STATIONARY SOURCE SAMPLING REPORT OF PARTICULATE EMISSIONS AT PAPCO ASPHALT PLANT #5

FOR

PIEDMONT ASPHALT PAVING
PO BOX 911
SALISBURY, NC

STATIONARY SOURCE SAMPLING REPORT OF PARTICULATE EMISSIONS AT PAPCO ASPHALT PLANT #5

FOR

PIEDMONT ASPHALT PAVING COMPANY
PO BOX 931
SALISBURY, NC 28155

May 9, 1991

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Section I

Introduction

Stationary source compliance testing was conducted at the Piedmont Asphalt Paving Company, Plant # 5, located in Salisbury, North Carolina. Two different test series were conducted by Apex Environmental Services, Inc. (AES). Each test series included three EPA Method 5 runs. Visual opacity reading were conducted simultaneously during the Method 5 runs. The first test series was conducted on March 27, April 1 and 2; the second test series was conducted on April 25, 1991.

The Hot Mix Asphalt Plant was tested to demonstrate compliance with the pertinent New Source Performance Standards. The plant failed to meet the required emissions limit for the first test series and was subsequently modified and re-tested. The average emission limit was also exceeded during the second series. Additional modifications are planned and additional testing has been scheduled.

Test participants included: William H. Howe , James B. Winegar Thomas E. Thompson. James A. Bacik, and Steve Teril representing AES: Yin-Pong Chang from the North Carolina Department of Environment, Health, and Natural Resources.

Summaries of the emission results and process rates are presented in Tables I, II and III, respectively. The computerized test results are presented in Appendix A, along with the field data and example calculations. The pertinent calibration data is presented in Appendix B and the sampling and analytical procedures are presented in Appendix C.

Section II

Summary of Results

Tables I and II summarize the results of the particulate emissions. Table III summarizes the process production data.

TABLE I

PARTICULATE EMISSION SUMMARY

TEST SERIES 135

RUN #	SAMPLE VOLUME (dscf)	MOISTURE (%)	ORSAT ANALYSIS CO2 (%)	ORSAT ANALYSIS O2 (%)	STACK FLOW RATE (acfm)	STACK FLOW RATE (dscfm)	AVERAGE STACK TEMP. (F)	ISOKINETIC (%)	PM CONC. (gr/dscf)	EMISSION RATE (LB/HR)	EMISSION RATE (OPACITY)*
2	43.642	28.91	4.6	13.8	27343.71	16432.17	156.05	105.5	.1878731	26.470	11
3	41.976	28.65	6.8	11.9	26895.42	16195.97	157.05	103.0	.2222077	30.857	13
4	47.518	19.30	3.7	15.6	29625.35	20744.93	144.47	111.0	.0473313	8.419	10

* Highest six-minute average, EPA Reference Method 9.

TABLE II

PARTICULATE EMISSION SUMMARY

TEST SERIES 139

RUN #	SAMPLE VOLUME (dscf)	MOISTURE (%)	ORSAT ANALYSIS CO2 (%)	ORSAT ANALYSIS O2 (%)	STACK FLOW RATE (acfm)	STACK FLOW RATE (dscfm)	AVERAGE STACK TEMP. (F)	ISOKINETIC (%)	PM CONC. (gr/dscf)	EMISSION RATE (LB/HR)	EMISSION RATE (OPACITY)*
1	49.792	17.27	3.2	16.8	27092.20	19311.04	143.0	102.4	.0697966	11.557	17
2	48.269	18.20	4.0	15.8	26824.57	18881.31	143.8	101.6	.0509896	8.255	19
3	47.989	18.04	3.6	16.3	26938.21	18872.35	147.8	101.0	.0582392	9.424	18

* Highest six-minute average, EPA Reference Method 9.

Section III

Process Description

The primary components of the Papco Plant #5 portable hot mix asphalt plant tested are the rotary dryer, storage bins, transfer equipment, wet scrubber, stack, and settling ponds.

The production process rate was monitored by the on-site computerized scales.

The process weights were adjusted for 60 minutes. The process summary data is provided in Table III.

TABLE III

PROCESS PRODUCTION DATA

RUN #	SAMPLE TIME	PRODUCTION (tons)	PRODUCTION RATE (tons/hour)
135-2	1016-1138	181	172
135-3	1257-1400	168	160
135-4	0725-0829	155	145
139-1	0817-0922	146	135
139-2	1003-1106	143	136
139-3	1140-1243	145	136

Section IV

Sampling and Analytical Procedures

Particulate Sampling Procedures:

AES performed EPA Method 5 particulate tests along with ancillary Reference Methods 1 through 4 and 9, as required. The sampling system utilized for the test series is constructed as specified in 40 CFR Part 60. Stack gas was drawn through a stainless steel button hook type nozzle, a heated 6 foot borosilicate glass lined probe, and through a 8.26cm Whatman 934AH glass fiber filter. The filter temperature was maintained at approximately 248 degrees F during the run.

The sampling train, plus pitot and orsat lines, were leaked checked prior to and, following each test run. The meter box, nozzles, and thermocouples were calibrated prior to deployment. At the conclusion of the test, a post calibration check of the meter box was found to be acceptable. The pertinent calibration data are presented in Appendix B.

Sample Recovery:

Upon completion of the test run and following the post leak check, the probe was disconnected from the remainder of the sampling train. The probe and nozzle were rinsed with acetone and brushed until the wash was visibly free of particulate matter. The rinse was collected in borosilicate glass bottles. The filter holder for each run was sealed and transported back to the AES laboratory for sample recovery. Particulate matter adhering to the front half of the filter holder was rinsed with acetone and brushed and combined with the probe rinse.

Moisture Determination:

The first two impingers of the sampled train were charged with 200 milliliters of water prior to each run. During sample recovery, the final water volumes were measured to determine net moisture catch. The fourth impinger was charged with a known weight of silica gel and subsequently weighed after the run to determine moisture catch.

Molecular Weight Determination and Oxygen Concentration:

Integrated gas samples were collected via a stainless probe, polyethylene tubing, and a peristaltic pump into a leak free tedlar gas sample bag. The gas sample was collected at a constant rate from each sample point during the particulate run except that no

sample was collected at the points nearest to the sample port. Since ambient air could be drawn in through the ports and dilute the gas sample.

The samples were analyzed with an orsat analyzer with 0.1% divisions for oxygen and carbon dioxide concentrations.

Particulate Analysis:

Particulate matter was determined gravimetrically in accordance with the procedures specified in Method 5.

Quality Assurance Procedures:

Calibrations are conducted in a manner and at a frequency which meet or exceed the EPA specifications. The procedures are followed in accordance with the applicable EPA reference methods and those recommended within the Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III (EPA-600/4-77-027b, August, 1977). Pertinent calibration data is presented in Appendix B.

Opacity Data:

All opacity data was collected concurrently with the Method 5 test runs following the directives of EPA Reference Method 9.

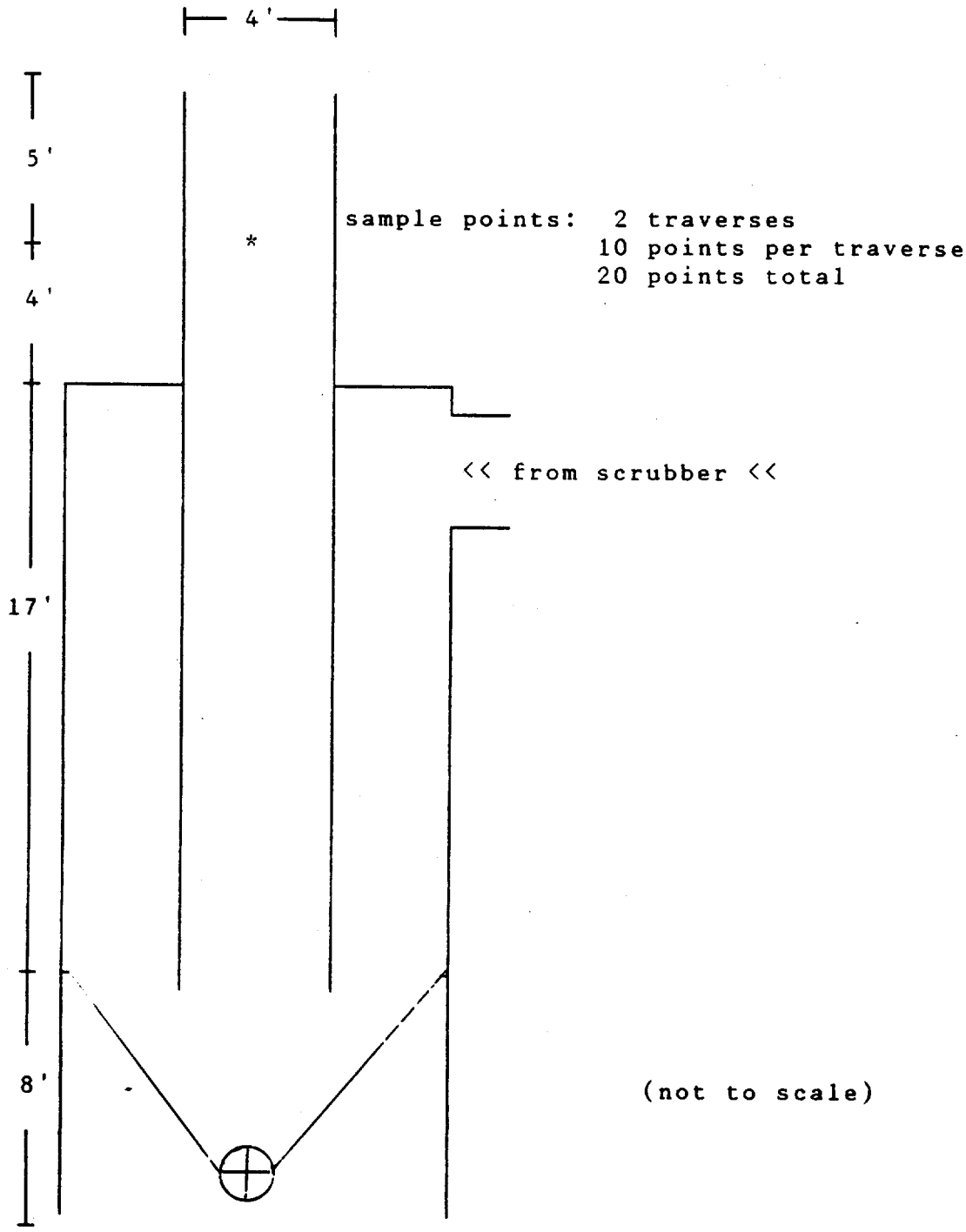

Figure 1: Stack Sampling Location

Appendix A

Field and Analytical Data

APEX SOURCE TEST
EPA METHODS 2-5
DEFINITION OF TERMS

PARAMETER	DEFINITION
Tt(min.)	TOTAL SAMPLING TIME
Dn(in.)	SAMPLING NOZZLE DIAMETER
Ps(in.H2O)	ABSOLUTE STACK STATIC GAS PRESSURE
Vm(cu.ft.)	ABSOLUTE VOLUME OF GAS SAMPLE MEASURED BY DGM
Vw(gm.)	TOTAL STACK MOISTURE COLLECTED
Pm(in.H2O)	AVERAGE STATIC PRESSURE OF DGM
Tm(F)	AVERAGE TEMPERATURE OF DGM
Pb(in.Hg.)	BAROMETRIC PRESSURE
% CO2	CARBON DIOXIDE CONTENT OF STACK GAS
% O2	OXYGEN CONTENT OF STACK GAS
% N2	NITROGEN CONTENT OF STACK GAS
SQR(DELPS)	AVE. SQ. ROOT OF S-PITOT DIFF. PRESSURE-TEMP. PRODUCTS
As(sq.in.)	CROSS-SECTIONAL AREA OF STACK(DUCT)
Ts(F)	TEMPERATURE OF STACK
Vm(dscf)	STANDARD VOLUME OF GAS SAMPLED ,Vm(std),AS DRY STD. CF
Vm(dscm)	STANDARD VOLUME OF GAS SAMPLED,Vm(std),AS DRY STD. CM
Vw gas(scf)	VOLUME OF WATER VAPOR IN GAS SAMPLE,STD
% moisture	WATER VAPOR COMPOSITION OF STACK GAS
Md	PROPORTION, BY VOLUME,OF DRY GAS IN GAS SAMPLE
MWd	MOLECULAR WEIGHT OF STACK GAS,DRY BASIS LB/LB-MOLE
MW	MOLECULAR WEIGHT OF STACK GAS,WET BASIC LB/LB-MOLE
Vs(fpm)	AVERAGE STACK GAS VELOCITY
Flow(acfm)	AVERAGE STACK GAS FLOW RATE(ACTUAL STACK COND.)
Flow(acmm)	AVERAGE STACK GAS FLOW RATE(ACTUAL STACK COND.)
Flow(dscfm)	AVERAGE STACK GAS VOLUMETRIC FLOW RATE(DRY BASIS)
Flow(dscmm)	AVERAGE STACK GAS VOLUMETRIC FLOW RATE(DRY BASIS)
% I	PERCENT ISOKINETIC
% EA	PERCENT EXCESS AIR IN STACK GAS
DGM	DRY GAS METER
Y	DRY GAS METER CORRECTION FACTOR
Pg	STACK STATIC GAS PRESSURE
Cp	PITOT COEFFICIENT
dH	ORIFICE PLATE DIFF. PRESS. VALUE
dP	PITOT DIFF. PRESS. VALUE

*** EPA	
STANDARD	Temperature = 68 deg-F (528 deg-R)
CONDITIONS	Pressure = 29.92 in. Hg.

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

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 2
DATE : 04/01/91
TEST PERIOD : 1016-1138

PARAMETER	VALUE
Sampling time (min.)	60
Barometric Pressure (in.Hg)	29.52
Sampling nozzle diameter (in.)	.311
Meter Volume (cu.ft.)	47.52704
Meter Pressure (in.H2O)	2.08
Meter Temperature (F)	104.55
Stack dimension (sq.in.)	1809.562
Stack Static Pressure (in.H2O)	-.15
Stack Moisture Collected (gm)	376.3574
Absolute stack pressure(in Hg)	29.50897
Average stack temperature (F)	156.05
Percent CO2	4.6
Percent O2	13.8
Percent N2	81.6
Delps Subroutine result	13.995
DGM Factor	.99
Pitot Constant	.84

APEX SOURCE TEST
EPA METHODS 2-5
FINAL RESULTS

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 2
DATE : 04/01/91
TEST PERIOD : 1016-1138

PARAMETER	RESULT
Vm(dscf)	43.64218
Vm(dscm)	1.235947
Vw gas(scf)	17.74525
Vw gas (scm)	.5025455
% moisture	28.90698
Md	.7109303
MWd	29.288
MW	26.02498
Vs(fpm)	2175.938
Vs (mpm)	663.3958
Flow(acfm)	27343.71
Flow(acmm)	774.3739
Flow(dscfm)	16432.17
Flow(dscmm)	465.359
% I	105.5063
% EA	178.2393

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APEX SOURCE TEST
EPA METHOD 5
PARTICULATE LOADING

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 2
DATE : 04/01/91
TEST PERIOD : 1016-1138

PARAMETER	FRONT-HALF	TRAIN TOTAL
Total Grams	0.5313800	0.5313800
Grams/dscf	0.0121758	0.0121758
Grams/acf	0.0073171	0.0073171
Grains/dscf	0.1878731	0.1878731
Grains/acf	0.1129021	0.1129021
Grams/dscm	0.4299288	0.4299288
Grams/acm	0.2583651	0.2583651
Pounds/dscf	0.0000268	0.0000268
Pounds/acf	0.0000161	0.0000161
Pounds/Hr	26.4699700	26.4699700
Kilograms/Hr	12.0067000	12.0067000

* BACK-HALF IMPINGER ANALYSIS WAS NOT REQUIRED

Program Revision:9/10/89

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

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 3
DATE : 04/01/91
TEST PERIOD : 1257-1400

PARAMETER	VALUE
Sampling time (min.)	60
Barometric Pressure (in.Hg)	29.52
Sampling nozzle diameter (in.)	.311
Meter Volume (cu.ft.)	46.56098
Meter Pressure (in.H2O)	1.88
Meter Temperature (F)	114.75
Stack dimension (sq.in.)	1809.562
Stack Static Pressure (in.H2O)	-.15
Stack Moisture Collected (gm)	357.3916 — 358.9
Absolute stack pressure(in Hg)	29.50897
Average stack temperature (F)	157.05
Percent CO2	6.8
Percent O2	11.9
Percent N2	81.3
Delps Subroutine result	13.82532
DGM Factor	.99
Pitot Constant	.84

APEX SOURCE TEST
EPA METHODS 2-5
FINAL RESULTS

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 3
DATE : 04/01/91
TEST PERIOD : 1257-1400

