Commonwealth of Pennsylvania
Environmental Resources
September 1, 1992

Subject: Source Test Review

To: Data File
Coolspring Stone Supply, Inc.
Marsolino Coolspring Quarry, Sand Classifier
Sinking Spring, Fayette County

From: Richard St. Louis, Chief
Source Testing Unit
Division of Technical Services and Monitoring
Bureau of Air Quality Control

Through: Chief, Source Testing and Monitoring Section

Coolspring Stone Supply, Inc. operates a sand classifier at Marsolino Coolspring Quarry in Sinking Spring. The classifier refines the aggregate produced by the company's limestone crushing plant into a sand product.

On July 28, 1992, Comprehensive Safety Compliance, Inc. conducted testing for particulate matter (EPA Method 5) and opacity (EPA Method 9), during which the sand classifier was producing approximately 59 tons of sand per hour (128% of rated capacity). Prior to sampling, a stack test protocol was approved by the Department. Both tests appear to have been conducted in accordance with state regulations, thus the results are acceptable to the Department.

The following results were taken from the report:

Emissions Summary

Run No.		1	2	3	Allowable
Test Date		7/28/92	7/28/92	7/28/92	-----
Particulates	[gr/dscf] [lbs/hour]	0.006 0.71	0.003 0.32	0.003 0.37	0.02 3.8
Opacity [%]		0	0	0	10

cc: 26-310-012A
Richard Murray - Greensburg D.O.
A&C
EPA/RSL
Reading File - Source Testing

RS:fms

PARTICULATE COMPLIANCE EMISSION TESTING
SAND PLANT BAGHOUSE
COOLSPRING STONE SUPPLY, INC.
COOLSPRING, PA

Report to:

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TABLE OF CONTENTS

APPENDIX

INTRODUCTION

On July 28, 1992, particulate emission compliance testing and opacity observations were performed on the Sand Plant Baghouse at Coolspring Stone Supply, Inc.'s plant in Coolspring, PA.

The test program was authorized by Mr. Frank Mazurek of Coolspring Stone Supply, Inc. Testing was performed by Mr. Kevin Kennedy and Mr. Jim Locke and visible emission readings were taken by Mr. Richard Campbell of Comprehensive Safety Compliance, (CSC) Inc. Testing and process operations were observed by Mr. Dick Murray and Mr. Tim Kuntz of the Pennsylvania Department of Environmental Resources Air Pollution Control Bureau.

2.0 SUMMARY OF RESULTS

Table No. 1 below is a summary of Particulate Emission Data and Opacity Data from tests on the Sand Plant Baghouse.

Table No. 2 is a summary of flue gas parameters.

TABLE NO. 1

Particulate Emissions and Opacity Data

Test Date 1992	Test No.	Test Location	Particulate Emission Data			Opacity Data[c]		
			Conc. gr/dscf[a]	Allowable gr/dscf	Emission Rate lb/hr[b]	Min. %	Max. %	Highest 3 min. Avg. %
7/28	PO-1	Baghouse Outlet	0.006	~~0.06~~ 0.02	0.71	0	0	0
7/28	PO-2	Baghouse Outlet	0.003	~~0.06~~ 0.02	0.32	0	0	0
7/28	PO-3	Baghouse Outlet	0.003	~~0.06~~ 0.02	0.37	0	0	0

[a]-Grains per dry standard cubic foot
[b]-Pounds per hour
[c]-Opacity data from EPA Method 9 observations

TABLE NO. 2

Summary of Flue Gas Parameters

Test Date 1992	Test No.	Test Location	Percent Moisture	Stack Temp. °F	Percent		Flowrates	
					CO_2[a]	O_2[b]	ACFM[c]	DSCFM[d]
7/28	PO-1	Baghouse Outlet	1.2	75	0.0	21.0	14000	12940
7/28	PO-2	Baghouse Outlet	1.7	77	0.0	21.0	15760	14440
7/28	PO-3	Baghouse Outlet	1.4	79	0.0	21.0	15890	14560

[a]-Percent carbon dioxide by volume
[b]-Percent oxygen by volume
[c]-Actual cubic feet per minute
[d]-Dry standard cubic feet per minute

3.0 PROCESS AND TEST PROGRAM DESCRIPTION

Process Description

The sand classifier operated at the Marsolino Colspring Quarry is a G.E. Environmental Services, Inc. Model GI66, capable of processing 75 tons of sand per hour. Fugitive emissions generated by the process are vented to a common baghouse. The baghouse is an Alco Associates reverse pulse collector, Model 120RPT224. The baghouse contains 224 ten-foot length bags constructed of woven dacron.

Test Program Description

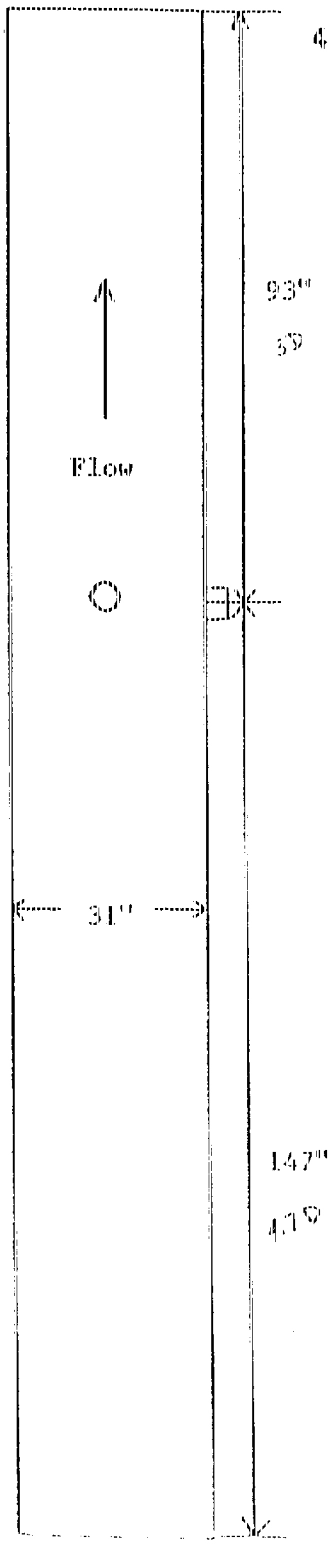
Testing was conducted on the Particulate Emissions from the Sand Plant Baghouse. The sampling location is shown in Figure No. 1 Sample duration was 60 minutes for Test No. 1 and 72 minutes for Tests 2 and 3.

Method 5 Sampling Procedures

After selecting the sampling site and the minimum number of traverse points, the stack pressure, temperature, moisture and range of velocity head were measured according to the procedures described in the Federal Register*.

Approximately 200 grams of silica gel was weighed in a sealed impinger prior to each test. Glass fiber filters** (4 inch diameter) dried at 105°C for 2 hours, desiccated for at least 24 hours, and weighed to the nearest 0.1 mg on an analytical balance. One hundred ml of distilled water was placed in each of the first two impingers. The third impinger was initially empty, and the impinger containing the silica gel was placed next in series. The sampling train was leak-checked at the sampling site prior to each test run by plugging the inlet to the nozzle and pulling 15-inch Hg vacuum, at the conclusion of the test by plugging the inlet to the nozzle and pulling a vacuum equal to the highest vacuum reached during the test run. A more detailed description of the sampling and analytical procedures is provided in Appendix B.

4.0 TESTING LOCATION SCHEMATIC



Traverse Point Location		
Point No.	Percent of Diameter	Location (inches)
1	2.1	1.0
2	6.7	2.1
3	11.8	3.7
4	17.7	5.5
5	25.0	7.8
6	35.6	11.8
7	64.4	20.0
8	75.0	23.2
9	82.3	25.5
10	88.2	27.3
11	93.3	28.9
12	97.9	30.0

2 sample ports
12 sample points per port
24 total sample points

Figure No. 1
Testing Location Schematic

TABLE NO. 3

Sand Plant Production Rates

Date 1992	Test No.	Production Rate tons/hr
7/28	PO-1	96.2
7/28	PO-2	93.1
7/28	PO-3	97.9

More detailed process data is provided in Appendix D.

A. FORMULAS AND CALCULATIONS

NOMENCLATURE AND DIMENSIONS

A_s = cross-sectional area of stack, ft^2

A_n = area of sampling nozzle, ft^2

B_{ws} = proportional by volume of water vapor in the gas stream, dimensionless

C_p = pitot tube coefficient, diamensionless = .84

$C'SO_x$ = concentration of sulfur in stack gas, ppm

%CO = percent of carbon by volume, dry basis

$\%CO^2$ = percent of carbon dioxide by volume, dry basis

H = average pressure drop across the orifice meter, inches of H_2O

I = percent of isokinetic sampling

M_d = dry molecular weight, lb/lb-mole

M_n = total amount of particulate matter collected, mg.

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

$\%N_2$ = percent of nitrogen by volume, dry basis

$\%O_2$ = percent of oxygen by volume, dry basis

p = velocity head of stack gas, inches of H_2O

P_{bar} = barometric pressure, inches of Hg

P_s = absolute stack gas pressure, inches of Hg

pmr = particulate matter emission rate, lbs/hr

Q_s = volumetric flow rate, wet basis, standard conditions

$Q_{s_{std}}$ = volumetric flow rate, dry basis, standard

T_m = average temperature of dry gas meter, °R

T_s = average temperature of stack gas, °R

V_{lc} = total volume of liquid collected in impingers and silica gel, ml

V_m = volume of sample through the dry gas meter at meter conditions, ft^3

$V_{m_{std}}$ = volume of gas sample through the dry gas meter at standard conditions, ft^3

V_s = stack gas velocity at stack conditions, fps

$V_{w_{std}}$ = volume of water in the gas sample at standard conditions, ft^3

θ = total sampling time, minutes

Note: Standard conditions = 70 F and 29.92 inches of Hg.

Formula Calculations for Particulate Emissions

1. Volume of dry gas sampled corrected to standard conditions. Note: V_m must be corrected for leakage if any leakage rates exceed L_a.)

$$V_{m_{std}} = 17.64 \times V_m \times Y \left[\frac{P_{bar} + \frac{H}{13.6}}{T_m} \right] =$$

2. Volume of water vapor at standard conditions, ft^3.

$$V_{w_{std}} = 0.04707 V_{l_c} =$$

3. Moisture content in stack gas.

$$B_{ws} = \frac{V_{wc_{std}}}{V_{m_{std}} + V_{wc_{std}}}$$

4. Dry molecular weight of stack gas.

$$M_d = 0.440\ (\%\ CO_2) + 0.320\ (\%O_2) + 0.280\ (\%\ N_2 + \%\ CO) =$$

5. Molecular weight of stack gas

$$M_s = M_d\ (1 - B_{ws}) + 18\ B_{ws} =$$

6. Stack velocity at stack conditions, fps

$$V_s = 85.49 \times C_p \times \sqrt{\Delta p \text{ avg.}} \times \sqrt{\frac{T_s}{P_s \; M_s}} =$$

7. Stack gas volumetric flow rate at stack conditions, cfh

$$Q_s = 3600 \times V_s \times A_s$$

8. Dry stack gas volumetric flow rate at standard conditions, cfh.

$$Q_{s_{std}} = 17.64 \times Q_s \times \frac{P_s}{T_s} \times (1-B_{ws}) = 30{,}524 \times 60 = 1{,}831{,}440$$

9. Concentration in g/scf

$$C'_s = 0.001 \text{ g/mg} \times \frac{M_n}{V_{m_{std}}} =$$

10. Particulate mass emission rate, lbs/hr.

$$pmr = \frac{C_s \times Q_{s_{std}}}{454}$$

11. Isokinetic variation

$$I = \frac{100 \; T_s \left[0.002669 \; V_{1c} + \frac{V_m}{T_m} \; Y \; \left(P_{bar} + \frac{H}{13.6}\right)\right]}{60 \; \theta \; V_s \; P_s \; A_n} =$$

