Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

AP-42 Section 12.2
Reference
Report Sect. 4
Reference 150

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Environmental Control

Report on the Particulate Emissions Testing with Visible Emission Readings Conducted for the Wheeling Pittsburgh Steel Corporation At their Monessen Work's Coke Oven Baghouse Purchase Order Number 400140

Clean Air Engineering, Inc.

April 5, 1984

Clean Air Engineering, Inc.

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INTRODUCTION

This report presents the test data and results of the test program conducted by Clean Air Engineering, Inc. for the Wheeling Pittsburgh Steel Corporation.

The testing took place at their Monessen Work's Coke Ovens.

The work is authorized by the Wheeling Pittsburgh Steel Corporation's purchase order number 400140.

The purpose of the testing was to determine if particulate emissions discharged during operation of their coke ovens is in compliance with all applicable environmental regulations.

The field portion of the testing was coordinated among the following personnel:

Dr. W. R. Samples	Wheeling Pittsburgh Steel Corporation
Mr. D. Doerle	Clean Air Engineering, Inc.

The tests were conducted during the week of March 12, 1984.

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DESCRIPTION OF INSTALLATION AND PROCESS

The tests described in this report were conducted on the flue gas generated during the push phase of the coke oven operating cycle. Sampling took place only from the push to the quench and each point corresponds to one of these cycles. The damper opening and closing was used to signal the beginning and end of each push.

The particulate emissions are controlled by a baghouse collector.

All tests were conducted at the coke oven baghouse stack.

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DISCUSSION OF RESULTS

The most significant test conditions and results are presented in the SUMMARY OF RESULTS TABLE beginning on page 2 - 2. Additional results and test PARAMETERS are given in Section 5.

A complete copy of the VISIBLE EMISSION DATA, RAW TEST DATA and the COMPUTER ANALYSIS of the raw test data showing the point by point % Isokinetic results are included in the appendix.

During Run #2 at one point the damper did not close at the end of a push. Sampling continued expecting the damper to close at any second, but when the next push started the testers realized they had sampled two pushes in one point thus sampling 25 pushes on Run #2.

An oversight by the testers resulted in the probe not being washed with distilled water on runs 1 and 2. The probe was however washed with acetone on these runs.

The particulate concentrations, in Grains/DSCF, were .0129, .0122, and .0098 for runs 1, 2, and 3 respectively.

To the best of our knowledge the enclosed data is accurate and reliable.

Respectfully Submitted,

CLEAN AIR ENGINEERING, INC.

Larry Golden
Report Manager

Steve Korando
Source Testing Manager

LG/SK/cjz

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TABLE I

SUMMARY OF RESULTS

RUN NO.	1	2	3
DATE, 1984	March 14	March 15	March 16
TIME (Approx.)	10:56 AM to 5:18 PM	7:43 AM to 2:27 PM	7:37 AM to 2:22 PM
Test Method	EPA M5	EPA M5	EPA M5
Gas Temperature, °F	86	95	97
Gas Moisture, Volume %	1.8	1.1	1.4
Gas Volume			
ACFM	129,400	134,300	132,100
DSCFM	120,700	124,900	121,100
Dust Concentration			
GR/DSCF	.0229	.0122	.0098
LB/HR of Pushing	23.7	13.0	3.71
LB/HR Clock Time	4.11	3.67	3.71

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PA.DER Regulation 123.13(b)

$$A = 0.76E^{0.42}$$

where A = allowable emissions, pounds per hour

E = F x W

F = emission factor, 1.0 for pushing

W = process weight in tons of coke per hour.

RUN	1	2	3
Coke produced*, tons	272	283	272
Duration of Test, minutes	382	403	405
W, tons coke/hour	42.7	42.1	40.3
A, allowable emissions, pounds/hour	3.8	3.7	3.6

*Coke produced per push, 11.3 tons.

SAMPLING PROCEDURES

The emission tests were conducted in accordance with the procedure specified in the Federal Register, Vol. 36, No. 247, dated December, 1971 and its revisions of August 18, 1977. The procedures used were as follows:

1. Method 1 for sample point and velocity traverse point location.
2. Method 2 for velocity and volumetric flow.
3. Method 3 for gas analysis and molecular weight determination.
4. Method 5 for particulate concentration and moisture content.

A schematic of the sampling train is shown in Figure I. The metering equipment was designed and manufactured by the Research Appliance Company in accordance with the United States Environmental Protection Agency standards.

A total of 24 points were sampled for a variable time period each. A cross section of the sampling location showing the sampling points is contained in Figure II.

All equipment was calibrated at Clean Air Engineering, Inc.'s laboratory prior to shipment to the job site. Copies of the calibration data are included in the Appendix of this report.