PARAMETER	RESULT
Vm(dscf)	41.97552
Vm(dscm)	1.188747
Vw gas(scf)	16.85101
Vw gas (scm)	.4772207
% moisture	28.64526
Md	.7135474
MWd	29.564
MW	26.25146
Vs(fpm)	2140.264
Vs (mpm)	652.5195
Flow(acfm)	26895.42
Flow(acmm)	761.6781
Flow(dscfm)	16195.97
Flow(dscmm)	458.6699
% I	102.957
% EA	124.4353

Program Revision:9/10/89

APEX SOURCE TEST
EPA METHOD 5
PARTICULATE LOADING

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 3
DATE : 04/01/91
TEST PERIOD : 1257-1400

PARAMETER	FRONT-HALF	TRAIN TOTAL
Total Grams	0.6044900	0.6044900
Grams/dscf	0.0144010	0.0144010
Grams/acf	0.0086721	0.0086721
Grains/dscf	0.2222077	0.2222077
Grains/acf	0.1338098	0.1338098
Grams/dscm	0.5084999	0.5084999
Grams/acm	0.3062102	0.3062102
Pounds/dscf	0.0000318	0.0000318
Pounds/acf	0.0000191	0.0000191
Pounds/Hr	30.8574500	30.8574500
Kilograms/Hr	13.9968400	13.9968400

* BACK-HALF IMPINGER ANALYSIS WAS NOT REQUIRED

Program Revision:9/10/89

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

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 4
DATE : 04-02-91
TEST PERIOD : 0725-0829

PARAMETER	VALUE
Sampling time (min.)	60
Barometric Pressure (in.Hg)	29.73
Sampling nozzle diameter (in.)	.311
Meter Volume (cu.ft.)	52.194
Meter Pressure (in.H20)	2.47
Meter Temperature (F)	114
Stack dimension (sq.in.)	1809.562
Stack Static Pressure (in.H20)	-.15
Stack Moisture Collected (gm)	240.9986
Absolute stack pressure(in Hg)	29.71897
Average stack temperature (F)	144.4211
Percent CO2	3.7
Percent O2	15.6
Percent N2	80.7
Delps Subroutine result	15.51383
DGM Factor	.99
Pitot Constant	.84

APEX SOURCE TEST
EPA METHODS 2-5
FINAL RESULTS

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 4
DATE : 04-02-91
TEST PERIOD : 0725-0829

PARAMETER	RESULT
Vm(dscf)	47.51778
Vm(dscm)	1.345704
Vw gas(scf)	11.36308
Vw gas (scm)	.3218025
% moisture	19.29843
Md	.8070157
MWd	29.216
MW	27.05149
Vs(fpm)	2357.505
Vs (mpm)	718.7513
Flow(acfm)	29625.35
Flow(acmm)	838.9899
Flow(dscfm)	20744.93
Flow(dscmm)	587.4963
% I	90.99367
% EA	273.4541

Program Revision:9/10/89

APEX SOURCE TEST
EPA METHOD 5
PARTICULATE LOADING

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 4
DATE : 04-02-91
TEST PERIOD : 0725-0829

PARAMETER	FRONT-HALF	TRAIN TOTAL
Total Grams	0.1457600	0.1457600
Grams/dscf	0.0030675	0.0030675
Grams/acf	0.0021480	0.0021480
Grains/dscf	0.0473313	0.0473313
Grains/acf	0.0331434	0.0331434
Grams/dscm	0.1083129	0.1083129
Grams/acm	0.0758452	0.0758452
Pounds/dscf	0.0000068	0.0000068
Pounds/acf	0.0000047	0.0000047
Pounds/Hr	8.4188730	8.4188730
Kilograms/Hr	3.8187760	3.8187760

* BACK-HALF IMPINGER ANALYSIS WAS NOT REQUIRED

Program Revision:9/10/89

APEX SOURCE TEST
EPA METHOD 2-5
SAMPLE CALCULATION

PLANT	: PAPCO
PLANT SITE	: SALISBURY , NC
SAMPLING LOCATION	: STACK
TEST #	: 2
DATE	: 04/01/91
TEST PERIOD	: 1016-1138

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

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

$$Vm(std) = \frac{.99 \times 47.52704 \times 528 \times [29.52 + (2.08/13.6)]}{29.92 \times (104.55 + 460)}$$

$$Vm(std) = 43.642 dscf$$

2) Volume of water vapor at standard conditions:

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

$$Vw(gas) = 0.04715 \times 376.3574 = 17.745\ scf$$

3) Percent Moisture in stack gas :

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

$$\%M = \frac{100 \times 17.745}{43.642 + 17.745} = 28.91\ \%$$

4) Mole fraction of dry stack gas :

$$Md = \frac{100 - \%M}{100} = \frac{100 - 28.91}{100} = .7109303$$

SAMPLE CALCULATION
PAGE TWO

5)Average Molecular Weight of DRY stack gas :

MWd = (.44 x %CO2) + (.32 x %O2) + (.28 x %N2)

MWd = (.44 x 4.6) + (.32 x 13.8) + (.28 x 81.6) = 29.288

6)Average Molecular Weight of wet stack gas :

MW = MWd x Md + 18(1 - Md)

MW = 29.288 x .7109303 + 18(1 - .7109303) = 26.02498

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

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

Vs = 85.49 x .84 x 60 x 13.995 x SQRT[1/(29.50897 X 26.02498)]

Vs = 2175.938 FPM

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

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

$$Qsd = \frac{2175.938 \times 1809.562 \times .7109303 \times 528 \times 29.50897}{144 \times 616.05 \times 29.92}$$

Qsd = 16432.17 dscfm

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

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

$$I\% = \frac{1039.574 \times 43.64218 \times 616.05}{2175.938 \times 60 \times 29.50897 \times .7109303 \times (.311)^2}$$

I% = 105.5063

10) Excess air (%) :

$$EA = \frac{100 \times \%O2}{(.264 \times \%N2) - \%O2} = \frac{100 \times 13.8}{(.264 \times 81.6) - 13.8}$$

EA = 178.24

11) Particulate Concentration :

Cs = (grams part.) / Vm(std) = .53138 / 43.64218

Cs = 0.0121758 Grams/DSCF

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

$$Ca = \frac{528 \times .7109303 \times 29.50897 \times 0.0121758}{29.92 \times 616.05}$$

Ca = 0.0073171 Grams/ACF

LBS/HR = Cs x 0.002205 x Qsd x 60

LBS/HR = 0.0121758x 0.002205 x 16432.2 x 60

LBS/HR = 26.46997

Program Revision:9/10/89

Name of Source: PAPCO

Observer: JAMES B.WINEGAR

File Name: 135-2

Start Time: 1016 Stop Time: 1121 Date of Test: 04-01-1991

- O R I G I N A L D A T A -

Sec>> Min	00	15	30	45	Sec>> Min	00	15	30	45
1	5	5	10	5	31	10	15	0	5
2	0	20	5	10	32	0	5	5	10
3	5	5	5	15	33	15	5	10	10
4	5	5	5	5	34	5	5	0	15
5	10	15	10	5	35	5	5	5	0
6	15	5	5	20	36	0	0	5	15
7	15	20	5	10	37	10	5	5	5
8	5	5	15	10	38	10	15	15	~G
9	10	10	10	10	39	5	10	0	5
10	5	10	15	10	40	5	0	0	5
11	5	5	5	10	41	10	5	0	10
12	10	5	5	0	42	5	20	5	5
13	5	10	10	10	43	0	5	15	5
14	5	5	0	15	44	10	0	0	5
15	5	5	15	25	45	5	5	0	5
16	5	0	5	5	46	5	10	5	10
17	5	5	0	10	47	5	10	10	5
18	5	15	10	5	48	5	5	5	0
19	0	20	10	0	49	10	5	5	25
20	5	5	0	5	50	15	5	0	5
21	20	10	5	5	51	5	10	5	0
22	5	5	10	90	52	15	5	15	5
23	5	10	5	5	53	5	5	0	10
24	0	5	5	5	54	5	5	5	5
25	5	15	10	5	55	15	5	10	0
26	10	15	5	5	56	15	5	5	15
27	0	5	5	0	57	5	30	10	10
28	20	10	5	5	58	5	15	5	10
29	5	5	5	10	59	5	10	20	10
30	5	15	5	10	60	5	5	5	5

NOTE: _____

DATE PRINT: 05-08-1991 TIME PRINT: 09:15:37

Name of Source: PAPCO

Observer: JAMES B.WINEGAR

File Name: 135-2

Start Time: 1016 Stop Time: 1121 Date of Test: 04-01-1991

- R O L L I N G A V E R A G E S -

Sec>> Min	00	15	30	45	Sec>> Min	00	15	30	45
1	-	-	-	-	31	8	8	7	7
2	-	-	-	-	32	7	6	6	7
3	-	-	-	-	33	7	7	8	8
4	-	-	-	-	34	7	7	7	7
5	-	-	-	-	35	7	7	7	7
6	-	-	-	8	36	7	6	6	6
7	9	9	9	9	37	6	6	6	6
8	9	9	9	9	38	6	7	7	6
9	9	10	10	10	39	-	-	-	-
10	10	10	10	10	40	-	-	-	-
11	10	10	10	10	41	-	-	-	-
12	10	10	10	9	42	-	-	-	-
13	8	8	8	8	43	-	-	-	-
14	8	8	8	8	44	-	-	-	5
15	8	7	8	8	45	5	5	5	5
16	8	8	7	7	46	5	6	6	6
17	7	7	7	7	47	6	6	6	6
18	7	7	7	8	48	6	6	6	5
19	7	8	8	7	49	6	6	5	6
20	7	7	7	7	50	6	7	7	7
21	8	8	7	6	51	7	7	7	7
22	6	7	7	10	52	7	7	8	7
23	10	11	11	11	53	7	7	7	7
24	10	10	10	10	54	7	7	7	7
25	10	10	10	10	55	7	7	8	6
26	10	11	11	11	56	6	6	7	7
27	10	10	10	10	57	7	8	8	9
28	10	10	10	7	58	8	9	8	8
29	7	6	6	7	59	8	9	9	9
30	7	7	7	8	60	9	9	9	9

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BLOCK SIZE (for Rolling Averages) = 24 READINGS

*The highest BLOCK in this ROLLING AVERAGE is at 23 Min and 30 Sec

>> OPERATION WAS PERFORMED ON THE: original DATA. <<

NOTE: _____

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DATE PRINT: 05-08-1991 TIME PRINT: 09:16:54

Name of Source: PAPCO

Observer: JAMES B.WINEGAR

File Name: 135-3

Start Time: 1258 Stop Time: 1400 Date of Test: 04-01-1991

- O R I G I N A L D A T A -

Sec>> Min	00	15	30	45	Sec>> Min	00	15	30	45
1	5	5	5	0	31	15	5	G	0
2	5	5	10	10	32	10	0	5	0
3	10	5	0	15	33	10	15	0	0
4	0	5	5	5	34	5	0	0	5
5	10	0	0	15	35	10	5	0	15
6	5	20	10	20	36	5	0	0	0
7	25	15	20	25	37	0	5	0	5
8	0	0	10	20	38	0	0	10	0
9	15	20	10	5	39	0	5	0	5
10	15	15	5	5	40	0	5	0	0
11	20	10	5	10	41	5	0	0	0
12	0	10	5	10	42	0	10	5	5
13	5	0	0	0	43	0	0	0	5
14	10	5	5	15	44	5	0	0	0
15	5	5	0	15	45	5	0	10	0
16	5	5	0	0	46	10	5	5	0
17	5	5	0	10	47	0	5	0	0
18	0	5	0	0	48	5	0	0	15
19	0	5	15	5	49	5	5	5	15
20	0	10	10	5	50	5	5	10	10
21	5	0	0	0	51	10	5	5	0
22	0	0	5	10	52	10	0	5	10
23	0	0	0	0	53	5	5	15	0
24	0	5	5	10	54	5	5	5	5
25	5	0	5	5	55	5	5	10	5
26	10	5	0	5	56	5	0	0	5
27	0	5	5	15	57	5	5	15	15
28	0	0	0	0	58	0	5	15	0
29	5	5	0	0	59	0	5	0	5
30	0	0	0	0	60	5	10	5	5

NOTE: _____

DATE PRINT: 05-08-1991 TIME PRINT: 09:18:13

Name of Source: PAPCO

Observer: JAMES B.WINEGAR

File Name: 135-3

Start Time: 1258 Stop Time: 1400 Date of Test: 04-01-1991

- R O L L I N G A V E R A G E S -

Sec>> Min	00	15	30	45	Sec>> Min	00	15	30	45
1	-	-	-	-	31	3	4	G	-
2	-	-	-	-	32	-	-	-	-
3	-	-	-	-	33	-	-	-	-
4	-	-	-	-	34	-	-	-	-
5	-	-	-	-	35	-	-	-	-
6	-	-	-	7	36	-	-	-	-
7	8	8	9	10	37	-	-	4	4
8	10	10	10	10	38	4	4	4	4
9	10	11	11	11	39	3	3	3	3
10	11	12	12	12	40	3	3	3	3
11	12	13	13	13	41	3	2	2	2
12	12	12	12	11	42	2	2	2	2
13	11	10	9	8	43	2	2	2	2
14	9	9	9	8	44	2	2	2	2
15	8	7	7	7	45	2	2	2	2
16	7	6	6	6	46	3	3	3	3
17	5	5	5	5	47	3	3	3	3
18	5	5	5	4	48	3	3	2	3
19	4	4	5	5	49	3	3	4	4
20	5	5	5	5	50	4	4	5	5
21	5	4	4	4	51	5	5	5	5
22	4	3	4	4	52	5	5	5	5
23	4	4	4	3	53	6	6	6	6
24	3	3	3	4	54	6	6	7	6
25	4	4	3	3	55	6	6	6	6
26	4	4	3	3	56	6	6	5	5
27	3	3	3	4	57	5	5	5	6
28	4	4	4	3	58	6	6	6	6
29	4	4	4	4	59	6	6	5	5
30	4	4	3	3	60	5	5	5	5

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BLOCK SIZE (for Rolling Averages) = 24 READINGS

*The highest BLOCK in this ROLLING AVERAGE is at 11 Min and 30 Sec

>> OPERATION WAS PERFORMED ON THE: original DATA. <<

NOTE: _____

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DATE PRINT: 05-08-1991 TIME PRINT: 09:18:57

Name of Source: PAPCO

Observer: JAMES B.WINEGAR

File Name: 135-4

Start Time: 1000 Stop Time: 1100 Date of Test: 04-02-1991

- O R I G I N A L D A T A -

Sec>> Min	00	15	30	45	Sec>> Min	00	15	30	45
1	10	10	10	10	31	5	10	5	5
2	5	15	5	5	32	10	10	5	5
3	5	5	5	5	33	10	15	15	15
4	5	5	5	5	34	5	25	5	5
5	5	5	0	0	35	5	5	5	5
6	5	5	5	5	36	5	0	5	5
7	0	5	0	10	37	0	5	5	0
8	5	5	10	5	38	5	5	5	5
9	5	10	15	5	39	5	5	5	5
10	10	5	5	5	40	0	5	5	10
11	5	5	5	5	41	5	5	5	0
12	5	10	5	5	42	5	5	5	5
13	5	5	5	5	43	5	0	5	5
14	10	10	5	5	44	5	10	5	15
15	5	10	5	5	45	15	10	5	5
16	5	5	10	15	46	5	5	10	5
17	5	10	15	10	47	5	5	5	5
18	10	5	5	10	48	0	5	20	15
19	5	5	5	5	49	10	10	10	15
20	5	5	5	10	50	20	5	15	10
21	5	15	10	5	51	10	10	5	15
22	5	5	10	10	52	0	10	5	5
23	5	10	5	10	53	15	15	5	5
24	15	20	5	5	54	15	5	5	5
25	5	10	10	15	55	15	5	15	5
26	15	5	10	5	56	0	20	5	5
27	10	5	15	10	57	10	10	0	5
28	5	5	15	10	58	5	15	10	10
29	15	5	5	5	59	15	5	20	20
30	5	25	5	10	60	15	10	5	15

NOTE: _____

DATE PRINT: 05-08-1991 TIME PRINT: 09:19:57

Name of Source: PAPCO

Observer: JAMES B.WINEGAR

File Name: 135-4

Start Time: 1000 Stop Time: 1100 Date of Test: 04-02-1991

- R O L L I N G A V E R A G E S -

Sec>> Min	00	15	30	45	Sec>> Min	00	15	30	45
1	-	-	-	-	31	9	9	9	9
2	-	-	-	-	32	9	9	9	9
3	-	-	-	-	33	9	9	9	9
4	-	-	-	-	34	9	10	10	9
5	-	-	-	-	35	9	9	9	9
6	-	-	-	6	36	9	8	8	8
7	5	5	5	5	37	7	7	7	7
8	5	4	5	5	38	7	7	7	7
9	5	5	5	5	39	6	6	6	5
10	5	5	5	5	40	5	4	4	4
11	5	5	6	6	41	4	4	4	4
12	6	6	6	6	42	4	4	4	4
13	6	6	6	6	43	5	4	4	5
14	6	7	6	6	44	5	5	5	5
15	6	6	6	6	45	6	6	6	6
16	6	6	6	6	46	6	6	6	6
17	6	7	7	7	47	6	6	6	6
18	7	7	7	7	48	6	6	7	7
19	7	7	7	7	49	7	8	8	8
20	7	7	7	7	50	9	9	9	9
21	7	8	8	8	51	9	9	9	9
22	8	8	8	7	52	9	9	9	9
23	7	7	7	7	53	9	10	10	10
24	7	8	8	8	54	10	10	10	9
25	8	8	8	9	55	10	9	10	9
26	9	9	9	9	56	8	9	9	8
27	9	9	9	9	57	8	8	8	8
28	9	9	9	9	58	8	8	8	9
29	10	10	10	9	59	9	8	9	9
30	9	9	9	9	60	9	10	10	10