SUMMARY OF PARTICULATE TESTS
MARSOLINO COOLSPRING QUARRY
BAGHOUSE OUTLET

1	TEST NO.	P-1	P-2	P-3
2	TEST DATE	7-28-92	7-28-92	7-28-92
3	BAROMETRIC PRESS. IN. HG.	28.35	28.35	28.35
4	AVERAGE VELOCITY HEAD IN. H2O	0.765	0.859	0.865
5	STATIC PRESSURE IN. H2O	0.380	0.380	0.380
6	AVERAGE STACK TEMP. DEG. F	75	77	79
7	AVERAGE ORIFICE DIFF. IN. H2O	2.3	3.0	3.0
8	AVERAGE METER TEMP. DEG. F	91	100	98
9	METERBOX CORRECTION FACTOR Y	0.981	0.981	0.981
10	SAMPLE VOLUME ACF.	51.764	72.175	71.970
11	SAMPLE TIME MINUTES	60.0	72.0	72.0
12	CONDENSATE ML.	6.0	10.0	10.0
13	DESICCANT GAIN ,GMS.	5.9	14.3	9.4
14	PERCENT CO2	0.0	0.0	0.0
15	PERCENT O2	21.0	21.0	21.0
16	PERCENT N2	79.0	79.0	79.0
17	STACK AREA SQ. FT.	5.241	5.241	5.241
18	NOZZLE AREA SQ. FT.	0.000327	0.000327	0.000327
19	PARTICULATE WEIGHT (mg)	19.3	10.9	12.3

21	Vm std (SCF)..................	46.364	63.721	63.768
22	Vw std (CF)..................	0.560	1.144	0.913
23	Bws % (fraction).............	0.012	0.018	0.014
24	Md (Dry mol. wt.)............	28.840	28.840	28.840
25	Ms (Stack Mol. Wt.)..........	28.711	28.649	28.687
26	Vs (Fps).....................	44.517	50.134	50.544
27	Qs (Acfm)....................	13999	15765	15894
28	Qs std (Dscfm)...............	12942	14437	14553
29	Cs (G/scf)...................	0.000	0.000	0.000
30	Cs (Gr/scf)..................	0.006	0.003	0.003
31	Pmr (Lb/Hr)..................	0.71	0.33	0.37
32	ISOKINETICS (%)..............	95.7	98.3	97.5

B. SAMPLING METHODOLOGY

EPA METHOD 1

SAMPLE AND VELOCITY TRAVERSES FOR STATIONARY SOURCES

SAMPLE AND VELOCITY TRAVERSES FOR STATIONARY SOURCES
EPA METHOD 1

The following method was used in this test program. Sampling procedures follow those described in EPA Method 1 of the Federal Register*.

SELECTION OF THE MEASUREMENT SITE

The velocity measurement was taken at (**) stack (or duct) diameters downstream and (**) diameters upstream from any flow disturbances.

CHOOSING THE NUMBER OF TRAVERSE POINTS (non-Cyclonic flow)

Particulate Traverse Sampling

At least twelve (12) traverse points were sampled for circular (or rectangular) stack diameters greater than .61 meters. At least eight (8) traverse points were sampled for circular stacks and nine (9) points for rectangular stacks for equivalent diameters for .30 to .61 meters. For other stack diameters, Figure 1-1 was referred to.

Non-Particulate Traverse Sampling

The above procedure was used except that Figure 1-2 is substituted for Figure 1-1.

CROSS SECTIONAL TRAVERSE POINT LOCATIONS

The traverse points were located on two (2) perpendicular diameters. For particulate traverse samples, on of the above diameters was positioned in the plane containing the greatest concentration variation.

Circular Stacks

EPA Method 1, Figure 1-3 and Table 1-2 was referred to.

Rectangular Stacks

Using Figure 1-4 and Table 1-1 a rectangular grid, sectioned into as many equal areas as there are traverse points, was constructed. A sample was taken at the center of each elemental area in the grid.

No traverse points were located within 2.5 centimeters of the stack wall for stack diameters greater than .61 meters. For stack diameters equal to or less than .61 meters, no traverse points were located within 1.3 centimeters. For both of the above cases, where the sample nozzle inside diameter was greater than the adjusted distances, the larger distance was used.

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*Federal Register, CFR 40, Part 60, July 1, 1989
** Check sampling location schematic included.

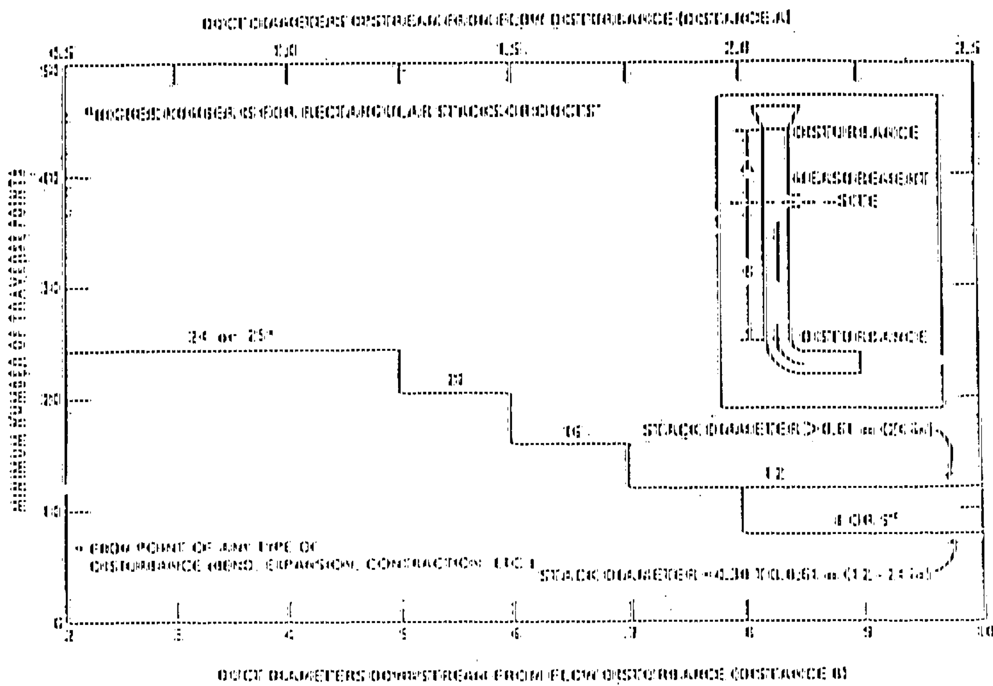


Figure 1-2. Minimum number of traverse points for particulate traverses.

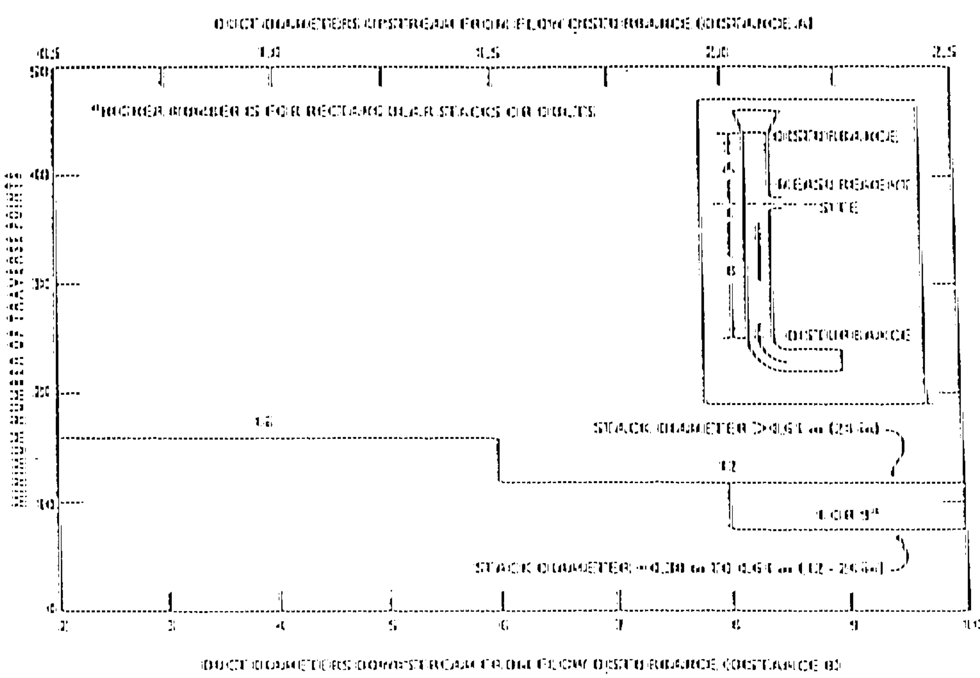


Figure 1-2. Minimum number of traverse points for velocity (nonparticulate) traverses.

TABLE 1-2. LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

[Percent of stack diameter from inside wall to traverse point]

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

TRAVERSE POINT	DISTANCE, % of diameter
1	4.4
2	14.6
3	29.6
4	70.4
5	85.4
6	95.6

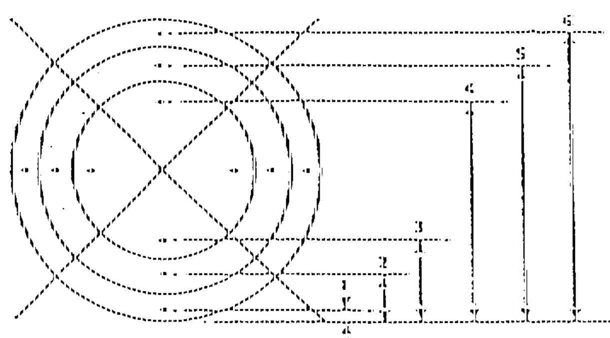


Figure 1-3. Example showing circular stack cross section divided into 12 equal areas, with location of traverse points indicated.

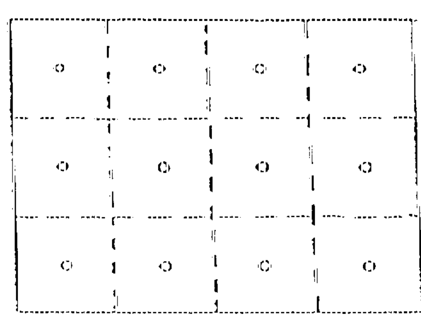


Figure 1-4. Example showing rectangular stack cross section divided into 12 equal areas, with a traverse point at centroid of each area.

Verification of the Absence of Cyclonic Flow through Stacks

For any stack where there existed a possibility of cyclonic flow, a test for the presence of cyclonic flow was performed using a manometer and Type S pitot tube.

The manometer was leveled and zeroed before the pitot tube was connected to the probe and positioned at each traverse point. The pitot tube was rotated (if necessary) until a null reading was obtained. All rotation angles were assigned absolute values. When no rotation was necessary, a value of 0 degrees was assigned. The values were summed, and the resultant angle called alpha ( ). Twenty (20) degrees is the limit of acceptability of the measurement locations for the average value of alpha with a Standard Deviation of ten (10) degrees or less.

A minimum of 24 traverse points for circular ducts and 42 points for rectangular ducts were used in the determination of gas flow angles. When the absence of cyclonic gas flow was verified, these same points were used to obtain velocity measurements.

EPA METHOD 2

DETERMINE OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE

DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE
EPA METHOD 2

The average velocity in a stack (or duct) was determined from the gas' density and average velocity head with a Type S pitot tube and stack gas flow was quantified.

SAMPLING APPARATUS

The apparatus shall consisted of the following equipment:

Pitot Tube - Type S pitot tube that meets all geometry standards was used to monitor stack gas velocity.

Draft Gauge - An inclined manometer made by Dwyer with readability of 0.01 inches H_2O in the 0-1 inch range was used.

Temperature Gauge - Included a thermocouple and digital readout capable of measuring temperatures to within 1.5% of the minimum stack temperatures.

Barometer - A barometer capable of measuring atmospheric pressure to within 2.5 mm Hg.

Gas Density Determination Equipment - Fyrite analyzer.

SAMPLING PROCEDURE

The apparatus was set up as illustrated in Figure 1.

The pretest leak-check was conducted for both the impact and static openings of the Pitot tube.

After adjusting the manometer level and zero, the velocity head and temperature were measured for each traverse point and recorded on the data sheet.

In addition, the static pressure in the stack was measured and the atmospheric pressure recorded.

The stack gas dry molecular weight was determined using EPA Method 3.

The moisture content was obtained using either EPA Method 4 or EPA Method 5.

The cross sectional area of the stack (or duct) at the sampling location was measured and recorded.