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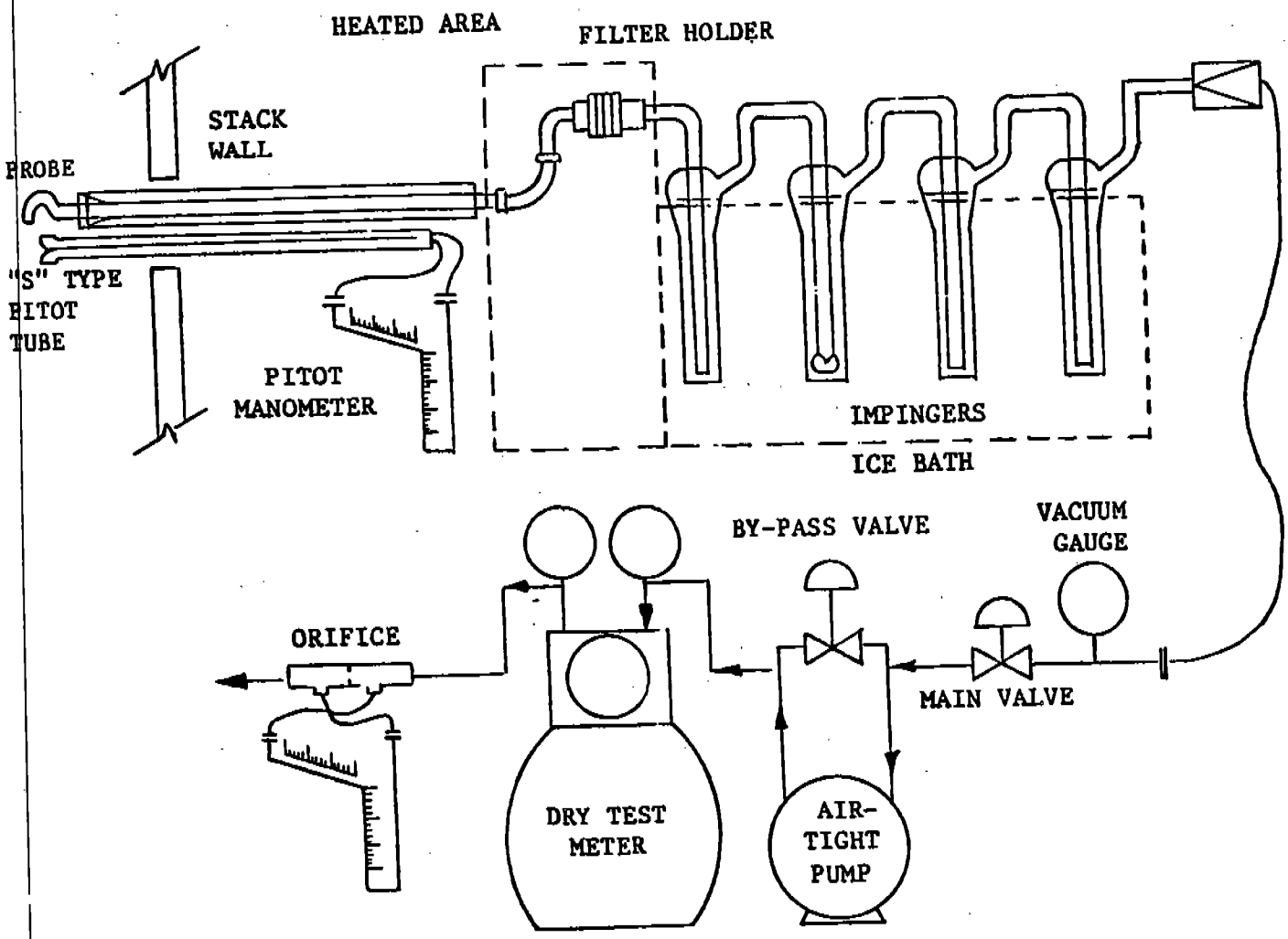

FIGURE I
SAMPLING TRAIN

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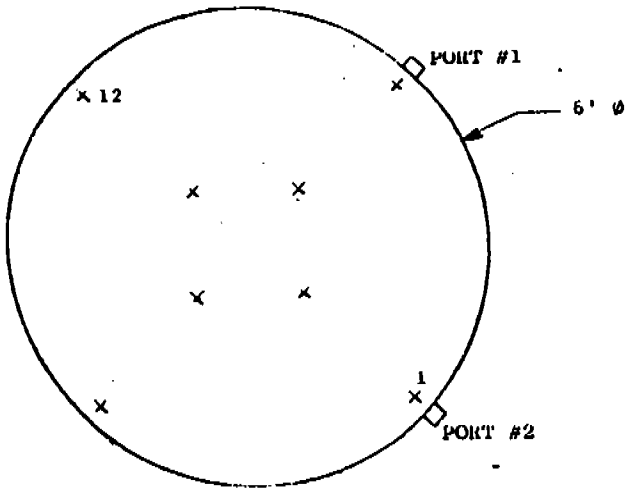

POINT #	DISTANCE FROM PORT IN INCHES
1	1.5
2	4.8
3	8.5
4	12.7
5	18.0
6	25.6
7	46.4
8	54.0
9	59.3
10	63.5
11	67.2
12	70.5

FIGURE II
CROSS SECTION OF STACK
SHOWING SAMPLING POINT LOCATIONS

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NOMENCLATURE

A - Absorbance.

