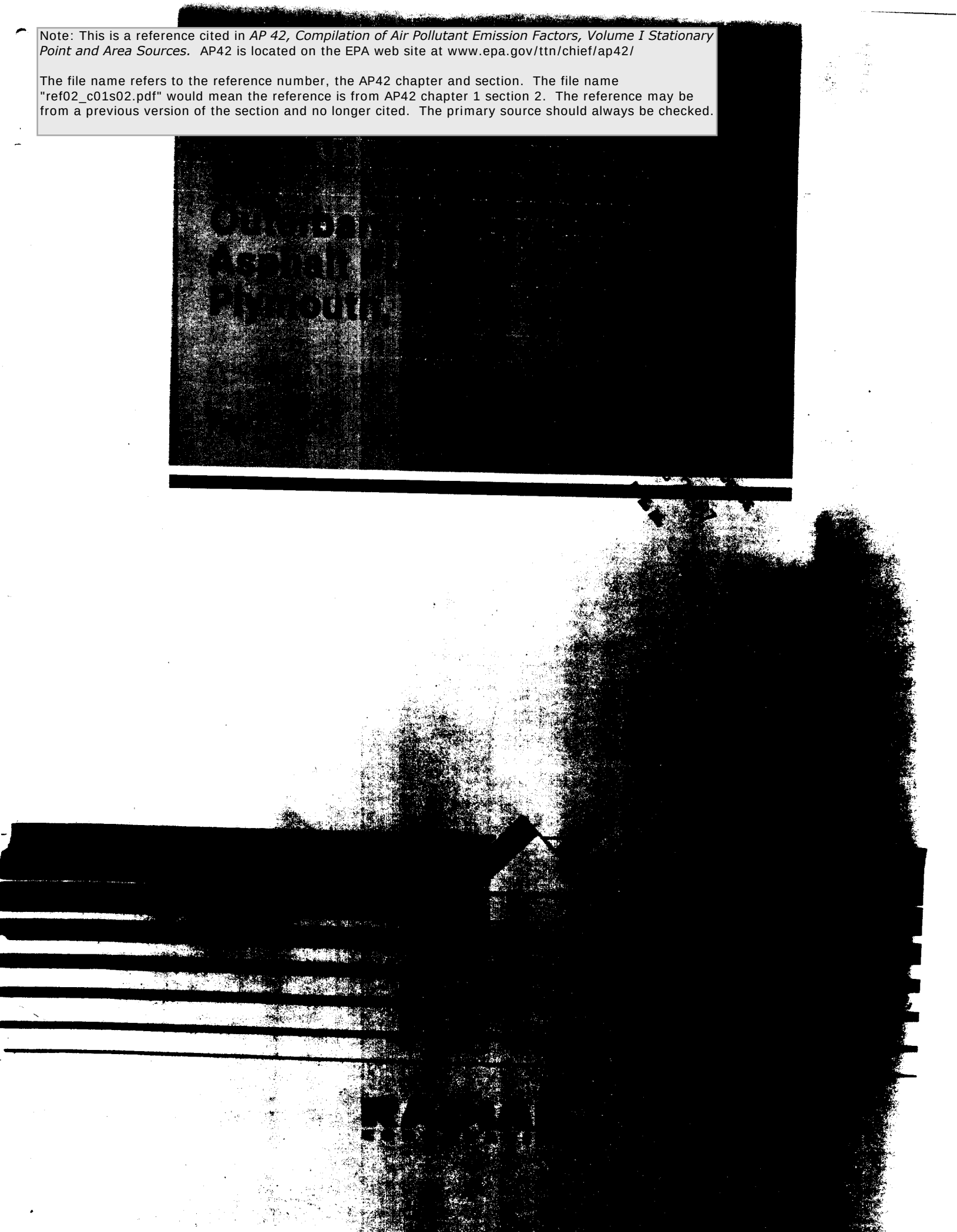

RADIAN
CORPORATION

Radian No. 262-017
DCN No. 87-262-017-01

COMPLIANCE FIELD TEST REPORT
OUTERBANKS CONTRACTING
ASPHALT PLANT

Prepared for:

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April 1987

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RADIAN REPORT CERTIFICATION

This report has been reviewed by the following Radian personnel and is a true representation of the results obtained from the sampling program conducted at Outerbanks Contracting, Plymouth, North Carolina Asphalt Plant on April 1, 1987. The sampling and analytical methods were performed in accordance with the procedures outlined in CFR 40 Part 60, Appendix A, Method 5A. (7-1-86 Edition pg 524-526).

APPROVAL

Project Director _____ Date 4/15/87
Robert F. Jongleux

Program Manager _____ Date 4/15/87
Gary D. Jones

RADIAN
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TABLE OF CONTENTS

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1.0 INTRODUCTION:

On Wednesday April 1, 1987 Radian Corporation conducted a compliance test for Outerbanks Contracting at their Plymouth, North Carolina asphalt plant. Radian Corporation performed three (3) particulate matter tests (EPA M5-A) in conjunction with visual emissions observations (EPA M9) at the baghouse outlet of the asphalt production plant.

The testing was performed by Gary Henry and Lee Garcia of Radian Corporation. Visible emission observations were recorded by Mr. Garcia, who is a certified Visible Emissions Evaluator (Certificate # 217711). Production data was supplied by Mr. Mike Owen of Outerbanks Contracting. The testing was observed by Mr. J.R. (Randy) Tripp of the North Carolina Department of Environmental Management (NCDEM).

Average particulate matter emission rate was 3.32 pounds per hour (lbs/hr) during the period of testing, with a high of 4.97 lbs/hr and a low of 1.66 lbs/hr. The emission rate per unit of production averaged .0166 pounds per ton (lbs/ton) of asphalt, with range of .0085 lbs/ton to .0248 lbs/ton. The average particulate matter concentration during the test was .0177 grains per dry standard cubic feet (gr/dscf). The NCDEM particulate matter limitation for this facility is .04 gr/dscf. Visible emissions were recorded as zero for all six minute intervals during the test period. Table 1 summarizes the testing results. Individual test summaries are to be found in Appendix A for the particulate matter and visual emission tests.

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TABLE 1. TEST SUMMARY

	Baghouse Pressure Drop (in H_2O)	Flue Gas Moisture %	Volumetric Flow Rate (ACFM)	Volumetric Flow Rate DSCFM)	Particulate Matter Emission Rate (lbs/hr)	Particulate Matter Emission Rate (lbs/ton)[a]	Particulate Matter Concentration (gr/dscf)
Test #1	1.5	28.9	44,290	21,705	1.66	.0085	.0089
Test #2	1.1	27.7	45,385	22,651	3.32	.0165	.0171
Test #3	1.0	31.5	45,217	21,373	4.97	.0248	.0271
AVERAGE	1.2	29.4	44,964	21,910	3.32	.0166	.0177

[a] Production rate was maintained at 200 TPH during test period.

2.0 SAMPLING:

Particulate matter samples were taken in accordance with protocols delineated in EPA Method 5A. A complete test protocol is contained in Appendix C. This method is very similar to EPA Method 5, wherein an isokinetic sample is withdrawn from the gas stream through a heated glass probe and filter. Particulate matter was deposited on the filter before the gas stream enters the condenser and metering system. Figure 1 is a schematic of the Method 5 sampling train. The optional glass cyclone was utilized during all test runs due to the expected high flue gas moisture content (>10 %).

Probe and filter temperatures were controlled to the method specification of $108^{o}F$ (± 18) for the duration of testing. A water cooled probe was substituted for the standard Method 5 probe in order to maintain probe temperature at the desired setting. Both probe liner and filter holder were of borosilicate glass construction. Tared Whatman 934 AH filters were used as the particulate collection substrate (<0.05% penetration of 0.3 micron DOP particles). Stainless steel buttonhook nozzels were used at the sample train inlet.

The condenser system consisted of four modified Smith-Greenberg impingers. The first and second impinger contained 100 ml of water. The third impinger was left empty to act as a condensate collector. The fourth impinger contained approximately 200 grams of silica gel to absorb any remaining water from the sample gas stream. The impinger system was kept iced at all times during sampling. The impingers were weighed before and after sampling for gravimetric determination of flue gas moisture fraction (as per EPA M4).

Samples volumes were measured with a Rockwell model 175-S dry gas meter. Current calibration information is located in Appendix D. Effluent gas velocities were measured with a type S pitot tube. Nozzle calibrations and Method 9 certification are also contained in Appendix D. Fixed gas composition was determined by fyrite analysis of integrated bag grab samples collected during each test period.

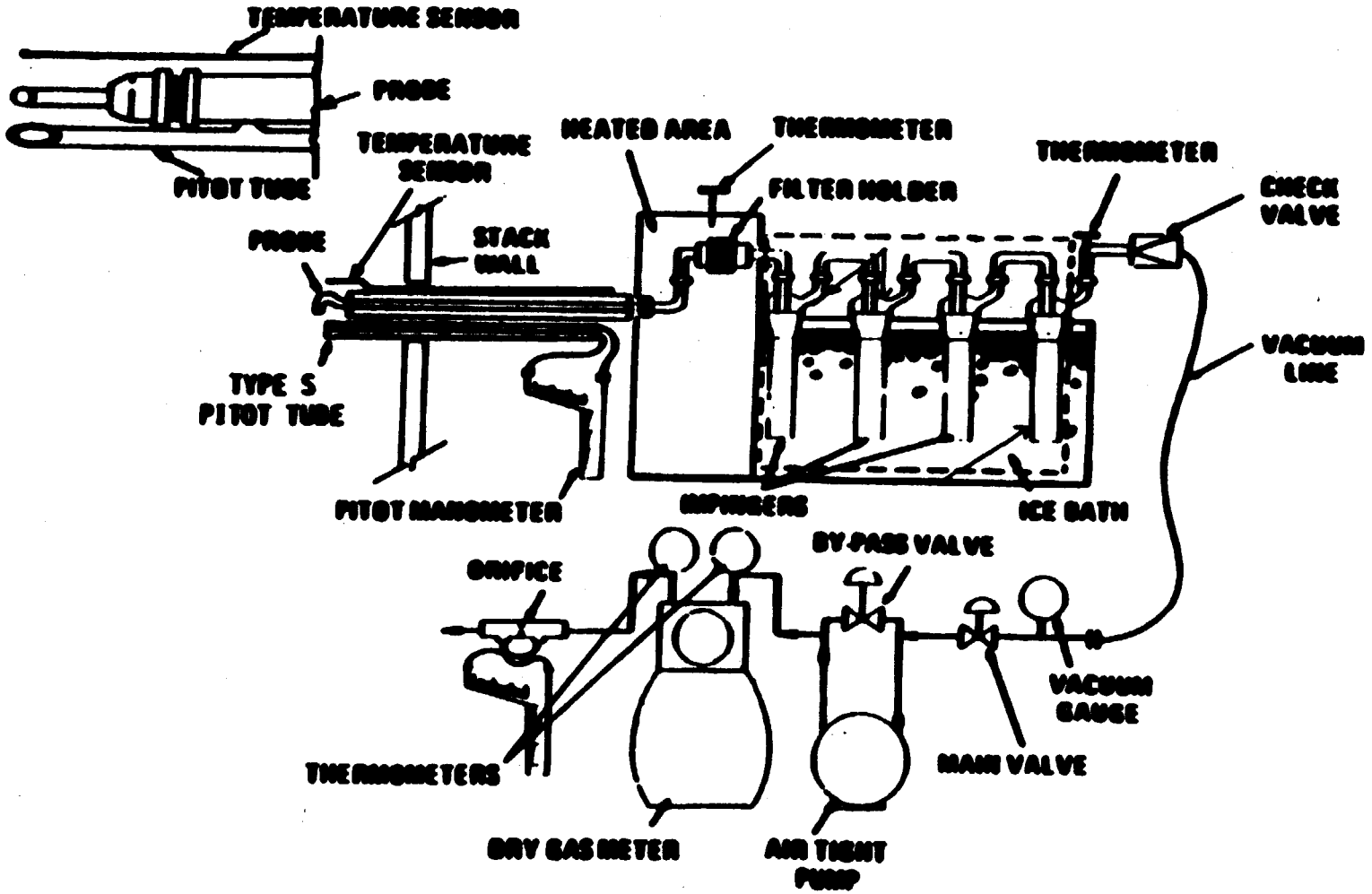

Figure 1 Components of the EPA Method 5 type sampling train.