BLOCK SIZE (for Rolling Averages) = 24 READINGS

*The highest BLOCK in this ROLLING AVERAGE is at 54 Min and 0 Sec

>> OPERATION WAS PERFORMED ON THE: original DATA. <<

NOTE: _____

DATE PRINT: 05-08-1991 TIME PRINT: 09:20:59

TRAVERSE DATA

COMPANY NAME Papco

DATE 3-27-91

SAMPLING LOCATION Stacks

PROJECT # 135

DUCT DIMENSIONS

INSIDE FAR WALL TO OUTSIDE OF PORT 50"

NIPPLE LENGTH 2"

DEPTH OF DUCT 48"

WIDTH (RECTANGULAR DUCT) —

EQUIVALENT DIAMETER:

$$D = \frac{2 \times \text{DEPTH} \times \text{WIDTH}}{\text{DEPTH} + \text{WIDTH}} = \text{NA}$$

	UP-STREAM	DOWN-STREAM
DISTANCE FROM PORTS TO NEAREST FLOW DISTURBANCE	21'	5'
DIAMETERS	5.25	1.25

POINT	FRACTION OF DUCT	DISTANCE FROM INSIDE WALL	DISTANCE FROM OUTSIDE WALL
1	.026	1.25	3 1/4
2	.082	3 15/16	5 15/16
3	.146	7	9
4	.226	10 7/8	12 7/8
5	342	16 7/16	18 7/16
6	.658	31 9/16	33 9/16
7	.774	37 1/8	39 1/8
8	.854	41	43
9	.918	44 1/16	46 1/16
10	.974	46 3/4	48 3/4
11			
12			
13			
14			
15			
16			

LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

	4	6	8	10	12	14	16
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5
5		85.4	67.7	34.2	25.0	20.1	16.9
6		95.6	80.6	65.8	35.6	26.9	22.0
7			89.5	77.4	64.4	36.6	28.3
8			96.8	85.4	75.0	63.4	37.5
9				91.8	82.3	73.1	62.5
10				97.4	88.2	79.9	71.7
11					93.3	85.4	78.0
12					97.9	90.1	83.1
13						94.3	87.5
14						98.2	91.5
15							95.1
16							98.4

DRAW HORIZONTAL LINE THROUGH DIAMETERS

If more than 8 and 2 diameters and if duct dia. is less than 24", use 8 or 9 points.

VELOCITY	DIAMETERS UP	DIAMETERS DOWN	PARTICULATE
	8.0	2.0	12
12	7.0	1.75	16
	6.0	1.5	20
16	~~5.0~~	~~1.25~~	24 or 25
	2.0	0.5	

PARTICULATE FIELD DATA

DATE 4-1-91
PROJECT NO. 135
RUN NO. 2

COMPANY NAME Pepco
SAMPLING LOCATION Unit #5 OPERATOR WHH
BAROMETRIC PRESSURE, IN. Hg 29.52 STATIC PRESSURE, IN. H2O -.15

LEAK CHECKS
PRE .002 cfm @ 15 in. Hg
POST .002 cfm @ 5 in. Hg
PITOT ✓ ORSAT ✓

ID NUMBER
NOZZLE 10-2 DIAMETER .311
SAMPLE BOX 1 TEDLAR BAG 2
PROBE 5-2 METER BOX 1
FILTER 594

NOMAGRAPH
METER dH@ 1.84 % MOISTURE 20
METER TEMP 110 METER Y .99
STACK TEMP 180 K FACTOR 6.5

TRAV. POINT NO.	SAMPLING TIME (min.)	CLOCK TIME	DGM READING (Vm) ft3	VELOCITY HEAD dP in.H2O	ORIFICE dH in. H2O	STACK TEMP (Ts), F	DGM TEMP (Tm),F in	DGM TEMP (Tm),F out	FILTER TEMP F	IMP. TEMP F	PUMP VAC. in Hg
A-1	0	1016	677.621	.20	1.3	156	65	64	251	61	1
2	3	1019	679.4	.32	2.1	159	105	64	248	51	1
3	6	1022	681.7	.40	2.6	158	111	67	248	52	2
4	9	1025	684.4	.42	2.7	157	116	69	247	57	2
5	12	1028	687.0	.41	2.6	156	118	72	248	63	2
6	15	1031	689.7	.34	2.2	156	121	74	245	66	2
7	18	1034	692.1	.32	2.1	155	123	76	245	67	2
8	21	1037	694.4	.28	1.8	155	124	78	244	60	2
9	24	1040	696.7	.25	1.6	159	126	82	249	55	2
10	27	1043	698.9	.17	1.1	159	126	84	252	52	2
B-1	30/30	1046/1049	700.7	.32	2.1	154	123	86	250	46	3
2	33	1052	703.1	.36	2.3	152	132	87	253	46	3
3	36	*1053/1058	705.4	.38	2.4	154	138	90	254	45	3
4	39	1103/1058	707.9	.40	2.6	157	140	92	257	48	4
5	42	1106	710.7	.42	2.7	156	141	93	252	52	4
6	45	1109	713.4	.36	2.3	157	143	95	247	53	3
7	48	1112	715.9	.33	2.1	155	143	96	243	54	3
8	51	1115	718.3	.31	2.0	155	142	98	240	55	3
9	54	1118	720.8	.23	1.5	155	140	99	242	57	4
10	57	1124	722.964	.23	1.5	156	140	99	243	56	4
-	60	1135 1124	725.148				125.85	83.25			
		1138					(104.55) ✓				
				2.08 ✓							

* Down @ 1053
On @ 1058 (5)

PLANT NAME Dupco PROJECT # 135 RUN # 2

Analyzed by: WHH Leakage ? No If Yes, est. volume. ____

Probe Rinse (PR)

Acetone Lot # 891694
bottle wt. w/rinse 560 g
bottle rinse wt. 35 g
bottle tare wt. (397.8) g

net rinse 162.2 g

Placed In Desiccator

	Time	Date
Filter	1640	4-2
PR Beaker	0745	4-3

Blank Adjustment = blank conc. .002 mg/g x net rinse 162.2 g = 0.3244 mg

	Date/time	Filter # 594	Beaker # 32	Room conditions R.H.%	Room conditions temp.	Cal. audit
wt.1	4-3 1725	.4309		35	68	.5000
wt.2	4-4 0750	.4307		40	62	.5000
wt.3	4-5 0730	-	3.0418	38	62	2.0000
wt.4	4-5 1635		3.0416	42	72	2.00000
wt.5						
wt.6						
wt.7						
wt.8						
wt.9						

Final wt.	.4308	3.0417
Tare wt.	.3566	2.5842

Filter gain 74.20 mg

Beaker gain +457.5 mg

Blank adjust. -(0.324) mg

Net gain 74.2 mg 457.5 mg TOTAL = 531.38 mg

PARTICULATE FIELD DATA

DATE 4-1-91
PROJECT NO. 139
RUN NO. 3

COMPANY NAME Papco
SAMPLING LOCATION Rent #5 OPERATOR WHH
BAROMETRIC PRESSURE, IN. Hg 29.52 STATIC PRESSURE, IN. H2O -.15

LEAK CHECKS
PRE .008 cfm @ 14 in. Hg
POST .012 cfm @ 9 in. Hg
PITOT ✓ ORSAT ✓

ID NUMBER
NOZZLE 10-1 DIAMETER .311
SAMPLE BOX 1 TEDLAR BAG 3
PROBE 5-1 METER BOX 1
FILTER 593

NOMAGRAPH
METER dH@ 1.84 % MOISTURE 28
METER TEMP 120 METER Y .99
STACK TEMP 160 K FACTOR 6.9
6.0

TRAV. POINT NO.	SAMPLING TIME (min.)	CLOCK TIME	DGM READING (Vm) ft3	VELOCITY HEAD dP in.H2O	ORIFICE dH in. H2O	STACK TEMP (Ts), F	DGM TEMP (Tm),F in	DGM TEMP (Tm),F out	FILTER TEMP F	IMP. TEMP F	PUMP VAC. in Hg
A-1	0 1257	1257	725.341	.28	1.7	155	95	81	264	62	2
2	3	1300	727.5	.38	2.3	160	112	91	257	52	3
3	6	1303	729.9	.42	2.5	161	118	82	249	57	4
4	9	1306	732.5	.41	2.4	162	125	86	245	60	4
5	12	1309	735.1	.38	2.3	163	129	87	244	63	4
6	15	1312	737.6	.32	1.9	160	132	89	242	65	4
7	18	1315	740.0	.28	1.7	159	135	90	241	66	3
8	21	1318	742.2	.26	1.6	159	135	93	240	65	3
9	24	1321	744.4	.20	1.2	159	138	93	241	67	3
10	27	1324	746.3	.20	1.2	159	137	96	243	65	3
B-1	30/30	1327/1330	748.3	.20	1.2	150	131	96	244	56	3
2	33	1333	750.3	.29	1.7	150	142	97	244	55	3
3	36	1336	752.4	.37	2.2	155	143	97	245	56	4
4	39	1339	754.6	.41	2.4	157	146	100	243	55	4
5	42	1342	757.3	.40	2.4	156	148	101	243	54	5
6	45	1345	760.1	.35	2.1	156	146	102	243	64	5
7	48	1348	762.6	.32	1.9	156	147	102	242	65	5
8	51	1351	765.0	.30	1.8	155	147	103	245	66	5
9	54	1354	767.4	.26	1.6	154	149	104	244	67	4
10	57	1357	769.7	.25	1.5	155	148	107	249	67	4
—	60	1400	771.902								
					1.88 ✓						

114.75 ✓

PLANT NAME Papco PROJECT # 135 RUN # 3

Analyzed by: WHH Leakage ? No If Yes, est. volume. ____

Probe Rinse (PR)

Acetone Lot # 891694
bottle wt. w/rinse 549.4 g
bottle rinse wt. 28 g
bottle tare wt. (396.6) g

net rinse 152.8 g

Placed In Desiccator

	Time	Date
Filter	1640	4-2
PR Beaker	0745	4-3

Blank Adjustment = blank conc. .002 mg/g x net rinse 152.8 g = 0.3056 mg

	Date/time	Filter # 593	Beaker # 33	Room conditions R.H.%	Room conditions temp.	Cal. audit
wt.1	4-3 1725	.4349		35	68	.5000
wt.2	4-4 0750.	.4349		40	62	.5000
wt.3	4-5 0730		3.1075	38	62	2.0000
wt.4	4-5 1635		3.1072	42	72	2.0000
wt.5						
wt.6						
wt.7						
wt.8						
wt.9						

Final wt.	4349	3.1074
Tare wt.	.3556	2.5819

Filter gain 79.30 mg

Beaker gain 525.50 mg

Blank adjust. (0.3056) mg

Net gain 79.3 mg 525.5 mg TOTAL = 604.49 mg

PARTICULATE FIELD DATA

COMPANY NAME Papco
SAMPLING LOCATION Stack #5 OPERATOR WHH
BAROMETRIC PRESSURE, IN. Hg 29.73 STATIC PRESSURE, IN. H2O -.15

DATE 4-2-91
PROJECT NO. 135
RUN NO. 4

LEAK CHECKS
PRE .003 cfm @ 15 in. Hg
POST .004 cfm @ 6 in. Hg
PITOT ✓ ORSAT ✓

ID NUMBER
NOZZLE 1C-2 DIAMETER .311
SAMPLE BOX 1 TEDLAR BAG 4
PROBE S-2 METER BOX 1
FILTER 541

NOMAGRAPH
METER dH@ 1.94 % MOISTURE 28
METER TEMP 110 METER Y .97
STACK TEMP 160 K FACTOR 5.6

%H2O 28
Stack 145 K = 6.8

TRAV. POINT NO.	SAMPLING TIME (min.)	CLOCK TIME	DGM READING (Vm) ft3	VELOCITY HEAD dP in.H2O	ORIFICE dH in. H2O	STACK TEMP (Ts), F	DGM TEMP (Tm),F in	DGM TEMP (Tm),F out	FILTER TEMP F	IMP. TEMP F	PUMP VAC. in Hg
A-1	0	1000	776.603	.30	1.7	155	93	76	252	45	1
2	3	1003	778.7	.40	2.2	156	105	75	246	44	2
3	6	1006	781.1	.44	2.5	148	114	76	245	45	2
4	9	1009	783.7	.46	2.6	143	120	78	245	45	2
5	12	1012	786.3	.47	2.6	142	125	81	248	47	2
6	15	1015	788.9	.42	2.3	144	128	83	250	49	3
7	18	1018	791.5	.38	2.1	144	132	86	252	51	3
8	21	1021	793.9	.36	2.0	145	133	87	253	51	3
9	24	1024	796.4	.35	2.4	145	137	90	254	52	4
10	27	1027	798.9	.30	2.0	147	138	94	253	53	4
B-1	30/30	1030 1032	801.3	.28	1.9	147	134	95	249	52	4
2	33	1035	803.6	.39	2.6	136	141	97	245	49	5
3	36	1038	806.3	.44	2.9	140	144	97	245	50	5
4	39	1041	809.1	.47	3.2	142	147	100	246	51	6
5	42	1044	812.0	.48	3.2	142	148	103	245	54	6
6	45	1047	815.0	.45	3.1	142	150	104	248	55	6
7	48	1050	818.0	.44	2.9	143	150	106	250	57	6
8	51	1053	821.0	.40	2.7	143	151	108	251	58	6
9	54	1056	822.8	.38	2.6	143	150	109	250	61	6
10	57	1059	826.5	.26	1.8	141	148	109	248	62	5
-	60	1102	829.797								
					2.47						

PLANT NAME Apco PROJECT # 135 RUN # 4

Analyzed by: WHH Leakage ? No If Yes, est. volume. ____

Probe Rinse (PR)

Acetone Lot # 891694
bottle wt. w/rinse 516.4 g
bottle rinse wt. 30 g
bottle tare wt. (396.4) g

net rinse 120.0 g

Placed In Desiccator

	Time	Date
Filter	16:40	4-2
PR Beaker	0745	4-3

Blank Adjustment = blank conc. .002 mg/g x net rinse 120.0 g = 0.24 mg

	Date/time	Filter # 541	Beaker # 34	Room conditions R.H.%	Room conditions temp.	Cal. audit
wt.1	4-3 1725	.4610		35	68	.5000
wt.2	4-4 0750.	.4608		40	62	.5000
wt.3	4-5 0730		2.5720	38	62	2.0000
wt.4	4-5 1635		2.5720	42	42	2.0000
wt.5						
wt.6						
wt.7						
wt.8						
wt.9						

Final wt.	.4609	2.5720
Tare wt.	.3489	2.5376

Filter gain 112.0 mg

Beaker gain 34.0 mg

Blank adjust. (0.24) mg

Net gain 112.0 mg 34.0 mg

TOTAL = 145.76 mg

PLANT NAME Papco PROJECT # 135 RUN # Blank

Analyzed by: WHH Leakage ? NO If Yes, est. volume. ____

Probe Rinse (PR)

Acetone Lot # 891694
bottle wt. w/rinse 524.6 g
bottle rinse wt. 22 g
bottle tare wt. (393.4) g

net rinse 153.2 g

0.3/153.2

Placed In Desiccator

	Time	Date
Filter	—	—
PR Beaker	0745	4-3

Blank Adjustment = blank conc. .002 mg/g x net rinse ____ g = ____ mg

	Date/time	Filter # NA	Beaker # 35	Room conditions R.H.%	Room conditions temp.	Cal. audit
wt.1	4-5 0730		2.5611	38	62	2.0000
wt.2	4-5 1635		2.5611	42	72	2.0000
wt.3						
wt.4						
wt.5						
wt.6						
wt.7						
wt.8						
wt.9						