A_n - Cross sectional area of nozzle, square feet.

A_s - Cross sectional area of stack, square feet.

B_{wo} - Proportion by volume of water vapor in the gas stream, %.

C_p - Pitot tube coefficient, dimensionless.

D_f - Dilution factor.

F_d - Ratio of dry gas generated to gross calories, DCFM/10^6BTU.

F_c - Ratio of gas generated to gross calories, DSCF/10^6BTU.

GCV - Gross calorific value of fuel, BTU/LB.

$\overline{DH}$ - Average pressure drop across the meter box orifice, inches H_2O.

$\overline{(DP)^{1/2}}$ - Average of square roots of velocity heads of stack gas, inches H_2O.

DH@ - Meter orifice calibration coefficient, dimensionless.

%I - Percent of isokinetic sampling (acceptable: $90\% \leq \%I \leq 110\%$).

K_p - 85.49 Ft./Sec., $\dfrac{[\text{(Lb./Lb.-Mole) (In. Hg)}]^{1/2}}{[\text{(°R) (In. H O}_2\text{)}]^{1/2}}$.

K_c - Calibration factor.

M_d - Dry molecular weight of stack gas, Lb./Lb. mole.

M_s - Molecular weight of stack gas (wet basis), Lb./Lb. mole.

M_n - Total amount of particulate matter collected, gm.

N - Normality of titrant, milliequivalents/ml.

P_b - Barometric pressure, inches Hg.

P_f - Final absolute pressure of flask, inches Hg.

P_i - Initial absolute pressure of flask, inches Hg.

P_s - Absolute stack gas pressure, inches Hg.

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NOMENCLATURE (Continued)

Q_a - Volumetric flow rate, actual conditions.

Q_s - Volumetric flow rate at standard conditions.

Q_{std} - Volumetric flow rate at standard conditions,(dry basis).

T_f - Final absolute temperature of flask, °R.

T_i - Initial absolute temperature of flask, °R.

$\overline{T_m}$ - Average dry gas meter temperature, °F.

$\overline{T_s}$ - Average stack temperature, °F

T_{std} - Absolute temperature at standard conditions, 528°R.

θ - Total sampling time, minutes.

V_a - Volume of aliquot, ml.

V_f - Volume of flask, ml.

V_{lc} - Total volume of liquid collected in impingers and silica gel, ml.

V_m - Volume of gas sample through the dry gas meter (@ meter conditions), cubic feet.

V_{mstd} - Volume of gas sample through the dry gas meter at standard conditions.

V_{sc} - Volume of flask sample at standard conditions, ml.

V_{soln} - Total volume of solution, ml.

V_t - Volume of titrant used to titrate aliquot, ml.

V_{tb} - Volume of titrant used to titrate blank, ml.

V_{wstd} - Volume of water collected at 29.92" Hg and 68°F, cubic feet.

V_s - Stack gas velocity, feet per second.

Y_d - Meter correction factor, dimensionless.

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SAMPLE CALCULATIONS - RUN #3
(Note: Results are taken from computer analysis)

1. Volume of Water Collected

$$V_{wstd} = .0471 \; V_{1c}$$

$$= (.0471) (38)$$

$$= 1.79 \text{ WSCF}$$

2. Volume of Gas Metered, Standard Conditions

$$V_{mstd} = \frac{(17.64) (V_m) \left[P_b + \frac{\overline{DH}}{13.6} \right]}{(460 + T_m)} (Y_d)$$

$$= \frac{(17.64) (127.50) \left[29.42 + \frac{2.5}{13.6} \right]}{(460 + 73)} (1.0094)$$

$$= 126.09 \text{ DSCF}$$

3. Moisture Content

$$B_{wo} = \frac{V_{wstd}}{V_{mstd} + V_{wstd}}$$

$$= \frac{1.79}{126.09 + 1.79}$$

$$= .0140$$

$$= 1.4 \%$$

4. Molecular Weight of Dry Gas Stream

$$M_d = .44 (\%CO_2) + .32 (\%O_2) + .28 (\%CO + \%N_2)$$

$$= .44 (\text{NEG}) + .32 (19.5) + .28 (80.5)$$

$$= 28.78$$

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SAMPLE CALCULATIONS (Continued)