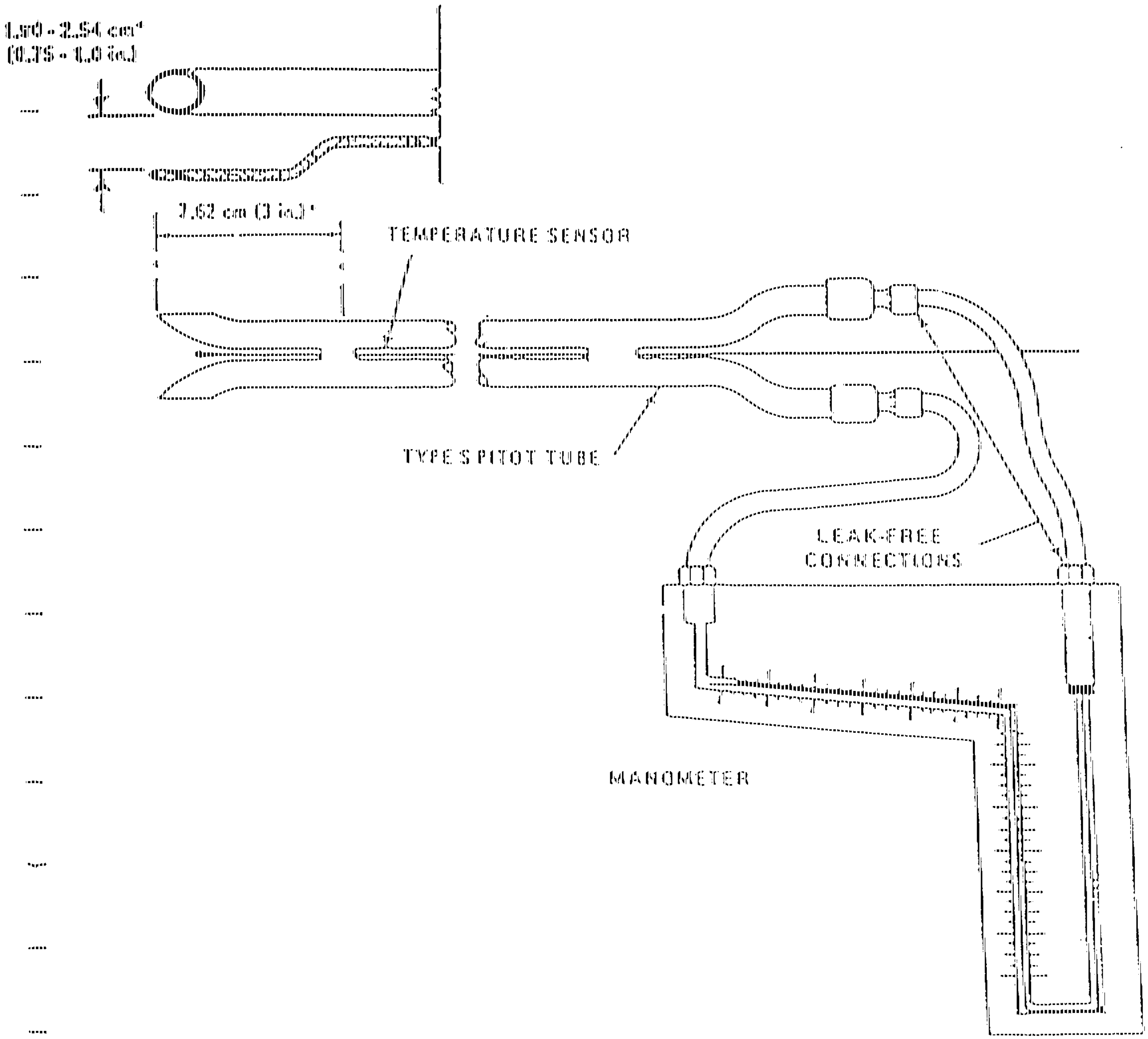


FIGURE NO. 1

EPA Method 2

Flow Measurement System

EPA METHOD 3

GAS ANALYSIS FOR CARBON DIOXIDE, OXYGEN, EXCESS AIR & DRY MOLECULAR WEIGHT

GAS ANALYSIS FOR CARBON DIOXIDE, OXYGEN, EXCESS AIR AND DRY MOLECULAR WEIGHT

EPA METHOD 3

The following method was used in this test program. Sampling procedures followed those described in EPA Method 3 of the Federal Register*.

SAMPLING APPARATUS

The gas analysis sampling train used in these tests at the exit stack met the design specifications established by the Federal EPA and was assembled by Comprehensive Safety Compliance, Inc. (CSC) personnel.

The apparatus consisted of the following:

INTEGRATE SAMPLING: APPARATUS

PROBE - A stainless steel probe equipped with an in-stack or out-stack glass wool filter to remove particulate matter.

PUMP - A leak-free, diaphragm-type pump to transport sample gas to the flexible bag.

CONDENSER - A water-cooled condenser to remove excess moisture.

VALVE - A needle valve to adjust the sample flow rate.

SURGE TANK - A surge tank installed between the pump and rate meter to eliminate the pulsation effect of the diaphragm pump on the rate meter.

RATE METER - A rotameter capable of measuring flow rates to within $\pm$ 2% of a flow range of 500 to 1000 cubic centimeters per minute.

PRESSURE GAUGE - A U-tube manometer of 760 mm of mercury was used to perform the sampling train leak test.

VACUUM GAUGE - A mercury manometer of 760 mm of mercury was used to perform the sampling train leak test.

ORSAT ANALYZER - This combustible gas analyzer was used to determine dry molecular weight (DMW) for O_2, CO_2 and CO.

*Federal Register, CFR 40, Part 60, July 1, 1989

CO_2 ANALYSIS

The analytical procedure was repeated until the results of three analyses differ by no more than:

a) .3% volume when the CO_2 is greater than 4% of the total gas volume.

b) .2% volume when CO_2 is less than or equal to 4% of the total gas volume.

O_2 ANALYSIS

The analytical procedure was repeated until the results of three analyses differ by no more than:

a) .3% volume when O_2 is greater than or equal to 15% of total gas volume.

b) .2% by volume when O_2 is greater than or equal to 15% of total gas volume.

CO AND N_2 ANALYSIS

For percent CO and N_2, the analytical procedure was repeated until three analyses differ by no more than .3%.

DETERMINATION OF THE DRY MOLECULAR WEIGHT

The DMW of each sample was determined using the following formula:

$$DMW = 0.440\ (\%\ CO_2) + .3220\ (\%\ O_2) + .280\ (\%\ N_2 + \%\ CO)$$

EMISSION RATE CORRECTION FACTOR OR EXCESS AIR DETERMINATION

An EPA approved combustible gas analyzer was used to determine the excess air content in the stack emissions.

For single point and grab samples, the values obtained for % O_2, CO and N_2 were substituted in the following equation to determine the % excess air:

$$\%\ EA = \frac{\%\ O_2 - .5\%\ CO}{.264\%\ N_2\ (\%\ O_2 - .5\%\ CO)} \quad X\ 100\%$$

The fuel factor, F, calculated as follows:

$$F = \frac{20.9^{*} - \%\ O_2}{\%\ CO_2}$$

*20.9 = The percent of O_2 by volume in ambient air.

INTEGRATED SAMPLING

The sample train was set up as shown in Figure No. 1.

For single point sampling the sample point location was at the center of the cross-section or at least 1 meter away from the stack wall. The analyzer leak test was performed, and the flexible bag as well as the sample train was also leak tested.

For multi-point sampling at least eight traverse points were sampled in circular stacks with diameters less than .61 meters (9 points for rectangular stacks of .61 meter equivalent diameter). At least twelve points were sampled for all other cases.

Traverse point location was performed; with respect to EPA Method 1. All points were traversed and sampled for an equal length of time.

After positioning the probe and purging the sample line, the sample bag was connected to the train.

The sample was taken at a constant rate.

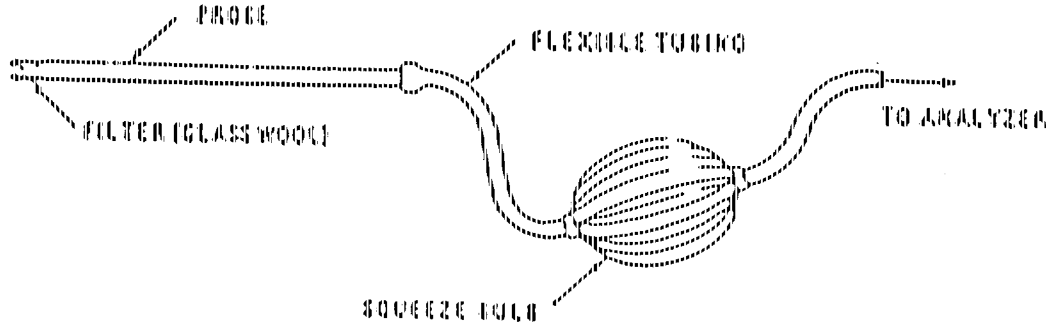
One flue gas sample was taken for each pollutant emission rate determination. Within eight hours the samples were analyzed for % CO_2 and O_2. The % N_2 and CO was determined and the dry molecular weight was calculated.

SAMPLE ANALYSIS

After a sample was drawn into a combustible gas analyzer, it was immediately analyzed for percent CO_2 and O_2. The percentage of the gas that is N_2 and Co was determined by subtracting the sum of the percents CO_2 and O_2 from 100 percent.

During sample analysis for a given gas, consecutive passes through the analyzer absorbing solutions were made until two consecutive readings were obtained. All values were averaged and recorded to the nearest 0.1%.

The analyzer was leak tested before and after the analyses were performed.



Grab-sampling train.

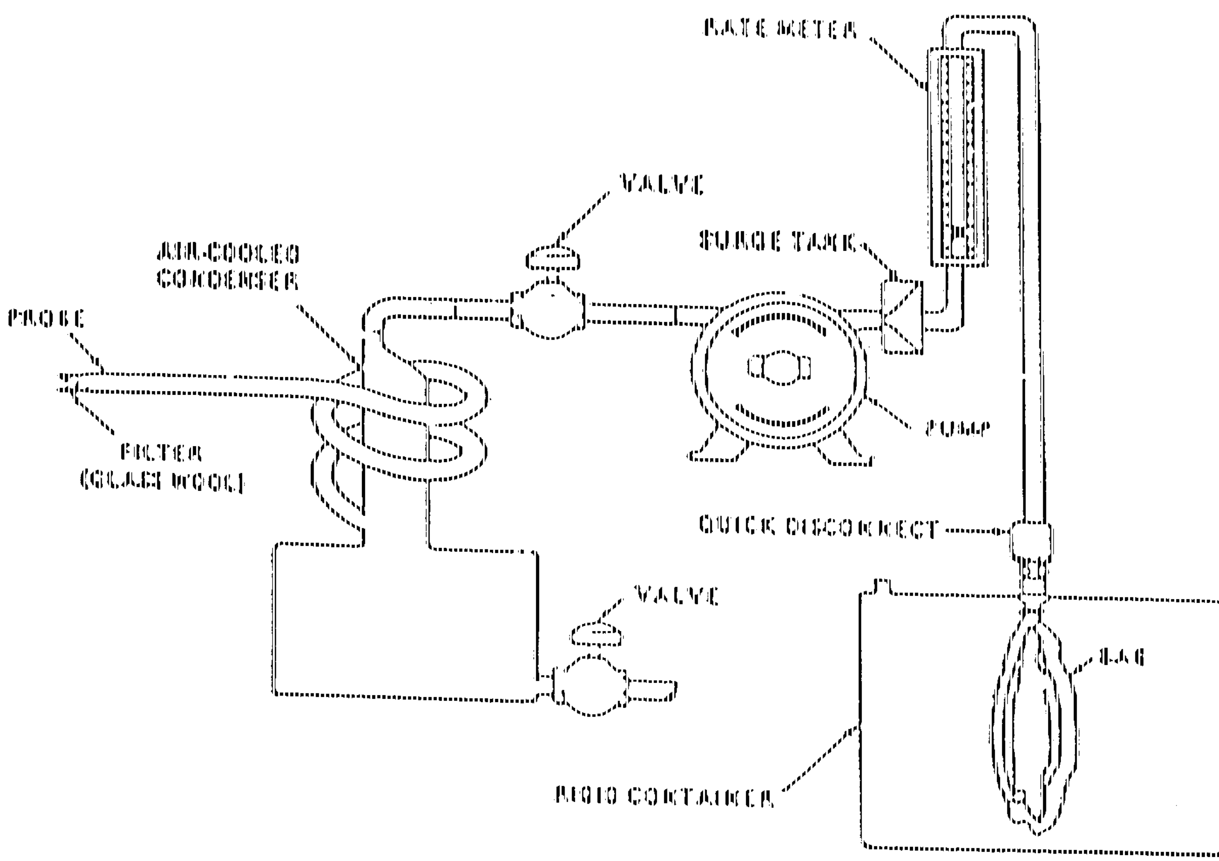


FIGURE NO. 1

EPA Method 3

Gas Composition Sampling Train

DETERMINATION OF MOISTURE CONTENT

EPA METHOD 4

DETERMINATION OF MOISTURE CONTENT
EPA METHOD 4

The following method was used in this test program. Sampling procedures followed those described in EPA Method 4 of the Federal Register*.