Outerbanks Contracting produces asphalt concrete by mixing aggregate with liquid asphalt in a heated rotary kiln. The asphalt plant is a mobile unit manufactured by Astec. The feed during the test period was 93.5% light aggregate and 6.5% liquid asphalt. No recycle asphalt was used during the test period. Asphalt production rates were maintained at 200 tons per hour (TPH) during the test period, which is the maximum production rate obtainable at this facility using light aggregate. A total of 1349 tons of asphalt were produced during the 7 hour period of production on April 1 (193 TPH average).

Gas exiting the kiln was collected and passed through a baghouse containing 13 modules, all of which were in operation during testing. A module consists of 4 rows of four bags each. Continuous cleaning of the bags are done with pulse jet venturi system. Each row of bags were cleaned every 14 seconds or once a minute per module during the test period. The average pressure drop measured across the baghouse during testing was 1.2 inches of water (in.H_2O). Figure 2 is a schematic of the flue gas flow.

Particulate sampling was performed in a 44" x 29" duct located on top of the baghouse. Four points in each of six ports were sampled for three minutes each (72 minute test). A schematic of the testing matrix is shown in Figure 3. Upon completion of sampling, the sample train was immediately leak checked to ensure a valid sample was taken. After allowing the train to cool, probes and filter holders were capped and moved to a sample recovery area where the train could be recovered without sample loss or contamination. Probes, filter holder front halves, and nozzles were brushed and rinsed with 1,1,1, trichloroethane into precleaned glass bottles, closed with a teflon lined cap. The filters were put into a clean glass petri dishes. All samples were appropriately labeled and saved for analysis.

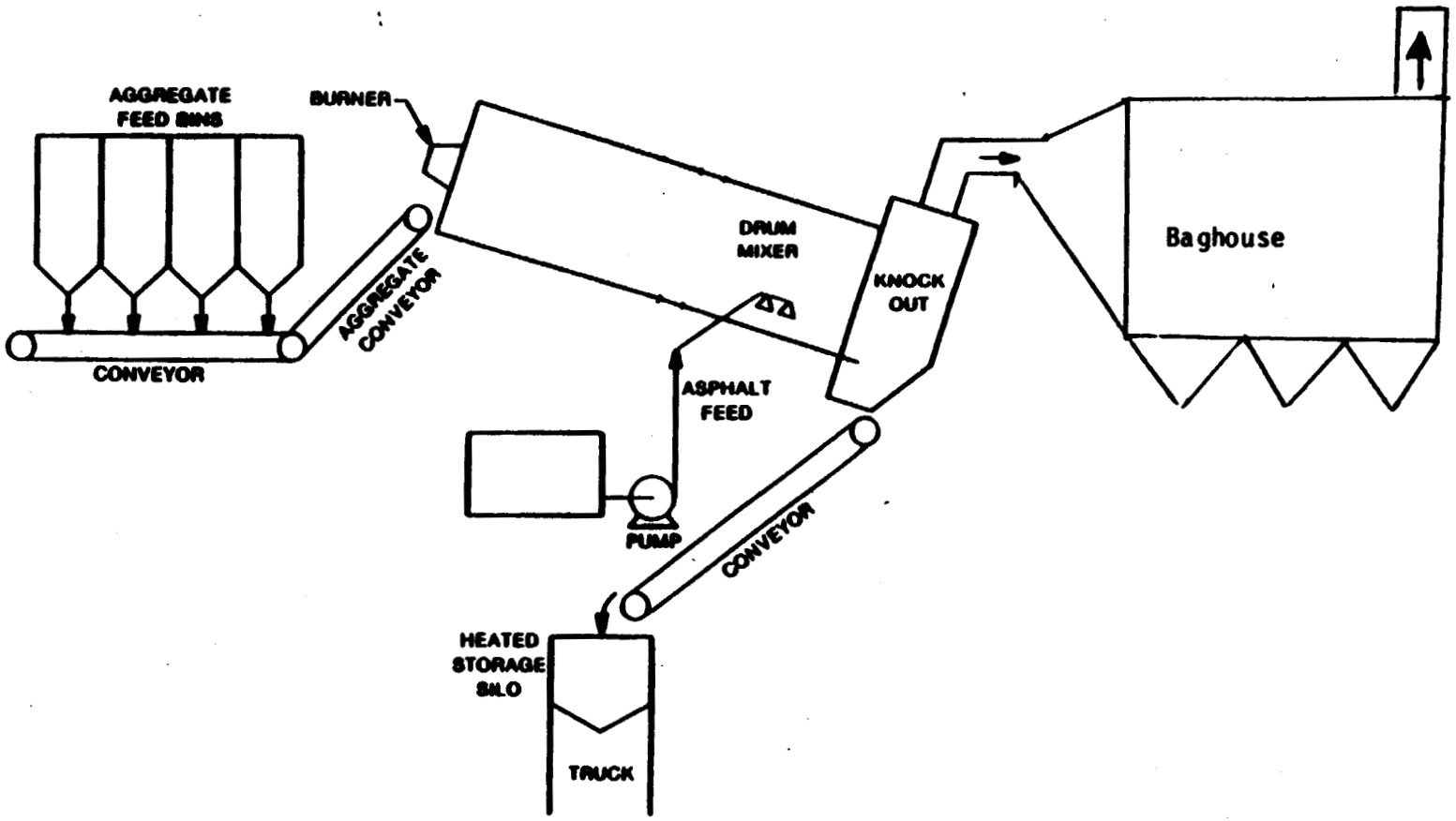

Figure 2 Schematic of asphalt concrete plant process and emission control equipment.

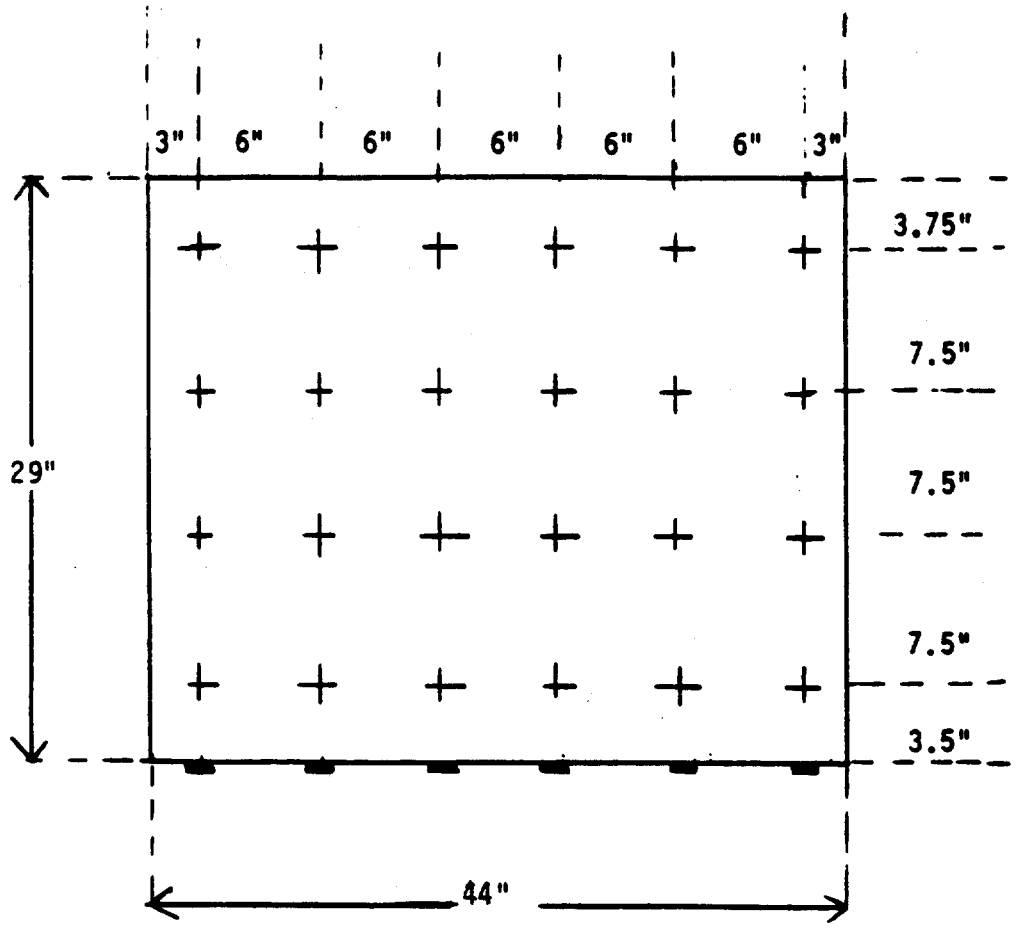

Figure 3. TEST POINT MATRIX

3.0 ANALYSIS:

Upon return to Radian's Research Triangle Park Laboratory, samples were gravimetrically analyzed. Front half rinses were placed in a separatory funnel to extract the water phase from the trichloroethane phase. Each phase was placed in separate tared beakers and allowed to dry at room temperature under a hood. After drying, beakers were dessicated for 72 hours before being weighed to a constant weight. Filters were placed in tared, glass weighing dishes and dessicated for 72 hours prior to weighing. The final dried weights of the trichlorethane and water beakers and the filter were combined for the particulate matter determination. Raw data from the analysis as well as sampling are located in Appendix B.

All gravimetric weights were determine on a calibrated laboratory analytical balance by a qualified technician. Class S weights were measured daily to ensure the accuracy of the analytical balance.