5. Molecular Weight of Stack Gas

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

$$= 28.78 (1 - .0140) + 18 (.0140)$$

$$= 28.63$$

6. Velocity of Stack Gas

$$V_s = K_p \; C_p \; \overline{(DP)}^{1/2} \frac{[\overline{T_s} + 460]^{1/2}}{[(M_s) (P_s)]^{1/2}}$$

$$= 85.49 (.840) (1.332) \frac{[97 + 460]^{1/2}}{[(28.63) (29.36)]^{1/2}}$$

$$= 77.90 \text{ Ft./Sec.}$$

7. Total Flow of Stack Gas

$$Q_a = 60 \; A_s \; V_s$$

$$= (60) (28.27) (77.90)$$

$$= 132{,}100 \text{ ACFM}$$

$$Q_{std} = \frac{Q_a \; P_s \; (17.64) (1 - B_{wo})}{\overline{T_s} + 460}$$

$$= \frac{(132{,}100) (29.36) (17.64) (1 - .0140)}{97 + 460}$$

$$= 121{,}100 \text{ DSCFM}$$

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SAMPLE CALCULATIONS (Continued)

8. Percent Isokinetic

$$\%I = \frac{(.09450)(\overline{T_s} + 460)\, V_{mstd}}{P_s\, V_s\, A_n\, \theta\, (1 - B_{wo})}$$

$$= \frac{(.09450)(97 + 460)(126.09)}{(29.36)(77.90)(.000201)(148.86)(1 - .0140)}$$

$$= 98.4\ \%$$

9. Particulate Concentration

$$GR/DSCF = \frac{(15.43)(M_n - \text{Sulfates})}{V_{mstd}}$$

$$= \frac{(15.43)(.0976 - .0179)}{126.09}$$

$$= .0098$$

$$\text{LB/HR of pushing} = \frac{(GR/DSCF)(Q_{std})(60)}{7000}$$

$$= \frac{(.0098)(121{,}100)(60)}{7000}$$

$$= 10.1$$

$$\text{LB/HR clock time} = \frac{\text{sampling time}}{\text{elapsed time}} \times \text{LB/HR of pushing}$$

$$= \frac{148.9}{405} \times 10.1$$

$$= 3.71$$

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PARAMETER SHEET

RUN NO.	1	2	3
P_b	29.43	29.65	29.42
P_s	29.39	29.58	29.36
V_m	49.31	98.47	127.50
$\overline{DH}$	2.1	2.6	2.5
$\overline{T_m}$	57	80	73
V_{mstd}	50.23	96.89	126.09
V_{lc}	19	22	38
V_{wstd}	.89	1.04	1.79
B_{wo}	.0175	.0106	.0140
$\%O_2$	19.3	19.5	19.5
$\%CO_2$	.0	.0	.0
M_d	28.76	28.78	28.78
M_s	28.57	28.67	28.63
C_p	.840	.840	.840
$\overline{T_s}$	86	95	97
$\overline{(DP)^{1/2}}$	1.317	1.363	1.332
V_s	76.3	79.2	77.9
A_s	28.27	28.27	28.27
A_n	.000185	.000201	.000201
%I	96.4	95.7	98.4
Y_d	1.0094	1.0094	1.0094
θ	66.2	114.0	148.9
M_n	.0776	.0786	.0976
DH@	1.835	1.835	1.835

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WEIGHT SUMMARY SHEET

*** FRONT HALF ***

RUN#	FILTER CATCH	ACETONE WASH**	H_2O WASH**	TOTAL FRONT HALF
1	.0114	.0267	*	.0381
2	.0184	.0470	*	.0654
3	.0510	.0104	.0033	.0647

*** BACK HALF ***

RUN#	H_2O SOLUBLES**	ACETONE WASH**	H_2O INSOLUBLES	SULFATES
1	.0345	.0035	.0015	(.0031)
2	.0069	.0044	.0019	(.0021)
3	.0181	.0129	.0019	(.0179)

TOTAL FRONT HALF AND BACK HALF LESS SULFATES

RUN #	WEIGHT
1	.0745
2	.0765
3	.0797

* See Discussion of Results
**Corrected for Blank

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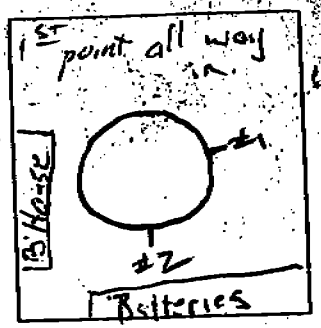
APPENDIX

RAW TEST DATA

PARTICULATE TESTING
RAW DATA SET

Plant: WPSC
Inlet/Outlet: _____ Unit#: Coke Baghouse
Operator: Doerle
Date: 3-14-84
Run No.: 1
Sample Box No.: A
Meter Box No.: R
Meter DH@: 1.835
K Factor: 1.05
Pitot C_p: _____ Pitot Leak Ck: _____
Leak Rate Before: 0.006 CFM @ 22" Hg
Leak Rate After: _____ CFM @ _____ Hg
Static Press., In. H_2O (+/-): -0.5

Start Time: ~~[illegible]~~ AM / PM
Finish Time: NEXT PAGE AM / PM
Meter Y_d: 1.0094