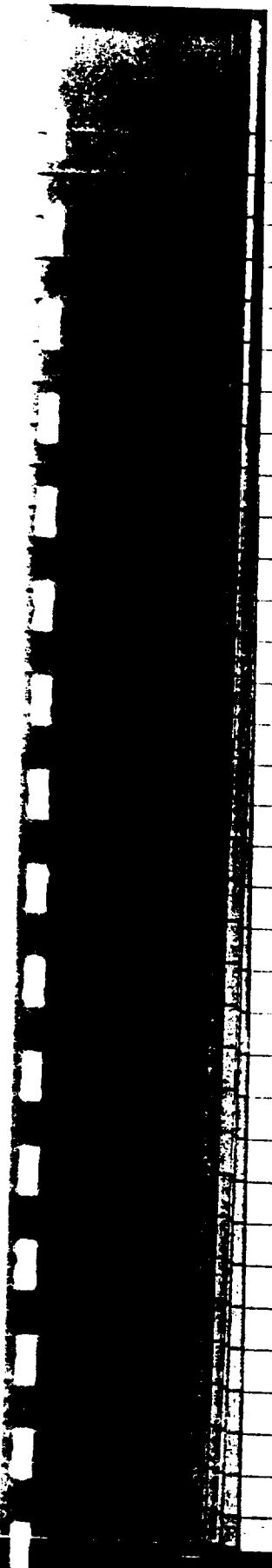
Final wt.		2.5611
Tare wt.		2.5608

Filter gain ____ mg

Beaker gain ____ mg

Blank adjust. (____) mg

Net gain ____ mg 0.3 mg TOTAL = ____ mg



Date	11/18/90	11/20/90
RH% / °F	1600	1210
Cal. Wt.	35/66	37/66
pre	.5000	.5050
post	.5000	.5000
Initials	WMJ	WMJ
filter		
570	~~.3497~~	.3497
571	.3526	.3526
572	.3520	.3520
573	.3520	.3520
574	.3522	.3523
575	~~.3488~~ .3494	.3498
576	.3506	.3506
577	.3566	.3566
578	.3514	.3514
579	.3553	.3553
580	.3557	.3556
581	~~.3554~~ .3557	.3557
582	.3535	.3535
583	.3532	.3532
584	.3507	.3507
585	.3510	.3512
586	.3543	.3544
587	.3518	.3519
588	.3493	.3496
589	.3480	.3482
590	.3552	.3554
591	.3570	.3571
592	.3565	.3570
593	.3554	.3557
594	.3565	.3567
595	.3532	.3535
596	.3574	.3575
597	.3578	.3579

2 yellow (575) (.3494) →

Whatman
934-AH
570-597
Des. 10/19/90
0930

Whatman
934 AH

#'s 541 - 597

8.26 cm

placed in
desic. 10/19/90
0930

DIT	11-18-90 1500 1610	11-20-90 1240
RH%/°F	35/65	37/67
Cal. Wt.		
pre	.5000	.5000
post	.5000	.5001
Initials	WMS	WMS
Filter		
#541	.3489	.3489
#542	.3522	.3522
#543	.3522	.3524
544	.3513	.3513
545	.3460	.3462
546	.3565	.3565
547	.3548	.3550
548	.3534	.3531
549	.3519	.3520
550	.3480	.3481
551	.3572	.3573
552	.3581	.3583
553	.3549	.3552
554	.3555	.3556
555	.3569	.3571
556	.3549	.3553
557	.3577	.3579
558	.3585	.3586
559	.3462	.3463
560	.3453	.3457
561	.3532	.3532
562	.3554	.3558
563	.3553	.3555
564	.3552	.3555
565	.3555	.3559
566	.3544	.3546
567	.3525	.3527
568	.3530	.3531
569	.3524	.3523

Des 1715 2-19-91

Weighing Dishes

26 - 50

70 ml

Date Time	2-24-91 1255	2-20-91 1015
RH% / F	42 / 66	41 / 68
Cal.		
pre	2.0000	2.0000
post	2.0000	1.9999
Initial>	WHH	WHH
26	2.6195	2.6195
27	2.6113	2.6113
28	2.5903	2.5902
29	2.6373	2.6373
30	2.5997	2.5997
31	2.5936	2.5934
32	2.5842	2.5842
33	2.5819	2.5818
34	2.5377	2.5375
35	2.5609	2.5607
36	2.6001	2.5999
37	2.5828	2.5826
38	2.5632	2.5630
39	2.5955	2.5952
40	2.6161	2.6159
41	2.6099	2.6096
42	2.5307	2.5304
43	2.5566	2.5563
44	2.5749	2.5747
45	2.5291	2.5289
46	2.5471	2.5469
47	2.5548	2.5547
48	2.5686	2.5685
49	2.5728	2.5728
50	2.5750	2.5750

[redacted]

Placed in Desiccator

Al. weighing #1-25 dishes (50ml)

2-13-91

10:15

Date	2-14-91	2-15-91
Time	11:25	0810
RH/°F	39/72	42/67
Cal		
pre	2.000	2.000
post	2.000	2.000
Initials	WHH	WHH
1	1.5470	1.5469
2	1.5642	1.5643
3	1.5618	1.5619
4	1.5498	1.5498
5	1.5626	1.5627
6	1.5497	1.5499
7	1.5511	1.5512
8	1.5574	1.5574
9	1.5395	1.5395
10	1.5381	1.5381
11	1.5625	1.5625
12	1.5485	1.5485
13	1.5480	1.5479
14	1.5581	1.5582
15	1.5595	1.5596
16	1.5560	1.5560
17	1.5656	1.5656
18	1.5600	1.5601
19	1.5509	1.5508
20	1.5636	1.5636
21	1.5464	1.5465
22	1.5674	1.5674
23	1.5522	1.5523
24	1.5570	1.5571
25	1.5641	1.5641

SAMPLE RECOVERY DATA

Plant Name Papco Source Plant #5 Project # 135

Reagents Prepared by: WHH

Run #	2	3	4	
Run Date	4-1-91	4-1-91	4-2-91	
Train prepared by	WHH	WHH	WHH	
Train recovered by	WHH	WHH	WHH	
	Identification No.			
Filter	594	593	541	
Probe Rinse (PR)	2	3	4	
Reagent (BH# 1)	2	3	4	
Reagent (BH# 2)	—	—	—	
Silica Gel	2	3	4	
	Moisture Analysis			
Reagent #1 (H2O)				
Initial Volume 300 ml				
Final Weight, g. ml	557	538	423	
Tared Weight, g. ml	200	200	300	
Reagent #2 (NA)				
Initial Volume ____ ml				
Final Weight, g.	NA	NA	NA	
Tared Weight, g.				
Condensed H2O, g	357	338	223	
Silica Gel				
Final Weight, g.	268.4	320.4	347.4	
Tared Weight, g.	250.4	279.5	329.0	
Absorbed H2O, g.	18.0	40.9	18.4	
Total H2O Collected, g.	375.0	358.9	241.4	

Remarks: _____

Relinquished by: NA
Received by: NA
Date/Time: NA

Relinquished by: WHH
Received by lab: WHH
Date/Time: 4/2 15:30

Apex Environmental Services, Inc.

ORSAT FIELD DATA

Plant Name Tapco

Sampling Location Stack Fuel Type #2

Run and/or Sample No. 3 Leak Test? ✓ Date 4/1/91 Operator WH

Time of Sample Collection	Time of Analysis	CO_2 Reading A	O_2 Reading B	CO Reading C	$\%O_2$ B-A	%CO C-B	$\%N_2$ 100-
Run #3	1424	4.2	17.5		13.3		
	1430	4.7	18.6		13.9		
	1435	4.8	19.0		14.2		
	Avg.	4.6		Avg.	13.8		

Run and/or Sample No. 2 Leak Test? ✓ Date 4/1/91 Operator WH

Time of Sample Collection	Time of Analysis	CO_2 Reading A	O_2 Reading B	CO Reading C	$\%O_2$ B-A	%CO C-B	$\%N_2$ 100-
Run #2	1455	6.8	18.7		11.9		
	1505	6.7	18.5		11.8		
	1515	6.8	18.8		12.0		
	Avg.	6.8		Avg.	11.9		

Run and/or Sample No. 4 Leak Test? ✓ Date 4/2/91 Operator WH

Time of Sample Collection	Time of Analysis	CO_2 Reading A	O_2 Reading B	CO Reading C	$\%O_2$ B-A	%CO C-B	$\%N_2$ 100-
Run #4	1136	3.6	19.2		15.6		
	1142	3.7	19.3		15.6		
	1150	3.7	19.3		15.6		
	Avg.	3.7		Avg.	15.6		

ADDITIONAL INFORMATION:

Run #4 - rate 155 tons

VISIBLE EMISSION OBSERVATION FORM 2

M9-1

SOURCE NAME	PAPCO
ADDRESS	SALISBURY PLANT
	AIRPORT RD
CITY	SALISBURY
STATE	NC
ZIP	—
PHONE	—
SOURCE ID NUMBER	

PROCESS EQUIPMENT	DRYER
OPERATING MODE	CONT
CONTROL EQUIPMENT	SCRUBBER
OPERATING MODE	CONT

DESCRIBE EMISSION POINT

START TAN STACK	STOP SAME
HEIGHT ABOVE GROUND LEVEL START ≈35'	STOP ≈35'
HEIGHT RELATIVE TO OBSERVER START ≈25'	STOP ≈25'
DISTANCE FROM OBSERVER START ≈500'	STOP ≈500'
DIRECTION FROM OBSERVER START NW	STOP NW

DESCRIBE EMISSIONS

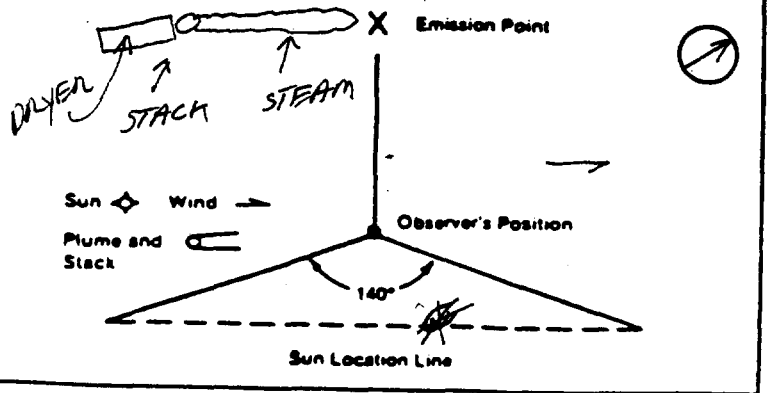
START LOOPING	STOP SAME
EMISSION COLOR START BRWN	STOP SAME
PLUME TYPE	CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT	NO ☐ YES ☒
IS WATER DROPLET PLUME	ATTACHED ☒ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED
START ≈100' OWN WIND STOP SAME

DESCRIBE BACKGROUND

START SKY	STOP SKY
BACKGROUND COLOR START LT GRY	STOP GRY
SKY CONDITIONS START 80%cl	STOP 90%cl
WIND SPEED START 5-10	STOP 5-10
WIND DIRECTION START SW	STOP SW
AMBIENT TEMP ** START 62°F	STOP 65 °F
WET BULB TEMP	59 °F
RH, percent	84%

SOURCE LAYOUT SKETCH



COMMENTS

* SLANT ∠ = 3° ** WB = 60 °F

G = 4 MIN FOR POINT A

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SIGNATURE

TITLE

DATE

OBSERVATION DATE 3/27/91 | START TIME 0726 | STOP TIME 0830

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

RANGE OF OPACITY READINGS MIN 0 MAX —	HIGHEST AVERAGE OPACITY AND AVERAGING PERIOD —
NUMBER OF READINGS ≥ — %	MINUTES OPACITY ≥ — × 0.25 = —

OBSERVER'S NAME (PRINT) JAMES B. WINEGAR

OBSERVER'S SIGNATURE J. B. Winegar | DATE 3/27/91

ORGANIZATION —

CERTIFIED BY ETA | DATE 3/13/91

VERIFIED BY | DATE

VISIBLE EMISSION OBSERVATION FORM 2

M9-02

SOURCE NAME	PAPCO
ADDRESS	SALISBURY PLANT
	AIRPORT RD
CITY	SALISBURY
STATE	NC
ZIP	—
PHONE	—
SOURCE ID NUMBER	

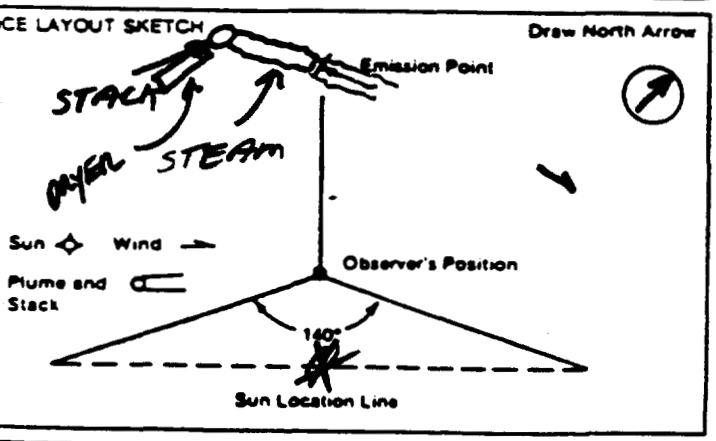
PROCESS EQUIPMENT	DRYER
OPERATING MODE	CONT
CONTROL EQUIPMENT	SCRUBBER
OPERATING MODE	CONT

DESCRIBE EMISSION POINT	
START TAN STACK	STOP SAME
HEIGHT ABOVE GROUND LEVEL START ≈ 35'	STOP ≈ 35'
HEIGHT RELATIVE TO OBSERVER START ≈ 25'	STOP ≈ 25'
DISTANCE FROM OBSERVER START ≈ 700'	STOP ≈ 700'
DIRECTION FROM OBSERVER START NW	STOP NW

DESCRIBE EMISSIONS	
START LOOPING	STOP SAME
EMISSION COLOR START LT BRN	STOP SAME
PLUME TYPE	CONTINUOUS ☑
	FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT	NO ☐ YES ☑
IS WATER DROPLET PLUME	ATTACHED ☑ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START ≈ 100' OWN WIND STOP SAME

DESCRIBE BACKGROUND	
START SKY	STOP SKY
BACKGROUND COLOR START BL	STOP BL-UH
SKY CONDITIONS START 0% cl	STOP 15% cl
WIND SPEED START 8-15	STOP 8-15
WIND DIRECTION START W	STOP VAR
AMBIENT TEMP START 63°F	STOP 66°F
WET BULB TEMP	50°F
RH, percent	39%

SOURCE LAYOUT SKETCH



OBSERVATION DATE	START TIME	STOP TIME
4/1/91	1016	1121

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

RANGE OF OPACITY READINGS MIN 0 MAX 30	HIGHEST AVERAGE OPACITY AND AVERAGING PERIOD —
NUMBER OF READINGS ≥ 20 % 11	MINUTES OPACITY ≥ 20 → 11 × 0.25 = 2.75

COMMENTS

* SLANT ∠ = 2°

G = 5 MIN

OBSERVER'S NAME (PRINT)	JAMES B. WINEGAR
OBSERVER'S SIGNATURE	J B Winegar
DATE	4/1/91
ORGANIZATION	—
CERTIFIED BY	ETA
DATE	3/13/91
VERIFIED BY	
DATE	

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SIGNATURE

TITLE

DATE

VISIBLE EMISSION OBSERVATION FORM 2

M9-03

SOURCE NAME: PAPCO		
ADDRESS: SALISBURY PLANT		
AIRPORT RD		
CITY: SALISBURY	STATE: NC	ZIP: —
PHONE: —	SOURCE ID NUMBER:	

PROCESS EQUIPMENT: DRYER	OPERATING MODE: CONT
CONTROL EQUIPMENT: SCRUBBER	OPERATING MODE: CONT

DESCRIBE EMISSION POINT

START: TAN STACK STOP: SAME

HEIGHT ABOVE GROUND LEVEL: START ≈35' STOP ≈35'	HEIGHT RELATIVE TO OBSERVER: START ≈35' STOP ≈35'
DISTANCE FROM OBSERVER: START ≈300' STOP ≈300'	DIRECTION FROM OBSERVER: START N-NE STOP N-NE

DESCRIBE EMISSIONS

START: CONING STOP: SAME

EMISSION COLOR: START LT BRN STOP SAME	PLUME TYPE: CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☐ YES ☑	IS WATER DROPLET PLUME: ATTACHED ☑ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED

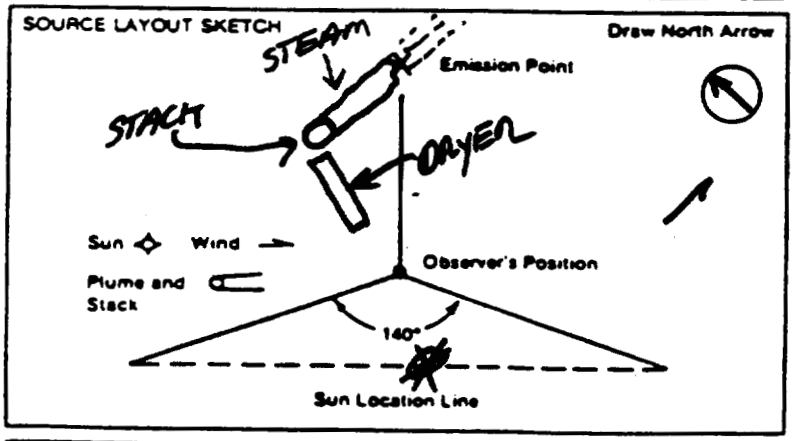
START: ≈100' DUNWILL STOP: SAME

DESCRIBE BACKGROUND

START: SKY STOP: SKY

BACKGROUND COLOR: START BL-WH STOP BL-WH	SKY CONDITIONS: START 30%cl STOP 50%cl	
WIND SPEED: START 5-10 STOP 10-20	WIND DIRECTION: START W STOP W	
AMBIENT TEMP: START 69°F STOP 72°F	WET BULB TEMP: 56°F	RH, percent: 43%