APPENDIX A

COMPUTER SUMMARIES AND EXAMPLE CALCULATIONS

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RADIAN SOURCE TEST
EPA METHOD 2-5
(RAW DATA)

PLANT	:	OUTER BANKS CONTRACTORS
PLANT SITE	:	PLYMOUTH , NC
SAMPLING LOCATION	:	BAGHOUSE OUTLET
TEST #	:	01
DATE	:	040187
TEST PERIOD	:	0855-1027

PARAMETER	VALUE
Sampling time (min.)	72
Barometric Pressure (in.Hg)	29.57
Sampling nozzle diameter (in.)	.1807
Meter Volume (cu.ft.)	33.31101
Meter Pressure (in.H2O)	.7641666
Meter Temperature (F)	66.72916
Stack dimension (sq.in.)	1276
Stack Static Pressure (in.H2O)	-1.36
Stack Moisture Collected (gm)	286.22
Absolute stack pressure(in Hg)	29.47
Average stack temperature (F)	293.875
Percent CO2	4
Percent O2	16
Percent N2	80
Delps Subroutine result	32.1186
DGM Factor	1.0013
Pitot Constant	.84

RADIAN
CORPORATION

RADIAN SOURCE TEST
EPA METHODS 2-5
FINAL RESULTS

PLANT	:	OUTER BANKS CONTRACTORS
PLANT SITE	:	PLYMOUTH , NC
SAMPLING LOCATION	:	BAGHOUSE OUTLET
TEST #	:	01
DATE	:	040187
TEST PERIOD	:	0855-1027

PARAMETER	RESULT
Vm(dscf)	33.10646
Vm(dscm)	.9375749
Vw gas(scf)	13.49527
Vw gas (scm)	.3821862
% moisture	28.95874
Md	.7104126
MWd	29.28
MW	26.01346
Vs(fpm)	4998.197
Vs (mpm)	1523.841
Flow(acfm)	44289.58
Flow(acmm)	1254.281
Flow(dscfm)	21705.28
Flow(dscmm)	614.6934
% I	105.4666
% EA	312.5001

Program Revision:1/15/84

RADIAN
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RADIAN SOURCE TEST
EPA METHOD 5
PARTICULATE LOADING

PLANT : OUTER BANKS CONTRACTORS
PLANT SITE : PLYMOUTH , NC
SAMPLING LOCATION : BAGHOUSE OUTLET
TEST # : 01
DATE : 040187
TEST PERIOD : 0855-1027

PARAMETER	FRONT-HALF	TRAIN TOTAL
Total Grams	0.0191600	0.0191600
Grams/dscf	0.0005787	0.0005787
Grams/acf	0.0002836	0.0002836
Grains/dscf	0.0089299	0.0089299
Grains/acf	0.0043764	0.0043764
Grams/dscm	0.0204353	0.0204353
Grams/acm	0.0100148	0.0100148
Pounds/dscf	0.0000013	0.0000013
Pounds/acf	0.0000006	0.0000006
Pounds/Hr	1.6619120	1.6619120
Kilograms/Hr	0.7538382	0.7538382

* BACK-HALF IMPINGER ANALYSIS WAS NOT REQUIRED

Program Revision: 1/16/84

RADIAN
CORPORATION

RADIAN SOURCE TEST
EPA METHOD 2-5
(RAW DATA)

PLANT	:	OUTER BANKS CONTRACTORS
PLANT SITE	:	PLYMOUTH , NC
SAMPLING LOCATION	:	BAGHOUSE OUTLET
TEST #	:	02
DATE	:	040187
TEST PERIOD	:	1145-1325

PARAMETER	VALUE
Sampling time (min.)	72
Barometric Pressure (in.Hg)	29.57
Sampling nozzle diameter (in.)	.1807
Meter Volume (cu.ft.)	35.379
Meter Pressure (in.H2O)	.8050001
Meter Temperature (F)	69.125
Stack dimension (sq.in.)	1276
Stack Static Pressure (in.H2O)	-1.36
Stack Moisture Collected (gm)	284.82
Absolute stack pressure(in Hg)	29.47
Average stack temperature (F)	293.0833
Percent CO2	5.5
Percent O2	15
Percent N2	79.5
Delps Subroutine result	33.09174
DGM Factor	1.0013
Pitot Constant	.84

RADIAN
CORPORATION

RADIAN SOURCE TEST
EPA METHODS 2-5
FINAL RESULTS

PLANT	:	OUTER BANKS CONTRACTORS
PLANT SITE	:	PLYMOUTH , NC
SAMPLING LOCATION	:	BAGHOUSE OUTLET
TEST #	:	02
DATE	:	040187
TEST PERIOD	:	1145-1325

PARAMETER	RESULT
Vm(dscf)	35.00609
Vm(dscm)	.9913725
Vw gas(scf)	13.42926
Vw gas (scm)	.3803167
% moisture	27.72616
Md	.7227385
MWd	29.48
MW	26.29704
Vs(fpm)	5121.792
Vs (mpm)	1561.522
Flow(acfm)	45384.77
Flow(acmm)	1285.297
Flow(dscfm)	22651.7
Flow(dscmm)	641.496
% I	106.8588
% EA	250.5011

Program Revision: 1/16/84

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RADIAN SOURCE TEST
EPA METHOD 5
PARTICULATE LOADING

PLANT	: OUTER BANKS CONTRACTORS
PLANT SITE	: PLYMOUTH , NC
SAMPLING LOCATION	: BAGHOUSE OUTLET
TEST #	: 02
DATE	: 040187
TEST PERIOD	: 1145-1325

PARAMETER	FRONT-HALF	TRAIN TOTAL
Total Grams	0.0387500	0.0387500
Grams/dscf	0.0011070	0.0011070
Grams/acf	0.0005525	0.0005525
Grains/dscf	0.0170802	0.0170802
Grains/acf	0.0085248	0.0085248
Grams/dscm	0.0390864	0.0390864
Grams/acm	0.0195082	0.0195082
Pounds/dscf	0.0000024	0.0000024
Pounds/acf	0.0000012	0.0000012
Pounds/Hr	3.3173300	3.3173300
Kilograms/Hr	1.5047310	1.5047310

* BACK-HALF IMPINGER ANALYSIS WAS NOT REQUIRED

Program Revision:1/16/84

RADIAN
CORPORATION

RADIAN SOURCE TEST
EPA METHOD 2-5
(RAW DATA)

PLANT	: OUTER BANKS CONTRACTORS
PLANT SITE	: PLYMOUTH , NC
SAMPLING LOCATION	: BAGHOUSE OUTLET
TEST #	: 03
DATE	: 040187
TEST PERIOD	: 1425-1553

PARAMETER	VALUE
Sampling time (min.)	72
Barometric Pressure (in.Hg)	29.57
Sampling nozzle diameter (in.)	.1807
Meter Volume (cu.ft.)	34.133
Meter Pressure (in.H2O)	.7995834
Meter Temperature (F)	73.08335
Stack dimension (sq.in.)	1276
Stack Static Pressure (in.H2O)	-1.36
Stack Moisture Collected (gm)	327.34
Absolute stack pressure(in Hg)	29.47
Average stack temperature (F)	293.375
Percent CO2	5.5
Percent O2	15
Percent N2	79.5
Delps Subroutine result	32.69508
DGM Factor	1.0013
Pitot Constant	.84

RADIAN
CORPORATION

RADIAN SOURCE TEST
EPA METHODS 2-5
FINAL RESULTS

PLANT	:	OUTER BANKS CONTRACTORS
PLANT SITE	:	PLYMOUTH , NC
SAMPLING LOCATION	:	BAGHOUSE OUTLET
TEST #	:	03
DATE	:	040187
TEST PERIOD	:	1425-1553

PARAMETER	RESULT
Vm(dscf)	33.52199
Vm(dscm)	.9493427
Vw gas(scf)	15.43408
Vw gas (scm)	.4370932
% moisture	31.52639
Md	.6847361
MWd	29.48
MW	25.86077
Vs(fpm)	5102.905
Vs (mpm)	1555.764
Flow(acfm)	45217.4
Flow(acmm)	1280.557
Flow(dscfm)	21373.23
Flow(dscmm)	605.2898
% I	108.4494
% EA	250.5011

Program Revision:1/16/84

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RADIAN SOURCE TEST
EPA METHOD 5
PARTICULATE LOADING

PLANT	: OUTER BANKS CONTRACTORS
PLANT SITE	: PLYMOUTH , NC
SAMPLING LOCATION	: BAGHOUSE OUTLET
TEST #	: 03
DATE	: 040187
TEST PERIOD	: 1425-1553

PARAMETER	FRONT-HALF	TRAIN TOTAL
Total Grams	0.0589300	0.0589300
Grams/dscf	0.0017580	0.0017580
Grams/acf	0.0008309	0.0008309
Grains/dscf	0.0271252	0.0271252
Grains/acf	0.0128214	0.0128214
Grams/dscm	0.0620732	0.0620732
Grams/acm	0.0293406	0.0293406
Pounds/dscf	0.0000039	0.0000039
Pounds/acf	0.0000018	0.0000018
Pounds/Hr	4.9709180	4.9709180
Kilograms/Hr	2.2547940	2.2547940

* BACK-HALF IMPINGER ANALYSIS WAS NOT REQUIRED

Program Revision:1/16/84

RADIAN
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RADIAN SOURCE TEST
EPA METHOD 2-5
SAMPLE CALCULATION

PLANT	: OUTER BANKS CONTRACTORS
PLANT SITE	: PLYMOUTH , NC
SAMPLING LOCATION	: BAGHOUSE OUTLET
TEST #	: 01
DATE	: 040187
TEST PERIOD	: 0855-1027

1) Volume of dry gas sampled at standard conditions (68 deg-F ,29.92 in. Hg).

$$Vm(std) = \frac{Y \times Vm \times [T(std) + 460] \times [Pb + (Pm/13.6)]}{P(std) \times (Tm + 460)}$$

$$Vm(std) = \frac{1.0013 \times 33.31101 \times 528 \times [\ 29.57 + (\ .7641666\ /13.6)]}{29.92 \times (\ 66.72916 + 460)}$$

$$Vm(std) = 33.106 dscf$$

2) Volume of water vapor at standard conditions:

$$Vw(gas) = 0.04715\ cf/gm \times W(l)\ gm$$

$$Vw(gas) = 0.04715 \times 286.22 = 13.495\ scf$$

3) Percent Moisture in stack gas :

$$\%M = \frac{100 \times Vw(gas)}{Vm(std) + Vw(gas)}$$

$$\%M = \frac{100 \times 13.495}{33.106 + 13.495} = 28.96\ \%$$

4) Mole fraction of dry stack gas :

$$Md = \frac{100 - \%M}{100} = \frac{100 - 28.96}{100} = .7104126$$

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CORPORATION

SAMPLE CALCULATION
PAGE TWO

5) Average Molecular Weight of DRY stack gas :

$$MWd = (.44 \times \%CO2) + (.32 \times \%O2) + (.28 \times \%N2)$$

$$MWd = (.44 \times 4) + (.32 \times 16) + (.28 \times 80) = 29.28$$

6) Average Molecular Weight of wet stack gas :

$$MW = MWd \times Md + 18(1 - Md)$$

$$MW = 29.28 \times .7104126 + 18(1 - .7104126) = 26.01346$$

7) Stack gas velocity in feet-per-minute (fpm) at stack conditions :

$$Vs = KpxCp \times [SQRT\ (dP)]\{ave\} \times SQRT\ [Ts\ \{avg\}] \times SQRT\ [1/(PsxMW)] \times 60sec/min$$

$$Vs = 85.49 \times .84 \times 60 \times 32.1186 \times SQRT[1/(29.47 \times 26.01346)]$$

$$Vs = 4998.197 \text{ FPM}$$

8) Average stack gas dry volumetric flow rate (DSCFM) :

$$Qsd = \frac{Vs \times As \times Md \times T(std) \times Ps}{144\ cu.in./cu.ft. \times (Ts + 460) \times P(std)}$$

$$Qsd = \frac{4998.197 \times 1276 \times .7104126 \times 528 \times 29.47}{144 \times 753.875 \times 29.92}$$

$$Qsd = 21705.28 \text{ dscfm}$$

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SAMPLE CALCULATION
PAGE THREE

9) Isokinetic sampling rate (%) :

Dimensional Constant C = K4 x 60 x 144 x [1 / (Pi /4)]
K4 = .0945 FOR ENGLISH UNITS

$$I\% = \frac{C \times Vm(std) \times (Ts + 460)}{Vs \times Tt \times Ps \times Md \times (Dn)^2}$$

$$I\% = \frac{1039.574 \times 33.10646 \times 753.875}{4998.197 \times 72 \times 29.47 \times .7104126 \times (.1807)^2}$$

I% = 105.4666

10) Excess air (%) :

$$EA = \frac{100 \times \%O2}{(.264 \times \%N2) - \%O2} = \frac{100 \times 16}{(.264 \times 80) - 16}$$