SCHEMATIC OF TESTING LOCATION

Filter #'s: 225
Thimble #: _____
Beaker #: _____

Ambient Temperature, °F: 450
Barometric Pressure, In. Hg: _____
Assumed Moisture, %: 3
Heater Box Setting: 70
Probe Length, Ft.: 7'
Nozzle Diameter, In.: .184
Probe Heater Setting: 85%
% O_2: _____
% CO_2: _____
H_2O, ml: _____
Silica Gel, gm: _____
Total V_{lc}: _____
Stack Area, Ft²: _____

TRAVERSE POINT NUMBER	MIN/PT ____ SAMPLING TIME θ, min.	VACUUM In. Hg	STACK TEMPERATURE T_s, °F	VELOCITY HEAD DP_s	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER DH, In. H_2O	Initial Volume: 87.60 GAS SAMPLE VOLUME V_m, Ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET T_m in, °F	OUTLET T_m out, °F	TEMP. OF GAS LEAVING CONDENSER OR LAST IMPINGER T_c, °F	SAMPLE BOX TEMPERATURE T_b, °F
1:44 1-1	10:56:00 / 10:57:44	4	82	2.2	2.3	89.116	64	52	48	274
2:58 2	11:06:54 / 11:09:52	4	80	2.2	2.3	91.453	64	52	50	271
3:41 K=1.15 3	11:18:31 / 11:22:12	5	88	2.3	2.6	94.474	68	54		270
3:02 4	11:32:30 / 11:35:32	6	88	2.4	2.8	97.183	62	52	48	270
3:28 5	11:45:28 / 11:48:56	6	88	2.5	2.9	100.361	66	53		260
2:51 6	11:59:58 / 12:02:49	6	86	2.5	2.9	102.974	62	51	50	273
2:48 7	12:12:11 / 12:14:59	5	81	2.0	2.3	105.250	60	52		268
2:48 8	12:59:12 / 13:03:00	5	73	1.8	2.1	107.647	62	52	46	260
2:57 9	13:12:00 / 13:14:57	4	79	1.6	1.8	109.792	61	52		270
3:09 10	13:25:05 / 13:28:19	4	77	1.6	1.8	~~113.2~~ 112.145	62	52	50	268
2:36 11	13:37:52 / 13:40:28	2	76	1.0*	1.1	113.600	59	52		265
3:05 59.07 12	13:51:38 / 13:54:43	3	79	1.4	1.6	115.702	60	51	51	270
TOTAL			977	16.1.13	26.5		AVG. 75.0	AVG. 62.5		
AVERAGE			83				AVG.			

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Page 1 of 2

*- Flows fluctuated badly - damper seemed to close & open. 10 best average. Noticed people talking about & pointing to fan dampers.

PARTICULATE TESTING
RAW DATA SET

Plant: WPSC
Inlet/Outlet: Coke ovens Unit#: Baghouse
Operator: Dorris
Date: 3-14-84
Run No.: 1
Sample Box No.:
Meter Box No.:
Meter DH@:
K Factor:
Pitot C_p: Pitot Leak Ck:
Leak Rate Before: CFM @ Hg
Leak Rate After: 0.00 CFM @ 7" Hg
Static Press., In. H_2O (+/-):

Start Time: 10:56 AM / PM
Finish Time: 5:18 AM / PM
Meter Yd:

Filter #'s:
Thimble #:
Beaker #:

Ambient Temperature, °F:
Barometric Pressure, In. Hg: 29.43
Assumed Moisture, %:
Heater Box Setting:
Probe Length, Ft.:
Nozzle Diameter, In.:
Probe Heater Setting:
% O_2: 19.0, 19.5 = 19.25
% CO_2: 0.0, 0.0 = 0.0
H_2O, ml: 6.0
Silica Gel, gm: 13.0
Total Vlc: 18.0
Stack Area, Ft²: 28.27

SCHEMATIC OF TESTING LOCATION

TRAVERSE POINT NUMBER	MIN/PT	SAMPLING TIME θ, min.	VACUUM In. Hg	STACK TEMPERATURE T_s, °F	VELOCITY HEAD DP_s	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER DH, In. H_2O	Initial Volume: GAS SAMPLE VOLUME V_m, Ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER: INLET T_m in, °F	OUTLET T_m out, °F	TEMP. OF GAS LEAVING CONDENSER OR LAST IMPINGER T_c, °F	SAMPLE BOX TEMPERATURE, °F
2:50 2-1		140210/140500	5	86	2.0	2.3	117.987	64	52	54	267
3:07 2		141430/141757	0	86	* .25	.29	118.932	57	53		273
2:04 3		142617/142921	0	90	.24	.28	119.850	57	52	56	270
2:56 4		143500/144156	6	99	2.0	2.3	122.224	60	52		265
2:21 5		154128/154649	5	84	2.2	2.5	124.228	52 ↔	60	50	256
2:06 6		155604/155810	5	86	2.2	2.5	126.000	60	51		247
2:29 7		160710/160959	5	89	2.2	2.5	128.100	63	52	53	255
2:02 8		162837/163036	5	88	2.1	2.4	129.188	62	52		264
2:25 9		163932/164158	5	94	2.0	2.3	131.143	62	52	51	269
2:08 10		165018/165226	5	96	1.9	2.2	133.445	58	52		265
2:34 11		170132/170404	4	100	1.8	2.1	135.420	61	51	47	263
12		171034/171322	4	95	1.7	2.0	136.905	58	51		266
TOTAL				1002/89	51.8/63 / 13.135	23.67		AVG. 722	AVG. 630		
AVERAGE				90	1.324	2.09	29.306	AVG. 2727/57			