SOURCE LAYOUT SKETCH



OBSERVATION DATE	START TIME	STOP TIME
4/1/91	1258	1300

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

RANGE OF OPACITY READINGS: MIN 0 MAX 25	HIGHEST AVERAGE OPACITY AND AVERAGING PERIOD: —
NUMBER OF READINGS ≥ 20 %: 7	MINUTES OPACITY ≥ 20: 7 × 0.25 = 1.75

COMMENTS

* SLANT ∠ = 7°

G = 2 MIN

OBSERVER'S NAME (PRINT): JAMES O. LINEGAR	
OBSERVER'S SIGNATURE: J. O. Linegar	DATE: 4/1/91
ORGANIZATION: —	
CERTIFIED BY: ETA	DATE: 3/13/91
VERIFIED BY	DATE

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

TITLE

DATE

VISIBLE EMISSION OBSERVATION FORM 2

M9-04

SOURCE NAME: PARCO

ADDRESS: SALISBURY PLANT

AIRPORT RD

CITY: SALISBURY | STATE: NC | ZIP: —

PHONE: — | SOURCE ID NUMBER:

PROCESS EQUIPMENT: DRYER | OPERATING MODE: CONT

CONTROL EQUIPMENT: SCRUBBER | OPERATING MODE: CONT

DESCRIBE EMISSION POINT

START: TAN STACK | STOP: SAME

HEIGHT ABOVE GROUND LEVEL: START ≈ 35' STOP ≈ 35' | HEIGHT RELATIVE TO OBSERVER: START ≈ 25' STOP ≈ 25'

DISTANCE FROM OBSERVER: START ≈ 500' STOP ≈ 500' | DIRECTION FROM OBSERVER: START W STOP W

DESCRIBE EMISSIONS

START: CONING | STOP: SAME

EMISSION COLOR: START LT BRN STOP SAME | PLUME TYPE: CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐

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

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START ≈ 75' ABOVE | STOP: SAME

DESCRIBE BACKGROUND

START: SKY | STOP: SKY

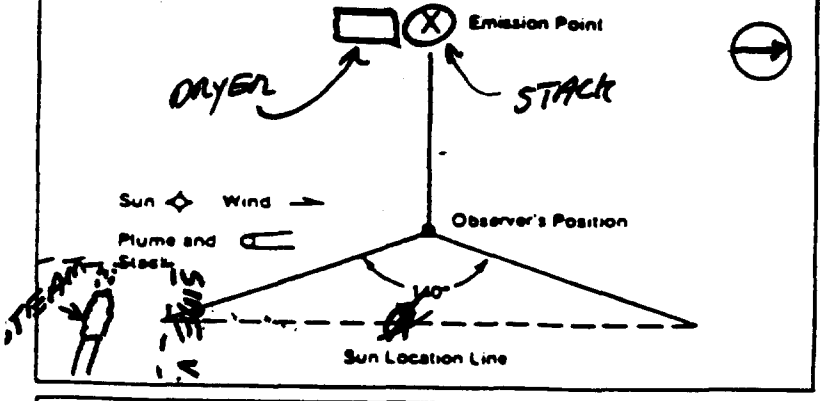
BACKGROUND COLOR: START BL STOP BL | SKY CONDITIONS: START 0%cl STOP 0%cl

WIND SPEED: START 2-4 STOP 2-4 | WIND DIRECTION: START VAR STOP VAR

AMBIENT TEMP: START 61°F STOP — | WET BULB TEMP: 50°F | RH, percent: 46%

SOURCE LAYOUT SKETCH

Draw North Arrow



COMMENTS

* SLANT 4 = 3°

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

TITLE | DATE

OBSERVATION DATE: 4/2/91 | START TIME: 1000 | STOP TIME: 1100

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

RANGE OF OPACITY READINGS: MIN 0 MAX 25 | HIGHEST AVERAGE OPACITY AND AVERAGING PERIOD: —

NUMBER OF READINGS ≥ 20 %: 8 | MINUTES OPACITY ≥ 20: 8 x 0.25 = 2.00

OBSERVER'S NAME (PRINT): JAMES B. WINEGAR

OBSERVER'S SIGNATURE: J. B. Winegar | DATE: 4/2/91

ORGANIZATION: —

CERTIFIED BY: ETA | DATE: 3/13/91

VERIFIED BY: | DATE:

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

PLANT : PAPCO
PLANT SITE : SALISBURY . NC
SAMPLING LOCATION : STACK
TEST # : 139-1
DATE : 04/25/91
TEST PERIOD : 0817-0922

PARAMETER	VALUE
Sampling time (min.)	60
Barometric Pressure (in.Hg)	29.45
Sampling nozzle diameter (in.)	.311
Meter Volume (cu.ft.)	54.07697
Meter Pressure (in.H20)	2.6
Meter Temperature (F)	116.05
Stack dimension (sq.in.)	1809.562
Stack Static Pressure (in.H20)	-.13
Stack Moisture Collected (gm)	220.4508
Absolute stack pressure(in Hg)	29.44044
Average stack temperature (F)	143
Percent CO2	3.2
Percent O2	16.8
Percent N2	80
Delps Subroutine result	14.17303
DGM Factor	1.014
Pitot Constant	.84

APEX SOURCE TEST
EPA METHODS 2-5
FINAL RESULTS

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 139-1
DATE : 04/25/91
TEST PERIOD : 0817-0922

PARAMETER	RESULT
Vm(dscf)	49.79182
Vm(dscm)	1.410104
Vw gas(scf)	10.39426
Vw gas (scm)	.2943653
% moisture	17.2702
Md	.827298
MWd	29.184
MW	27.2525
Vs(fpm)	2155.923
Vs (mpm)	657.2937
Flow(acfm)	27092.2
Flow(acmm)	767.2511
Flow(dscfm)	19311.04
Flow(dscmm)	546.8886
% I	102.4282
% EA	388.8889

Program Revision:9/10/89

APEX SOURCE TEST
EPA METHOD 5
PARTICULATE LOADING

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 139-1
DATE : 04/25/91
TEST PERIOD : 0817-0922

PARAMETER	FRONT-HALF	TRAIN TOTAL
Total Grams	0.2252300	0.2252300
Grams/dscf	0.0045234	0.0045234
Grams/acf	0.0032243	0.0032243
Grains/dscf	0.0697966	0.0697966
Grains/acf	0.0497503	0.0497503
Grams/dscm	0.1597225	0.1597225
Grams/acm	0.1138485	0.1138485
Pounds/dscf	0.0000100	0.0000100
Pounds/acf	0.0000071	0.0000071
Pounds/Hr	11.5567000	11.5567000
Kilograms/Hr	5.2420840	5.2420840

* BACK-HALF IMPINGER ANALYSIS WAS NOT REQUIRED

Program Revision:9/10/89

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

PLANT : PAPCO
PLANT SITE : SALISBURY . NC
SAMPLING LOCATION : STACK
TEST # : 139-2
DATE : 04/25/91
TEST PERIOD : 1003

PARAMETER	VALUE
Sampling time (min.)	60
Barometric Pressure (in.Hg)	29.45
Sampling nozzle diameter (in.)	.311
Meter Volume (cu.ft.)	54.09699
Meter Pressure (in.H20)	2.54
Meter Temperature (F)	134.35
Stack dimension (sq.in.)	1809.562
Stack Static Pressure (in.H20)	-.13
Stack Moisture Collected (gm)	227.8148
Absolute stack pressure(in Hg)	29.44044
Average stack temperature (F)	143.75
Percent CO2	4
Percent O2	15.8
Percent N2	80.2
Delps Subroutine result	14.02471
DGM Factor	1.014
Pitot Constant	.84

APEX SOURCE TEST
EPA METHODS 2-5
FINAL RESULTS

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 139-2
DATE : 04/25/91
TEST PERIOD : 1003

PARAMETER	RESULT
Vm(dscf)	48.26941
Vm(dscm)	1.36699
Vw gas(scf)	10.74147
Vw gas (scm)	.3041984
% moisture	18.20252
Md	.8179748
MWd	29.272
MW	27.22021
Vs(fpm)	2134.626
Vs (mpm)	650.8006
Flow(acfm)	26824.57
Flow(acmm)	759.6718
Flow(dscfm)	18881.31
Flow(dscmm)	534.7188
% I	101.5563
% EA	294.074

Program Revision:9/10/89

APEX SOURCE TEST
EPA METHOD 5
PARTICULATE LOADING

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 139-2
DATE : 04/25/91
TEST PERIOD : 1003

PARAMETER	FRONT-HALF	TRAIN TOTAL
Total Grams	0.1595100	0.1595100
Grams/dscf	0.0033046	0.0033046
Grams/acf	0.0023260	0.0023260
Grains/dscf	0.0509896	0.0509896
Grains/acf	0.0358907	0.0358907
Grams/dscm	0.1166847	0.1166847
Grams/acm	0.0821321	0.0821321
Pounds/dscf	0.0000073	0.0000073
Pounds/acf	0.0000051	0.0000051
Pounds/Hr	8.2548280	8.2548280
Kilograms/Hr	3.7443650	3.7443650

* BACK-HALF IMPINGER ANALYSIS WAS NOT REQUIRED

Program Revision:9/10/89

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

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 139-3
DATE : 04/25/91
TEST PERIOD : 1140-1243

PARAMETER	VALUE
Sampling time (min.)	60
Barometric Pressure (in.Hg)	29.45
Sampling nozzle diameter (in.)	.311
Meter Volume (cu.ft.)	53.37598
Meter Pressure (in.H20)	2.57
Meter Temperature (F)	129.9
Stack dimension (sq.in.)	1809.562
Stack Static Pressure (in.H20)	-.13
Stack Moisture Collected (gm)	224.0256
Absolute stack pressure(in Hg)	29.44044
Average stack temperature (F)	147.8
Percent CO2	3.6
Percent O2	16.3
Percent N2	80.1
Delps Subroutine result	14.07953
DGM Factor	1.014
Pitot Constant	.84

APEX SOURCE TEST
EPA METHODS 2-5
FINAL RESULTS

PLANT : PAPCO
PLANT SITE : SALISBURY , NC
SAMPLING LOCATION : STACK
TEST # : 139-3
DATE : 04/25/91
TEST PERIOD : 1140-1243

PARAMETER	RESULT
Vm(dscf)	47.98891
Vm(dscm)	1.359046
Vw gas(scf)	10.56281
Vw gas (scm)	.2991387
% moisture	18.04013
Md	.8195987
MWd	29.228
MW	27.20245
Vs(fpm)	2143.669
Vs (mpm)	653.5577
Flow(acfm)	26938.21
Flow(acmm)	762.8901
Flow(dscfm)	18872.35
Flow(dscmm)	534.4649
% I	101.0141
% EA	336.3322

Program Revision:9/10/89

APEX SOURCE TEST
EPA METHOD 5
PARTICULATE LOADING

PLANT	: PAPCO
PLANT SITE	: SALISBURY , NC
SAMPLING LOCATION	: STACK
TEST #	: 139-3
DATE	: 04/25/91
TEST PERIOD	: 1140-1243

PARAMETER	FRONT-HALF	TRAIN TOTAL
Total Grams	0.1811300	0.1811300
Grams/dscf	0.0037744	0.0037744
Grams/acf	0.0026443	0.0026443
Grains/dscf	0.0582392	0.0582392
Grains/acf	0.0408012	0.0408012
Grams/dscm	0.1332746	0.1332746
Grams/acm	0.0933694	0.0933694
Pounds/dscf	0.0000083	0.0000083
Pounds/acf	0.0000058	0.0000058
Pounds/Hr	9.4240010	9.4240010
Kilograms/Hr	4.2746990	4.2746990

* BACK-HALF IMPINGER ANALYSIS WAS NOT REQUIRED

Program Revision:9/10/89

Name of Source: PAPCO

Observer: JAMES B. WINEGAR

File Name: P139

Start Time: 0819 Stop Time: 0919 Date of Test: 04 25 1991

- O R I G I N A L D A T A -

Sec>> Min	00	15	30	45	Sec>> Min	00	15	30	45
1	10	15	15	10	31	10	10	10	15
2	20	15	20	20	32	10	15	5	10
3	20	10	5	5	33	5	10	5	5
4	5	15	10	15	34	15	15	10	10
5	10	5	5	25	35	15	15	15	15
6	10	15	5	5	36	20	10	15	15
7	5	5	10	10	37	25	15	10	10
8	15	10	5	5	38	15	10	15	15
9	5	5	5	5	39	20	20	15	15
10	5	5	10	5	40	15	10	25	25
11	5	5	5	5	41	20	15	15	20
12	5	5	5	5	42	20	20	15	15
13	15	5	15	10	43	10	30	25	10
14	10	10	10	5	44	15	10	5	10
15	10	10	15	15	45	15	15	10	5
16	10	15	15	15	46	10	10	15	10
17	15	10	15	10	47	10	20	15	15
18	10	5	5	5	48	5	10	10	10
19	10	10	5	10	49	10	10	5	5
20	10	15	10	5	50	5	10	5	5
21	15	10	10	5	51	5	10	15	10
22	10	25	15	20	52	10	10	5	10
23	15	15	15	15	53	10	10	5	10
24	15	30	20	15	54	5	5	5	10
25	20	10	15	15	55	15	10	5	10
26	15	15	10	15	56	5	5	15	10
27	15	15	15	20	57	10	5	20	15
28	15	10	15	15	58	15	10	20	5
29	10	10	5	10	59	15	10	5	15
30	10	10	5	15	60	10	10	10	15

NOTE: _____

DATE PRINT: 05-08-1991 TIME PRINT: 09:38:22

Name of Source: PAPCO

Observer: JAMES B. WINEGAR

File Name: P139

Start Time: 0819 Stop Time: 0919 Date of Test: 04 25 1991

- R O L L I N G A V E R A G E S -

Sec>> Min	00	15	30	45	Sec>> Min	00	15	30	45
1	-	-	-	-	31	13	13	12	12
2	-	-	-	-	32	12	12	12	12
3	-	-	-	-	33	11	11	11	10
4	-	-	-	-	34	10	10	10	10
5	-	-	-	-	35	10	10	11	11
6	-	-	-	12	36	11	11	12	12
7	12	11	11	11	37	12	13	13	12
8	11	11	10	10	38	13	12	13	13
9	9	9	9	9	39	14	14	14	15
10	9	8	8	8	40	15	15	15	16
11	8	8	8	7	41	16	16	16	16
12	7	6	6	6	42	16	17	17	17
13	7	7	7	7	43	16	17	17	17
14	7	7	7	7	44	17	17	17	17
15	7	7	8	8	45	16	16	16	16
16	8	9	9	9	46	15	15	15	14
17	10	10	10	11	47	14	14	14	14
18	11	11	11	11	48	13	13	13	13
19	11	11	10	10	49	13	12	11	11
20	10	11	11	11	50	10	10	10	10
21	11	11	11	10	51	10	9	10	10
22	10	11	11	11	52	10	10	9	9
23	11	11	11	11	53	9	9	9	8
24	11	13	13	14	54	8	8	8	8
25	14	14	14	15	55	8	8	8	8
26	15	15	15	15	56	8	8	9	9
27	15	15	16	16	57	9	9	9	9
28	16	16	16	16	58	9	9	10	10
29	15	15	15	15	59	10	10	10	10
30	14	14	13	13	60	10	11	11	11

BLOCK SIZE (for Rolling Averages) = 24 READINGS

*The highest BLOCK in this ROLLING AVERAGE is at 43 Min and 30 Sec

>> OPERATION WAS PERFORMED ON THE: original DATA. <<

NOTE: _____

DATE PRINT: 05-08-1991 TIME PRINT: 09:38:53

Name of Source: PAPCO

Observer: JAMES B.WINEGAR

File Name: P139-2

Start Time: 1003 Stop Time: 1103 Date of Test: 04-25-1991

- O R I G I N A L D A T A -

Sec>> Min	00	15	30	45	Sec>> Min	00	15	30	45
1	15	15	5	25	31	30	15	5	10
2	20	15	15	30	32	10	5	5	5
3	25	30	20	15	33	5	5	5	5
4	15	10	15	10	34	5	15	10	5
5	15	10	10	25	35	5	15	20	20
6	15	15	15	15	36	20	15	30	20
7	5	10	15	15	37	30	20	15	20
8	10	15	15	10	38	20	15	10	20
9	15	5	10	25	39	10	5	5	10
10	10	15	15	10	40	5	5	10	5
11	10	10	20	10	41	5	10	5	10
12	10	10	25	15	42	15	15	15	15
13	15	15	15	10	43	10	5	10	5
14	10	15	10	10	44	15	10	10	10
15	10	10	10	15	45	5	5	15	10
16	10	15	10	15	46	10	5	5	10
17	5	5	10	5	47	10	10	15	5
18	10	5	10	20	48	10	5	10	10
19	25	15	5	5	49	10	15	15	15
20	5	5	5	10	50	25	15	15	15
21	10	5	5	10	51	10	5	10	10
22	10	15	25	25	52	10	5	10	15
23	10	5	5	5	53	10	15	20	25
24	5	15	20	20	54	25	30	20	20
25	20	15	20	15	55	20	20	20	20
26	20	25	20	20	56	30	15	5	10
27	20	20	15	20	57	15	15	10	15
28	10	10	20	15	58	20	20	25	20
29	10	5	10	10	59	25	10	15	20
30	10	15	10	10	60	25	20	25	15