EA = 312.50

11) Particulate Concentration :

Cs = (grams part.) / Vm(std) = .01916 / 33.10646

Cs = 0.0005787 Grams/DSCF

$$Ca = \frac{T(std) \times Md \times Ps \times Cs}{P(std) \times Ts}$$

$$Ca = \frac{528 \times .7104126 \times 29.47 \times 0.0005787}{29.92 \times 753.875}$$

Ca = 0.0002836 Grams/ACF

LBS/HR = Cs x 0.002205 x Qsd x 60

LBS/HR = 0.0005787x 0.002205 x 21705.3 x 60

LBS/HR = 1.661912

Program Revision: 1/16/84

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APPENDIX B

FIELD AND ANALYTICAL DATA SHEETS

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TEST 1 - PAGE 1

FIELD DATA

PLANT Outer Banks
DATE 9-1-89
SAMPLING LOCATION Bag House Out
SAMPLE TYPE Dan Houlis (MSA)
RUN NUMBER FL-09-01-MSA-01
OPERATOR GDH, FLC
AMBIENT TEMPERATURE 38°
BAROMETRIC PRESSURE 29.57
STATIC PRESSURE, P_g -1.36"
FILTER NUMBER(S) 7 Thru 6240
INIT LK CK .014" @ 15" Hg
FINAL LK CK .010" @ 15" Hg

PROBE LENGTH AND TYPE 6' water cooled
NOZZLE I.D. .1897
ASSUMED MOISTURE, % 27
SAMPLE BOX NUMBER
METER BOX NUMBER 2
METER $\Delta H_@$ 1.83
C FACTOR
PROBE HEATER SETTING 108°F
HEATER BOX SETTING 108°F
REFERENCE Δp
METER Y 1.0013

START BAG 855
END BAG 1026

SCHEMATIC OF TRAVERSE POINT LAYOUT

RECORD ALL DATA EVERY 3 MINUTES

K-FACTOR .5078

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (ft^3)	VELOCITY HEAD (Δp), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET (T_m in), °F	DRY GAS METER TEMPERATURE OUTLET (T_m out), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Different Pressures (BAGHOUSE) (in H2O)
	0	8:53	302.194										
A-1	3	56	304.45	1.0	2.03	2.03	302	51	51	2	126	49	1.5
2	6	901	306.85	.28	1.42	1.42	293	60	54	2	118	43	1.5
3	9	04	307.88	1.0	.51	.51	290	64	56	2	124	45	1.3
STOP 4	12	07	308.949	.78	.39	.39	287	65	58	2	109	46	1.6
					CHANGED PORT								
START	12	910	308.949										
B-1	15	13	310.80	2.6	1.32	1.32	291	64	60	2	116	49	1.9
2	18	16	312.73	3.0	1.52	1.52	269	67	61	2	112	47	1.6
3	21	19	314.53	1.9	.96	.96	290	68	62	2	112	47	1.8
STOP 4	24	22	315.725	1.0	.51	.51	291	69	63	2	126	48	1.8
					CHANGED PORT								
START	24	925	315.725	~~8.1~~	~~1.07~~								
C-1	27	28	317.020	2.1	1.07	1.07	289	66	63	2	125	51	1.4
2	30	31	318.75	2.1	1.07	1.07	291	70	66	10	105	50	1.2
3	33	34	320.27	1.5	.76	.76	290	72	66	8	126	49	1.2
STOP 4	36	37	321.308	.39	.40	.40	294	72	67	6	120	50	1.4
					CHANGED PORT								
START	36	942	321.308										
D-1	39	45	323.37	2.4	1.21	1.21	295	67	66	12	126	52	1.2
2	42	48	324.82	1.2	.61	.61	300	73	69	4	125	50	1.6
3	45	51	325.97	.81	.41	.41	301	75	70	2	122	52	1.4
4	48	54	326.451	.48	.24	.24	299	75	71	2	115	53	1.6

COMM.

EPA (Rev. 7/5)

B-1

RADIAN
CORPORATION

TEST1 PAGE 2

FIELD DATA

PLANT Sea Banks
DATE 4-1-87
SAMPLING LOCATION Baghouse outlet
SAMPLE TYPE Dioxin/Furan (MSA)
RUN NUMBER PL-049-MSA-01
OPERATOR GDH
AMBIENT TEMPERATURE 50
BAROMETRIC PRESSURE 29.57
STATIC PRESSURE (P_g) −1.36" H_2O
FILTER NUMBER(S) 7

PROBE LENGTH AND TYPE 6' water cooled
NOZZLE I.D. .1807
ASSUMED MOISTURE, % 27
SAMPLE BOX NUMBER
METER BOX NUMBER 2
METER $\Delta H_@$ 1.53
C FACTOR
PROBE HEATER SETTING 105°F
HEATER BOX SETTING 105°F
REFERENCE Δp
METER Y 1.0013

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Dilution pressure
	0	958	326.451										
F-1	61	1001	327.86	1.8	.91	.91	296	69	69	11	112	53	1.6
2	54	04	328.95	.79	.40	.40	294	70	69	9	115	51	1.4
3	57	07	329.80	.43	.22	.22	294	71	70	8	114	51	1.2
STOP 4	60	10	330.514	.33	.17	.17	293	70	70	8	114	51	1.2
START	60	1015	330.514										
F-1	62	18	331.47	.55	.28	.28	296	68	68	12	109	54	1.2
2	66	21	332.85	1.5	.76	.76	296	73	71	13	118	53	1.89
3	69	24	334.35	1.5	.76	.76	296	72	71	11	126	50	1.6
STOP 4	72	27	335.445	.80	.41	.41	296	71	70	9	125	50	1.4

COMMENTS:

EPA (Rev) 2/86

B-2

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TEST 2: PAGE 1

FIELD DATA

PLANT Outer Banks
DATE 4-1-97
SAMPLING LOCATION Baghouse outlet
SAMPLE TYPE MSA (Particulate)
RUN NUMBER FL-0401-MSA-02
OPERATOR FLG-GDH
AMBIENT TEMPERATURE 80°F
BAROMETRIC PRESSURE 29.57
STATIC PRESSURE (P_g) -1.36" H_2O
FILTER NUMBER(S) #2

Leak Check .006 @ 15" Hg
Pitot Leak .020 @ 15" Hg

PROBE LENGTH AND TYPE 6' water cooled
NOZZLE I.D. .1807
ASSUMED MOISTURE, % 27%
SAMPLE BOX NUMBER —
METER BOX NUMBER 2
METER $\Delta H_@$ 1.83
C FACTOR —
PROBE HEATER SETTING 105°F
HEATER BOX SETTING 105°F
REFERENCE Δp —
METER Y 1.0013

START BAG AT
1146
1326

1 of 2

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

	TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Differential Pressure (Background) ("H_2O)
		0	1145	341.726										
STOP	F-1	6	1149	342.340	1.2	.61	.61	273	62	63	1	110	52	.80
START														
		3	1153	342.340										
	F-2	5	1156	343.300	1.2	.61	.61	281	62	62	0	105	55	1.0
	2	6	1158	344.320	.69	.35	.35	284	63	60	0	112	49	1.2
	3	9	1201	345.01	.25	.12	.12	288	63	61	0	123	49	1.4
STOP	4	12	04	345.976	.65	.33	.33	289	63	62	0	126	48	.80
						CHANGED PORT								
START		12	1207	345.976										
	E-1	15	10	347.73	2.3	1.17	1.17	299	63	62	0	124	52	A3
	2	18	13	348.960	.70	.45	.45	295	68	65	0	126	49	1.0
	3	21	16	349.850	.43	.22	.22	298	70	66	0	125	49	1.0
STOP	4	24	19	350.678	.43	.22	.22	293	70	66	0	116	50	1.4
START		24	1222	350.678										
	D-1	27	25	352.28	1.8	.91	.91	297	68	67	10	103	54	1.4
	2	30	28	353.81	1.5	.76	.76	297	72	68	12	118	49	1.2
	3	33	31	355.03	1.0	.51	.51	294	74	70	10	116	49	1.4
STOP	4	36	34	355.884	.46	.23	.23	295	70	69	7.5	109	49	1.2
START		36	1237	355.884										
	C-1	39	40	357.750	2.5	1.27	1.27	295	67	67	14	103	51	1.4
	2	42	43	359.62	2.2	1.12	1.12	298	70	68	14	110	48	1.2

COMMENTS:

EPA (Rev. 2/5

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CORPORATION

TEST 2: PAGE 2

FIELD DATA

PLANT Outer Banks Outerbridge
DATE 5-1-87
SAMPLING LOCATION ABB Heat Recovery
SAMPLE TYPE Method 5M Particulate
RUN NUMBER OB-0501-M5A-02
OPERATOR E.A - G.M
AMBIENT TEMPERATURE 50°F
BAROMETRIC PRESSURE 29.5"
STATIC PRESSURE, (P_g) -1.36 in. H_2O
FILTER NUMBER (s) #2

2 of 2

PROBE LENGTH AND TYPE 6' water cooled
NOZZLE I.D. .1507
ASSUMED MOISTURE, % 27%
SAMPLE BOX NUMBER -
METER BOX NUMBER 2
METER $\Delta H_@$ 1.83
C FACTOR -
PROBE HEATER SETTING 106°F
HEATER BOX SETTING 108°F
REFERENCE Δp -
METER Y 1.0013

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

	TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m_{in}}$), °F	DRY GAS METER TEMPERATURE OUTLET ($T_{m_{out}}$), °F	PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Diffusion Pressure (Dan Hauser)
	C-2	42	1245	359.62										
	3	45	46	361.060	1.5	.76	.76	298	71	68	11	117	45	1.2
STOP	4	48	49	362.227	.83	.42	.42	294	70	68	9	118	50	1.2
START		48	1257	362.227										
	B-1	51	1300	364.40	2.8	1.32	1.32	293	67	67	15	116	55	.70
	2	54	03	366.63	3.0	1.52	1.52	291	74	69	15	117	52	.60
	3	57	06	368.04	2.8	1.11	1.11	298	76	70	13.5	118	50	1.1 *
STOP	4	60	09	369.694	1.8	.91	.91	289	78	70	12	117	52	1.0 *
START		60	1313	369.654										
	A-1	63	16	371.32	2.0	1.02	1.02	294	74	71	14	113	58	1.0 ↓
	2	66	19	373.55	3.5	1.77	1.77	292	81	73	16	108	56	.60 ↓
	3	69	22	375.41	2.2	1.11	1.11	294	82	75	12	112	55	1.0 ↓
	4	72	25	377.105	2.2	1.11	1.11	288	83	75	12	116	56	1.1 ↓

COMMENTS: * PRESSURE AND VACUUM switched

EPA Form 7235

B-4

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TEST 3: PAGE 1

FIELD DATA

PLANT Outer Banks
DATE 4-1-87
SAMPLING LOCATION Discharge duct
SAMPLE TYPE MSA Particulate
RUN NUMBER A-0401-SA-03
OPERATOR GAH - FLG
AMBIENT TEMPERATURE 80°F
BAROMETRIC PRESSURE 29.57
STATIC PRESSURE, P_g -1.96" H_2O
FILTER NUMBER(S) #1
Init LR ck .02 @ 15" H_g
Final LR ck .015 @ 15" H_g

1 of 2

SCHEMATIC OF TRAVERSE POINT LAYOUT

READ AND RECORD ALL DATA EVERY 3 MINUTES

PROBE LENGTH AND TYPE 6' water cooled
NOZZLE I.D. .1807
ASSUMED MOISTURE, % 27%
SAMPLE BOX NUMBER
METER BOX NUMBER 2
METER $\Delta H_@$ 1.53
C FACTOR —
PROBE HEATER SETTING 101°F
HEATER BOX SETTING 101°F
REFERENCE Δp —
METER Y 1.0013