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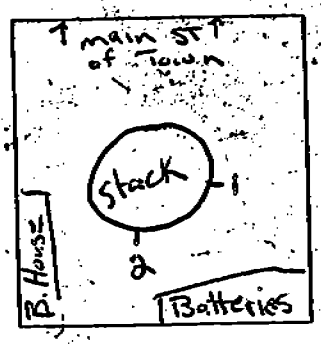
*- Auto control for dampers apparently didn't work.

PARTICULATE TESTING
RAW DATA SET

Plant: WPC
Inlet/Outlet: Baghouse Unit#: Coke Ovens
Operator: Dixie
Date: 3-15-84
Run No.: 2
Sample Box No.: A
Meter Box No.: R
Meter DH@: 1.835
K Factor: 1.3
Pitot C_p: .84 Pitot Leak Ck: ✓
Leak Rate Before: 0.00 CFM @ 13 Hg
Leak Rate After: CFM @ Hg
Static Press., In. H_2O (+/−):

Start Time: 7:43 AM / PM
Finish Time: : AM / PM
Meter Y_d: 1.0094



SCHEMATIC OF TESTING LOCATION

Filter #'s: 226
Thimble #:
Beaker #:

Ambient Temperature, °F: 50
Barometric Pressure, In. Hg: 29.65
Assumed Moisture, %: 3
Heater Box Setting: 70%
Probe Length, Ft.: 7'
Nozzle Diameter, In.: .192
Probe Heater Setting: 85%
% O_2:
% CO_2:
H_2O, ml:
Silica Gel, gm:
Total V_{lc}:
Stack Area, Ft²: 28.27

TRAVERSE POINT NUMBER	MIN/PT	SAMPLING TIME θ, min.	VACUUM In. Hg	STACK TEMPERATURE T_s, °F	VELOCITY HEAD DP_s	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER DH, In. H_2O	Initial Volume: 37.500 GAS SAMPLE VOLUME V_m, Ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET T_m In, °F	OUTLET T_m out, °F	TEMP. OF GAS LEAVING CONDENSER OR LAST IMPINGER T_c, °F	SAMPLE BOX TEMPERATURE T_b, °F
2:45	2:1	074335/074615	5	80	2.1	2.7	39.837	63	52	48	266
5:23	2	075213/075736	5	81	2.0	2.6	44.579	73	58		245
6:09	3	080434/081043	5	77	2.1	2.7	49.948	78	61	50	260
6:43	4	081553/082241	5	67	2.0	2.6	55.778	76	63		268
7:20	K=4 5	083301/084021	5	73	2.2	3.1	62.614	78	64	52	274
1:43	6	084832/085015	5	90	2.1	2.9	64.249	70	63		270
5:34	7	085704/090238	5	90	2.0	2.8	69.280	78	65	53	275
6:15	8	090735/091350	5	86	2.0	2.8	74.915	84	68		271
8:27	9	091912/092739	4	91	1.9	2.7	82.437	88	70	57	269
7:04	10	092856/094004	4	89	1.8	2.5	88.567	88	73		271
3:08	11	10:55:48/10:56:56	4	85	1.7	2.4	91.194	83	76	68	260
5:04	12	11:08:19/11:15:23	4	93	1.5	2.1	95.143	87	78		258
TOTAL				1002	32.947	30.9		AVG. 94.4	AVG. 79.1		
108.35 AVERAGE				96.4	1.37	2.58	98.471	AVG. 383.1	79.8		

109.33 min

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PARTICULATE TESTING RAW DATA SET

Plant WPSC
Inlet/Outlet Coke Ovens Unit# Baghouse
Operator Doerle
Date 3-15-84
Run No. 2
Sample Box No.
Meter Box No.
Meter DH@
K Factor
Pitot C_p Pitot Leak Ck
Leak Rate Before CFM @ Hg
Leak Rate After 0.00 CFM @ 10" Hg
Static Press., In. H_2O (+/-) -.9