NOTE: _____

DATE PRINT: 05-08-1991 TIME PRINT: 09:40:11

Name of Source: PAPCO

Observer: JAMES B.WINEGAR

File Name: P139-2

Start Time: 1003 Stop Time: 1103 Date of Test: 04-25-1991

- R O L L I N G A V E R A G E S -

Sec>> / Min	00	15	30	45	Sec>> / Min	00	15	30	45
1	-	-	-	-	31	16	16	15	15
2	-	-	-	-	32	14	14	13	12
3	-	-	-	-	33	12	11	11	10
4	-	-	-	-	34	10	10	10	9
5	-	-	-	-	35	9	9	10	10
6	-	-	-	17	36	11	11	11	12
7	16	16	16	16	37	12	12	12	13
8	16	16	16	15	38	13	14	14	15
9	14	13	13	13	39	15	15	15	15
10	13	13	13	13	40	15	15	15	15
11	13	13	14	13	41	15	14	14	13
12	13	13	13	13	42	13	13	12	12
13	13	14	14	13	43	11	11	11	10
14	13	13	13	13	44	10	10	10	9
15	13	13	13	13	45	9	9	9	9
16	13	13	13	13	46	10	10	9	10
17	13	12	12	12	47	10	10	10	10
18	12	11	11	11	48	10	9	9	9
19	11	11	11	11	49	9	9	10	10
20	11	10	10	10	50	10	11	11	11
21	10	10	10	9	51	11	11	11	11
22	9	9	10	10	52	11	11	11	11
23	11	11	10	10	53	11	12	12	13
24	10	11	11	11	54	13	14	15	15
25	11	11	11	12	55	16	16	16	16
26	12	13	14	14	56	16	16	16	16
27	15	15	16	16	57	16	16	16	17
28	16	16	16	15	58	17	18	18	19
29	15	15	16	16	59	19	19	19	19
30	16	16	16	15	60	19	18	18	18

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BLOCK SIZE (for Rolling Averages) = 24 READINGS

*The highest BLOCK in this ROLLING AVERAGE is at 59 Min and 0 Sec

>> OPERATION WAS PERFORMED ON THE: original DATA. <<

NOTE: _____

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DATE PRINT: 05-08-1991 TIME PRINT: 09:42:43

Name of Source: PAPCO

Observer: JAMES B.WINEGAR

File Name: P139-3

Start Time: 1140 Stop Time: 1240 Date of Test: 04-25-1991

- O R I G I N A L D A T A -

Sec>> Min	00	15	30	45	Sec>> Min	00	15	30	45
1	10	15	10	5	31	15	30	15	20
2	10	5	10	10	32	15	10	20	15
3	15	5	15	20	33	10	10	15	5
4	15	10	15	15	34	10	10	10	5
5	10	20	10	10	35	5	5	5	5
6	20	15	15	20	36	15	5	5	5
7	30	25	15	10	37	5	5	5	5
8	15	20	15	10	38	10	20	30	20
9	10	15	15	15	39	15	15	10	15
10	20	20	15	10	40	10	10	10	20
11	30	25	10	10	41	15	15	10	10
12	5	5	15	20	42	5	5	5	5
13	15	15	5	5	43	10	20	5	5
14	5	5	5	15	44	5	5	5	5
15	20	30	30	25	45	5	5	5	5
16	20	15	10	10	46	5	10	10	10
17	5	5	5	5	47	15	5	10	5
18	5	5	20	15	48	15	5	10	15
19	15	15	10	5	49	15	10	20	5
20	10	10	10	20	50	5	5	10	5
21	5	15	15	20	51	5	5	15	15
22	15	15	20	20	52	10	5	5	5
23	15	15	15	15	53	5	10	25	5
24	15	15	20	10	54	15	20	15	30
25	20	25	25	20	55	10	10	5	5
26	20	15	20	30	56	5	5	30	30
27	15	15	20	20	57	15	20	15	15
28	15	15	10	10	58	15	25	25	20
29	10	10	15	25	59	20	10	5	5
30	20	20	15	15	60	5	5	25	25

NOTE: _____

DATE PRINT: 05-08-1991 TIME PRINT: 09:43:29

Name of Source: PAPCO

Observer: JAMES B.WINEGAR

File Name: P139-3

Start Time: 1140 Stop Time: 1240 Date of Test: 04-25-1991

- R O L L I N G A V E R A G E S -

Sec>> / Min	00	15	30	45	Sec>> / Min	00	15	30	45
1	-	-	-	-	31	17	18	17	17
2	-	-	-	-	32	17	17	17	16
3	-	-	-	-	33	16	16	16	15
4	-	-	-	-	34	15	15	15	14
5	-	-	-	-	35	14	14	14	13
6	-	-	-	13	36	12	12	11	11
7	14	14	14	14	37	11	10	9	9
8	15	15	15	15	38	8	9	9	9
9	15	16	16	15	39	10	10	10	10
10	16	16	16	16	40	10	10	10	11
11	17	17	17	17	41	11	11	12	12
12	16	16	16	16	42	11	11	11	11
13	15	15	14	14	43	12	12	12	12
14	14	13	13	13	44	12	11	10	10
15	13	14	15	15	45	9	9	9	8
16	15	15	15	15	46	8	8	8	8
17	14	13	12	12	47	8	7	7	7
18	12	12	12	12	48	7	7	8	8
19	12	12	12	12	49	8	8	9	9
20	13	13	13	13	50	9	9	9	9
21	13	12	11	11	51	9	9	9	10
22	11	11	11	12	52	10	10	9	9
23	12	13	13	14	53	9	9	10	10
24	14	14	14	14	54	10	10	10	11
25	14	15	15	16	55	11	11	10	10
26	16	17	17	18	56	10	10	11	12
27	18	18	18	18	57	12	13	13	13
28	18	18	18	17	58	13	14	15	16
29	17	17	17	17	59	16	16	15	15
30	17	18	17	18	60	15	14	15	15

BLOCK SIZE (for Rolling Averages) = 24 READINGS

*The highest BLOCK in this ROLLING AVERAGE is at 27 Min and 30 Sec

>> OPERATION WAS PERFORMED ON THE: original DATA. <<

NOTE: _____

APEX SOURCE TEST
EPA METHOD 2-5
SAMPLE CALCULATION

PLANT	: PAPCO
PLANT SITE	: SALISBURY , NC
SAMPLING LOCATION	: STACK
TEST #	: 139-1
DATE	: 04/25/91
TEST PERIOD	: 0817-0922

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

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

$$Vm(std) = \frac{1.014 \times 54.07697 \times 528 \times [29.45 + (2.6/13.6)]}{29.92 \times (116.05 + 460)}$$

$$Vm(std) = 49.792 dscf$$

2) Volume of water vapor at standard conditions:

$$Vw(gas) = 0.04715\ cf/gm \times W(1)\ gm$$

$$Vw(gas) = 0.04715 \times 220.4508 = 10.394\ scf$$

3) Percent Moisture in stack gas :

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

$$\%M = \frac{100 \times 10.394}{49.792 + 10.394} = 17.27\ \%$$

4) Mole fraction of dry stack gas :

$$Md = \frac{100 - \%M}{100} = \frac{100 - 17.27}{100} = .827298$$

SAMPLE CALCULATION
PAGE TWO

5)Average Molecular Weight of DRY stack gas :

MWd = (.44 x %CO2) + (.32 x %O2) + (.28 x %N2)

MWd = (.44 x 3.2) + (.32 x 16.8) + (.28 x 80) = 29.184

6)Average Molecular Weight of wet stack gas :

MW = MWd x Md + 18(1 - Md)

MW = 29.184 x .827298 + 18(1 - .827298) = 27.2525

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

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

Vs = 85.49 x .84 x 60 x 14.17303 x SQRT[1/(29.44044 X 27.2525)]

Vs = 2155.923 FPM

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

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

$$Qsd = \frac{2155.923 \times 1809.562 \times .827298 \times 528 \times 29.44044}{144 \times 603 \times 29.92}$$

Qsd = 19311.04 dscfm

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

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

$$I\% = \frac{1039.574 \times 49.79182 \times 603}{2155.923 \times 60 \times 29.44044 \times .827298 \times (.311)^2}$$

I% = 102.4282

10) Excess air (%) :

$$EA = \frac{100 \times \%O2}{(.264 \times \%N2) - \%O2} = \frac{100 \times 16.8}{(.264 \times 80) - 16.8}$$

EA = 388.89

11) Particulate Concentration :

Cs = (grams part.) / Vm(std) = .22523 / 49.79182

Cs = 0.0045234 Grams/DSCF

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

$$Ca = \frac{528 \times .827298 \times 29.44044 \times 0.0045234}{29.92 \times 603}$$

Ca = 0.0032243 Grams/ACF

LBS/HR = Cs x 0.002205 x Qsd x 60

LBS/HR = 0.0045234x 0.002205 x 19311.0 x 60

LBS/HR = 11.5567

Program Revision:9/10/89

PARTICULATE FIELD DATA

COMPANY NAME Tapco - Plant #5 DATE 4-25-91
SAMPLING LOCATION Stack OPERATOR Witt PROJECT NO. 139
BAROMETRIC PRESSURE, IN. Hg 29.45 STATIC PRESSURE, IN. H2O -.13 RUN NO. 1

LEAK CHECKS
PRE .004 cfm @ 15 in. Hg
POST .004 cfm @ 4 in. Hg
PITOT ✓ ORSAT ✓

ID NUMBER
NOZZLE 10-2 DIAMETER .311
SAMPLE BOX 1 TEDLAR BAG 1
PROBE 6-1 METER BOX 1
FILTER 592

NOMAGRAPH
METER dH@ 1.826 % MOISTURE 16
METER TEMP 110 METER Y 1.014
STACK TEMP 140 K FACTOR 7.7

TRAV. POINT NO.	SAMPLING TIME (min.)	CLOCK TIME	DGM READING (Vm) ft3	VELOCITY HEAD dP in.H2O	ORIFICE dH in. H2O	STACK TEMP (Ts), F	DGM TEMP (Tm),F in	DGM TEMP (Tm),F out	FILTER TEMP F	IMP. TEMP F	PUMP VAC. in Hg
A-1	0	0817	881.406	.25	1.8	132	120	73	270	62	1
2	3	0820	883.5	.30	2.3	143	132	73	318	42	1
3	6	0823	885.8	.34	2.6	144	138	78	271	44	1
4	9	0827	889.3	.41	3.1	145	141	82	253	49	2
5	12	0830	892.3	.43	3.3	145	140	83	246	57	2
6	15	0833	895.2	.41	3.1	145	141	85	242	60	2
7	18	0836	898.2	.37	2.8	144	139	89	240	61	2
8	21	0839	901.0	.37	2.8	144	139	90	240	63	2
9	24	0842	903.8	.32	2.4	144	141	92	242	64	2
10	27	0845	906.5	.27	2.1	143	140	93	244	65	2
B-1	30/30	0848	909.1	.26	2.0	137	132	93	253	43	2
2	33	0855	911.4	.22	1.7	143	146	94	256	40	2
3	36	0858	913.8	.27	2.1	144	143	96	258	62	2
4	39	0901	916.2	.28	2.2	144	144	98	258	56	2
5	42	0904	918.7	.34	2.6	144	144	98	258	53	2
6	45	0907	921.2	.41	3.1	144	146	102	255	51	3
7	48	0910	924.1	.44	3.4	145	147	103	254	52	3
8	51	0913	927.2	.41	3.1	144	148	104	251	52	3
9	54	0916	930.1	.36	2.7	144	147	104	248	52	3
10	57	0919	933.0	.27	2.1	142	145	105	247	52	3
-	60	0922	935.483								
				$\sqrt{\Delta P}$ =							
				.577 ✓			140.4	91.75			
					2.6	143	—	116.05			

PLANT NAME Apco PROJECT # 139 RUN # 1

Analyzed by: WHH Leakage ? NO If Yes, est. volume. ____

Probe Rinse (PR)

Acetone Lot # 891694
bottle wt. w/rinse 137 g
bottle rinse wt. 16 g
bottle tare wt. (96) g

net rinse 57 g

Placed In Desiccator

	Time	Date
Filter	1940	4-25
PR Beaker	1345	4-26

Blank Adjustment = blank conc. 0.01 mg/g x net rinse 57 g = .57 mg

	Date/time	Filter # 592	Beaker # 6	Room conditions R.H.%	Room conditions temp.	Cal. audit
wt.1	4-26 1500	.5314		42	73	.5000
wt.2	4-27 1410	.5314	1.6610	44	72	.5000 -2.0000
wt.3	4-28 1315		1.6010	45	72	2.0000
wt.4						
wt.5						
wt.6						
wt.7						
wt.8						
wt.9						

Final wt.	.5314	1.6010
Tare wt.	.3568	1.5498

Filter gain 174.6 mg
Beaker gain 51.2 mg
Blank adjust. (.57) mg

Net gain 174.6 mg 51.2 mg TOTAL = 225.23 mg

PARTICULATE FIELD DATA

DATE 4-25-91
PROJECT NO. 139
RUN NO. 2

COMPANY NAME Papco - Plant #5
SAMPLING LOCATION Stack OPERATOR WHH
BAROMETRIC PRESSURE, IN. Hg 29.45 STATIC PRESSURE, IN. H2O -.13

LEAK CHECKS
PRE .004 cfm @ 11 in. Hg
POST .004 cfm @ 6 in. Hg
PITOT ✓ ORSAT ✓

ID NUMBER
NOZZLE 10-1 DIAMETER .361
SAMPLE BOX 1 TEDLAR BAG 2
PROBE 6-2 METER BOX 1
FILTER 591

NOMAGRAPH
METER dH@ 1.822 % MOISTURE 16
METER TEMP 120 METER Y 1.014
STACK TEMP 145 K FACTOR 2.7

TRAV. POINT NO.	~~Clock~~ SAMPLING TIME (min.)	~~Sample~~ CLOCK TIME	DGM READING (Vm) ft3	VELOCITY HEAD dP in.H2O	ORIFICE dH in. H2O	STACK TEMP (Ts), F	DGM TEMP (Tm),F in	DGM TEMP (Tm),F out	FILTER TEMP F	IMP. TEMP F	PUMP VAC. in Hg
A-1	1003	0	935.708	.27	2.1	140	126	95	262	44	2
2	1006	3	938.0	.32	2.4	142	144	97	235	39	3
3	1009	6	940.6	.37	2.8	144	147	102	245	43	4
4	1012	9	943.6	.39	3.0	144	151	105	254	45	4
5	1015	12	946.5	.42	3.2	144	152	105	252	48	4
6	1018	15	949.4	.43	3.3	144	153	106	253	51	4
7	1021	18	952.3	.40	3.1	144	154	109	255	52	4
8	1024	21	955.3	.34	2.6	144	156	113	260	53	4
9	1027	24	958.2	.32	2.4	144	155	116	265	53	4
10	1030	27	960.7	.29	2.2	143	157	115	269	54	4
B-1	1033/1036	30/30	963.4	.18	1.4	140	148	118	251	52	2
2	1039	33	965.4	.23	1.8	143	156	119	260	51	3
3	1042	36	967.7	.26	2.0	144	159	120	235	53	3
4	1045	39	970.2	.29	2.2	144	158	119	234	53	4
5	1048	42	972.7	.34	2.6	146	160	122	247	55	4
6	1051	45	975.4	.43	3.3	146	162	121	251	54	5
7	1054	48	978.4	.44	3.4	146	165	123	254	58	6
8	1057	51	982.4	.39	3.0	145	165	125	262	60	6
9	1100	54	984.6	.30	2.4	144	164	124	264	61	6
10	1103	57	987.6	.20	1.6	144	163	126	266	61	3
-	1106	60	989.805								
					.54			134.35			

PLANT NAME Papco PROJECT # 139 RUN # 2

Analyzed by: WHH Leakage ? NO If Yes, est. volume. ____

Probe Rinse (PR)