SAMPLING APPARATUS

The moisture content sampling train used in these tests at the exit stack met certain design specifications established by the Federal EPA and was assembled by CSC, Inc. personnel. It consisted of:

> Probe - Stainless steel with a heating system capable of maintaining a minimum gas temperature of 250°F at the exit end during sampling.
>
> Filter Holder - Pyrex glass with heating system capable of maintaining a filter temperature of approximately 250° F.
>
> Impingers - Four impingers connected in series with glass ball joints. The first, third and fourth impingers are of the Greensburg-Smith design, modified by replacing the tip with a 1/2 inch I.D. glass tube extending to 1/2 inch from the bottom of the flask.
>
> Metering System - Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5°F, calibrated dry gas meter, and related equipment, to maintain an isokinetic sampling rate and to determine sample volume. The dry gas meter is made by Rockwell and the fiber van pump is made by Gast.
>
> Barometer - Aneroid type to measure atmospheric pressures to ±0.1 inch Hg.

*Federal Register, CFR 40, Part 60, July 1, 1989

SAMPLING PROCEDURE

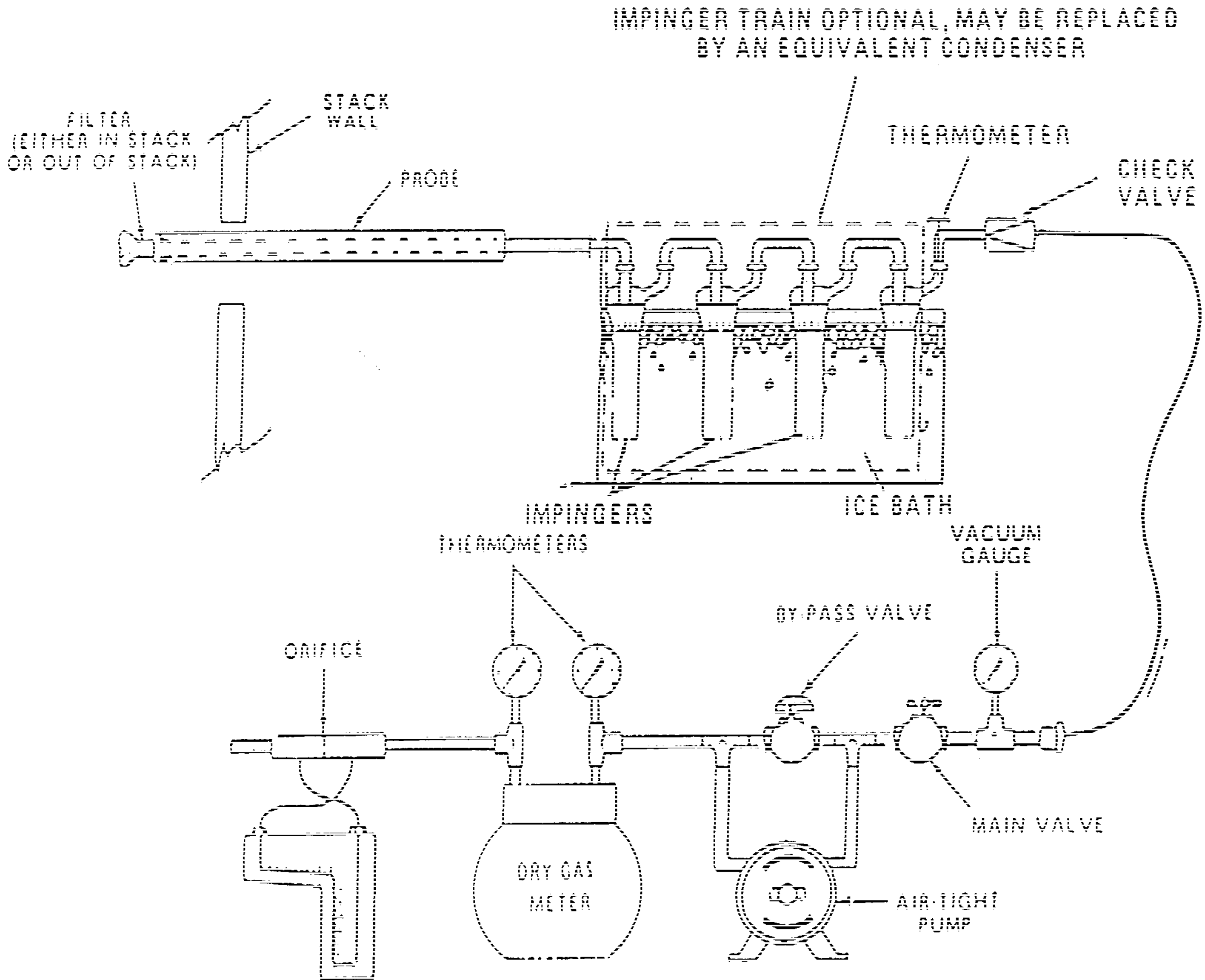
After selecting the sampling site and the minimum number of traverse points, the stack pressure and temperature were measured according to the procedures described in the Federal Register*.

Approximately 200 grams of silica gel were weighed in a sealed impinger prior to each test. One-hundred ml of distilled water was placed in each of the first two impingers; the third impinger was initially empty; and the impinger containing the silica gel was placed next in series. The train was set up with the probe as shown in Figure A-1. The sampling train was leak-checked at the sampling site prior to each test run by plugging the inlet to the nozzle and pulling a 15 inch Hg vacuum, and at the conclusion of the test by plugging the inlet to the nozzle and pulling a vacuum equal to the highest vacuum reached during the test run.

Crushed ice was placed around the impingers to keep the temperature of the gases leaving the last impinger at 68°F or less.

During sampling, stack gas and sampling train data were recorded at each sampling point and when significant changes in stack flow conditions occur. All sampling data were recorded on the Field Data Sheet.

*Federal Register, CFR 40, Part 60, July 1, 1989



Moisture sampling train-reference method.

SAMPLE RECOVERY PROCEDURE

The sampling train was moved carefully from the test site to the cleanup area. Sample fractions were recovered as follows:

1. The volume of water from the first three impingers was measured and recorded on the Recovery Data Sheet.

2. The silica gel from the fourth impinger was weighed and the gain recorded on the Sample Recovery Data Sheet with other pertinent data.

EPA METHOD 5

DETERMINATION OF PARTICULATE EMISSIONS

DETERMINATION OF PARTICULATE EMISSIONS
EPA METHOD 5

The following method was used in this test program. Sampling procedures followed those described in Method 5 of the Federal Register*.

SAMPLING APPARATUS

The particulate sampling train used in these tests at the exit stack met design specifications established by the Federal EPA and was assembled by Comprehensive Safety Compliance, Inc. (CSC) personnel. It consisted of:

Nozzle - Quartz with sharp, tapered leading edge and accurately measured round opening.

Probe - Quartz Glass

Filter Holder - Pyrex glass with heating system capable of maintaining a filter temperature of approximately 250 F.

Draft Gauge - An inclined manometer made by Dwyer with readability of 0.01 inches H_2O in the 0-1 inch range was used.

Impingers - Four impingers connected in series with glass ball joints. The first, third and fourth impingers were of the Greensburg-Smith design, modified by replacing the tip with a 1/2 inch I.D. glass tube extending to 1/2 inch from the bottom of the flask.

Metering System - Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5 , calibrated dry gas meter, and related equipment, to maintain an isokinetic sampling rate and to determine sample volume. The dry gas meter is made by Rockwell and the fiber vane pump is made by Gast.

Barometer - Aneroid type to measure atmospheric pressures to $\pm$0.1 inch Hg.

*Federal Register, CFR 40, Part 60, July 1, 1989

SAMPLING PROCEDURE

After selecting the sampling site and the minimum number of traverse points, the sack pressure, temperature, moisture and range of velocity head were measured according to the procedures described in the Federal Register*.

Approximately 200 grams of silica gel was weighed in a sealed impinger prior to each test. Glass fiber filters** (4 inch diameter) were dried at 105 C for 2 hours, desiccated for at least 24 hours, and weighed to the nearest 0.1 mg on an analytical balance. One hundred ml of distilled water was placed in each of the first two impingers; the third impinger was initially empty; and the impinger containing the silica gel was placed next in series. The train was set up with the probe as shown in Figure A-1. The sampling train was leak-checked at the sampling site prior to each test run by plugging the inlet to the nozzle and pulling 15 inch Hg vacuum, and at the conclusion of the test by plugging the inlet to the nozzle and pulling a vacuum equal to the highest vacuum reached during the test run.

The pitot tube and lines were leak-checked at the test site prior to and following the initial velocity traverse. The check was made by blowing into the impact opening of the pitot tube until 3 or more inches of water were recorded on the manometer and then capping the impact opening and holding it for 15 seconds to assure it was leak free. The static pressure side of the pitot tube was leak checked using the same procedure, except suction was used to obtain the 3 inch H_2O manometer reading. Crushed ice was placed around the impingers to keep the temperature of the gases leaving the last impinger at 68 F or less.

During sampling, stack gas and sampling train data were recorded at each sampling point and when significant changes in stack flow conditions occurred. Isokinetic sampling rates were set throughout the sampling period with the aid of a nomograph or calculator. All sampling were recorded on the Particulate Field Data Sheet.

* Federal Register, CFR 40, Part 60, July 1, 1989
**934 AH type

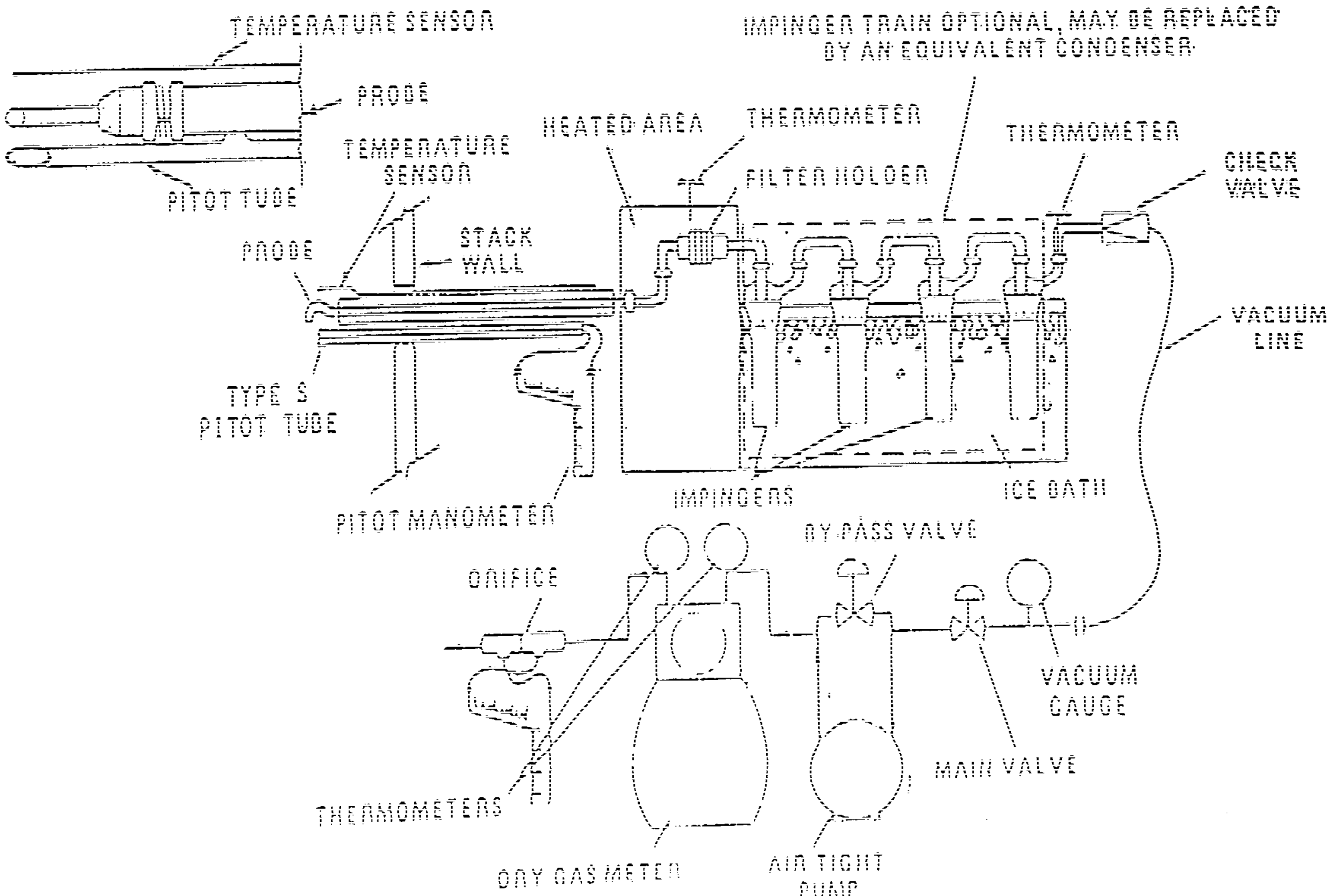


Figure 1. Schematic of Method 5 sampling train.

