	[illegible]	9.8		54°		59%

DATA SUMMARY (6) STACK BEING TESTED

DATA SUMMARY ON STACK BEING TESTED

AGGREGATE

1. Name/type of mix 11 SURFACE [illegible]
2. Name/type of 2nd mix (if used) 8 BINDER
3. Type/temperature of Liquid Asphalt AC-20 / 270 °F
4. Sieve/Screening analysis: ______ % Passing;

	1st mix / 2nd mix		1st mix / 2nd mix		1st mix / 2nd mix
1"	___ / 97.4	3/8"	93.0 / 56.9	#___	___ / ___
3/4"	___ / 92.2	#200	2.7 / 1.9	#___	___ / ___
1/2"	100 / 74.1	#4	60.4 / 40	#___	___ / ___

CONTROL SYSTEM

Manufacturer CMI

A. Baghouse:

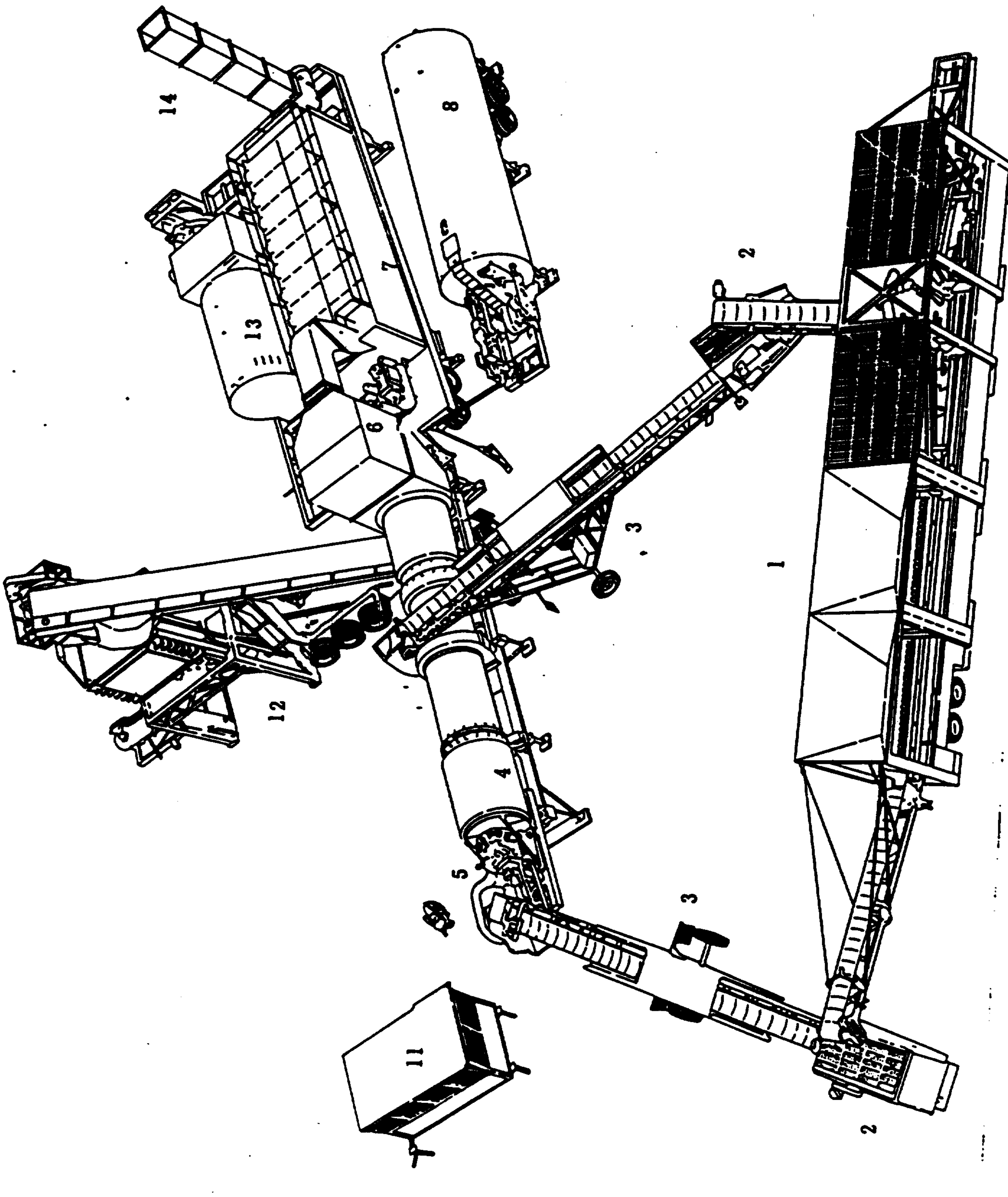
1. Type of bags NOMEX # of bags 900 Sq. ft. of bags 13 253
2. Air to cloth ratio 5:1 Designed ACFM ______
3. Type of cleaning - pulse jet X reverse air ______ plenum pulse ______ other ______
4. Cleaning cycle time PRESSURE ON DEMAND Interval between cleaning cycle ______
5. Pulse pressure on cleaning 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 WALSH + KELLY Date 10-31-91

Company Representative [illegible]



CMI drum mixer plant (baghouse)

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

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

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

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

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

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

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

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

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

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

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

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

13. Fuel storage.

14. Stack

V. EQUIPMENT USED

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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.

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.