Start Time AM : PM
Finish Time AM : PM
Meter Y_d

Filter #'s
Thimble #
Beaker #

SCHEMATIC OF TESTING LOCATION

Ambient Temperature, °F
Barometric Pressure, In. Hg
Assumed Moisture, %
Heater Box Setting
Probe Length, Ft.
Nozzle Diameter, In.
Probe Heater Setting
% O_2 19.5 19.5 = 19.5
% CO_2 0.0 0.0 = 0.0
H_2O, ml 20
Silica Gel, gm 15 > Started w/313g.
Total V_{lc} 35-13=23 not 380
Stack Area, Ft²

TRAVERSE POINT NUMBER	MIN/PT — SAMPLING TIME θ, min.	VACUUM In. Hg	STACK TEMPERATURE T_s, °F	VELOCITY HEAD DP_s	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER DH, In. H_2O	Initial Volume: GAS SAMPLE VOLUME V_m, Ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET T_m In, °F	OUTLET T_m out, °F	TEMP. OF GAS LEAVING CONDENSER OR LAST IMPINGER T_c, °F	SAMPLE BOX TEMPERATURE T_b, °F
2:48 1-1	112423/112711	5	101	2.0	2.8	97.656	89	80	68	265
1:57 2	113526/113723	5	103	1.9	2.7	99.426	90	81	66	269
4:25 3	114437/11:49:02	5	110	2.2	3.1	103.629	92	81		260 c-23
3:25 4	115849/120214	5	117	2.1	2.9	106.800	88	80	64	263
5:26 5	121331/121857	5	110	2.3	3.2	112.121	90	80		242
2:28 6	130943/131211	5	100	2.4	3.4	114.577	94	84	67	245
2:38 ~~3:08~~ 7	131936/132214	5	115	2.0	2.8	117.009	95	84		253
2:02 8	133230/133432	4	114	1.5	2.1	118.752	90	83	64	253
12:40 ~~[illegible]~~ 9	134230/135510	3	119	1.4	2.0	~~128.666~~ ~~[illegible]~~	96	84		260
4:15 10	140219/140634	4	105	1.5	2.1	131.990	93	84	63	271
1:16 11	141535/141651	3	115	1.4	2.0	132.975	91	86		269
5:26 12	142147/142653	3	111	1.3	1.8	135.971	94	87	64	268
TOTAL			1311		30.9		AVG. 110.8	AVG. ~~[illegible]~~ 994		
AVERAGE							AVG.			

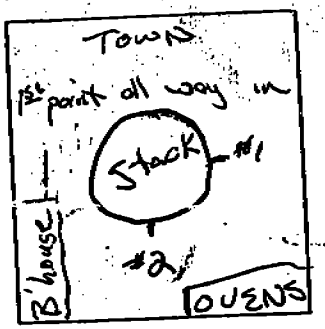
[illegible] * Clean Air Engineering, Inc.

Probable 25 pushes

PARTICULATE TESTING RAW DATA SET

Plant: WPSC
Inlet/Outlet: Baghouse Unit#: Coke Ovens
Operator: DOERLE
Date: 3-16-84
Run No.: 3
Sample Box No.: A
Meter Box No.: B
Meter DH@: 1.835
K Factor: 1.4
Pitot C_p: .84 Pitot Leak Ck: ✓
Leak Rate Before: 0.00 CFM @ 10 Hg
Leak Rate After: ____ CFM @ ____ Hg
Static Press., In. H_2O (+/−): -.8

Start Time: 7:37 AM / PM
Finish Time: 7: ____ AM / PM
Meter Yd: 1.0094



Filter #'s: 227
Thimble #:
Beaker #:

Ambient Temperature, °F: 60
Barometric Pressure, In. Hg: 29.42
Assumed Moisture, %: 3
Heater Box Setting: 70%
Probe Length, Ft.: 7
Nozzle Diameter, In.: .192
Probe Heater Setting: 85%
% O_2: 19.5 19.5
% CO_2: 0.0 0.0
H_2O, ml: 3
Silica Gel, gm: 3.5
Total Vlc: 3.5
Stack Area, Ft²: 28.27