SAMPLE RECOVERY PROCEDURE

The sampling train was moved carefully from the test site to the cleanup area. Samples of the acetone and distilled water used in the sample recovery were taken for use as blanks. The volume of water from the first three impingers was measured. Sample fractions were recovered as follows:

Container No. 1 - The filter was removed from its holder and placed in a petri dish and sealed.

Container No. 2 - Loose particulate and H_2O washings from all sample-exposure surface prior to the filter were placed in a sample container, sealed and labelled. Particulate was removed from the probe with the aid of a brush and H_2O rinsing. The liquid level was marked after the container was sealed.

Container No. 3 - Loose particulate and acetone washings from all sample-exposure surface prior to the filter were placed in a sample container, sealed and labeled. Particulate was removed from the probe with the aid of a brush and acetone rinsing. The liquid level was marked after the container was sealed.

Container No. 4 - A minimum of 200 ml of acetone was taken for the blank analysis. The blank was obtained and treated in a similar manner as the acetone washing.

Container No. 5 - Distilled water in the impinger section of the sampling train was measured and placed in a sample container. The impingers and connecting glassware were rinsed with distilled H_2O and this rinse was added to the container for shipment to the laboratory.

Container No. 6 - The impinger section of the sampling train of the connecting glassware was rinsed with acetone and this rinse was put in a container for shipment to the laboratory.

Container No. 7 - A minimum of 200 ml of distilled water was taken for the blank analysis. The blank was obtained and treated in a similar manner as the water rinse.

The silica gel from the fourth impinger was weighed and the gain recorded on the Sample Recovery Data Sheet with other pertinent data.

ANALYTICAL PROCEDURES

The following procedures were used and follow the methods described in the DER Source Testing Manual*.

Container No. 1 - The filter and any loose particulate matter from this sample container were placed into a tared glass weighing dish, baked at 105 C for 2 hours, desiccated for 24 hours to a constant weight and weighed to the nearest 0.1 mg.

Container No. 2 - The H_2O washings were transferred to a tared beaker and evaporated to dryness at 105 C temperature and pressure, desiccated for 24 hours to a constant weight, and weighed to the nearest 0.1 mg.

Container No. 3 - the acetone washings were transferred to a tared beaker and evaporated to dryness at ambient temperature and pressure, desiccated for 24 hours to a constant weight, and weighed to the nearest 0.1 mg.

Container No. 4 - The acetone blank was transferred to a tared breaker and evaporated to dryness at ambient temperature and pressure. The blank was then desiccated for 24 hours to a constant weight and weighed to the nearest 0.1 mg.

Container No. 5 - The contents of this container were filtered through 0.8 - 0.22 micron tared filters (with 0.22 micron filter being the final one) to remove insoluble particulate. The filters and filtrates in tared breakers were evaporated to dryness at 105 C, then desiccated to a constant weight and weighed on an analytical balance to the nearest 0.1 mg.

Container No. 6 - The acetone was transferred to a tared beaker and evaporated to dryness at ambient temperature and pressure. The sample was then desiccated for 24 hours to a constant weight and weighed to the nearest 0.1 mg.

Container No. 7 - The distilled water blank was transferred to a tared beaker and evaporated to dryness at 105 C. The blank was desiccated to a constant weight and weighed on analytical balance to the nearest 0.1 mg.

The term "constant weight" means a difference of no more than 0.5 mg or 1% of total weight less tare weight, whichever is greater between two consecutive readings, with no less than 6 hours of desiccation between weighings.

NOZZLE CALIBRATION DATA FORM

Date Jan. 7, 1992 Calibrated by J Locke

Nozzle identification number	D_1, (in.)	D_2, (in.)	D_3, (in.)	ΔD, (in.)	D_{avg}
#8	0.245	0.245	0.245	0.000	0.245

where:

$D_{1,2,3,}$ = Three different nozzles diameters, in.; each diameter measure within 0.001 in.

ΔD = Maximum difference between any two diameters, in., $\Delta D \leq 0.004$ in.

D_{avg} = Average of D_1, D_2, and D_3.

METER BOX CALIBRATION DATA AND CALCULATION FORM

(English units)

Date 3/6/92 Meter box number 993

Barometric pressure, P_b = 29.2 in. Hg Calibrated by [illegible]

Orifice manometer setting (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Avg[a] (t_d), °F	Time (θ), min.	Y_i	$\Delta H@_i$ in. H_2O
0.5	5	5.076	72	77 / 68	67 / 68	70	11:15	.980	
1.0	5	5.295	72	116 / 97	88 / 67	90.5	8:45	.988	
1.5	10	10.37	72	108 / 98	78 / 63	87	14:29	.988	
2.0	10	10.42	72	102 / 110	75 / 67	88.5	12:28	.985	
3.0	10	10.44	72	106 / 110	75 / 65	88	10:26	.979	
4.0	10	10.186	72	58 / 99	58 / 68	70	8:57	.968	
							Avg	.981	

ΔH, in. H_2O	$\frac{\Delta H}{13.6}$	$Y_i = \frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6}) (t_w + 460)}$	$\Delta H@_i = \frac{0.0317 \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\theta}{V_w}\right]^2$
0.5	0.0368		1.98
1.0	0.0737		1.73
1.5	0.110		1.77
2.0	0.147		1.75
3.0	0.221		1.80
4.0	0.294		1.88
			1.79

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

PRETEST CALIBRATIONS

DATE 3-6-92

	1	2	3	4	5	6
D.G.M. (FT3)	5.076	5.226	10.370	10.412	10.494	10.186
WET METER (F)	72	72	72	72	72	72
DGM INLET START	77	116	109	102	102	58
DGM INLET END	68	97	98	110	110	99
DGM OUTLET START	67	82	78	75	75	54
DGM OUTLET END	68	67	63	67	65	69
TIME (Min)	11.3	8.8	14.5	12.5	10.4	9.0
BAR. PRESS.	29.20	29.20	29.20	29.20	29.20	29.20
AVERAGE TEMP.	70.0	90.5	87.0	88.5	88.0	70.0
Yi =	0.980	0.988	0.988	0.985	0.974	0.968
Y =	0.981					
DH @ (in. H2O)	1.48	1.73	1.77	1.75	1.80	1.88
DH @ AVG	1.74					

POSTTEST DRY GAS METER CALIBRATION DATA FORM

Test numbers ________ Date 7/24/92 Meter box number 44 #3 Plant Marsh asphalt

Barometric pressure, P_b = 28.9 in. Hg Dry gas meter number ________ Pretest Y 1.0

Orifice manometer setting, (ΔH), in. H_2O	Gas volume: Wet test meter (V_w), ft^3	Gas volume: Dry gas meter (V_d), ft^3	Temperature: Wet test meter (t_w), °F	Temperature: Dry gas meter: Inlet (t_{d_i}), °F	Temperature: Dry gas meter: Outlet (t_{d_o}), °F	Temperature: Dry gas meter: Average (t_d)[a], °F	Time (Θ), min	Vacuum setting, in. Hg	Y_i	$Y_i = \dfrac{V_w P_b (t_d + 460)}{V_d \left(P_b + \dfrac{\Delta H}{13.6}\right)(t_w + 460)}$
2.0	10	10.49	75	~~117~~ 118	~~93~~ 94	105.5	12:49	3.5	1.0	$\dfrac{10\ 28.9\ 565.5}{10.49\ 28.9 + 2/13.6\ 535}$
2.0	10	10.50	75	~~114~~ 120	~~94~~ 94	107.5	12:47	3.5	1.0	$\dfrac{10\ 28.9\ 567.5}{10.50\ 28.9\ 2/13.6\ 535}$
2.0	10	10.51	75	~~115~~ 120	~~94~~ 94	107.75	12:49	3.5	1.01	$\dfrac{10\ 28.9\ 567.75}{10.51\ 28.9\ 2/13.6\ 535}$
									Y = 1.0	

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

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

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

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

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

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

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

ΔH = Pressure differential across orifice, in H_2O.

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

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

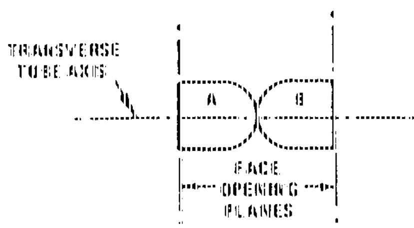
P_b = Barometric pressure, in. Hg.

Θ = Time of calibration run, min.

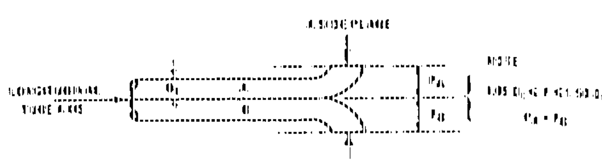
PITOT TUBE INSPECTION DATA SHEET

Pitot Tube Identification Number: #4 Date: 1-29-92

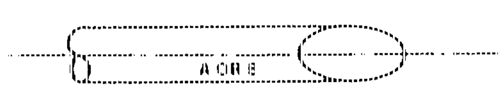
1. What is the external diameter of the tubing in inches? .406
2. Are the face opening planes perpendicular to the transverse axis as in Figure A (end view)? YES
3. Are the face opening planes parallel to the longitudinal axis as in Figure B (top view)? YES
4. Are both legs of equal length and center lines coincident, when viewed from both sides as in Figure (C)? YES
5. Does the tube meet all the geometric specifications to be assigned a .84 coefficient? YES



(a)



(b)



(c)

CALIBRATED BY: [signature]

PITOT TUBE INSPECTION DATA SHEET

Pitot Tube Identification Number: #7   Date: 1-29-92

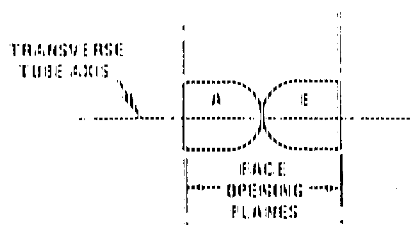
1. What is the external diameter of the tubing in inches? .382

2. Are the face opening planes perpendicular to the transverse axis as in Figure A (end view)? Yes

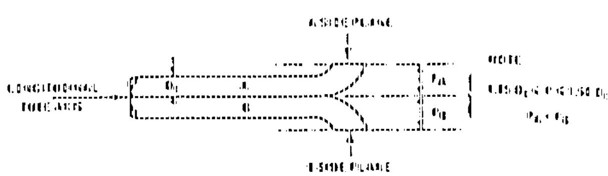
3. Are the face opening planes parallel to the longitudinal axis as in Figure B (top view)? Yes

4. Are both legs of equal length and center lines coincident, when viewed from both sides as in Figure (C)? Yes

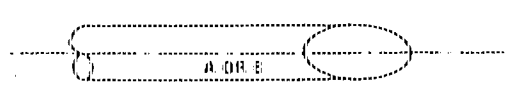
5. Does the tube meet all the geometric specifications to be assigned a .84 coefficient? Yes



(a)



(b)



(c)

CALIBRATED BY: Jean Ezlacke

C. FIELD DATA SHEETS

PLANT Malbourne Crisodry
LOCATION 2nd Class R.H.
OPERATOR J Locke
DATE 7-28-92
RUN NO. P-1
SAMPLE BOX NO.
METER BOX NO. 443
METER ΔH@
Q FACTOR
PITOT TUBE COEFFICIENT, C_p .84

SCHEMATIC OF STACK CROSS SECTION
Location
Stack dimen. 3'

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE 28.35
ASSUMED MOISTURE, % 2
PROBE LENGTH, (in) 4
NOZZLE IDENTIFICATION NO. #8
AVERAGE CALIBRATED NOZZLE DIAMETER, (in) .245
PROBE HEATER SETTING 250°F
LEAK RATE, (cfm) .00 at 6.5"
PROBE LINER MATERIAL Glass
STATIC PRESSURE, (in. Hg) +.38
FILTER NO. 100257

TRAVERSE POINT NUMBER	TIME	SAMPLING TIME (θ), min.	VACUUM (in. Hg)	STACK TEMPERATURE (T_S) (°F)	VELOCITY HEAD (ΔP_S), (in H_2O)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (in H_2O)	GAS SAMPLE VOLUME (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET (°F)	GAS SAMPLE TEMPERATURE AT DRY GAS METER OUTLET (°F)	FILTER HOLDER TEMPERATURE, (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER, (°F)
	9:15	0					407.946				
A-1		2.5	3.00	73	.45	1.7	409.794	88	69	254	34
2	9:20	5	3.00	75	.42	1.6	411.598	96	69	254	34
3		7.5	3.00	73	.45	1.7	413.543	99	70	256	35
4	9:25	10	3.25	68	.52	2.0	415.510	102	71	255	35
5		12.5	3.75	71	.65	2.5	417.767	104	72	255	34
6	9:30	15	3.50	73	.60	2.3	419.953	106	73	255	33
7		17.5	3.75	72	.67	2.6	422.179	107	75	256	34
8	9:35	20	4.50	70	.83	3.2	424.677	107	75	252	33
9		22.5	4.75	71	.92	3.5	427.342	108	76	254	34
10	9:40	25	4.00	74	.65	2.5	429.651	111	78	253	35
11		27.5	3.75	74	.57	2.3	431.876	109	79	252	33
12	9:45	30	3.0	75	.49	1.9	433.866	110	79	251	34
					~~.68~~	~~2.6~~		~~[illegible]~~	~~[illegible]~~	~~251~~	
B-1		32.5	4.0	76	.68	2.6	436.148	89	70	251	33
2	9:50	35	4.0	79	.70	2.7	438.500	100	78	251	36
3		37.5	4.0	77	.66	2.6	440.836	105	79	250	36
4	9:55	40	4.0	73	.70	2.7	443.200	108	78	245	38
TOTAL								Avg.	Avg.		
AVERAGE								Avg.			