SAMPLE ANALYTICAL DATA FORM

Company Name WALSH & KELLY

Sample Location ______

Blank Volume (V_a) 45 ml

Date/Time wt. blank 11-4/8A

Date/Time wt. blank 11-4/2P

Relative Humidity in Lab 43 %

Density of Acetone (ρ_a) .7857 mg/ml

Gross wt. 165.0917 g

Gross wt. 165.0915 g

Ave. Gross wt. 165.0916 g

Tare wt. 165.0914 g

Weight of blank (m_{ab}) 0.0002 g

Acetone blank residue concentration (C_a) : $(C_a) = (m_{ab}) / (V_a) (\rho_a)$ = (0.000005 mg/g)

Acetone Blank Wt. : $W_a = C_a V_{aw} \rho_a$ = (0.000005)(430)(0.7857) = (0.0017 g)

		Run # 1	Run # 2	Run # 3
Acetone rinse volume (V_{aw})	ml	430	430	430
Date/Time of wt. 11-11/130P Gross wt.	g	172.3037	165.9543	162.6698
Date/Time of wt. 11-12/8A Gross wt.	g	172.3032	165.9539	162.6701
Average Gross wt.	g	172.3035	165.9541	162.6700
Tare wt.	g	172.2682	165.9289	162.6580
Less Acetone blank wt. (W_a)	g	0.0017	0.0017	0.0017
Weight of particulate in acetone rinse (m_a)	g	0.0336	0.0235	0.0103

Filter Numbers	#	TH 5554	TH5555	TH 5556
Date/Time of wt. 11-11/130P Gross wt.	g	0.5820	0.5758	0.5762
Date/Time of wt. 11-12/8A Gross wt.	g	0.5823	0.5757	0.5758
Average Gross wt.	g	0.5822	0.5758	0.5760
Tare wt.	g	0.5795	0.5733	0.5722

Weight of particulate on filter (m_f)	g	0.0027	0.0025	0.0038
Weight of particulate in acetone rinse (m_a)	g	0.0336	0.0235	0.0103
Total weight of particulate (m_n)	g	0.0363	0.0260	0.0141

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]

Walsh & Kelly — Company Name

10-31-91 — Date

REFERENCE METHOD 3: GAS ANALYSIS BY FYRITE

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

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

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

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

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

RUN 1:	$CO_2\%$	3	$CO_2\%$	2	$CO_2\%$	3	AVG.	2.7
	$O_2\%$	17	$O_2\%$	18	$O_2\%$	17	AVG.	17.3
	$N_2\%$		$N_2\%$		$N_2\%$		AVG.	80.0
RUN 2:	$CO_2\%$	2.5	$CO_2\%$	1	$CO_2\%$	2	AVG.	1.8
	$O_2\%$	17.5	$O_2\%$	17.5	$O_2\%$	18	AVG.	17.7
	$N_2\%$		$N_2\%$		$N_2\%$		AVG.	80.5
RUN 3:	$CO_2\%$	1.5	$CO_2\%$	2	$CO_2\%$	2	AVG.	1.8
	$O_2\%$	17.4	$O_2\%$	17	$O_2\%$	17.0	AVG.	17.2
	$N_2\%$		$N_2\%$		$N_2\%$		AVG.	81.0

VII. CALCULATIONS

SUMMARY OF TEST DATA

		10-31-91 RUN #1	10-31-91 RUN #2	10-31-91 RUN #3
SAMPLING TRAIN DATA				
	start	08:37	11:10	13:12
	finish	09:53	12:20	14:19
1. Sampling time, minutes	Θ	60.0	60.0	60.0
2. Sampling nozzle diameter, in.	D_n	.2550	.2550	.2550
3. Sampling nozzle cross-sect. area, ft^2	A_n	.000355	.000355	.000355
4. Isokinetic variation	I	98.7	97.1	99.5
5. Sample gas volume - meter cond., cf.	V_m	44.855	44.468	44.421
6. Average meter temperature, ^oR	T_m	523	533	533
7. Avg. oriface pressure drop, in. H_2O	dH	1.50	1.43	1.41
8. Total particulate collected, mg.	M_n	36.30	26.00	14.10
VELOCITY TRAVERSE DATA				
9. Stack area, ft^2.	A	13.50	13.50	13.50
10. Absolute stack gas pressure, in. Hg.	P_s	29.65	29.62	29.55
11. Barometric pressure, in. Hg.	P_{bar}	29.65	29.62	29.55
12. Avg. absolute stack temperature, R^o	T_s	678	679	683
13. Average -\/vel. head, (C_p= .81)	-\/dP	1.02	0.99	0.98
14. Average stack gas velocity, ft./sec.	V_s	66.51	64.56	64.36
STACK MOISTURE CONTENT				
15. Total water collected by train, ml.	V_{ic}	412.90	374.50	395.20
16. Moisture in stack gas, %	B_{ws}	29.99	28.68	29.89
EMISSIONS DATA				
17. Stack gas flow rate, dscf/hr.(000's)	Q_{sd}	1746	1722	1674
18. Stack gas flow rate, cfm	acfm	53873	52294	52132
19. Particulate concentration, gr/dscf	C_s	0.0123	0.0091	0.0050
20. Particulate concentration, lb/hr	E	3.07	2.24	1.20
21. Particulate concentration, lb/mBtu	E'	0.00000	0.00000	0.00000
ORSAT DATA				
22. Percent CO_2 by volume	CO_2	2.70	1.80	1.80
23. Percent O_2 by volume	O_2	17.30	17.70	17.20
24. Percent CO by volume	CO	.00	.00	.00
25. Percent N_2 by volume	N_2	80.00	80.50	81.00

Format: summryR3

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:

$$V_{m(std)} = (17.64)(1.006)(\ 44.855) \left[\frac{(29.65) + \frac{1.50}{13.6}}{523}\right] = 45.294 \text{ dscf}$$

RUN 2:

$$V_{m(std)} = (17.64)(1.006)(\ 44.468) \left[\frac{(29.62) + \frac{1.43}{13.6}}{533}\right] = 44.009 \text{ dscf}$$

RUN 3:

$$V_{m(std)} = (17.64)(1.006)(\ 44.421) \left[\frac{(29.55) + \frac{1.41}{13.6}}{533}\right] = 43.857 \text{ dscf}$$

Format: dgmR3

Total Contaminants by Weight: GRAIN LOADING

Particulate concentration C_s' gr./dscf.

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

Where:

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

M_n = Total amount of particulate matter collected, mg.