START BAG AT 1426
END BAG AT 1651

	TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F	Stratification Pressure (Backflow) in. H_2O
		0	1425	379.127		DESIRED	ACTUAL		INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F				
	A-1	3	28	381.170	3.1	1.58	1.58	293	73	71	0	91	51	1.1
	2	6	31	383.35	3.4	1.72	1.72	295	73	73	1	126	48	.90
	3	9	34	384.86	1.6	.81	.81	292	82	74	1	126	51	.70
STOP	4	12	37	386.153	1.1	.56	.56	290	78	74	1	126	48	.80
						CHANGED PORT								
START		12	1440	386.153										
	B-1	15	43	387.950	2.1	1.07	1.07	292	74	74	1	107	52	1.0
	2	18	46	389.77	2.8	1.42	1.42	297	74	73	2	121	46	1.2
	3	21	49	391.56	2.3	1.17	1.17	295	74	73	8	118	44	1.0
STOP	4	24	52	392.963	1.4	.71	.71	291	72	72	6	116	45	1.0
						CHANGED PORT								
START		24	1500	392.963										
	C-1	27	53	394.70	2.3	1.17	1.17	298	70	68	11	124	51	1.1
	2	30	1506	396.51	2.3	1.17	1.17	294	71	71	11.5	119	45	1.0
	3	33	09	398.23	1.9	.96	.96	292	72	70	11	122	45	1.0
STOP	4	36	07	399.460	1.1	.56	.56	293	73	70	10	122	46	1.2
						CHANGED PORT								
START		36	1510	399.460										
	D-1	39	13	401.06	2.0	1.02	1.02	293	69	69	12	118	52	1.2
	2	42	16	402.55	1.5	.76	.76	294	73	70	11	120	47	1.2
	3	45	19	403.81	1.0	.51	.51	298	75	71	10	122	48	1.2
STOP	4	48	22	404.805	.70	.36	.36	296	74	72	9	121	48	1.0

COMMENTS

EPA (Rev. 2/5

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METHOD 5 DATA

TEST 3 : PAGE 2

PLANT Outer Banks
DATE 4-1-87
SAMPLING LOCATION Baghouse-out
SAMPLE TYPE MSA (Particulate)
RUN NUMBER PL-0401-MSA-03
OPERATOR SDM-FLG
AMBIENT TEMPERATURE 50°F
BAROMETRIC PRESSURE 29.57
STATIC PRESSURE (P_s) −1.36" H_2O
FILTER NUMBER (s) #1
NOMINAL SAMPLE VOLUME 30 ft³
INITIAL LEAK CHECK .02 @ 15" Hg

2 of 2

PROBE LENGTH AND TYPE 6' Glass water cooled
NOZZLE I.D. .1607
ASSUMED MOISTURE, % 27
SAMPLE BOX NUMBER —
METER BOX NUMBER 8
METER Δ H@ 1.83
C FACTOR —
PROBE HEATER SETTING 108°F
HEATER BOX SETTING 108°F
REFERENCE Δp —
DRY/GAS METER FACTOR (Y) 1.0013
FINAL LEAK CHECK .015 @ 15" Hg

SCHEMATIC OF TRAVERSE POINT LAYOUT
READ AND RECORD ALL DATA EVERY 3 MINUTES

	Traverse Point Number	Sampling Time (Min.)	Clock Time (24-hr Clock)	Gas Meter Reading (V_m), ft³	Velocity Head (ΔP_s), in. H_2O	Stack T, in °F	Orifice Pressure Differential (ΔH, in. H_2O) Desired	Actual	Temperature °F °C (Circle One) Probe	Filter Skin	Filter Out	Recirc. Water	Differential Pressure Across Absorbent Trap (" H_2O)	Dry Gas Meter Inlet (T_m in)	Dry Gas Meter Outlet (T_m out)	Impinger Exit	Pump Vacuum in. Hg	
			1526	404.805														
	E-1	51	29	406.48	2.1	294	1.07	1.07			118		0	72	71	56	12	148
	2	54	32	407.68	.80	293	.41	.41			118		.20	75	73	48	10	148
	3	57	35	408.32	.49	292	.22	.22			118		1.0	76	73	50	10	145
STOP	4	60	38	409.071	.38	292	.19	.19			110		1.0	77	74	52	9	
						CHANGED PORT												
START		60	1541	409.071														
	F-1	63	44	410.76	2.3	298	1.17	1.17			105		1.0	74	74	55	13	
	2	66	47	412.08	.68	296	.35	.35			126		1.0	76	75	48	9	
	3	69	50	412.635	.20	292	.10	.10			125		1.0	75	75	50	7	
	4	72	53	413.260	.25	[illegible]	.13	.13			110		.90	73	73	51	9	

COMMENTS

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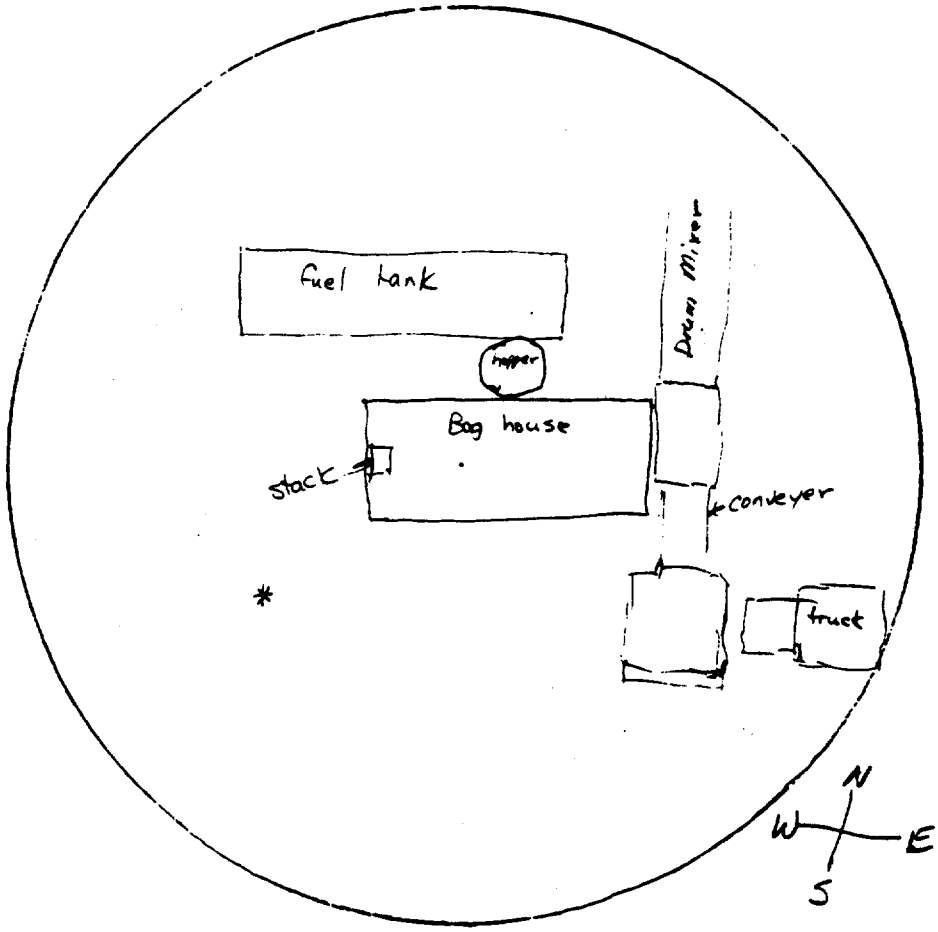
Use circle to draw a diagram showing any pertinant buildings, trees, roads etc. in relationship to your point of observation of the source. Indicate direction of North by an arrow and the letter "N" and the wind direction by a double line arrow(⇒). Also, indicate approximate distances.



* point of V.E. observations

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DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT

Plume Observation Record Form

Date 4/1/87
Observer Lee Garcia
Checked By
Type of installation
Asphalt Plant
Fuel #2 dist Stack Ht. 20'
Observers Distance from Stack
60' Ft.
Wind Speed 4-7 Direct N
Sky Condition clear
Plume Color white
Plume Background blue
Plume Behavior looping
Steam Plume
detached 0 Ft. from stack
attached 100 Ft. dissipated
Start Time 0853
Ending Time 0900
Ending Weather clear
Wind Speed 4-7 Direct N
Sky Condition blue

No. Units in Excess of
standard 0
5 min/hr. allow 20
No. Units of VIO. 0
Remarks:
compliance run #1

Source Outer Banks Construction
Address #4 Plant
Plywood Rd
Plymouth NC

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

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DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT

DIVISION OF ENVIRONMENTAL MANAGEMENT

Plume Observation Record Form

Date 4/1/87
Observer Lee Garcia
Checked By
Type of installation
Asphalt Plant
Fuel ____ Stack Ht. ____
Observers Distance from Stack
60' Ft.
Wind Speed 4-7 Direct N
Sky Condition Clear
Plume Color white
Plume Background blue
Plume Behavior looping
Steam Plume
detached 0 Ft. from stack
attached 100 Ft. dissipated
Start Time 0900
Ending Time 1000
Ending Weather clear
Wind Speed 4-7 Direct N
Sky Condition blue
No. Units in Excess of
standard 0
5 min/hr. allow 20
No. Units of VIO. 0
Remarks:
compliance run #1

Source Outer Banks Contractors
Address #4 Plant
Plywood Rd
Plymouth NC

Min. \ Sec.	0	15	30	45	Min. \ Sec.	0	15	30	45
0	0	0	0	0	30	0	0	0	0
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

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3

DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT

DIVISION OF ENVIRONMENTAL MANAGEMENT

Plume Observation Record Form

Date 4/1/87

Observer Lee Garcia

Checked By

Type of installation Asphalt Plant F

Fuel #2 diesel Stack Ht. 20'

Observers Distance from Stack 60' Ft.

Wind Speed 4-7 Direct N

Sky Condition clear

Plume Color white

Plume Background blue

Plume Behavior looping

Steam Plume

detached 0 Ft. from stack
attached 100 Ft. dissipated

Start Time 1000

Ending Time ~~1028~~ 1030

Ending Weather ~~1028~~ clear

Wind Speed 4-7 Direct N

Sky Condition blue

No. Units in Excess of standard 0

5 min/hr. allow 20

No. Units of VIO. 0

Remarks:

Compliance run #1

Source Outer Banks Contractors

Address #4 Plant
Plywood Rd.
Plymouth NC

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

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DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT

DIVISION OF ENVIRONMENTAL MANAGEMENT

Plume Observation Record Form

Date 4/1/87

Observer Lee Garcia

Checked By

Type of installation Asphalt Plant

Fuel #2diesel Stack Ht. 20'

Observers Distance from Stack 60' Ft.

Wind Speed 4-7 Direct N

Sky Condition clear

Plume Color white

Plume Background blue

Plume Behavior looping

Steam Plume

detached 0 Ft. from stack
attached 100 Ft. dissipated

Start Time 1152

Ending Time 1200

Ending Weather clear

Wind Speed 4-7 Direct N

Sky Condition clear

No. Units in Excess of standard

5 min/hr. allow 20

No. Units of VIO.