Acetone Lot # 891644
bottle wt. w/rinse 142 g
bottle rinse wt. 12 g
bottle tare wt. (95)g

net rinse 59 g

Placed In Desiccator

	Time	Date
Filter	1840	4-25
PR Beaker	1345	4-24

Blank Adjustment = blank conc. 0.01 mg/g x net rinse 59 g = .59 mg

	Date/time	Filter # 591	Beaker # 7	Room conditions R.H.%	Room conditions temp.	Cal. audit
wt.1	4-24 1500	.4725		42	73	5.000
wt.2	4-27 1410	.4725	1.5958	44	72	.5000 2.0000
wt.3	4-28 1315		1.5958	45	72	2.0000
wt.4						
wt.5						
wt.6						
wt.7						
wt.8						
wt.9						

Final wt.	.4725	1.5958
Tare wt.	.3570	1.5512

Filter gain 115.5 mg

Beaker gain 44.6 mg

Blank adjust. (.59)mg

Net gain 115.5 mg 44.6 mg TOTAL = 159.51 mg

PARTICULATE FIELD DATA

DATE 4-25-91
PROJECT NO. 139
RUN NO. 3

COMPANY NAME Papco
SAMPLING LOCATION Stack OPERATOR WHH
BAROMETRIC PRESSURE, IN. Hg 29.45 STATIC PRESSURE. IN. H2O -.13

LEAK CHECKS
PRE .004 cfm @ 10 in. Hg
POST .002 cfm @ 6 in. Hg
PITOT ✓ ORSAT ✓

ID NUMBER
NOZZLE 10-2 DIAMETER .3111
SAMPLE BOX 1 TEDLAR BAG 3
PROBE 6-1 METER BOX 1
FILTER 590

NOMAGRAPH
METER dH@ 1.836 % MOISTURE 16
METER TEMP 140 METER Y 1.014
STACK TEMP 145 K FACTOR 7.8

TRAV. POINT NO.	SAMPLING TIME (min.)	CLOCK TIME	DGM READING (Vm) ft3	VELOCITY HEAD dP in.H20	ORIFICE dH in. H20	STACK TEMP (Ts), F	DGM TEMP (Tm),F in	DGM TEMP (Tm),F out	FILTER TEMP F	IMP. TEMP F	PUMP VAC. in Hg
A-1	0	1140	990.192	.26	2.0	143	109	102	237	49	1
2	3	1143	992.4	.29	2.3	149	125	103	239	45	1
3	6	1146	994.8	.35	2.7	150	136	102	246	43	2
4	9	1149	997.5	.37	2.9	150	138	103	252	44	2
5	12	1152	1000.2	.41	3.2	149	143	104	256	45	2
6	15	1155	1003.1	.39	3.1	149	146	104	261	46	2
7	18	1158	1006.0	.38	2.9	150	146	108	263	47	2
8	21	1201	1009.0	.34	2.7	150	148	109	262	48	2
9	24	1204	1011.6	.31	2.4	148	151	110	267	49	2
10	27	1207	1014.3	22	1.7	144	150	113	261	51	3
B-1	30/30	1210/1213	1016.5	.24	1.9	140	140	112	267	51	2
2	33	1216	1018.8	.25	2.0	148	152	114	265	50	2
3	36	1219	1021.2	.28	2.2	148	154	114	265	49	2
4	39	1222	1023.6	.31	2.4	149	155	116	266	49	2
5	42	1225	1026.2	.33	2.6	148	158	118	261	51	3
6	45	1228	1029.0	.35	2.7	148	158	118	261	51	3
7	48	1231	1032.0	.44	3.4	149	161	120	252	54	4
8	51	1234	1035.0	.42	3.3	149	162	122	251	55	4
9	54	1237	1038.3	.35	2.7	148	163	123	252	57	3
10	57	1240	1041.0	.29	2.3	147	163	124	249	58	3
	60	1243	1043.568								
		~~1246~~									
					2.57			129.9			

PLANT NAME Papco PROJECT # 139 RUN # 3

Analyzed by: WHH Leakage ? NO If Yes, est. volume. ____

Probe Rinse (PR)

Acetone Lot # 991694
bottle wt. w/rinse 144 g
bottle rinse wt. 21 g
bottle tare wt. (104) g

net rinse 67 g

Placed In Desiccator

	Time	Date
Filter	1340	4-25
PR Beaker	1345	4-26

Blank Adjustment = blank conc. 0.01 mg/g x net rinse 67 g = .67 mg

	Date/time	Filter # 590	Beaker # 5	Room conditions R.H.%	Room conditions temp.	Cal. audit
wt.1	4-26 1500	.4992		42	73	.5000
wt.2	4-27 1410	.4990	1.5954	44	72	.5000 2.0000
wt.3	4-28 1315		1.5954	45	72	2.0000
wt.4						
wt.5						
wt.6						
wt.7						
wt.8						
wt.9						

Final wt.	.4991	1.5954
Tare wt.	.3553	1.5574

Filter gain 143.8 mg
Beaker gain 38.0 mg
Blank adjust. (.67) mg

Net gain 143.8 mg 38.0 mg TOTAL = 181.13 mg

PLANT NAME Fapco PROJECT # 139 RUN # Blank

Analyzed by: WHH Leakage ? NO If Yes, est. volume. ____

Probe Rinse (PR)

Acetone Lot # 891694
bottle wt. w/rinse 178 g
bottle rinse wt. 11 g
bottle tare wt. (104) g

net rinse 85 g

Placed In Desiccator

	Time	Date
Filter	1940	4-25
PR Beaker	1345	4-26

Blank Adjustment = blank conc. 2.0/85 = 0.024 mg/g mg/g x net rinse ____ g = ____ mg

	Date/time	Filter # 545	Beaker # 9	Room conditions R.H.%	Room conditions temp.	Cal. audit
wt.1	4-26 1500	.3455		42	73	.5000
wt.2	4-27 1410	.3455	1.5415	44	72	.5000 2.0000
wt.3	4-28 1315		1.5415	45	72	2.0000
wt.4						
wt.5						
wt.6						
wt.7						
wt.8						
wt.9						

Final wt.	.3455	1.5415
Tare wt.	.3461	1.5395

Filter gain ____ mg

Beaker gain ____ mg

Blank adjust. (____) mg

Net gain −0.6 mg 2.0 mg TOTAL = ____ mg

ORSAT FIELD DATA

Plant Name Papco - Plant #5

Sampling Location Stack Fuel Type #2

Run and/or Sample No. 1 Leak Test? ✓ Date 4-25-91 Operator WHH

Time of Sample Collection	Time of Analysis	CO_2 Reading A	O_2 Reading B	CO Reading C	$\%O_2$ B-A	%CO C-B	$\%N_2$ 100-C
w/ Run #1	1210	3.2	20.0		16.8		
	1217	3.2	20.0		16.8		
	1223	3.2	20.0		16.8		
	Avg.	3.2		Avg.	16.8		

Run and/or Sample No. 2 Leak Test? ✓ Date 4-25-91 Operator

Time of Sample Collection	Time of Analysis	CO_2 Reading A	O_2 Reading B	CO Reading C	$\%O_2$ B-A	%CO C-B	$\%N_2$ 100-C
w/ Run #2	1300	4.1	19.8		15.7		
	1307	4.0	19.8		15.8		
	1313	4.0	19.8		15.8		
	Avg.	4.0		Avg.	15.8		

Run and/or Sample No. Leak Test? Date Operator

Time of Sample Collection	Time of Analysis	CO_2 Reading A	O_2 Reading B	CO Reading C	$\%O_2$ B-A	%CO C-B	$\%N_2$ 100-C
w/ Run #3	1317	3.6	19.9		16.3		
	1321	3.6	19.9		16.3		
	1325	3.6	19.9		16.3		
	Avg.	3.6		Avg.	16.3		

ADDITIONAL INFORMATION:

SAMPLE RECOVERY DATA

Plant Name Papco Source Plant #5 Project # 139

Reagents Prepared by: WHH

Run #	1	2	3	Blank
Run Date	4-25-91	4-25-91	4-25-91	4-25-91
Train prepared by	WHH	WHH	WHH	WHH
Train recovered by	WHH	WHH	WHH	WHH
		Identification No.		
Filter	592	591	590	545
Probe Rinse (PR)	1	2	3	4
Reagent (BH# 1)	1	2	3	4
Reagent (BH# 2)	–	–	–	–
Silica Gel	1	2	3	4
		Moisture Analysis		
Reagent #1 (H_2O)				
Initial Volume 200 ml	232 +162	250 +164	240 +168	
Final Weight, g.	394	414	408	
Tared Weight, g. ml	200	200	200	200
Reagent #2 (NA)				
Initial Volume ____ ml				
Final Weight, g.	NA	NA	NA	
Tared Weight, g.				
Condensed H2O, g	194	214	208	
Silica Gel				
Final Weight, g.	343.1	300.0	367.1	
Tared Weight, g.	316.3	285.8	350.7	321.7
Absorbed H2O, g.	26.8	14.2	16.4	
Total H2O Collected, g.	220.8	228.2	224.4	

Remarks: _____

Relinquished by: WHH
Received by: WHH
Date/Time: _____

Relinquished by: _____
Received by lab: WHH
Date/Time: 4/25 1900

Apex Environmental Services, Inc.

VISIBLE EMISSION OBSERVATION FORM 2

MY-3

SOURCE NAME: PARCO		
ADDRESS: SALISBURY PLANT AIRPORT RD		
CITY: SALISBURY	STATE: NC	ZIP: —
PHONE: —	SOURCE ID NUMBER:	

PROCESS EQUIPMENT: DRYER	OPERATING MODE: CONT
CONTROL EQUIPMENT: SCRUBBER	OPERATING MODE: CONT

DESCRIBE EMISSION POINT

START: TAN STACK STOP: SAME

HEIGHT ABOVE GROUND LEVEL: START ≈35' STOP ≈35'	HEIGHT RELATIVE TO OBSERVER: START ≈25' STOP ≈25'
DISTANCE FROM OBSERVER: START ≈600' STOP ≈600'	DIRECTION FROM OBSERVER: START NW STOP NW

DESCRIBE EMISSIONS

START: COMING STOP: SAME

EMISSION COLOR: START LT BRN STOP OFF WH	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☐ YES ☑	IS WATER DROPLET PLUME: ATTACHED ☑ DETACHED ☐

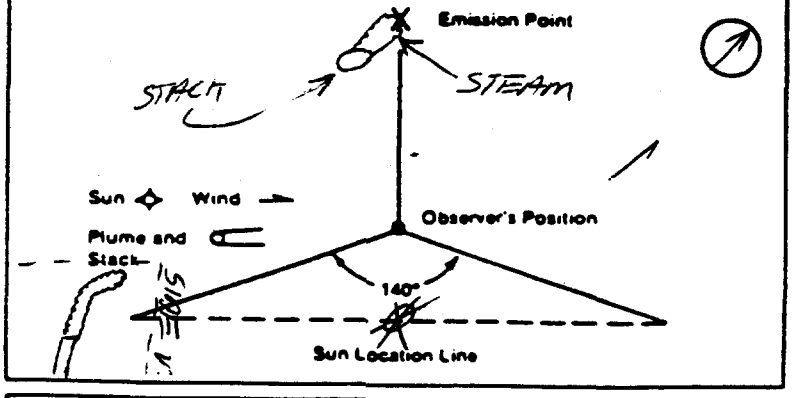
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START ≈100' DWNWIND STOP SAME

DESCRIBE BACKGROUND

START: SKY STOP: SKY

BACKGROUND COLOR: START BL STOP BL-WH	SKY CONDITIONS: START 15%cl STOP 40%cl	
WIND SPEED: START 3-6 STOP 1-3	WIND DIRECTION: START S STOP VAR	
AMBIENT TEMP: START 68°F STOP —	WET BULB TEMP: 56°F	RH, percent: —

SOURCE LAYOUT SKETCH — Draw North Arrow



COMMENTS:

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE:

TITLE: DATE:

OBSERVATION DATE: 4/25/91 START TIME: 1140 STOP TIME: 1240

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

RANGE OF OPACITY READINGS: MIN 5 MAX	HIGHEST AVERAGE OPACITY AND AVERAGING PERIOD:
NUMBER OF READINGS ≥ 20 %: 56	MINUTES OPACITY ≥ 20: 56 × 0.25 = 14.00

OBSERVER'S NAME (PRINT): JAMES B. WINEGAR

OBSERVER'S SIGNATURE: J. B. Winegar DATE: 4/25/91

ORGANIZATION: —

CERTIFIED BY: ETA DATE: 3/14/91

VERIFIED BY: — DATE: —

VISIBLE EMISSION OBSERVATION FORM 2

M9-1

SOURCE NAME: PAPCO

ADDRESS: SALISBURY PLANT

AIRPORT RD

CITY: SALISBURY | STATE: NC | ZIP: —

PHONE: — | SOURCE ID NUMBER:

PROCESS EQUIPMENT: DRYER | OPERATING MODE: CONT

CONTROL EQUIPMENT: SCRUBBER | OPERATING MODE: CONT

DESCRIBE EMISSION POINT

START: TAN STACK | STOP: SAME

HEIGHT ABOVE GROUND LEVEL: START ≈35' STOP ≈35' | HEIGHT RELATIVE TO OBSERVER: START ≈25' STOP ≈25'

DISTANCE FROM OBSERVER: START ≈600' STOP ≈600' | DIRECTION FROM OBSERVER: START NW STOP NW

DESCRIBE EMISSIONS

START: CONING | STOP: FUMIGATING

EMISSION COLOR: START LT BRN STOP SAME | PLUME TYPE: CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐

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

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: START ≈100' ABOVE * STOP ≈100' DWNW.IND

DESCRIBE BACKGROUND

START: SKY | STOP: SKY

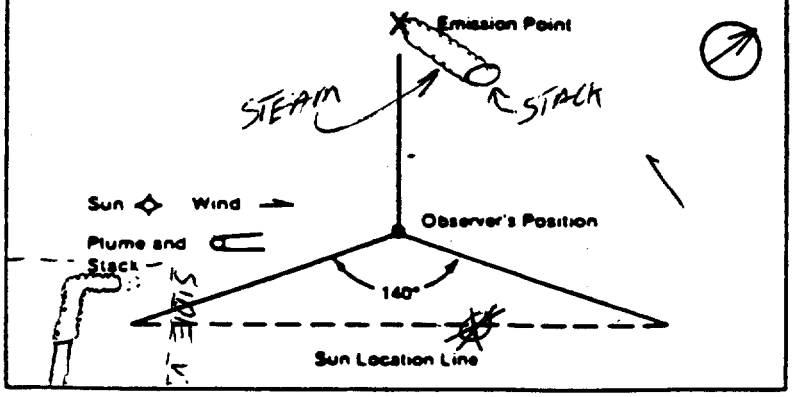
BACKGROUND COLOR: START BL STOP BL | SKY CONDITIONS: START 20%cl STOP 15%cl

WIND SPEED: START 2-4 STOP 3-6 | WIND DIRECTION: START E STOP NE

AMBIENT TEMP: START 52°F STOP 54°F | WET BULB TEMP: 48°F | RH, percent: 75%

SOURCE LAYOUT SKETCH

Draw North Arrow



COMMENTS

* ≈ 70' DWN WIND

@ 919 WB = 52°F RH = 62%

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

TITLE | DATE

OBSERVATION DATE: 4/25/91 | START TIME: 0819 | STOP TIME: 0919

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

RANGE OF OPACITY READINGS: MIN 5 MAX 30 | HIGHEST AVERAGE OPACITY AND AVERAGING PERIOD: —

NUMBER OF READINGS ≥ 20 %: 26 | MINUTES OPACITY ≥ 20: 26 × 0.25 = 6.50

OBSERVER'S NAME (PRINT): JAMES B. WINEGAR

OBSERVER'S SIGNATURE: B. Winegar | DATE: 4/25/91

ORGANIZATION: —

CERTIFIED BY: ETA | DATE: 3/14/91

VERIFIED BY: — | DATE

VISIBLE EMISSION OBSERVATION FORM 2

MG-2

SOURCE NAME: PARCO		
ADDRESS: SALISBURY PLANT AIRPORT RD		
CITY: SALISBURY	STATE: NC	ZIP: —
PHONE: —	SOURCE ID NUMBER:	

PROCESS EQUIPMENT: DRYER	OPERATING MODE: CONT
CONTROL EQUIPMENT: SCRUBBER	OPERATING MODE: CONT

DESCRIBE EMISSION POINT

START: TAN STACK STOP: SAME

HEIGHT ABOVE GROUND LEVEL: START ≈35' STOP ≈35'	HEIGHT RELATIVE TO OBSERVER: START ≈25' STOP ≈25'
DISTANCE FROM OBSERVER: START ≈600' STOP ≈600'	DIRECTION FROM OBSERVER: START NW STOP NW

DESCRIBE EMISSIONS

START: COMING STOP: SAME

EMISSION COLOR: START LT BRN STOP SAME	PLUME TYPE: CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☐ YES ☑	IS WATER DROPLET PLUME: ATTACHED ☑ DETACHED ☐

POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED

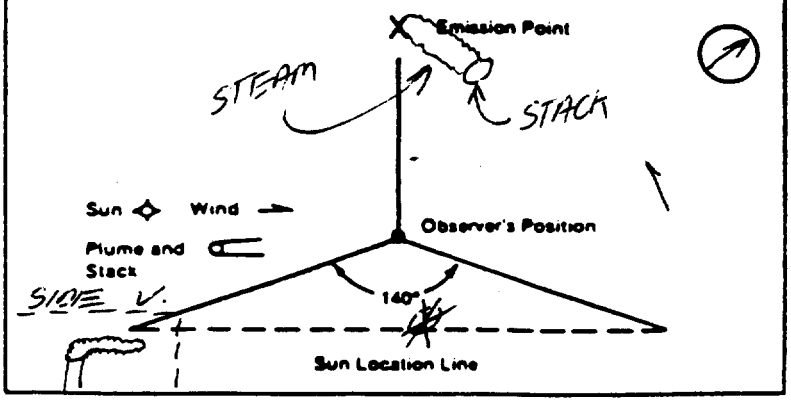
START: ≈100' DOWNWIND STOP: SAME

DESCRIBE BACKGROUND

START: SKY STOP: SKY

BACKGROUND COLOR: START BL STOP BL	SKY CONDITIONS: START 15%cl STOP 15%cl	
WIND SPEED: START 4-8 STOP 3-6	WIND DIRECTION: START E STOP VAR	
AMBIENT TEMP: START 63°F STOP 66°F	WET BULB TEMP: 55°F	RH, percent: 60%

SOURCE LAYOUT SKETCH



COMMENTS

@ 1103 WB = 56°F RH = 53%

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SIGNATURE

TITLE DATE

OBSERVATION DATE: 4/25/91 START TIME: 1003 STOP TIME: 1103

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

RANGE OF OPACITY READINGS: MIN 5 MAX 30	HIGHEST AVERAGE OPACITY AND AVERAGING PERIOD: —
NUMBER OF READINGS ≥ 20 %: 58	MINUTES OPACITY ≥ 20: 58 × 0.25 = 14.5

OBSERVER'S NAME (PRINT): JAMES B. WINEGAR

OBSERVER'S SIGNATURE: J. B. Winegar DATE: 4/25/91

ORGANIZATION: —

CERTIFIED BY: ETA DATE: 3/14/91

VERIFIED BY: — DATE: —

Appendix B

Calibration Data

APEX INSTRUMENTS
EPA METHOD 5
Meter Box Calibration

Meter Box # AES-1 Date: 3/25/91
Barometric Pressure: 29.70

DRY GAS METER						CALIBRATION METER Yc= 1.0002					
dH	T	Initial	Final	Total		Temp		Initial	Final	Total	Temp
		Cubic Feet				Tmi	Tmo	Cubic Feet			
0.50	15.0	588.769	594.968	6.199		86	73	60.073	66.092	6.019	71
						115	80				71
1.00	10.0	595.395	601.180	5.785		121	81	66.502	72.046	5.544	71
						132	88				71
1.50	10.0	601.555	608.623	7.068		132	89	72.394	79.061	6.667	71
						142	96				71
2.00	10.0	609.000	617.108	8.108		142	100	79.418	86.972	7.554	71
						144	107				71
3.00	10.0	617.388	627.337	9.949		144	107	87.228	96.415	9.187	71
						145	114				71

METER Y		DEL H	
1.0019	0.0	1.743	-0.08
1.0183	0.0	1.799	-0.03
1.0174	0.0	1.839	0.01
1.0185	0.0	1.873	0.05
1.0143	0.0	1.876	0.05
AVG. 1.014		AVG. 1.826	

DRY GAS METER CALIBRATION DATA

.ce 3/25/91 . Calibration Meter # 1039897 Console Leak Check Front ✓

Yc = ~~0.9998~~ 1.0002 WHH Back ✓

Meter Box # 1 Barometric Pressure, Pb = 29.70 Pitot Leak Check ✓

Calibrated by TET Dry Gas Meter # 40015 Electrical Check ✓

Orifice (dH) in. H2O		Gas Volume			Temperature			Time (θ), min.
		Cal. Meter (Vc), cu.ft.	Dry Gas Meter (Vd), cu.ft.		Cal. Meter (Tc), F	Dry Gas Meter		
						Inlet (T_{m_1}), F	Outlet (T_{m_2}), F	
0.5	init.	60.073	588.769	init.	71	86	73	15
	final	66.092	594.968	final	71	115	80	
	total	5.973	6.199	avg.	71		88.5	
1.0	init.	66.502	595.393	init.	71	121	81	10
	final	72.046	601.180	final	71	132	88	
	total	5.544	5.785	avg.	71		105.5	
1.5	init.	72.394	601.555	init.	71	132	89	10
	final	79.061	608.623	final	71	142	96	
	total	6.667	7.068	avg.	71		117.75	
2.0	init.	79.418	609.00	init.	71	142	100	10
	final	86.972	617.108	final	71	144	107	
	total	7.554	8.108	avg.	71		123.25	
3.0	init.	87.228	617.388	init.	71	144	107	10
	final	96.415	627.337	final	71	145	114	
	total	9.187	9.949	avg.	71		130	

$$Y = \frac{Y_c V_c \, P_b (T_m + 460)}{V_d (P_b + dH/13.6)(T_c + 460)}$$

$$dH@ = \frac{0.0317 \, dH}{P_b (T_{mo} + 460)} \left[(T_c + 460) \, \theta / Y_c V_c \right]^2$$

APEX INSTRUMENTS

APEX ENVIRONMENTAL
EPA METHOD 5
Meter Box Post Test Calibration Project# 135

Meter Box # 1 Date: 4-19-91
Vacuum: 5.0 Barometric Pressure: 29.73

		DRY GAS METER VOLUME					CALIBRATION METER VOLUME (Yc= 1.0002)				
dH	Time	Initial	Final	Total	Temp Tmi	Tmo	Initial	Final	Total	Temp. Init.	Final
2.14	11.0	843.397	852.493	9.096	120	77	197.969	206.702	8.733	65	65
					132	87					
2.14	10.0	852.493	860.824	8.331	133	87	206.702	214.581	7.879	65	65
					141	94					
2.14	10.0	860.824	869.229	8.405	141	94	214.581	222.453	7.872	65	65
					144	103					

METER Y		DEL H	
1.0262	0.00	1.842	0.01
1.0283	0.00	1.841	0.01
1.0303	0.00	1.818	-0.02

AVG. 1.028 AVG. 1.834

POST TEST

DRY GAS METER CALIBRATION DATA

Project # 135

Date 4.19.91 Calibration Meter # 1039897 DGM Leak Check Front —

Yc = 1.000 Back —

Meter Box # A-1 Barometric Pressure, Pb = 29.73 Pitot Leak Check —

Calibrated by TET Dry Gas Meter # 40015 Electrical Check —

Vacuum 5.0 Hg"

Orifice (dH) in. H2O	Gas Volume			Temperature				Time (θ), min.
		Cal. Meter (Vc), cu.ft.	Dry Gas Meter (Vd), cu.ft.		Cal. Meter (Tc), F	Dry Gas Meter		
						Inlet (T_{m_i}), F	Outlet (T_{m_o}), F	
2.14	init.	197.969	843.397	init.	65	120	77	11
	final	206.702	852.493	final	65	132	87	
	total	8.733	9.096	avg.	65		104	
2.14	init.	206.702	852.493	init.	65	133	87	10
	final	214.581	860.824	final	65	141	94	
	total	7.879	8.331	avg.	65		113.75	
2.14	init.	214.581	860.824	init.	65	141	94	10
	final	222.453	869.229	final	65	144	103	
	total	7.872	8.405	avg.	65			

$$Y = \frac{Yc\,Vc\,Pb(Tm + 460)}{Vd(Pb + dH/13.6)(Tc + 460)}$$

APEX INSTRUMENTS

APEX ENVIRONMENTAL
EPA METHOD 5
Meter Box Post Test Calibration Project# 139

Meter Box # 1 Date: 4-26-91
Vacuum: 6.0 Barometric Pressure: 29.82

		DRY GAS METER VOLUME					CALIBRATION METER VOLUME (Yc= 1.0002)				
dH	Time	Initial	Final	Total	Temp Tmi	Tmo	Initial	Final	Total	Temp. Init.	Final
2.57	6.0	50.547	55.852	5.305	97	74	750.368	755.590	5.222	65	65
					119	77					
2.57	6.0	55.852	61.222	5.370	118	78	755.590	760.851	5.261	65	65
					131	81					
2.57	6.0	61.222	66.619	5.397	130	81	760.851	766.091	5.240	65	65
					138	85					

METER Y		DEL H	
1.0282	0.0	1.857	0.03
1.0424	0.0	1.816	-0.01
1.0449	0.0	1.819	-0.01

AVG. 1.038 AVG. 1.831

POST TEST

DRY GAS METER CALIBRATION DATA

Project # 139

Date 4-26-91 Calibration Meter # 1039897 DGM Leak Check Front ✓

Yc = 1.000 Back ✓

Meter Box # 1 Barometric Pressure, Pb = 29.92 Pitot Leak Check ✓

Calibrated by TET Dry Gas Meter # 40015 Electrical Check ✓

Vacuum 6.0 Hg"

Orifice (dH) in. H20		Gas Volume: Cal. Meter (Vc), cu.ft.	Gas Volume: Dry Gas Meter (Vd), cu.ft.		Temperature: Cal. Meter (Tc), F	Temperature: Dry Gas Meter Inlet (Tm1), F	Temperature: Dry Gas Meter Outlet (Tm2), F	Time (θ), min.
2.57	init.	750.368	50.547	init.	65	97	74	6
	final	755.590	55.852	final	65	119	77	
	total	5.222	5.305	avg.	65		91.75	
2.57	init.	755.590	55.852	init.	65	118	78	6
	final	760.851	61.222	final	65	131	81	
	total	5.261	5.370	avg.	65		102	
2.57	init.	760.851	61.222	init.	65	130	81	6
	final	766.091	66.619	final	65	138	85	
	total	5.240	5.397	avg.	65		108.5	

$$Y = \frac{Yc\,Vc\,Pb(Tm + 460)}{Vd(Pb + dH/13.6)(Tc + 460)}$$

APEX INSTRUMENTS

3-91 Apex Environmental Services Temp. 69° F. Pb. - 29.75

Rockwell S-110 Reference Meter # 1039897

$$\gamma = \frac{2.00 \times 1.00 \times (460+69^\circ) \times 29.75}{V_T \times (\frac{\Delta H}{13.6} + P_b)(460+69^\circ)} = 31475.50$$

@ 3.0" w.c. $\Delta H \div 13.6 + P_b = 29.9706$

Volume		Yd
1.986	31486.9325	.9996369
1.986	31486.9325	.9996369
1.9825	31431.44197	1.0014017
1.985	31471.078089	1.0001405
1.984	31455.2236416	1.0006446

Ave. Yd @ 3.0" wc = 1.00029212

2.5" wc $\Delta H \div 13.6 + P_b = 29.9338$

Vol.		Yd
1.987	31464.10565	1.000362
1.989	31495.7756	.999356
1.987	31464.10565	1.000362
1.985	31432.435697	1.001370
1.987	31464.10565	1.000362

Ave. Yd @ 2.5" wc. = 1.0003624

2.0" w.c. $\Delta H \div 13.6 + P_b = 29.8970$

Vol.		Yd
1.992	31504.5018	.999079
1.991	31488.6863	.9995812
1.990	31472.87087	1.00008
1.988	31441.2398	1.0010896
1.989	31457.055	1.000586

Ave. Yd @ 2.0" w.c. = 1.00008

Apex 5-110 # 1039897 Reference Meter

1.0" W.C. $\Delta H \div 13.6 + P_b = 29.8235$

Vol.		Yd
1.995	31474.3798	1.00003559
1.995	31474.3798	1.00003559
1.996	31490.15647	.9995345679
1.995	31474.3798	1.00003559
1.994	31458.603211	1.000053711

Ave. Yd @ 1.0" WC = 1.000036089 95

.5" W.C. $\Delta H \div 13.6 + P_b = 29.78676$

Vol.		Yd
1.997	31467.12049	1.000266294
1.9975	31474.9990	1.000015917
1.997	31467.12049	1.000266294
1.997	31467.12049	1.000266294
1.9965	31459.24189	1.000516799

Ave. Yd @ .5" WC. = 1.000265696

Overall -

" W.C.	Yd
3.0	1.000292[redacted]
2.5	1.0003624
2.0	1.00008
1.0	1.000036
.5	1.000265[redacted]

Overall Ave. Yd = 1.00020

Proved on American Bell Prover #2989
Certificate of Accuracy dated May 25, 1988 Certified to 0.00% Err
Traceable to the National Bureau of Standards

THERMOCOUPLE CALIBRATION DATA SHEET

Date 12-5-90

Calibrator W.H Howe

Ambient Temperature (F°) 62

Reference Thermometer Mercury

Barometric Pressure (in. Hg) 29.54

Thermocouple Readout WS#1 Omega Model 115 w/ 20 Channel switch

		Freezing Point		Ambient		Boiling Point		CL-300 Simulator	
	Thermocouple Id.	Reference Thermometer	Thermocouple Readout	Reference Thermometer	Thermocouple Readout	Reference Thermometer	Thermocouple Readout	Reference Thermometer	Thermocouple Readout
								0 °F	-5
#1	HH-K-24SLE	32°F	32	62°F	62	211°F	211	100	97
								300	301
#2	TT-K-24SLE		32		62		211	500	500
								700	697
#3	EXPP-K-24S		32		61		211	900	898
								1100	1100
								1300	1298
								1500	1499
								1700	1700
								1900	1901
								2100	OFF
								200	200
								400	398
								600	599
								800	800
								1000	1001
								1200	1199
								1400	1399
								1600	1600
								1800	1800
								2000	OFF

#1 - lot # TCCH1309 PTCAL 1003P

#2 - lot # CCH1307PTCAL 1464P

#3 - lot # TCCH1297 PTCAL 1298P

Apex Environmental Services, Inc.

ANEROID BAROMETER CALIBRATION DATA

Barometer: Brand Swift Scientific Identification # 1

Range 27.75 - 31.25" Scale Divisions .05"

Reference Barometer			Aneroid		Calibrated	
Type	Source	Value	Initial	Adjusted	Date	Initials
Hg	AES	29.62	29.60	29.62	1-18-91	WHH
Hg	AES	762	75.9	76.2	3-16-91	WHH

ANALYTICAL BALANCE CALIBRATION FORM

Balance name Mettler AE100 **Number** SNR K04827

Classification of standard weights "S"

Date	0.5000g	10.0000 g	30.0000 g	60.0000 g	100.0000 g	Analyst
5/9/90	.5000	10.0000	30.0000	60.0000	100.0000	WHH
11/12/90	.5000	10.0000	30.0000	60.0000	100.0000	WHH

BALANCE CALIBRATION FORM

Balance name Ohaus Triple Beam **Number** #1

Classification of standard weights S 215 WHH 11/12/90

Date	5 g	30 g	100 g	200 g	~~235~~ g	Analyst
1-11-90	5.05	30.05	100.05/99.95 (10 beam / 100 beam)	199.95	234.90	WHH
5-9-90	5.05	30.05	100.05/99.95	199.95	234.95	WHH
11/12/90	5.05	30.05	100.05/100.000	200.0	215.0	WHH

PITOT TUBE

INSPECTION

PITOT ID#: 5-1 *

Date: 2-8-90

By: WHH

Pitot tube assembly level? ✓ yes _____ no

Pitot tube openings damaged? _____ yes (explain below) ✓ no

α_1 = 0 ° (<10°), α_2 = 1 ° (<10°), β_1 = 3 (<5°),

β_2 = 3 ° (<5°)

γ = 1 °, θ = 0 °, A = 1.125 ~~cm~~ (in.)

z = A sin γ = .020 ~~cm~~ (in.); <0.32 cm (<1/8 in.),

w = A sin θ = 0 ~~cm~~ (in.); <0.08 cm (<1/32 in.)

P_A .545 cm (in.) P_b .529 cm (in.)

D_t = 3/8 ~~cm~~ (in.)

Comments: modular tip, mounted on 5'ft. probe

* New number changed to 6-1

Calibration required? _____ yes ✓ no

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PITOT TUBE

INSPECTION

PITOT ID#: 5-2 *

Date: 10-18-90

By: JAB

Pitot tube assembly level? ✓ yes _____ no

Pitot tube openings damaged? _____ yes (explain below) ✓ no

α_1 = 0- ° (<10°), α_2 = 0 ° (<10°), β_1 = 0 (<5°),

β_2 = 0 ° (<5°)

γ = 0 °, θ = 0 °, A = 1.015625 ~~cm~~ (in.)

z = A sin γ = 0 ~~cm~~ (in.); <0.32 cm (<1/8 in.),

w = A sin θ = 0 ~~cm~~ (in.); <0.08 cm (<1/32 in.)

A .5078 ~~cm~~ (in.) P_b .5078 ~~cm~~ (in.)

D_t = 3/8 " ~~cm~~ (in.)

Comments: * new number, changed to 6-2

Calibration required? _____ yes ✓ no

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Appendix C

Sampling and Analytical Procedures