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

Run 1:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{36.30}{45.294}\right] = 0.0123\ \text{gr./dscf.}$$

Run 2:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{26.00}{44.009}\right] = 0.0091\ \text{gr./dscf.}$$

Run 3:

$$C_s' = \left[0.0154\ \frac{gr}{mg}\right]\left[\frac{14.10}{43.857}\right] = 0.0050\ \text{gr./dscf.}$$

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:

$$M_d = 0.44(2.70\%) + 0.32(17.30\%) + 0.28(.00\% + 80.00\%) = 29.12 \frac{lb}{lb\text{-}mole}$$

Run 2:

$$M_d = 0.44(1.80\%) + 0.32(17.70\%) + 0.28(.00\% + 80.50\%) = 29.00 \frac{lb}{lb\text{-}mole}$$

Run 3:

$$M_d = 0.44(1.80\%) + 0.32(17.20\%) + 0.28(.00\% + 81.00\%) = 28.98 \frac{lb}{lb\text{-}mole}$$

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) (394.0) = 18.5 cu.ft
$V_{wsg(std)}$ = (0.04715) (18.9) = 0.9 cu.ft

Run 2:

$V_{wc(std)}$ = (0.04707) (358.0) = 16.9 cu.ft
$V_{wsg(std)}$ = (0.04715) (16.5) = 0.8 cu.ft

Run 3:

$V_{wc(std)}$ = (0.04707) (375.0) = 17.7 cu.ft
$V_{wsg(std)}$ = (0.04715) (20.2) = 1.0 cu.ft

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:

$$B_{ws} = \frac{18.5 + 0.9}{18.5 + 0.9 + 45.294} \text{ X } 100 = 29.99 \%$$

Run 2:

$$B_{ws} = \frac{16.9 + 0.8}{16.9 + 0.8 + 44.009} \text{ X } 100 = 28.68 \%$$

Run 3:

$$B_{ws} = \frac{17.7 + 1.0}{17.7 + 1.0 + 43.857} \text{ X } 100 = 29.89 \%$$

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 = 29.12 (1 - 29.99) + 18 (29.99) = 25.79 (lb./lb.-mole)

Run 2:

M_s = 29.00 (1 - 28.68) + 18 (28.68) = 25.85 (lb./lb.-mole)

Run 3:

M_s = 28.98 (1 - 29.89) + 18 (29.89) = 25.70 (lb./lb.-mole)

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 $\left[(g/g\text{-mole})\text{-}(mm\ Hg) / (^oK)(mm\ H_2O)\right]^{1/2}$
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, (^{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:

$$V = (85.49)(.81)(1.02)\sqrt{\frac{678}{(29.65)(25.79)}} = 66.51 \text{ ft/sec.}$$

Run 2:

$$V = (85.49)(.81)(0.99)\sqrt{\frac{679}{(29.62)(25.85)}} = 64.56 \text{ ft/sec.}$$

Run 3:

$$V = (85.49)(.81)(0.98)\sqrt{\frac{683}{(29.55)(25.70)}} = 64.36 \text{ ft/sec.}$$

Format: vsR3

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:

$$Q_{sd}=3600(1- \; .2999 \;)(\; 66.51)(\; 13.50) \left[\frac{528}{678} \right] \left[\frac{29.65}{29.92} \right] = 1746427.8 \; \frac{dscf}{hr}$$

Run 2:

$$Q_{sd}=3600(1- \; .2868 \;)(\; 64.56)(\; 13.50) \left[\frac{528}{679} \right] \left[\frac{29.62}{29.92} \right] = 1722656.7 \; \frac{dscf}{hr}$$

Run 3:

$$Q_{sd}=3600(1- \; .2989 \;)(\; 64.36)(\; 13.50) \left[\frac{528}{683} \right] \left[\frac{29.55}{29.92} \right] = 1674331.3 \; \frac{dscf}{hr}$$

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:

$$E = \frac{(0.0123)(1746427.8)}{7000} = 3.07 \text{ lb. / hr.}$$

Run 2:

$$E = \frac{(0.0091)(1722656.7)}{7000} = 2.24 \text{ lb. / hr.}$$

Run 3:

$$E = \frac{(0.0050)(1674331.3)}{7000} = 1.20 \text{ lb. / hr.}$$

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:

$$I = (100)(\ 678\ ) \left[\frac{(0.002669)(412.90) + \frac{44.855}{523} \left[29.65 + \frac{1.50}{13.6} \right]}{60\ (\ 60.0\ )\ (\ 66.51\ )\ (\ 29.65\ )\ (\ .000355\ )} \right] = 98.7\%$$

Run 2:

$$I = (100)(\ 679\ ) \left[\frac{(0.002669)(374.50\ ) + \frac{44.468}{533} \left[29.62 + \frac{1.43}{13.6} \right]}{60\ (\ 60.0\ )\ (\ 64.56\ )\ (\ 29.62\ )\ (\ .000355\ )} \right] = 97.1\%$$

Run 3:

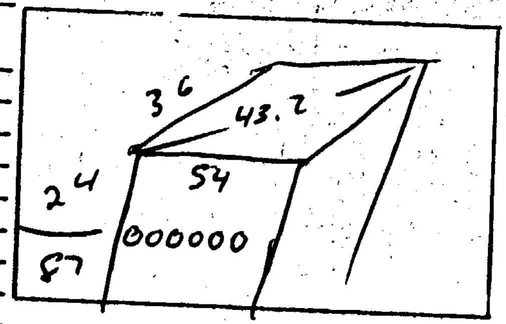
$$I = (100)(\ 683\ ) \left[\frac{(0.002669)(395.20\ ) + \frac{44.421}{533} \left[29.55 + \frac{1.41}{13.6} \right]}{60\ (\ 60.0\ )\ (\ 64.36\ )\ (\ 29.55\ )\ (\ .000355\ )} \right] = 99.5\%$$

VIII. FIELD DATA

RAMCON ENVIRONMENTAL CORPORATION

Plant WALSH & KELLY

Location PORTAGE, IN
Operator W.J. ROCKETT
Date 10-31-91
Run No. 1
Sample Box No. 1
Meter Box No. C-185
Meter H @ 1.414
C Factor 1.006
Pitot Tube Coefficient Cp .811



Schematic of Stack Cross Section

Ambient Temperature 40
Barometric Pressure 29.65
Assumed Moisture, % 30
Probe Length, m(ft) 4'
Nozzle Identification No. .0663546
Avg. Calibrated Nozzle Dia., (in.) .255/.255/.255
Probe Heater Setting 8
Leak Rate, m³/min.(cfm) .005 C6"
Probe Liner Material 516 SS
Static Pressure, mm Hg(in.Hg)
Filter No. TH5554