IMPINGER WATER
Final 206 ml
Init 200 ml
Cond. 6 ml

DESICCANT
Final 205.9 gms
Init 200.0 gms
Gain 5.9 gms

ORSAT ANALYSES

Time	18	03	52
CO_2	0	0	0
O_2	21	21	21
CO			

C-368

PLANT [illegible]

LOCATION 4 Hr. Clk. DNA

OPERATOR T. Lake

DATE 7-28-92

RUN NO. P-1

SAMPLE BOX NO.

METER BOX NO. 482

METER ΔH@

C FACTOR

PITOT TUBE COEFFICIENT, C_p .84

TRAVERSE POINT NUMBER	TIME	SAMPLING TIME (θ), min.	VACUUM (in. Hg)	STACK TEMPERATURE (T_S) (°F)	VELOCITY HEAD (ΔP_S), (in. H_2O)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (in. H_2O)	GAS SAMPLE VOLUME (ft^3)	GAS SAMPLE TEMPERATURE - AT DRY GAS METER INLET (°F)	GAS SAMPLE TEMPERATURE - AT DRY GAS METER OUTLET (°F)	FILTER HOLDER TEMPERATURE, (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER, (°F)
	9:55	40									
B-5		42.5	4.00	75	.62	2.04	445.452	103	77	250	37
6	10:00	45	3.25	77	.50	1.9	447.487	103	79	250	37
7		47.5	3.00	76	.42	1.6	449.340	109	79	250	36
8	10:05	50	3.50	78	.60	2.3	451.528	107	79	250	35
9		52.5	3.00	77	.40	1.6	453.395	110	80	248	35
10	10:10	55	3.50	76	.55	2.1	455.422	109	82	248	36
11		57.5	3.50	76	.55	2.1	457.645	112	81	246	35
12	10:15	60	3.50	76	.55	2.1	459.710	111	81	244	36
TOTAL								Avg. 105	Avg. 77		
AVERAGE				75	.565	2.3	51.264	Avg. 91		252	

PLANT Nalsonds
LOCATION Sand Class Baghouse
OPERATOR J Locke
DATE 7-28-90
RUN NO. U-2
SAMPLE BOX NO.
METER BOX NO. UV3
METER ΔH@
C FACTOR
PITOT TUBE COEFFICIENT, C_p .84

SCHEMATIC OF STACK CROSS SECTION
Location
Stack dimen. 31

AMBIENT TEMPERATURE 1
BAROMETRIC PRESSURE 28.35
ASSUMED MOISTURE, % 1
PROBE LENGTH, (ft) 4
NOZZLE IDENTIFICATION NO. B
AVERAGE CALIBRATED NOZZLE DIAMETER, (in.) .245
PROBE HEATER SETTING 250
LEAK RATE, (cfm) 0.0 at 7.0 in
PROBE LINER MATERIAL Glass
STATIC PRESSURE, (in. Hg) -.37
FILTER NO. 100256

TRAVERSE POINT NUMBER	TIME	SAMPLING TIME (θ), min.	VACUUM (in. Hg)	STACK TEMPERATURE (T_S) (°F)	VELOCITY HEAD (ΔP_S), in. H_2O	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (in. H_2O)	GAS SAMPLE VOLUME (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET (°F)	GAS SAMPLE TEMPERATURE AT DRY GAS METER OUTLET (°F)	FILTER HOLDER TEMPERATURE, (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER, (°F)
	11:10	0					459.914				
B-1	11:13	3	3.75	79	.81	3.3	463.193	80	82	275	33
2	11:16	6	4.50	79	.85	3.5	466.476	124	82	244	33
3	11:19	9	4.50	82	.92	3.7	469.800	123	84	238	34
4	11:22	12	4.50	75	.92	3.7	473.137	123	85	236	34
5	11:25	15	4.25	75	.83	3.4	476.338	122	86	245	36
6	11:28	18	4.00	76	.77	3.1	479.400	121	87	249	36
7	11:31	21	3.50	78	.62	2.5	482.185	121	87	251	35
8	11:34	24	3.50	76	.67	2.7	485.048	119	87	252	34
9	11:37	27	3.75	76	.73	3.0	488.042	119	87	248	37
10	11:40	30	4.00	76	.76	3.1	491.097	114	88	242	36
11	11:43	33	4.00	76	.76	3.1	494.160	119	87	242	35
12	11:46	36	3.75	76	.70	2.8	497.074	115	87	240	
A-1	11:54	39	3.0	84	.60	2.4	499.750	93	84	246	32
A 2	11:57	42	3.5	83	.63	2.6	502.532	105	84	246	33
3	12:00	45	3.5	80	.64	2.6	505.325	110	83	246	34
4	12:03	48	3.0	75	.56	2.3	507.968	112	84	245	33
5	12:06	51	3.0	76	.56	2.3	510.632	113	84	246	34
TOTAL								Avg.	Avg.		
AVERAGE								Avg.			

IMPINGER WATER
Final 210 ml
Init. 200 ml
Cond. 10 ml

DESICCANT
Final 275.7 gms
Init. 261.4 gms
Gain 14.3 gms

ORSAT ANALYSES

Time	3	18	37
CO_2	0	0	0
O_2	21	21	21
CO			

C-388

PLANT [illegible]

LOCATION Sans Clo...

OPERATOR S Locke

DATE 1-28-92

RUN NO. P-2

SAMPLE BOX NO.

METER BOX NO. 443

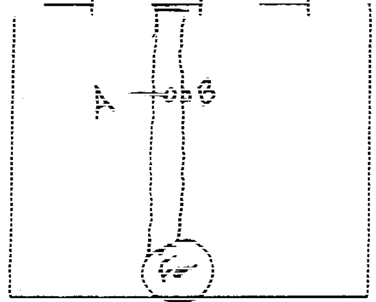
METER ΔH@

C FACTOR

PITOT TUBE COEFFICIENT, C_p .84

TRAVERSE POINT NUMBER	TIME	SAMPLING TIME (θ), min.	VACUUM (in. Hg)	STACK TEMPERATURE (T_S) (°F)	VELOCITY HEAD (ΔP_S), (in.H_2O)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (in. H_2O)	GAS SAMPLE VOLUME (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: INLET (°F)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: OUTLET (°F)	FILTER HOLDER TEMPERATURE, (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER, (°F)
	12:06	51									
A- 6	12:09	54	3.25	76	.62	2.5	513.420	113	84	244	36
7	12:12	57	3.50	76	.67	2.7	516.168	114	84	244	35
8	12:15	60	4.0	77	.75	3.0	519.175	115	85	243	37
9	12:18	63	4.25	77	.80	3.3	522.312	116	85	250	39
10	12:21	66	4.50	77	.85	3.5	525.723	117	86	251	38
11	12:24	69	4.50	76	.85	3.5	528.772	116	86	252	37
12	12:27	72	4.50	76	.92	3.7	532.089	117	87	252	37
TOTAL								Avg. 115	Avg. 85		
AVERAGE				77	.859	3.0	72.175	Avg. 100		247	

PLANT [illegible]
LOCATION Sand Clarksburg
OPERATOR Slake
DATE 7-28-92
RUN NO. P-3
SAMPLE BOX NO. ______
METER BOX NO. 443
METER ΔHo ______
C FACTOR ______
PITOT TUBE COEFFICIENT, C_p .84



SCHEMATIC OF STACK CROSS SECTION
Location ______
Stack dimen. 31

AMBIENT TEMP [illegible]
BAROMETRIC PRESSURE 28.35
ASSUMED MOISTURE, % 1
PROBE LENGTH, (ft) 4
NOZZLE IDENTIFICATION NO. 8
AVERAGE CALIBRATED NOZZLE DIAMETER, (in.) .245
PROBE HEATER SETTING 250
LEAK RATE, (cfm) ______
PROBE LINER MATERIAL Glass
STATIC PRESSURE, (in. Hg) +.38
FILTER NO. 12257

TRAVERSE POINT NUMBER	TIME	SAMPLING TIME (θ), min.	VACUUM (in. Hg)	STACK TEMPERATURE (T_S) (°F)	VELOCITY HEAD (ΔP_S), (in. H_2O)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (in. H_2O)	GAS SAMPLE VOLUME (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET (°F)	GAS SAMPLE TEMPERATURE AT DRY GAS METER OUTLET (°F)	FILTER HOLDER TEMPERATURE, (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER, (°F)
	1:10	0					532.100				
A-1		3	4.00	83	.635	2.6	534.850	82	77	256	38
2		6	4.00	87	.70	2.8	537.720	93	77	241	33
3		9	4.00	81	.65	2.6	540.540	100	77	234	34
4		12	4.00	77	.62	2.5	543.286	103	78	248	35
5		15	3.75	78	.60	2.4	546.014	106	79	261	38
6		18	4.00	75	.62	2.5	548.742	105	81	261	37
7		21	4.00	77	.65	2.6	551.540	108	81	256	33
8		24	4.50	71	.76	3.1	554.593	111	82	258	35
9		27	5.00	76	.84	3.4	557.830	112	83	254	37
10		30	5.25	76	.98	3.95	561.148	116	84	254	36
11		33	4.75	76	.80	3.2	564.327	115	85	253	36
12	1:46	36	4.75	76	.80	3.2	567.349	117	86	249	36
			5.5	79	1.1	4.2		101	85	253	38
B-1	1:55	39	↓	↓	↓	↓	570.855	↓	↓	↓	↓
2		42	5.5	79	1.1	4.2	571.385	109	85	253	37
3		45	5.5	78	1.1	4.2	577.900	115	85	253	37
4		48	5.0	80	.93	3.8	581.275	118	86	252	39
5		51	4.75	80	.80	3.2	584.412	116	88	251	41
TOTAL								Avg.	Avg.		
AVERAGE								Avg.			