Remarks:

compliance run #2

Source Outer Bank Contractors

Address #4 Plant
Plywood Rd.
Plymouth NC

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

RADIAN CORPORATION

DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT

DIVISION OF ENVIRONMENTAL MANAGEMENT

Plume Observation Record Form

Date 4/1/87

Observer Lee Garcia

Checked By [illegible]

Type of installation Asphalt Plant

Fuel #2diesel Stack Ht. 20'

Observers Distance from Stack 120 Ft.

Wind Speed 4-7 Direct N

Sky Condition clear

Plume Color white

Plume Background blue

Plume Behavior looping

Steam Plume

detached 0 Ft. from stack

attached 100 Ft. dissipated

Start Time 1200

Ending Time 1300

Ending Weather clear

Wind Speed 1-3 Direct N

Sky Condition blue

No. Units in Excess of standard 0

5 min/hr. allow 20

No. Units of VIO. 0

Remarks:

Compliance run #2

Source Outer Banks Contractors

Address #4 Plant
Plywood Rd.
Plymouth NC

Sec. / Min.	0	15	30	45	Sec. / Min.	0	15	30	45
0	0	0	0	0	30	0	0	0	0
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

RADIAN
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6

DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT

DIVISION OF ENVIRONMENTAL MANAGEMENT

Plume Observation Record Form

Date 4/1/87
Observer Lee Garcia
Checked By
Type of installation
Asphalt Plant
Fuel ~~#2 diesel~~ Stack Ht. 20'
Observers Distance from Stack
120' Ft.
Wind Speed 1-3 Direct N
Sky Condition clear
Plume Color white
Plume Background blue
Plume Behavior looping
Steam Plume
detached 0 Ft. from stack
attached 100 Ft. dissipated
Start Time 1300
Ending Time 1325
Ending Weather clear
Wind Speed 1-3 Direct N
Sky Condition blue

No. Units in Excess of standard 0
5 min/hr. allow 20
No. Units of VIO. 0

Remarks:
compliance run #2

Source Outer Banks Contractors
Address #4 Plant
Plywood Rd.
Plymouth NC

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

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DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT

Plume Observation Record Form

Date 4/1/87
Observer Lee Garcia
Checked By
Type of installation
Asphalt Plant
Fuel #2 diesel / Stack Ht. 20'
Observers Distance from Stack
125 Ft.
Wind Speed 1-3 Direct N
Sky Condition clear
Plume Color white
Plume Background blue
Plume Behavior looping
Steam Plume
detached 0 Ft. from stack
attached 100 Ft. dissipated
Start Time 1425
Ending Time 1500
Ending Weather clear
Wind Speed 1-3 Direct N
Sky Condition blue
No. Units in Excess of
standard 0
5 min/hr. allow 20
No. Units of VIO. 0
Remarks:
compliance run #3

Source Outer Banks Contractors
Address # 4 Plant
Plywood Rd.
Plymouth NC

Sec. / Min.	0	15	30	45	Sec. / Min.	0	15	30	45
0					30	0	0	0	0
1					31	0	0	0	0
2					32	0	0	0	0
3					33	0	0	0	0
4					34	0	0	0	0
5					35	0	0	0	0
6					36	0	0	0	0
7					37	0	0	0	0
8					38	0	0	0	0
9					39	0	0	0	0
10					40	0	0	0	0
11					41	0	0	0	0
12					42	0	0	0	0
13					43	0	0	0	0
14					44	0	0	0	0
15					45	0	0	0	0
16					46	0	0	0	0
17					47	0	0	0	0
18					48	0	0	0	0
19					49	0	0	0	0
20					50	0	0	0	0
21					51	0	0	0	0
22					52	0	0	0	0
23					53	0	0	0	0
24					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

RADIAN
CORPORATION

DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT

Plume Observation Record Form

Date 4/1/87
Observer Lee Garcia
Checked By
Type of installation
Asphalt Plant
Fuel #2 diesel Stack Ht. 20'
Observers Distance from Stack
125' Ft.
Wind Speed 1-3 Direct N
Sky Condition clear
Plume Color white
Plume Background blue
Plume Behavior looping
Steam Plume
detached 0 Ft. from stack
attached 100 Ft. dissipated
Start Time 1500
Ending Time 1553
Ending Weather clear
Wind Speed 1-3 Direct
Sky Condition blue
No. Units in Excess of
standard 0
5 min/hr. allow 20
No. Units of VIO. 0
Remarks:
Compliance run #3

Source Outer Banks Contractors
Address # 4 Plant
Plywood Rd.
Plymouth NC

Min. \ Sec.	0	15	30	45	Min. \ Sec.	0	15	30	45
0	0	0	0	0	30	0	0	0	0
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			
24	0	0	0	0	54				
25	0	0	0	0	55				
26	0	0	0	0	56				
27	0	0	0	0	57				
28	0	0	0	0	58				
29	0	0	0	0	59				

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SAMPLING TRAIN RECOVERY SHEET

PLANT Outer Banks Contracting
DATE 4/1/87
SAMPLING LOCATION BAGHOUSE OUT
SAMPLE TYPE Particulate
RUN NUMBER PL-0401-M5A-01
SAMPLE BOX NUMBER
CLEAN-UP PERSON GDH
SOLVENT RINSES TCE / DI water

COMMENTS: cyclone used due to expected high moisture content

CONTAINER Beaker # 3 (H2O Extract)
FINAL: 106.5591 grams
TARE: 106.5050 grams
NET 4.81 mg

FRONT HALF - PARTICULATE PHASE

SOLVENT WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER # Beaker #2

GRAVIMETRIC RESULTS
FINAL: 100.79573 grams
TARE: 100.78405 grams
NET: 11.68 mg

	TARE	CONTAINER #	GRAVIMETRIC RESULTS	
FILTER NUMBER #7	.6240 grams	PL-9 #7 Teflon	FINAL: 626.67	mg
			TARE: 624.00	mg
			NET: 2.67	mg

Total TCE Rinse 494.88

FRONT HALF SUBTOTAL 19.16 mg

ORGANIC-VAPOR PHASE

TRANSFER LINE AND CONDENSER (SOLVENT RINSE) — CONTAINER # NA
RESIN TRAP (XAD-2) (NOTE): CAP & LABEL IMMEDIATELY — TRAP # NA.
IMPINGER NO.1 (QA) — CONTAINER #4 NA

NET GAIN 286.2 g
(See Impinger Results Reverse Side)

LABORATORY RESULTS

	mg
	mg
	mg
	mg
	mg
	mg
TOTAL	mg

NOTES/OBSERVATIONS: cyclone used to collect moisture prior to filter (included in net gain)
Water phase evident in probe rinse, therefore extracted per Section 1.3.2 of Method 5A

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SAMPLING TRAIN RECOVERY SHEET

PLANT Outer Banks
DATE 4/15/97
SAMPLING LOCATION BAGHOUSE OUT
SAMPLE TYPE MSA Particulate
RUN NUMBER PL-0401-M5A-02
SAMPLE BOX NUMBER
CLEAN-UP PERSON GDH
SOLVENT RINSES TCE/DI water

COMMENTS: cyclone used due to expected high moisture content

CONDENSER: #5 (Backup)

FINAL: 106.14523 g
TARE: 107.13095 g
NET: 14.28 mg

FRONT HALF - PARTICULATE PHASE

SOLVENT WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER # 4

GRAVIMETRIC RESULTS

FINAL: 104.87549 g
TARE: 104.85285 g
NET: 22.64 mg

FILTER NUMBER FF2 — TARE .6272 gram — CONTAINER # PL-10

FINAL: 629.03 mg
TARE: 627.20 mg
NET: 1.83 mg

TCE RINSE 415.08

FRONT HALF SUBTOTAL 38.75 mg

ORGANIC-VAPOR PHASE

TRANSFER LINE AND CONDENSER (SOLVENT RINSE) — CONTAINER # NA

RESIN TRAP (XAD-2) (NOTE): CAP & LABEL IMMEDIATELY — TRAP # NA

IMPINGER NO.1 (DA) — CONTAINER #4 NA

NET GAIN 284.8 mg
(See Impinger Results Reverse Side)

LABORATORY RESULTS

100 mg
mg
mg
mg
mg
mg
TOTAL mg

NOTES/OBSERVATIONS: Cyclone used to collect moisture prior to filter (included in net gain)
Water phase evident in probe rinse, therefore extracted per Addn 9.3.2 of Method 5A

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SAMPLING TRAIN RECOVERY SHEET

PLANT Outer Banks
DATE 4-1-87
SAMPLING LOCATION Bag House Out
SAMPLE TYPE MSA Particulate
RUN NUMBER PL-0401-MSA-03
SAMPLE BOX NUMBER
CLEAN-UP PERSON BDK
SOLVENT RINSES TCE/DI Water

COMMENTS: cyclone used due to expected high moisture content

CONTAINER # Beaker #8
FINAL 100.14707 g
TARE 100.13460 g
NET 12.47 mg

FRONT HALF - PARTICULATE PHASE

SOLVENT WASH OF NOZZLE, PROBE, CYCLONE (BYPASS), FLASK, FRONT HALF OF FILTER HOLDER — CONTAINER # #6

GRAVIMETRIC RESULTS
FINAL: 98.60639 g
TARE: 98.56037 g
NET: 46.02 mg

FILTER NUMBER Filter #1 TARE .6271g — CONTAINER # PL-11
FINAL: 627.54 mg
TARE: 627.10 mg
NET: 0.44 mg

TCE Total Rinse 460.56

FRONT HALF SUBTOTAL 58.93 mg

ORGANIC-VAPOR PHASE

TRANSFER LINE AND CONDENSER (SOLVENT RINSE) — CONTAINER # NA

RESIN TRAP (XAD-2) (NOTE): CAP & LABEL IMMEDIATELY — TRAP # NA

IMPINGER NO.1 (QA) — CONTAINER #4 NA

NET GAIN 327.3 (See Impinger Results Reverse Side)

LABORATORY RESULTS

mg
mg
mg
mg
mg
mg
TOTAL mg

NOTES/OBSERVATIONS: Cyclone used to collect moisture prior to filter (included in net gain
Water phase evident in probe rinse, therefore extracted per Section 4.3.2 of Method 5A.

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SAMPLING TRAIN IMPINGER RECOVERY SHEET

Sample Code Ident. PL-0401-NSA-01 Date 4-1-87

Impinger No.	Solution Used	Amount of Solution (ml)	Imp. Tip Configuration	Weight (grams)
1*	DI water	103.11	MOD	Final 679.7, Initial 543.6, Wt. gain 136.1
2	DI water	103.31	MOD	Final 642.6, Initial 607.3, Wt. gain 35.3
3	Empty	0	MOD	Final 454.3, Initial 448.6, Wt. gain 5.7
4	Silica Gel	303.85	MOD	Final 779.7, Initial 767.3, Wt. gain 12.4
5				Final, Initial, Wt. gain
6				Final, Initial, Wt. gain
7				Final, Initial, Wt. gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 286.22

cyclone moisture gain 96.72

*QA SAMPLE FOR ORGANIC COLLECTION EFFICIENCY - SAVE IN CONTAINER #4.

Samples for Further Analysis:

Sample No.	Description	Species	Results (Total mg.)

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SAMPLING TRAIN IMPINGER RECOVERY SHEET

Sample Code Ident. R-0401-MSA-02 Date 4/1/87

Impinger No.	Solution Used	Amount of Solution (ml)	Imp. Tip Configuration	Weight (grams)
1[a]	DI Water	100.81	MOD	Final 704.8 / Initial 576.7 / Wt. gain 128.1
2	DI Water	104.31	MOD	Final 600.8 / Initial 590.1 / Wt. gain 10.7
3	Empty	0	MOD	Final 446.2 / Initial 443.9 / Wt. gain 2.3
4	Silica Gel	256.1	MOD	Final 752.0 / Initial 740.8 / Wt. gain 11.2
5				Final / Initial / Wt. gain
6				Final / Initial / Wt. gain
7				Final / Initial / Wt. gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 284.82

CYCLONE MOISTURE GAIN 131.92

[a]QA SAMPLE FOR ORGANIC COLLECTION EFFICIENCY - SAVE IN CONTAINER #4.