	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL	594	435.1
INITIAL	200	416.2
DIFFERENCE	394	18.9

TRAV. PT No.	SAMPLING TIME (θ)min.	VACUUM in. Hg	STACK TEMP (Ts)	VELOCITY HEAD (Ps) 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	8:37 / 8:39	3	220	.94	1.3	833.9 / 835.3	46	46	275	40
2	8:41	4	220	1.2	1.7	836.9	58	48	280	40
3	8:43	5	220	1.2	1.7	838.5	64	48	265	40
4	8:45	5	220	1.3	1.9	840.1	68	48	220	40
5	8:47	5	220	1.3	1.9	841.8	68	48	260	40
B 1	8:48 / 8:50	4	215	1.2	1.7	843.4	66	48	250	40
2	8:52	5	215	1.2	1.7	845.0	70	48	225	40
3	8:54	5	215	1.3	1.9	846.6	72	50	240	40
4	8:56	5	215	1.3	1.9	848.2	74	50	255	40
5	8:58	5	215	1.2	1.7	849.9	74	50	230	40
C 1	9:00 / 9:02	4	215	.90	1.3	851.5	72	52	235	42
2	9:04	5	215	1.2	1.7	852.9	74	52	250	42
3	9:06	5	215	1.1	1.6	854.5	76	52	245	42

(27)

RAMCON emissions test log sheet, cont. DATE 9-31-91 LOCATION Webb...[illegible] TEST NO. 1

(28)

TRAVERSE POINT [redacted]	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP [redacted]	VELOCITY HEAD [redacted] ΔPs (in H2O)	ORFICE DIFF. PRESSURE [redacted] ΔH (in H2O) [redacted]	GAS VOLUME Vm (ft³)	GAS SAMPLE TEMP. (°F) [redacted] in	[redacted] outs	SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
4	9:08	5	215	1.2	1.7	856.1	78	52	268	42
5	9:10	5	215	1.0	1.4	857.5	78	52	250	42
P 1	9:17 / 9:19	3	215	.84	1.2	858.8	62	54	245	42
2	9:21	4	220	.95	1.4	860.4	72	54	270	42
3	9:23	5	220	1.1	1.6	861.9	78	54	250	42
4	9:25	5	220	1.1	1.6	863.4	80	54	220	42
5	9:27	4	220	1.0	1.4	~~863~~ 864.9	80	54	260	42
E 1	9:31 / 9:33	3	215	.70	.99	866.1	70	56	270	42
2	9:35	3	220	.60	.85	867.3	76	56	260	42
3	9:37	4	220	.85	1.2	868.7	78	56	240	40
4	9:39	5	220	1.1	1.6	870.3	80	56	225	42
5	9:41	4	220	1.0	1.4	871.7	80	56	265	42
F 1	9:43 / 9:45	3	215	.65	.92	872.9	74	56	250	42
2	9:47	4	220	.85	1.2	874.2	78	56	240	42
3	9:49	4	220	.95	1.4	875.7	80	56	270	42
4	9:51	4	220	1.0	1.4	877.2	80	56	250	42
5	9:53	4	220	1.1	1.6	878.755	82	56	260	42

RAMCON ENVIRONMENTAL CORPORATION

Plant Walsh & Kelly
Location Portage, In
Operator W. T. Lockett
Date 10-31-91
Run No. 2
Sample Box No. 1
Meter Box No. 0-183
Meter H @ 1.414
C Factor 1.006
Pitot Tube Coefficient Cp .811

Schematic of Stack Cross Section

Ambient Temperature 48
Barometric Pressure 29.62
Assumed Moisture, % 30
Probe Length, m(ft) 4'
Nozzle Identification No. .0003546
Avg. Calibrated Nozzle Dia., (in.) .255/.255/.255
Probe Heater Setting 8
Leak Rate, m³/min.(cfm) .01 @ 6"
Probe Liner Material 316 SS
Static Pressure, mm Hg(in.Hg)
Filter No. TH5555

	IMPINGER VOLUME ml	SILICA GEL WEIGHT g
FINAL	559	492.7
INITIAL	200	476.2
DIFFERENCE	359	16.5

TRAV. PT	SAMPLING TIME (θ)min.	VACUUM in. Hg	STACK TEMP (T_s) °F	VELOCITY HEAD (P_s) in H20	PRESSURE DIFF. ORF. MTR in. H20	GAS SAMPLE VOLUME ft^3	GAS SAMPLE TEMP. AT DRY GAS METER °F Inlet	GAS SAMPLE TEMP. AT DRY GAS METER °F Outlet	FILTER HOLDER TEMP °F	GAS TEMP LVG CONDENSER OR LAST IMPINGER °F
A 1	11:10 / 11:12	2	200	.95	1.1	886.8 / 888.1	62	62	230	48
2	11:14	3	215	.95	1.4	889.6	78	62	250	46
3	11:16	4	220	1.0	1.4	891.0	80	62	240	42
4	11:18	4	220	1.1	1.6	892.6	84	62	240	42
5	11:20	4	220	.95	1.4	894.1	86	62	275	42
B 1	11:23 / 11:25	4	225	.70	.99	895.3	80	62	240	42
2	11:27	4	225	.80	1.1	896.6	82	62	260	42
3	11:29	4	225	.80	1.1	897.9	84	62	270	42
4	11:31	4	220	.90	1.3	899.3	86	62	250	42
5	11:33	4	220	1.1	1.6	901.0	86	62	240	42
C 1	11:34 / 11:36	3	215	.65	.93	902.2	84	62	265	42
2	11:38	3	220	.80	1.1	903.5	86	62	250	42
3	11:40	3	220	.85	1.2	904.8	86	62	230	42

Pol... #RE 06

RAMCON emissions test log sheet, cont. DATE 9-31-91 LOCATION Walbek TEST NO. 2

(30)