— 1.2" ΔH

IMPINGER WATER
Final 210 ml
Init. 200 ml
Cond. 10 ml

DESICCANT
Final 262 gms
Init. 206.8 gms
Gain 9.4 gms

ORSAT ANALYSES

Time	5	28	42
CO_2	0	0	0
O_2	21	21	21
CO			

C-377

PLANT [illegible]
LOCATION Sand Clean. BH.
OPERATOR T Locke
DATE 7-28-98
RUN NO. 7-3
SAMPLE BOX NO.
METER BOX NO. 443
METER ΔH@
C FACTOR
PITOT TUBE COEFFICIENT, C_p .84

TRAVERSE POINT NUMBER	TIME	SAMPLING TIME (θ), min.	VACUUM (in. Hg)	STACK TEMPERATURE (T_S) (°F)	VELOCITY HEAD (ΔP_S), (in. H_2O)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (in. H_2O)	GAS SAMPLE VOLUME (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: INLET (°F)	GAS SAMPLE TEMPERATURE AT DRY GAS METER: OUTLET (°F)	FILTER HOLDER TEMPERATURE, (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER, (°F)
		51									
8 6		54	5.0	79	.83	3.4	587.598	119	87	246	40
7		57	4.0	78	.160	2.4	590.390	120	88	243	40
8		60	3.75	80	.56	2.3	593.043	118	89	240	39
9		63	4.0	80	.64	2.6	595.802	116	86	239	39
10		66	4.0	79	.160	2.4	598.537	119	84	253	31
11		69	4.0	78	.165	2.6	601.345	118	88	257	38
12	2:31	72	4.0	78	.160	2.4	604.070	119	88	250	34
TOTAL								Avg. 111	Avg. 84		
AVERAGE				79	.865	3.0	71.970	Avg. 98		251	

CYCLONIC FLOW DETERMINATION

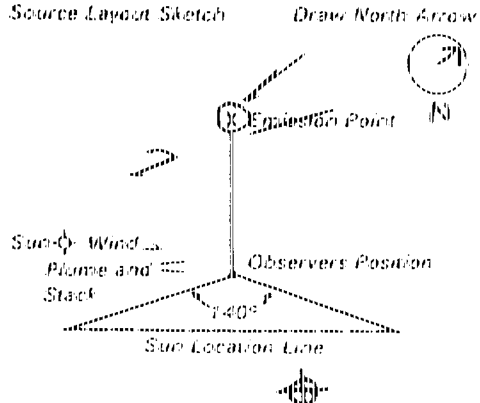
PLANT Marsolin - Coolspring
DATE 7-28-92 RUN NO. 1
STACK DIAMETER OR DIMENSIONS, - (in.) 31
BAROMETRIC PRESSURE, (in. Hg) 28.35
CROSS SECTIONAL AREA, (ft²)
OPERATORS J Locke K Kennedy
PITOT TUBE I.D. NO.
AVG. COEFFICIENT, C_p = .84
LAST DATE CALIBRATED

SCHEMATIC OF STACK CROSS SECTION

POINT NO.	ANGLE	POINT NO.	ANGLE	POINT NO.	ANGLE
A-1	9				
2	7				
3	7				
4	5				
5	5				
6	10				
7	10				
8	5				
9	6				
10	8				
11	10				
12	10				
B-1	20				
2	20				
3	10				
4	7				
5	5				
6	6				
7	4				
8	9				
9	10				
10	10				
11	10				
12	8				

Visible Emission Observation Form

SOURCE NAME	
Marsalino Stone Supply	
ADDRESS	
CITY: Coalspring	STATE: PA / ZIP:
PHONE:	SOURCE ID NUMBER:
PROCESS EQUIPMENT: Sand Plant	OPERATING MODE: normal
CONTROL EQUIPMENT: Baghouse	OPERATING MODE: normal
DESCRIBE EMISSION POINT START: Baghouse exit stack	STOP: Baghouse exit stack
HEIGHT ABOVE GROUND LEVEL START: 60' STOP: 60'	HEIGHT RELATIVE TO OBSERVER START: 0 STOP: 0
DISTANCE FROM OBSERVER START: 300' STOP: 300'	DIRECTION FROM OBSERVER START: NW STOP: N.W.
DESCRIBE EMISSIONS START: None visible	STOP: None visible
EMISSION COLOR START: None STOP: None	PLUME TYPE: CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT: NO ☑ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START: 1" from exit	STOP: 1" from exit
DESCRIBE BACKGROUND START: Trees	STOP: Trees
BACKGROUND COLOR START: Green STOP: Green	SKY CONDITIONS START: Clear STOP: Clear
WIND SPEED START: 0-2mph STOP: 0-2mph	WIND DIRECTION START: S STOP: S
AMBIENT TEMP. START: 70° STOP: 74°	WET BULB TEMP. / RH, percent



COMMENTS: TEST NO. 1

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SIGNATURE
TITLE | DATE

OBSERVATION DATE	START TIME	STOP TIME
7-28-92	9:15 AM	10:15 AM

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

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT): Richard L. Campbell	
OBSERVER'S SIGNATURE: Richard L. Campbell	DATE: 7-28-92
ORGANIZATION: CSC Inc.	
CERTIFIED BY: ETA	DATE: 3-25-92
VERIFIED BY	DATE

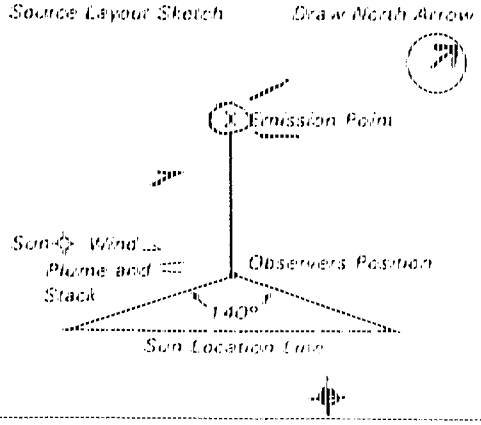
Visible Emission Observation Form

SOURCE NAME	Maesano Stone Supply
ADDRESS	
CITY	Coolspring
STATE	PA
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	Stone Plant
OPERATING MODE	Normal
CONTROL EQUIPMENT	Baghouse
OPERATING MODE	Normal
DESCRIBE EMISSION POINT	START Baghouse Exit Stack STOP
HEIGHT ABOVE GROUND LEVEL	START 60' STOP 60'
HEIGHT RELATIVE TO OBSERVER	START 5' STOP 5'
DISTANCE FROM OBSERVER	START 300' STOP 300'
DIRECTION FROM OBSERVER	START NW STOP NW
DESCRIBE EMISSIONS	START None Visible STOP None Visible
EMISSION COLOR	START None STOP None
PLUME TYPE	CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT	NO ☒ YES ☐
IF WATER DROPLET PLUME	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 1' from exit STOP 1' from exit
DESCRIBE BACKGROUND	START Green Trees STOP Green Trees
BACKGROUND COLOR	START Green STOP Green
SKY CONDITIONS	START 50% Cloudy STOP 50% Cloudy
WIND SPEED	START 2-5 mph STOP 2-5 mph
WIND DIRECTION	START S STOP S
AMBIENT TEMP.	START 75° STOP
WET BULB TEMP.	
RH percent	

OBSERVATION DATE	START TIME	STOP TIME
7-28-92	11:10 AM	12:22 PM

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

Source Layout Sketch — Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD	
NUMBER OF READINGS ABOVE % WERE	
RANGE OF OPACITY READINGS	MINIMUM MAXIMUM
OBSERVER'S NAME (PRINT)	Richard L. Campbell
OBSERVER'S SIGNATURE	Richard L. Campbell
DATE	7-28-92
ORGANIZATION	CSC Inc.
CERTIFIED BY	ETA
DATE	3-25-92
VERIFIED BY	
DATE	

COMMENTS

TEST NO. 2

PAGE 1

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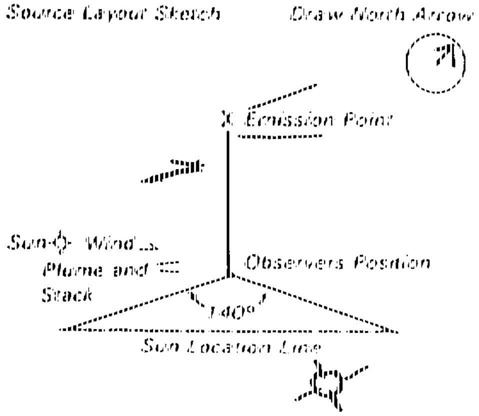
TITLE

DATE

Visible Emission Observation Form

SOURCE NAME			OBSERVATION DATE	START TIME	STOP TIME
MARSOLINO STONE SUPPLY			7-28-92	11:15 AM	12:22 PM
ADDRESS					
CITY Coolspring	STATE PA	ZIP			
PHONE	SOURCE ID NUMBER				
PROCESS EQUIPMENT Sand Plant		OPERATING MODE Normal			
CONTROL EQUIPMENT Baghouse		OPERATING MODE Normal			
DESCRIBE EMISSION POINT START Baghouse stack exit		STOP Baghouse stack exit			
HEIGHT ABOVE GROUND LEVEL START 60' STOP 60'	HEIGHT RELATIVE TO OBSERVER START 5' STOP 5'				
DISTANCE FROM OBSERVER START 300' STOP 300'	DIRECTION FROM OBSERVER START NW STOP NW				
DESCRIBE EMISSIONS START None Visible		STOP None Visible			
EMISSION COLOR START None STOP None	PLUME TYPE: CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐				
WATER DROPLETS PRESENT: NO ☑ YES ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐				
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED START 1' from exit		STOP 1' from exit			
DESCRIBE BACKGROUND START Trees		STOP Trees			
BACKGROUND COLOR START Green STOP Green	SKY CONDITIONS START 50% cloudy STOP 50% cloudy				
WIND SPEED START 2-5mph STOP 2-5mph	WIND DIRECTION START S STOP S				
AMBIENT TEMP. START 75° STOP	WET BULB TEMP.	RH, percent			

Source Layout Sketch Draw North Arrow



MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
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					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS MINIMUM	MAXIMUM
OBSERVER'S NAME (PRINT) Richard L. Campbell	
OBSERVER'S SIGNATURE Richard L. Campbell	DATE 7-28-92
ORGANIZATION CSC Inc.	
CERTIFIED BY ETA	DATE 3-25-92
VERIFIED BY	DATE

COMMENTS

TEST NO. 2 CONT

PAGE 2

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TITLE	DATE

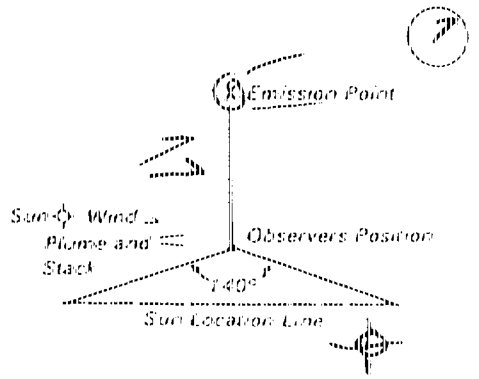
Visible Emission Observation Form

SOURCE NAME	OBSERVATION DATE	START TIME	STOP TIME
Massalino Stone Supply	7-28-92	1:10 PM	2:25 PM

ADDRESS	
CITY	Coolspring
STATE	Pa.
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	SAND Plant
OPERATING MODE	normal
CONTROL EQUIPMENT	Baghouse
OPERATING MODE	normal
DESCRIBE EMISSION POINT	START Baghouse stack Exit; STOP Baghouse Stack Exit
HEIGHT ABOVE GROUND LEVEL	START 60' STOP 60'
HEIGHT RELATIVE TO OBSERVER	START 0' STOP 0'
DISTANCE FROM OBSERVER	START 300' STOP 300'
DIRECTION FROM OBSERVER	START NW STOP NW
DESCRIBE EMISSIONS	START None Visible STOP None Visible
EMISSION COLOR	START None STOP None
PLUME TYPE	CONTINUOUS ☑ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT	NO ☑ YES ☐
IF WATER DROPLET PLUME	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 1' from Exit STOP 1' from Exit
DESCRIBE BACKGROUND	START Trees STOP Trees
BACKGROUND COLOR	START Green STOP Green
SKY CONDITIONS	START 50% cloudy STOP 50% cloudy
WIND SPEED	START 2-5 MPH STOP 2-5 MPH
WIND DIRECTION	START SW STOP SW
AMBIENT TEMP.	START 75° STOP 75°
WET BULB TEMP.	
RH percent	

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

Source Layout Sketch — Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD	NUMBER OF READINGS ABOVE % WERE
RANGE OF OPACITY READINGS	MINIMUM / MAXIMUM
OBSERVER'S NAME (PRINT)	Richard L. Campbell
OBSERVER'S SIGNATURE	Richard L. Campbell
DATE	7-28-92
ORGANIZATION	CSC INC.
CERTIFIED BY	ETA
DATE	3-25-92
VERIFIED BY	
DATE	