Samples for Further Analysis:

Sample No.	Description	Species	Results (Total mg.)

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SAMPLING TRAIN IMPINGER RECOVERY SHEET

Sample Code Ident. PL-0401-M5A-03 Date 4-1-87

Impinger No.	Solution Used	Amount of Solution (ml)	Imp. Tip Configuration	Weight (grams)
1*	DI water	486.35	MOD	Final 725.8 Initial 564.9 Wt. gain 160.9
2	DI water	103.22	MOD	Final 596.8 Initial 564.9 Wt. gain 31.9
3	Empty	0	MOD	Final 450.1 Initial 446.4 Wt. gain 3.7
4	Silica Gel	254.7	MOD	Final 796.0 Initial 788.3 Wt. gain 7.7
5				Final Initial Wt. gain
6				Final Initial Wt. gain
7				Final Initial Wt. gain

TOTAL WEIGHT GAIN OF IMPINGERS (grams) 327.34 OK pr

Cyclone moisture gain 143.14

*QA SAMPLE FOR ORGANIC COLLECTION EFFICIENCY - SAVE IN CONTAINER #4.

Samples for Further Analysis:

Sample No.	Description	Species	Results (Total mg.)

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METHOD 5 ANALYSIS DATA SHEET

Client Outerbanks Contracting
Plant Asphalt
Sample Type M5-A

Run # ALL
Date 4/10/87
Technician PEL/RAT
Sheet 1 of 1

Run #	Sample ID#	Sample Vol. ml	Blank Corr. ml	Tare Weight (g)	Final Weight (g)	Sample Weight (mg)	Comments
Beaker #1	TCE BLANK	200	—	107.1535 107.1533 Avg.	107.15257 107.15234 Avg.	-.95	USE BLANK CORRECTION OF 0.
#2	01-TCE	495	0	100.7841 100.7840 Avg. 100.78405	100.79573 100.79574 Avg. 100.79573	11.68	
#3	01-H_2O Extract	1		106.1505 106.1505 Avg. 106.15050	106.15551 106.15511 Avg. 106.15531	4.81	
#4	02-TCE	415	0	104.8527 104.8530 Avg. 104.8528	104.87560 104.87539 Avg. 104.87549	22.64	
#5	02-H_2O Extract			106.1310 106.1309 Avg. 106.13095	106.14593 106.14503 Avg. 106.14523	14.28	
# 6	03-TCE	461	0	98.56035 98.56039 Avg. 98.56037	98.60558 98.60620 Avg. 98.60639	46.02	
# 8	03-H_2O Extract			100.13458 100.13462 Avg. 100.13460	100.14707 100.14707 Avg. 100.14707	12.47	
Pre Test Blank		200	—	108.49299 108.49303 Avg 108.49301	108.49258 108.49300 Avg 108.49299	Avg: 2 -0.00002	

Method 5 analysis data sheet.

APPENDIX C

METHOD 5A PROTOCOL

Gas Volume Meters as Calibration Standards. Source Evaluation Society Newsletter. 3(1):17-30. February 1978.

METHOD 5A—DETERMINATION OF PARTICULATE EMISSIONS FROM THE ASPHALT PROCESSING AND ASPHALT ROOFING INDUSTRY

1. *Applicability and Principle*

1.1 Applicability. This method applies to the determination of particulate emissions from asphalt roofing industry process saturators, blowing stills, and other sources as specified in the regulations.

1.2 Principle. Particulate matter is withdrawn isokinetically from the source and collected on a glass filter fiber maintained at a temperature of 42°±10°C (108°±18°F). The particulate mass, which includes any material that condenses at or above the filtration temperature, is determined gravimetrically after removal of uncombined water.

2. *Apparatus*

2.1 Sampling Train. The sampling train configuration is the same as shown in Figure 5-1 of Method 5. The sampling train consists of the following components:

2.1.1 Probe Nozzle, Pitot Tube, Differential Pressure Gauge, Filter Holder, Condenser, Metering System, Barometer, and Gas Density Determination Equipment. Same as Method 5, Sections 2.1.1, 2.1.3 to 2.1.5, and 2.1.7 to 2.1.10, respectively.

2.1.2 Probe Liner. Same as in Method 5, Section 2.1.2, with the note that at high stack gas temperatures (greater than 250°C (480°F)), water-cooled probes may be required to control the probe exit temperature to 42°±10°C (108±18°F).

2.1.3 Precollector Cyclone. Borosilicate glass following the construction details shown in Air Pollution Technical Document-0581, "Construction Details of Isokinetic Source-Sampling Equipment".

NOTE: The tester shall use the cyclone when the stack gas moisture is greater than 10 percent. The tester shall not use the precollector cyclone under other, less severe conditions.

2.1.4 Filter Heating System. Any heating (or cooling) system capable of maintaining a sample gas temperature at the exit end of the filter holder during sampling at 42°±10°C (108°±18°F). Install a temperature gauge capable of measuring temperature to within 3°C (5.4°F) at the exit end of the filter holder so that the sample gas temperature can be regulated and monitored during sampling. The tester may use systems other than the one shown in APTD-0581.

2.2 Sample Recovery. The equipment required for sample recovery is as follows:

2.2.1 Probe-Liner and Probe-Nozzle Brushes, Graduated Cylinder and/or Balance, Plastic Storage Containers, and Funnel and Rubber Policeman. Same as Method 5, Sections 2.2.1, 2.2.5, 2.2.6, and 2.2.7, respectively.

2.2.2 Wash Bottles, Glass.

2.2.3 Sample Storage Containers. Chemically resistant, borosilicate glass bottles, with rubber-backed Teflon screw cap liners or caps that are constructed so as to be leak-free and resistant to chemical attack by 1,1,1-trichloroethane (TCE). 500-ml or 1000-ml. (Narrow mouth glass bottles have been found to be less prone to leakage.)

2.2.4 Petri Dishes, Glass, unless otherwise specified by the Administrator.

2.2.5 Funnel, Glass.

2.3 Analysis. For analysis, the following equipment is needed:

2.3.1 Glass Weighing Dishes, Desiccator, Analytical Balance, Balance, Hygrometer, and Temperature Gauge. Same as Method 5, Sections 2.3.1 to 2.3.4, 2.3.6, and 2.3.7, respectively.

2.3.2 Beakers, Glass, 250-ml and 500-ml.

2.3.3 Separatory Funnel, 100-ml or greater.

3. *Reagents*

3.1 Sampling. The reagents used in sampling are as follows:

3.1.1 Filters, Silica Gel, and Crushed Ice. Same as Method 5, Sections 3.1.1, 3.1.2, and 3.1.4, respectively.

3.1.2 Stopcock Grease. TCE-insoluble, heat-stable grease (if needed). This is not necessary if screw-on connectors with Teflon sleeves, or similar, are used.

3.2 Sample Recovery. Reagent grade 1,1,1-trichloroethane (TCE), ≤0.001 percent residue and stored in glass bottles, is required. Run TCE blanks prior to field use and use only TCE with low blank values (≤0.001 percent). The tester shall in no case subtract a blank value of greater than 0.001 percent of the weight of TCE used from the sample weight.

3.3 Analysis. Two reagents are required for the analysis:

3.3.1 TCE. Same as 3.2.

3.3.2 Desiccant. Same as Method 5, Section 3.3.2.

4. *Procedure*

4.1 Sampling Train Operation. The complexity of this method is such that in order to obtain reliable results, testers should be trained and experienced with Method 5 test procedures.

4.1.1 Pretest Preparation. Unless otherwise specified, maintain and calibrate all components according to the procedure described in Air Pollution Technical Document-0576, "Maintenance, Calibration, and Operation of Isokinetic Source-Sampling Equipment".

Prepare probe liners and sampling nozzles as needed for use. Thoroughly clean each component with soap and water followed by a minimum of three TCE rinses. Use the probe and nozzle brushes during at least one of the TCE rinses (refer to Section 4.2 for rinsing techniques). Cap or seal the open ends of the probe liners and nozzles to prevent contamination during shipping.

Prepare silica gel portions and glass filters as specified in Method 5, Section 4.1.1.

4.1.2 Preliminary Determinations. Select the sampling site, probe nozzle, and probe length as specified in Method 5, Section 4.1.2.

Select a total sampling time greater than or equal to the minimum total sampling time specified in the test procedures section of the applicable regulation. Follow the guidelines outlined in Method 5, Section 4.1.2, for sampling time per point and total sample volume collected.

4.1.3 Preparation of Collection Train. Prepare the collection train as specified in Method 5, Section 4.1.3, with the addition of the following:

Set up the sampling train as shown in Figure 5-1 of Method 5 with the addition of the precollector cyclone, if used, between the probe and filter holder. The temperature of the precollector cyclone, if used, should be about the same as for the filter, i.e., 42°±10°C (108°±18°F). Use no stopcock grease on ground glass joints unless the grease is insoluble in TCE.

4.1.4 Leak Check Procedures. Follow the procedures given in Method 5, Sections 4.1.4.1 (Pretest Leak Check), 4.1.4.2 (Leak Check During Sample Run), and 4.1.4.3 (Post-Test Leak Check).

4.1.5 Particulate Train Operation. Operate the sampling train as described in Method 5, Section 4.1.5, except maintain the gas temperature exiting the filter at 42°±10°C (108°±18°F).

4.1.6 Calculation of Percent Isokinetic. Same as in Method 5, Section 4.1.6.

4.2 Sample Recovery. Using the procedures and techniques described in Method 5, Section 4.2, quantitatively recover any particulate matter into the following containers (additions and deviations to the stated procedures are as noted):

4.2.1 Container No. 1 (Filter). Same instructions as Method 5, Section 4.2, "Container No. 1." If it is necessary to fold the filter, do so such that the film of oil is inside the fold.

4.2.2 Container No. 2 (Probe to Filter Holder). Taking care to see that material on the outside of the probe or other exterior surfaces does not get into the sample, quantitatively recover particulate matter or any condensate from the probe nozzle, probe fitting, probe liner, precollector cyclone and collector flask (if used), and front half of the filter holder by washing these components with TCE and placing the wash in a glass container. Carefully measure the total amount of TCE used in the rinses. Perform the TCE rinses as described in Method 5, Section 4.2, "Container No. 2," using TCE instead of acetone.

Brush and rinse the inside of the cyclone, cyclone collection flask, and the front half of the filter holder. Brush and rinse each surface three times or more, if necessary, to remove visible particulate.

4.2.3 Container No. 3 (Silica Gel). Same procedure as in Method 5, Section 4.2, "Container No. 3."

4.2.4 Impinger Water. Treat the impingers as follows: Make a notation of any color or film in the liquid catch. Follow the same procedure as in Method 5, Section 4.2, "Impinger Water."

4.2.5 Blank. Save a portion of the TCE used for cleanup as a blank. Take 200 ml of this TCE directly from the wash bottle being used and place it in a glass sample container labeled "TCE blank."