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)
4	11:42	4	220	.90	1.3	906.3	88	62	270	42
5	11:44	4	220	.95	1.4	907.7	85	62	270	42
D 1	11:46 / 11:48	3	215	.85	12	909.1	80	62	275	42
2	11:50	4	220	.95	1.4	910.5	86	62	240	42
3	11:52	4	220	1.0	1.4	911.8	88	62	260	42
4	11:54	4	220	1.0	1.4	913.6	88	62	285	42
5	11:56	4	215	1.1	1.6	915.1	88	62	275	42
E 1	11:58 / 12:00	4	215	1.1	1.6	916.6	82	62	275	42
2	12:02	5	215	1.2	1.7	918.3	88	62	250	42
3	12:04	5	220	1.3	1.9	920.2	88	62	215	42
4	12:06	5	220	1.2	1.7	921.6	88	62	260	42
5	12:08	5	220	1.2	1.7	923.2	88	62	270	42
F 1	12:10 / 12:12	4	215	.95	1.4	927.7	80	62	240	42
2	12:14	5	220	1.1	1.6	926.3	86	62	270	42
3	12:16	5	220	1.2	1.9	927.9	88	64	255	42
4	12:18	5	220	1.3	1.9	929.7	88	64	250	42
5	12:20	5	220	1.2	1.7	931.268	90	64	280	42

RAMCON ENVIRONMENTAL CORPORATION

Plant: WALSH & KELLY
Location: PORTAGE, IN
Operator: W. J. LOCKETT
Date: 10-31-91
Run No.: 3
Sample Box No.: 1
Meter Box No.: C-185
Meter H @: ~~[illegible]~~ 1.414
C Factor: 1.006
Pitot Tube Coefficient Cp: .811

Ambient Temperature: 50
Barometric Pressure: 29.55
Assumed Moisture, %: 30
Probe Length, m(ft): 4'
Nozzle Identification No.: .0003546
Avg. Calibrated Nozzle Dia., (in.): .255/.255/.255
Probe Heater Setting: 8
Leak Rate, m³/min. (cfm): .005
Probe Liner Material: S/S SS
Static Pressure, mm Hg (in.Hg):
Filter No.: TH5556

	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL	575	539.2
INITIAL	201	519.?
DIFFERENCE	375	20.2

Schematic of Stack Cross Section

TRAV. PT [redacted]	SAMPLING TIME (θ) min.	VACUUM in. Hg	STACK TEMP (T_s) [redacted]	VELOCITY HEAD (P_s) in H20	PRESSURE DIFF. ORF. MTR in H20	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	13:12 / 13:14	3	210	.96	1.3	931.6 / 933.1	64	64	260	42
2	13:16	4	220	1.1	1.6	934.5	78	64	270	42
3	13:18	4	225	1.2	1.7	936.1	80	64	250	42
4	13:20	4	225	1.2	1.7	937.6	84	64	230	42
5	13:22	4	225	1.3	1.9	939.4	84	62	260	42
B 1	13:24 / 13:26	4	220	1.1	1.6	940.9	80	62	270	42
2	13:28	4	225	1.2	1.7	942.6	82	62	240	42
3	13:30	5	225	1.2	1.7	944.2	84	62	230	42
4	13:32	5	225	1.3	1.9	945.8	86	62	220	42
5	13:34	5	225	1.3	1.9	947.7	86	62	250	42
C 1	13:35 / 13:37	4	220	.80	1.1	949.0	82	62	270	42
2	13:39	4	220	.95	1.4	950.6	84	62	255	42
3	13:41	5	225	1.1	1.6	952.2	86	62	220	42

(31)

Pol... #RE .6

RAMCON emissions test log sheet, cont. DATE 9-31-91 LOCATION Webb Kelly TEST NO. 3

TRAVERSE POINT [redacted]	SAMPLING TIME θ (min)	VACUUM mm Hg (in. Hg)	STACK TEMP [redacted]	VELOCITY HEAD [redacted]	ORFICE DIFF. PRESSURE [redacted]	GAS VOLUME Vm (ft^3)	GAS SAMPLE TEMP. (°F) [redacted]		SAMPLE BOX TEMP. (°F)	IMPINGER TEMP (°F)
4	13:43	5	[redacted]	1.1	1.6	953.8	88	62	255	42
5	13:45	5	225	1.2	1.7	955.4	88	62	230	42
D 1	13:46 / 13:48	3	225	,75	1.1	956.9	80	62	265	42
2	13:50	3	220	,80	1.1	958.2	84	62	255	42
3	13:52	3	220	,80	1.1	959.5	86	62	250	42
4	13:54	3	220	1.1	1.6	961.2	88	62	225	42
5	13:56	3	220	1.1	1.6	962.6	88	62	240	42
E 1	13:59 / 14:01	3	220	,50	,71	963.6	80	62	270	42
2	14:03	3	220	,65	,93	964.9	84	62	265	42
3	14:05	3	225	,70	,99	966.2	86	62	255	42
4	14:07	3	225	,85	1.2	967.5	88	62	255	42
5	14:09	3	225	1.1	1.6	969.1	88	62	260	42
F 1	14:11 / 14:13	3	220	[illegible].6	,85	970.2	82	62	260	42
2	14:13	3	220	,90	1,3	971.4	84	62	275	42
3	14:15	4	225	,95	1.4	973.2	86	62	255	42
4	14:17	5	225	,75	1.1	974.6	88	62	255	42
5	14:19	5	230	,90	1,3	976.021	88	62	275	42

IX. CALIBRATION

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test number ______ Date 11-4-91 Meter box number C-185 Plant ______

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

Orifice manometer setting, (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Average[a] (t_d), °F	Time (θ), min	Vacuum setting, in. Hg	Y_i	Y_i $\frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
.5	~~10~~ 5	8.5 / 13.671	66	90 / 92	66 / 68	79	11.45		.9896	1.399
1	10	14.5 / 24.710	66	92 / 96	68 / 70	81.5	16.22		1.0659	1.397
2	10	253 / 35.505	66	92 / 98	70 / 72	83	11.58		1.0067	1.420
									Y = 1.0007	1.405

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

where

V_w = Gas volume passing through the wet test meter, ft^3.
V_d = Gas volume passing through the dry gas meter, ft^3.
t_w = Temperature of the gas in the wet test meter, °F.
t_{d_i} = Temperature of the inlet gas of the dry gas meter, °F.
t_{d_o} = Temperature of the outlet gas of the dry gas meter, °F.

t_d = Average temperature of the gas in the dry gas meter, obtained by the average of t_{d_i} and t_{d_o}, °F.
ΔH = Pressure differential across orifice, in. H_2O.
Y_i = Ratio of accuracy of wet test meter to dry gas meter for each run.
Y = Average ratio of accuracy of wet test meter to dry gas meter for all three runs; tolerance = pretest Y ±0.05Y.
P_b = Barometric pressure, in. Hg.
θ = Time of calibration run, min.