COMMENTS
TEST P-3
PAGE-1

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS
SIGNATURE
TITLE
DATE

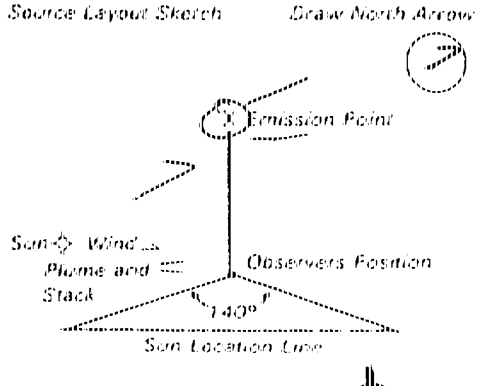
Visible Emission Observation Form

SOURCE NAME	MASSALINO STONE Supply
ADDRESS	
CITY	Coal Spring
STATE	PA
ZIP	
PHONE	
SOURCE ID NUMBER	
PROCESS EQUIPMENT	SAND PLANT
OPERATING MODE	Normal
CONTROL EQUIPMENT	BAGHOUSE
OPERATING MODE	normal
DESCRIBE EMISSION POINT	START Baghouse Exit Stack STOP Baghouse Exit Stack
HEIGHT ABOVE GROUND LEVEL	START 60' STOP 60'
HEIGHT RELATIVE TO OBSERVER	START STOP
DISTANCE FROM OBSERVER	START 300' STOP 300'
DIRECTION FROM OBSERVER	START NW STOP NW
DESCRIBE EMISSIONS	START None Visible STOP None Visible
EMISSION COLOR	START None STOP None
PLUME TYPE	CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT	NO ☑ YES ☐
IF WATER DROPLET PLUME	ATTACHED ☐ DETACHED ☐
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED	START 1' from Exit STOP 1' from Exit
DESCRIBE BACKGROUND	START Trees STOP Trees
BACKGROUND COLOR	START Green STOP Green
SKY CONDITIONS	START Sct cloudy STOP Sct cloudy
WIND SPEED	START 2-5mph STOP 2-5mph
WIND DIRECTION	START S STOP S
AMBIENT TEMP.	START 75° STOP 77°
WET BULB TEMP	
RH, percent	

OBSERVATION DATE	START TIME	STOP TIME
7-28-92	1:10 PM	2:32 PM

MIN \ SEC	0	15	30	45	MIN \ SEC	0	15	30	45
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					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				
30					60				

Source Layout Sketch — Draw North Arrow



AVERAGE OPACITY FOR HIGHEST PERIOD

NUMBER OF READINGS ABOVE % WERE

RANGE OF OPACITY READINGS MINIMUM MAXIMUM

OBSERVER'S NAME (PRINT) Richard L. Campbell

OBSERVER'S SIGNATURE Richard L. Campbell DATE 7-28-92

ORGANIZATION CSC INC.

CERTIFIED BY ETA DATE 3-25-92

VERIFIED BY DATE

COMMENTS TEST P-3 cont PAGE 2

I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS

SIGNATURE

TITLE DATE

FABRIC FILTER DATA SHEET — PARAMETERS
OF DESIGN AND OPERATION AFFECTING PERFORMANCE

Facility Marcelina Coalspring Boiler No. ——

Monitor Name Sand Classifier Baghouse Test No. R-1

Design Efficiency Test Date 7-28-92

Recording Interval[a] Sampling Time (minutes)	Clock Time (24 hr. clock)	Pressure Drop Across Baghouse (in. H_2O)	Pressure Drop Across Compartment (in. H_2O) 1	2	3	4	5
5	9:20	1.0					
10	9:25	.98					
15	9:30	.90					
20	9:35	1.0					
25	9:40	1.0					
30	9:45	.80					
35	9:50	.90					
40	9:55	1.0					
45	10:00	1.0					
50	10:05	1.0					
55	10:10	1.0					
60	10:15	1.0					
	Representative						
	Design						

FABRIC FILTER DATA SHEET – PARAMETERS
OF DESIGN AND OPERATION AFFECTING PERFORMANCE

Facility Marcelina Coolspring   Boiler No. —

Monitor Name Sand Classifier Baghouse   Test No. P-2

Design Efficiency   Test Date 7-28-92

Recording Interval[a]		Pressure Drop Across Baghouse (in. H_2O)	Pressure Drop Across – Compartment (in. H_2O)				
Sampling Time (minutes)	Clock Time (24 hr. clock)		1	2	3	4	5
	11:10/start						
3	11:13	1.0					
6	11:16	1.0					
9	11:19	.9					
12	11:22	.9					
15	11:25	1.0					
18	11:28	1.0					
21	11:31	1.0					
24	11:34	1.0					
27	11:37	1.0					
30	11:40	.9					
33	11:43	.9					
36	11:46/stop	.9					
39	11:54/start	1.0					
42	11:57	1.0					
45	12:00	.9					
48	12:03	.9					
51	12:06	.9					
54	12:09	1.0					
57	12:12	.9					
	Representative						
	Design						

FABRIC FILTER DATA SHEET — PARAMETERS OF DESIGN AND OPERATION AFFECTING PERFORMANCE

Facility Marsolina Coolspring Boiler No. —

Monitor Name Sand Classifier Baghouse Test No. R-2

Design Efficiency Test Date 7-28-92

Recording Interval[a]		Pressure Drop Across Baghouse (in. H_2O)	Pressure Drop Across Compartment (in. H_2O)				
Sampling Time (minutes)	Clock Time (24 hr. clock)		1	2	3	4	5
60	12:15	4.0					
63	12:18	4.0					
66	12:21	4.0					
69	12:24	4.0					
72	12:27/stop	4.0					
	Representative						
	Design						

FABRIC FILTER DATA SHEET – PARAMETERS
OF DESIGN AND OPERATION AFFECTING PERFORMANCE

Facility Marcelina Cols pring Boiler No. —

Monitor Name Sand Classifier Baghouse Test No. P-3

Design Efficiency Test Date 7-28-93

Recording Interval[a]		Pressure Drop Across Baghouse (in. H_2O)	Pressure Drop Across Compartment (in. H_2O)				
Sampling Time (minutes)	Clock Time (24 hr. clock)		1	2	3	4	5
	110						
3	113	1.0					
6	116	1.0					
9	119	1.0					
12	122	.9					
15	125	.9					
18	128	.9					
21	131	.9					
24	134	1.0					
27	137	1.0					
30	140	1.0					
33	143	1.0					
36	146/stop	1.0					
39	155/start	1.1					
42	158	1.1					
45	201	1.1					
48	204	1.1					
51	207	1.2					
54	210	1.2					
57	213	1.1					
	Representative						
	Design						

FABRIC FILTER DATA SHEET — PARAMETERS OF DESIGN AND OPERATION AFFECTING PERFORMANCE

Facility: Magnolia Coolspring   Boiler No. —

Monitor Name: Sand Classifier Baghouse   Test No. R-3

Design Efficiency: —   Test Date: 7-28-92

Recording Interval[a]		Pressure Drop Across Baghouse (in. H_2O)	Pressure Drop Across Compartment (in. H_2O)				
Sampling Time (minutes)	Clock Time (24 hr. clock)		1	2	3	4	5
60	216	1.1					
63	219	1.1					
66	222	1.0					
69	225	1.0					
72	228	1.0					
	Representative						
	Design						

D. Process Data

Production Rates

Figure No. 1 is a copy of the production chart used during the tests at Marsolino Coolspring. A 7-day chart was mistakenly used in place of a 24-hour chart. The chart was converted into hours as noted and the test periods were marked.

This chart shows the production of four products. A breakdown of the four products, by percentage, can be found in Table No. 4.

TABLE NO. 4

Production Percentages

Product	Size (in)	Percent of Total
2A	2	25
2B	1-1/2	35
1B	1/2	20
Dust	3/16	20

Table No. 5 is a breakdown of total tons per hour to tons of dust per hour per test.

TABLE NO. 5

Tons of Dust per Hour

Test No.	Total Production (tons/hr)	Dust Production (tons/hr)
P-1	481.0	96.2
P-2	465.4	93.1
P-3	489.6	97.9

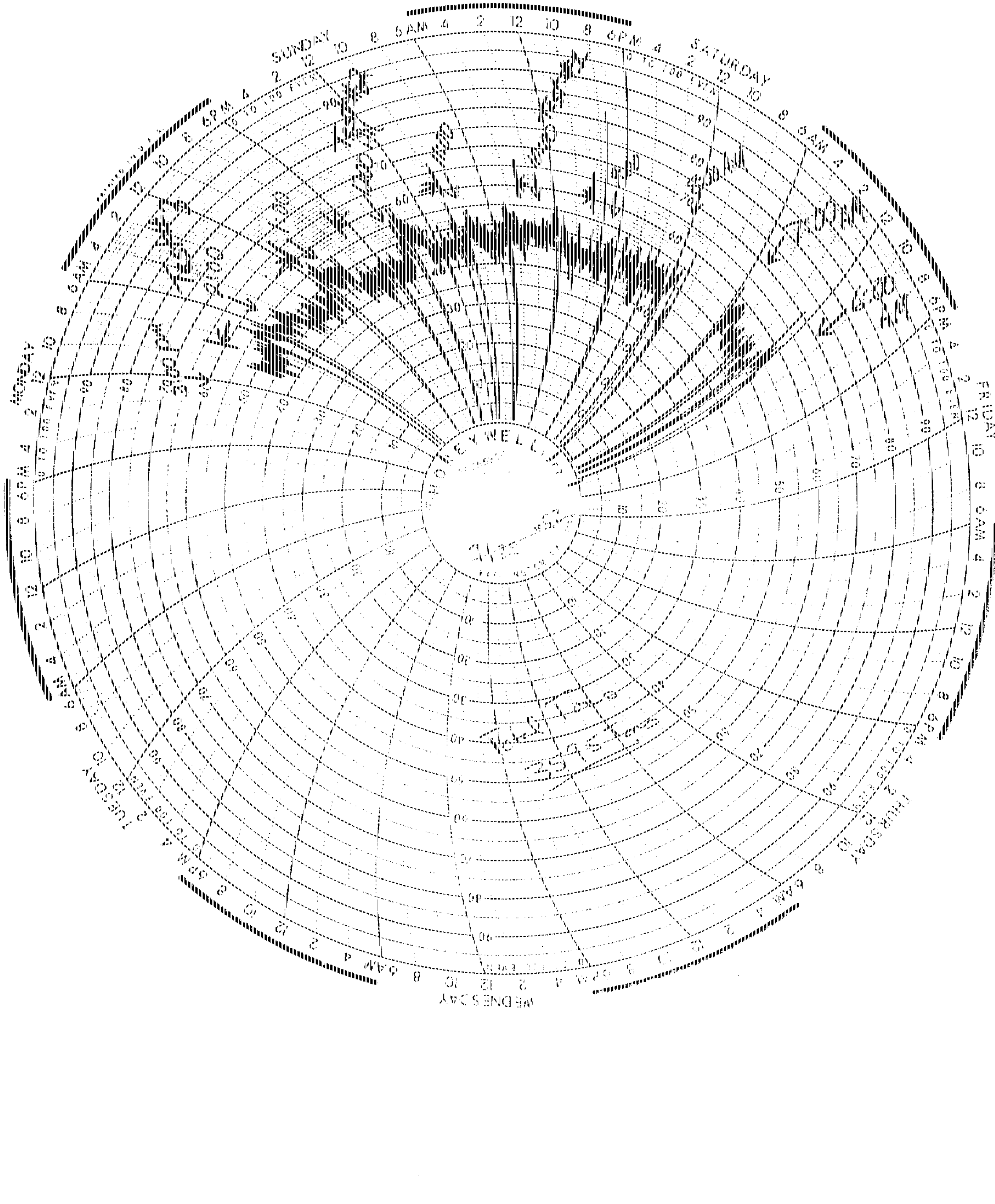


Figure No. 1 Production Rate Chart

E. Laboratory Data

ANALYTICAL DATA

Test No.	PO-1	PO-2	PO-3
Test Date	7/28/92	7/28/92	7/28/92
Filter No.	100259	100256	100257
Filter Tare, mg	628.0	627.1	630.0
Filter Final, mg	628.2	627.2	639.9
Filter Net, mg	0.2	0.1	9.9
Probe Acetone, mg	17.0	7.0	1.0
Probe Water, mg	1.2	3.3	1.2
Impinger Insol., mg	0.9	0.5	0.2
Impinger Soluble, mg**	0.2**	2.8**	0.4**
Impinger Acetone, mg**	0.0**	0.8**	0.2**
Acetone Blank (mg)*	<0.1	---	---
Water Blank (mg)*	<0.1	---	---
Total Particulate, mg	19.3	10.9	12.3

* Data not corrected for blank values.
**Data not used in total.

Analyst ____________

Reviewer ____________

F. V. E. Certification

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Richard L. Campbell

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

Thomas Rose
President

233083
Certificate Number

William [illegible]
Vice President

Pittsburgh
Location

David B. Savage, Jr.
Program Manager

March 25, 1992
Date of Issue