4.3 Analysis. Record the data required on a sheet such as the one shown in Figure 5A-1. Handle each sample container as follows:

4.3.1 Container No. 1 (Filter). Transfer the filter from the sample container to a tared glass weighing dish and desiccate for 24 hours in a desiccator containing anhydrous calcium sulfate. Rinse Container No. 1 with a measured amount of TCE and analyze this rinse with the contents of Container No. 2. Weigh the filter to a constant weight. For the purpose of Section 4.3, the term "constant weight" means a difference of no more than 10 percent or 2 mg (whichever is greater) between two consecutive weighings made 24 hours apart. Report the "final weight" to the nearest 0.1 mg as the average of these two values.

4.3.2 Container No. 2 (Probe to Filter Holder). Before adding the rinse from Container No. 1 to Container No. 2, note the level of liquid in the container and confirm on the analysis sheet whether or not leakage occurred during transport. If noticeable leakage occurred, either void the sample or take steps, subject to the approval of the Administrator, to correct the final results.

Measure the liquid in this container either volumetrically to ±1 ml or gravimetrically to ±0.5 g. Check to see if there is any appreciable quantity of condensed water present in the TCE rinse (look for a boundary layer or phase separation). If the volume of condensed water appears larger than 5 ml, separate the oil-TCE fraction from the water fraction using a separatory funnel. Measure the volume of the water phase to the nearest ml; adjust the stack gas moisture content, if necessary (see Sections 6.4 and 6.5). Next, extract the water phase with several 25-ml portions of TCE until, by visual observation, the TCE does not remove any addi-

tional organic material. Evaporate the remaining water fraction to dryness at 93°C (200°F), desiccate for 24 hours, and weigh to the nearest 0.1 mg.

Treat the total TCE fraction (including TCE from the filter container rinse and water phase extractions) as follows: Transfer the TCE and oil to a tared beaker and evaporate at ambient temperature and pressure. The evaporation of TCE from the solution may take several days. Do not desiccate the sample until the solution reaches an apparent constant volume or until the odor of TCE is not detected. When it appears that the TCE has evaporated, desiccate the sample and weigh it at 24-hour intervals to obtain a "constant weight" (as defined for Container No. 1 above). The "total weight" for Container No. 2 is the sum of the evaporated particulate weight of the TCE-oil and water phase fractions. Report the results to the nearest 0.1 mg.

4.3.3 Container No. 3 (Silica Gel). This step may be conducted in the field. Weigh the spent silica gel (or silica gel plus impinger) to the nearest 0.5 g using a balance.

4.3.4 "TCE Blank" Container. Measure TCE in this container either volumetrically or gravimetrically. Transfer the TCE to a tared 250-ml beaker and evaporate to dryness at ambient temperature and pressure. Desiccate for 24 hours and weigh to a constant weight. Report the results to the nearest 0.1 mg.

NOTE: In order to facilitate the evaporation of TCE liquid samples, these samples may be dried in a controlled temperature oven at temperatures up to 38°C (100°F) until the liquid is evaporated.

5. *Calibration*

Calibrate the sampling train components according to the indicated sections of Method 5: Probe Nozzle (5.1), Pitot Tube Assembly (5.2), Metering System (5.3), Probe Heater (5.4), Temperature Gauges (5.5), Leak Check of Metering System (5.6), and Barometer (5.7).

6. *Calculations*

6.1 Nomenclature. Same as in Method 5, Section 6.1, with the following additions:

C_t = TCE blank residue concentration, mg/g.
M_t = Mass of residue of TCE after evaporation, mg.
V_w = Volume of water collected in precollector, ml.
V_t = Volume of TCE blank, ml.
V_{ts} = Volume of TCE used in wash, ml.
W_t = Weight of residue in TCE wash, mg.
P_t = Density of TCE, mg/ml (see label on bottle).

6.2 Dry Gas Meter Temperature and Orifice Pressure Drop. Using the data obtained in this test, calculate the average dry gas meter temperature and average orifice pressure drop (see Figure 5-2 of Method 5).

6.3 Dry Gas Volume. Using the data from this test, calculate $V_{m(std)}$ by using Equation 5-1 of Method 5. If necessary, adjust the volume for leakages.

6.4 Volume of Water Vapor.

$$V_{w(std)} = K_1(V_{lc} + V_w)$$

Eq. 5A-1

Where:

$K_1 = 0.00133$ m³/ml for metric units.
$= 0.04707$ ft³/ml for English units.

$$B_{ws} = V_{w(std)}/V_{m(std)} + V_{w(std)}$$

Eq. 5A-2

NOTE: In saturated or water droplet-laden gas streams, two calculations of the moisture content of the stack gas shall be made, one from the impinger and precollector analysis (Equations 5A-1 and 5A-2) and a second from the assumption of saturated conditions. The lower of the two values of moisture content shall be considered correct. The procedure for determining the moisture content based upon assumption of saturated conditions is given in the note of Section 1.2 of Method 4. For the purpose of this method, the average stack gas temperature from Figure 2 may be used to make this determination, provided that the accuracy of the in-stack temperature sensor is within ±1°C (2°F).

6.6 TCE Blank Concentration.

$$C_t = M_t/V_tP_t$$

Eq. 5A-3

6.7 TCE Wash Blank.

$$W_t = (C_t \times V_{ts} \times P_t)$$

Eq. 5A-4

6.8 Total Particulate Weight. Determine the total particulate catch from the sum of the weights obtained from Containers 1, 2, and 3, less the TCE blank.

6.9 Particulate Concentration.

$$C_s = K_2M_n/V_{m(std)}$$

Eq. 5A-5

Where:

$K_2 = 0.001$ g/mg.

6.10 Isokinetic Variation and Acceptable Results. Method 5, Sections 6.11 and 6.12, respectively.

7. *Bibliography*

The bibliography for Reference Method 5A is the same as for Method 5, Section 7.

METHOD 5D—DETERMINATION OF PARTICULATE MATTER EMISSIONS FROM POSITIVE PRESSURE FABRIC FILTERS

1. *Applicability and Principle*

1.1 Applicability. This method applies to the determination of particulate matter

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CORPORATION

APPENDIX D

CALIBRATIONS AND CERTIFICATION

RADIAN CORPORATION

Outer Banks Contractors - Post Cal.

DRY GAS METER CALIBRATION DATA

(English Units) Pretest Post Test ✓

Calibration Meter # 683014 Y = .9987

Barometric Pressure, P_b = 29.46

Dry Gas Meter # 2

Date 4/3/82

Meter Box # 2

Vacuum = 10"

Orifice Manometer Setting ΔH in. H_2O	Manometer Pressure Cal. Meter ΔHw	Gas Volume Calibration Meter V_w ft³	Gas Volume Dry Gas Meter V_d ft³	Temperature	Calibration Meter In	Calibration Meter Out	Dry Gas Meter In	Dry Gas Meter Out	Time θ Min. .00	Y	$\Delta H@$
.80	.03	final 68.647	final 29.740	initial	71	72	initial	78	72			
		initial 61.681	initial 22.642	mid.			mid.					
		total 6.966	total 7.098	final	71	71	final	85	76		.9892	
				ave.	71.8		ave.	77.8				
.80	.03	final 77.808	final 39.101	initial	71	71	initial	84	76			
		initial 68.647	initial 29.740	mid.			mid.					
		total 9.161	total 9.361	final	72	70	final	88	80		.9956	
				ave.	71		ave.	82				
.80	.03	final 84.981	final 46.464	initial	72	70	initial	87	80			
		initial 77.808	initial 39.101	mid.			mid.					
		total 7.173	total 2.363	final	72	70	final	90	82		.9965	
				ave.	71		ave.	84.8				
		final	final	initial			initial					
		initial	initial	mid.			mid.					
		total	total	final			final					

$$\frac{V_w}{V_d}\left(P_b - \frac{\Delta H}{13.6}\right)\frac{(t_d + 460)}{(t_w + 460)}$$

$$\Delta H@ = \frac{0.0317\ \Delta H}{P_b\ \theta\ (t_d + 460)}\left[\frac{(t_w + 460)\ \theta}{V_w}\right]^2$$

ave .9938

ΔH		
.8	$\frac{6.966 \times 29.46 \times 537.8 \times .9987}{7.098 \times 29.52 \times 531.8} = .9892$	
.8	$\frac{9.161 \times 29.46 \times 542 \times .9987}{9.361 \times 29.52 \times 531} = .9956$	
.8	$\frac{7.173 \times 29.46 \times 544.81 \times .9987}{7.361 \times 29.52 \times 531} = .9965$	

Meter leak check front ✓ back ✓

Pitot leak check ✓

Electrical check ✓

Calibrating technician [illegible]

RADIAN
CORPORATION

DRY GAS METER CALIBRATION DATA

(English Units) Pretest ☐ Post Test ☒

Date 2/19/87 Barometric Pressure, Bp = 29.94 Brg

Meter Box # 2 Dry Gas Meter # Calib. meter y Factor .9957

Orifice manometer setting, ΔH, in. H_2O	Barometric Pressure at Wet Test Meter, in Hg	Gas volume wet test meter V_{wi}, V_{wf}, ft^3	Gas volume dry gas meter V_{di}, V_{df}, ft^3	Temperature: Wet test Meter t_w, °F	Temperature: Dry gas meter Inlet t_{di}, °F	Temperature: Dry gas meter Outlet t_{df}, °F	Temperature: Dry gas meter Average t_d, °F	Time, Min.	Y	ΔH@
1.0	−.03	5.0	5.176	76	93 96 96	87 88 88	91.33	—	.989	
1.0	−.03	4.999	5.178	76	94 96 97	88 88 88	91.83	—	.990	
1.0	−.03	5.012	5.195	76	96 97 97	89 89 89	92.83	—	.991	
									Avg.	.990

Y

ΔH@

$$.9957 \times \frac{V_w\left(P_b + \frac{\Delta H}{13.6}\right)\left(t_d + 460\right)}{V_d\left(P_b + \frac{\Delta H@}{13.6}\right)\left(t_w + 460\right)}$$

$$\frac{0.0317\ \Delta H}{P_b\left(t_d + 460\right)}\left[\frac{t_w + 460}{V_w}\right]^2$$

$\frac{4.99 \times 29.94 \times 551.63}{5.176 \times 30.01 \times 536} = \frac{82369.03279}{83257.82336} = .989$	
$\frac{4.99 \times 29.94 \times 551.63}{5.178 \times 30.01 \times 536} = \frac{82443.73309}{83287.99408} = .990$	
$\frac{5.005 \times 29.94 \times 552.83}{5.195 \times 30.01 \times 536} = \frac{82341.40965}{83563.4452} = .991$	
Avg = .990	

Y = Ratio of accuracy of wet test meter to dry test meter, Tolerance = ±0.02.

ΔH@ = Orifice pressure differential that gives 0.75 cfm of air at 70°F and 29.92 inches of mercury, in. H_2O. Tolerance = ±0.20.

Post test tolerance must be within ± 0.05 and within a range of 0.30

Meter Lids Check Front ✓ Back

Pitot Leak Check ✓

Electrical Check ✓

Remarks

Calibrating technician GDH

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CORPORATION

Date (DDMMYY): 4/1/87

Initials of Calibrator: [illegible]

Nozzle Identification No.	D_1 (inches)	D_2 (inches)	D_3 (inches)	Average Diameter (inches)
3/16	.181	.180	.181	.1807

Note: The maximum acceptable difference between any two measurements is 0.004 inches. If this tolerance cannot be met, the nozzle should not be used.

- Nozzle calibration sheet.

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Lee [illegible]

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum [illegible] on white and black smoke did not exceed 7.5% opacity and no single error [illegible] was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for [illegible] months from date of issue.

Thomas [illegible] — President

[illegible]711 — Certificate Number

Willie S. Lee — Vice President

Cincinnati, Ohio — Location

David Savage — Program Manager

March 18, 1987 — Date of Issue