Form #REC-01

POSTTEST DRY GAS METER CALIBRATION DATA FORM (English units)

Test number ______ Date 10-20-91 Meter box number C-185 Plant ______

Barometric pressure, P_b = 30.11 in. Hg Dry gas meter number 638809 Pretest Y ______

Orifice manometer setting, (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Average[a] (t_d), °F	Time (Θ), min	Vacuum setting, in. Hg	Y_i	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d \left(P_b + \frac{\Delta H}{13.6}\right)(t_w + 460)}$
.5	~~10~~ 5	508.9 / 514.029	68	94 / 100	72 / 74	85	11.408		1.005	1.402
1	10	514.5 / 524.77	68	96 / 112	74 / 74	86.5	16.20		1.000	1.409
2	10	525.6 / 535.774	68	96 / 114	74 / 76	87.5	11.551		1.014	1.431
									Y = 1.006	1.414

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

where

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

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

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

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

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

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

ΔH = Pressure differential across orifice, in. H_2O.

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

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

P_b = Barometric pressure, in. Hg.

Θ = Time of calibration run, min.

Form #RFC-01

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 5-7-89 Thermocouple number inlet/outlet

Ambient temperature 20 °C Barometric pressure 29.88 in. Hg

Calibrator [illegible] 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 10-31-91	40°F	40°F	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 5-7-89 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°F	32	0
B	Boiling water	212	212	0
C	Boiling oil	381	381	0
D	Ambient 10-31-91	40°F	40°F	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 4/1/91 Thermocouple number 41

Ambient temperature 70 °C Barometric pressure 30.15 in. Hg

Calibrator [signature] 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 H_2O	32	32	0
B	Boiling H_2O	212	212	0
C	Oil Boiling	381	381	0
D	10-31-91	40°F	40°F	0

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

[b] Type of calibration system used.

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

RAMCON

Lear Siegler Stack Sampler

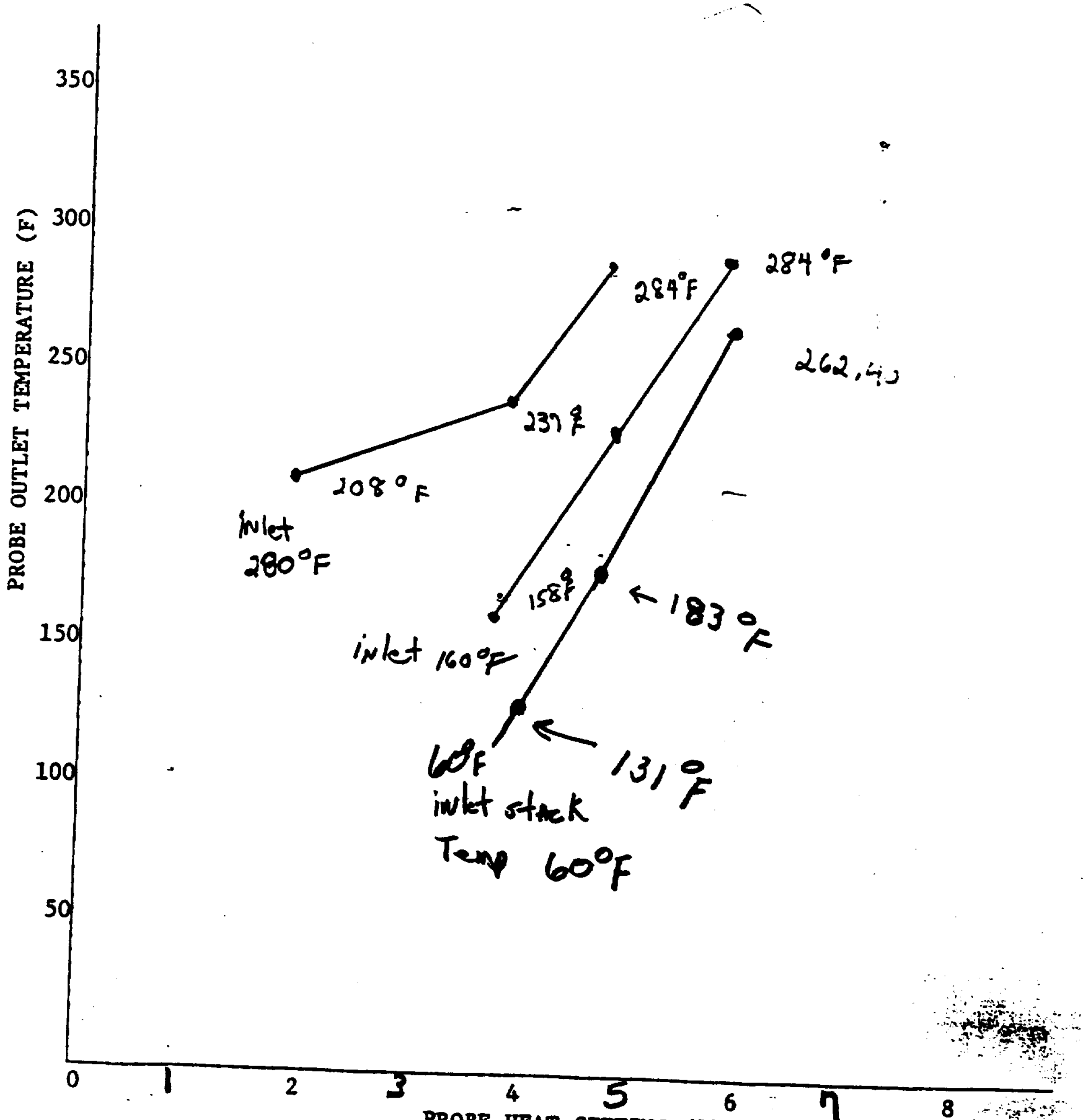
Heating Probe Calibration

Probe No. 41 Probe Length 4'

Date of Calibration 5-8-89 Signature Sam T. Turner

Name of Company to be tested ______

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



Pitot Tube Calibration (S Type)

Pitot Tube Identification No. 41 Date: 4-1-91

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	.85	1.3	.808	.003
2	.52	.79	.811	.000
3	1.2	1.8	.816	.005
		$\bar{C}_p$ (SIDE A)	.811	

"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	.85	1.3	.808	.003
2	.52	.79	.811	0
3	1.2	1.8	.816	.005
		$\bar{C}_p$ (SIDE B)	.811	

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

$|\bar{C}_p\,(\text{SIDE A})-\bar{C}_p\,(\text{SIDE B})|$ ←MUST BE ≤0.01

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

X. RAMCON PERSONNEL

Name: **Mr. Tim Huey**
Title: **Laboratory Technician**

Qualifications:

Mr. Huey is currently serving as Laboratory Technician. He is proficient in conducting many analysis procedures such as front and back-half particulate analysis, titrations, extractions, etc. He received an associate degree in Chemical Engineering from State Technical Institute in Memphis.

Project Duties:

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

Name: Mr. G. Sumner Buck, III
Title: President

Qualifications:

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

Project Duties:

Mr. Buck will be responsible for the overall supervision of the project. He provided supervision for the project preparation, testing schedules for each team on-site, and overall organization between the testing crews and facility.

Name: **Mr. Bill Lockett**
Title: **Team Leader**

Qualifications:

Mr. Lockett has been employed by RAMCON Environmental Corp. for four years. He has completed Team Leader training in isokinetic and proportional test methods. He currently is certified in conducting Method 9 for opacity. He has been involved in conducting tests on process stacks, incinerators, boilers, etc. He had served as a Field Technician for more than two years and is qualified as a Team Leader.

Project Duties:

Mr. Lockett is responsible for conducting isokinetic sampling procedures at the facility(s). He is responsible for preparation, calibration and cleaning of the necessary equipment for this testing. His duties on-site include assembling the sample train, leak checking the system, operation of the train and recording the test data on the field data forms.

XI. VISIBLE EMISSIONS

SOURCE NAME: Walsh and Kelly

ADDRESS:

CITY: **STATE:** Ind. **ZIP:**

PHONE: **SOURCE ID NUMBER:**

PROCESS EQUIPMENT: **OPERATING MODE:** 325 TPH

CONTROL EQUIPMENT: **OPERATING MODE:**

DESCRIBE EMISSION POINT:

HEIGHT ABOVE GROUND LEVEL: 27' **HEIGHT RELATIVE TO OBSERVER:** 24'

DISTANCE FROM OBSERVER: 220' **DIRECTION FROM OBSERVER:** South

DESCRIBE EMISSIONS: Looping Plume

EMISSION COLOR: White/gray **PLUME TYPE:** CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒

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

AT WHAT POINT IN THE PLUME WAS OPACITY DETERMINED: Point of Steam Dissipation

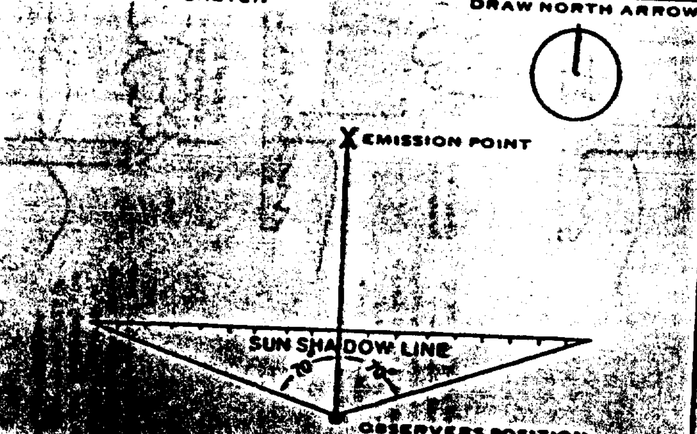
DESCRIBE BACKGROUND: White cloudy sky

BACKGROUND COLOR: White **SKY CONDITIONS:** Over cast

WIND SPEED: 5 mph **WIND DIRECTION:** West

AMBIENT TEMPERATURE: 41°F **RELATIVE HUMIDITY:** 60%

SOURCE LAYOUT SKETCH **DRAW NORTH ARROW**



OBSERVATION DATE: 10-31-91 **START TIME:** 8:31 **STOP TIME:** 9:31

M \ SEC	0	15	30	45
1	0	5	5	0
2	0	5	5	5
3	0	5	5	10
4	0	0	0	0
5	0	0	0	0
6	0	0	0	5
7	0	0	0	0
8	5	0	0	10
9	0	0	0	0
10	0	0	0	0
11	0	5	0	0
12	0	0	0	5
13	0	5	0	0
14	0	5	0	0
15	10	5	0	0
16	0	0	5	5
17	10	5	0	0
18	0	5	0	5
19	5	0	5	5
20	5	10	5	0
21	5	0	0	0
22	5	10	0	0
23	5	0	0	0
24	5	5	10	0
25	0	0	0	0
26	0	10	5	0
27	0	0	0	5
28	0	5	5	10
29	5	5	0	5
30	5	0	0	5

M \ SEC	0	15	30	45
31	0	0	5	0
32	0	5	0	0
33	5	5	10	0
34	5	10	0	0
35	0	5	0	5
36	5	0	0	0
37	0	5	10	5
38	0	0	5	0
39	0	5	0	5
40	0	5	0	5
41	5	5	0	0
42	0	5	0	0
43	5	10	5	0
44	5	5	0	0
45	5	5	0	5
46	10	5	10	5
47	5	5	5	10
48	5	10	5	5
49	5	10	5	5
50	0	5	5	5
51	5	10	5	10
52	5	10	5	10
53	5	0	0	5
54	0	0	5	10
55	5	0	0	0
56	0	5	5	0
57	0	5	0	5
58	5	5	0	5
59	10	5	5	0
60	10	0	0	10

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

RANGE OF OPACITY READINGS: MINIMUM MAXIMUM

OBSERVER'S NAME (PRINT): Jeffrey Lynn Shrader

OBSERVER'S SIGNATURE: [signature] **DATE:** 10-31-91

ORGANIZATION: Ramcon

CERTIFIED BY: State of TN **DATE:** 5-7-91

VERIFIED BY: Carl Koontz **DATE:** 5-7-91

COMMENTS:

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE:

TITLE: **DATE:**

REC#14

SOURCE NAME: Walsh and Kelly

ADDRESS:

CITY:　**STATE:** Ind　**ZIP:**

PHONE:　**SOURCE ID NUMBER:**

PROCESS EQUIPMENT:　**OPERATING MODE:**

CONTROL EQUIPMENT:　**OPERATING MODE:**

DESCRIBE EMISSION POINT:

HEIGHT ABOVE GROUND LEVEL: 27'　**HEIGHT RELATIVE TO OBSERVER:** 24'

DISTANCE FROM OBSERVER: 220'　**DIRECTION FROM OBSERVER:** South

DESCRIBE EMISSIONS: Looping plume

EMISSION COLOR: White/gray　**PLUME TYPE:** CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒

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

AT WHAT POINT IN THE PLUME WAS OPACITY DETERMINED: Point of steam dissipation

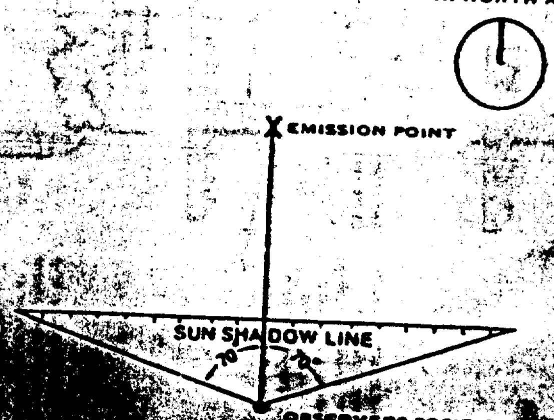
DESCRIBE BACKGROUND: White cloudy sky

BACKGROUND COLOR: White　**SKY CONDITIONS:** overcast

WIND SPEED: 5 mph　**WIND DIRECTION:** West

AMBIENT TEMPERATURE: 49°F　**RELATIVE HUMIDITY:** 52%

SOURCE LAYOUT SKETCH　DRAW NORTH ARROW



OBSERVATION DATE: 10-31-91　**START TIME:** 11:08　**STOP TIME:** 12:08

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

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

RANGE OF OPACITY READINGS: MINIMUM　MAXIMUM

COMMENTS:

OBSERVER'S NAME (PRINT): Jeffrey Lynn Shrader

OBSERVER'S SIGNATURE: Jeffrey Shrader　**DATE:** 10-31-91

ORGANIZATION: Raincon

CERTIFIED BY: State of TN　**DATE:** 5-7-91

VERIFIED BY: Carl Koontz　**DATE:** 5-7-91

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE:

TITLE:　**DATE:**

REC#14

SOURCE NAME: Walsh and Kelly

ADDRESS:

CITY: | STATE: Ind | ZIP:

PHONE: | SOURCE ID NUMBER:

PROCESS EQUIPMENT: | OPERATING MODE:

CONTROL EQUIPMENT: | OPERATING MODE:

DESCRIBE EMISSION POINT:

HEIGHT ABOVE GROUND LEVEL: 27' | HEIGHT RELATIVE TO OBSERVER: 27'

DISTANCE FROM OBSERVER: 220' | DIRECTION FROM OBSERVER: South

DESCRIBE EMISSIONS: Looping Plume

EMISSION COLOR: White/gray | PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☒

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

AT WHAT POINT IN THE PLUME WAS OPACITY DETERMINED: Point of steam dissipation

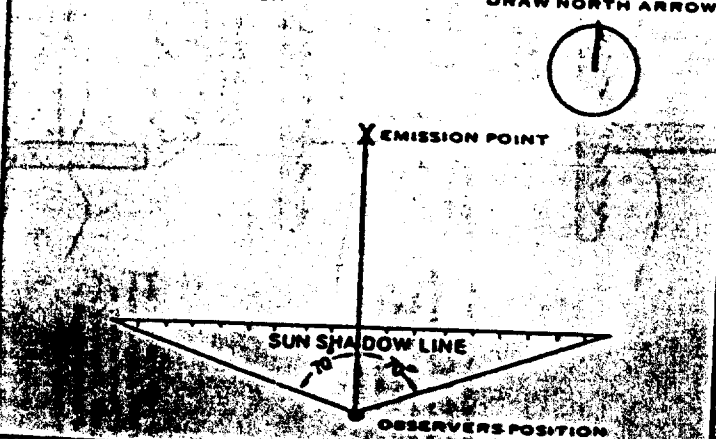
DESCRIBE BACKGROUND: White cloudy sky

BACKGROUND COLOR: White | SKY CONDITIONS: Overcast

WIND SPEED: 7 mph | WIND DIRECTION: South

AMBIENT TEMPERATURE: 41°F | RELATIVE HUMIDITY: 53%

SOURCE LAYOUT SKETCH | DRAW NORTH ARROW



OBSERVATION DATE: 10-31-91 | START TIME: 1:11 | STOP TIME: 2:11

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

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

RANGE OF OPACITY READINGS: MINIMUM | MAXIMUM

OBSERVER'S NAME (PRINT): Jeffrey Lynn Shrader

OBSERVER'S SIGNATURE: [signature] | DATE: 10-31-91

ORGANIZATION: Ramcon

CERTIFIED BY: State of TN | DATE: 6-7-91

VERIFIED BY: Carl Koontz | DATE: 6-7-91

COMMENTS:

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE:

TITLE: | DATE:

REC#14

TENNESSEE DEPARTMENT OF CONSERVATION
Division of Air Pollution Control
701 Broadway, Customs House, Nashville, TN 37247-3530

MAY 28 1991

Jeff Shrader
RAMCON
223 Scott St
Memphis, TN 38112

RE: Certificate Number 1400

Dear Mr. Shrader:

Enclosed you will find your certification card and certificate for successfully completing the May 7-8, 1991 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 November 07, 1991.

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