SCHEMATIC OF TESTING LOCATION

TRAVERSE POINT NUMBER	MIN/PT ____ SAMPLING TIME θ, min.	VACUUM In. Hg	STACK TEMPERATURE T_s, °F	VELOCITY HEAD DP_s	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER DH, In. H_2O	Initial Volume: 38.700 GAS SAMPLE VOLUME V_m, Ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET T_m In, °F	OUTLET T_m out, °F	TEMP. OF GAS LEAVING CONDENSER OR LAST IMPINGER T_c, °F	SAMPLE BOX TEMPERATURE T_p, °F
5:21 2.1	073700/074221	9	85	2.2	3.1	43.740	66	64	60	265
4:04 2	074909/075313	9	100	2.0	2.8	47.490	75	68		270
6:54 3	075910/080604	9	94	1.9	2.7	53.670	84	73	59	267
3:10 4	081301/081611	9	101	2.0	2.8	56.548	80	72		265
5:17 5	082300/082817	9	106	2.0	2.8	61.369	86	74	58	259
5:15 6	083429/083944	9	97	2.0	2.8	66.033	87	74		266
5:44 7	084553/085137	9	98	2.0	2.8	71.294	86	75	63	256
4:44 8	085753/090437	8	96	1.8	2.5	77.195	89	77		262
8:40 9	091113/091953	7	110	1.6	2.2	84.200	85	75	63	242
1:10 10	092859/093000	7	101	1.5	2.1	85.283	75	72		267
2:48 11	104205/104483	7	88	1.6	2.2	87.550	74	70	66	256
5:50 12	105054/105644	7	99	1.5	2.1	92.090	78	70		255
TOTAL			1175		30.9		AVG. 106.5	AVG. 86.4		
AVERAGE							AVG.			

Clean Air Engineering, Inc.

Page ____ of ____

PARTICULATE TESTING
RAW DATA SET

Plant WPSC
Inlet/Outlet Baghouse Unit# Coke Ovens
Operator Dogle
Date 3-16-84
Run No. 3
Sample Box No.
Meter Box No.
Meter DH@
K Factor
Pitot C_p Pitot Leak Ck
Leak Rate Before CFM @ Hg
Leak Rate After CFM @ Hg
Static Press., In. H_2O (+/−) -.9

Start Time AM : PM
Finish Time AM : PM
Meter Y_d

Filter #'s
Thimble #
Beaker #

Ambient Temperature, °F 40
Barometric Pressure, In. Hg
Assumed Moisture, %
Heater Box Setting
Probe Length, Ft. 1
Nozzle Diameter, In.
Probe Heater Setting
% O_2
% CO_2
H_2O, ml
Silica Gel, gm
Total V_{lc}
Stack Area, Ft^2

SCHEMATIC OF TESTING LOCATION

TRAVERSE POINT NUMBER	MIN/PT ____ SAMPLING TIME θ, min.	VACUUM In. Hg	STACK TEMPERATURE T_s, °F	VELOCITY HEAD DP_s	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER DH, In. H_2O	Initial Volume: GAS SAMPLE VOLUME V_m, Ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET T_m in, °F	OUTLET T_m out, °F	TEMP. OF GAS LEAVING CONDENSER OR LAST IMPINGER T_c, °F	SAMPLE BOX TEMPERATURE T_b, °F
3:07 1-1	110254/111101	10	93 112	2.1	2.9	99.552	79	69	66	241
3:24 2	111735/112101	10	113	2.1	2.9	102.744	77	68	66	272
8:18 3	112624/113442	10	98	2.1	2.9	110.149	78	68	65	268
9:21 4	114021/114943	10	102	2.0	2.8	118.639	80	69		253
5:40 5	115603/120143	10	98	2.0	2.8	123.794	79	68	64	249
12:16 6	125301/130517	10	85	2.0	2.8	134.922	74	72	61	267
7:43 7	131030/131813	7	99	1.5	2.1	140.887	74	69		271
4:57 8	132457/132954	7	88	1.5	2.1	144.721	71	60	60	273
10:01 9	133527/134528	7	90	1.5	2.1	152.441	73	61		265
5:23 10	135101/135624	6	101	1.4	2.0	156.473	70	60	61	267
7:14 11	140209/140923	6	94	1.3	1.8	161.633	72	60		266
6:27 12	141518/142145	5	80	1.2	1.7	166.200	71	60	60	266
TOTAL			1160	31.937	48.9		AVG. 89.8	AVG. 77.4		
AVERAGE			2355/97	1.331	54.8/2.49	127.500	AVG. 364/75			

135.44 min

WEIGHT SHEET

WEIGH SHEET # 1

RDS	RUN	WT #	IDENTIFIER	FBT	WASH ML	CORR.	GROSS	TARE	NET
		1	BLANK	B	200	0.0000	102.3436	102.3436	.0000
01	1	2	60	B	300	.0000	106.6045	106.5778	.0267
02	2	3	1	B	300	.0000	84.5221	84.4751	.0470
03	3	4	2	B	300	.0000	95.3425	95.3321	.0104
01	1	5	225	F	----	------	.6049	.5935	.0114
02	2	6	226	F	----	------	.6096	.5912	.0184
03	3	7	227	F	----	------	.6398	.5888	.0510
01	1	8	100	B	115	.0000	92.9360	92.9325	.0035
02	2	9	15	B	110	.0000	104.0965	104.0921	.0044
03	3	10	11	B	125	.0000	108.8209	108.8080	.0129
		11	-----	-	----	------	--------	--------	-------
		12	-----	-	----	------	--------	--------	-------
		13	-----	-	----	------	--------	--------	-------
		14	-----	-	----	------	--------	--------	-------
		15	-----	-	----	------	--------	--------	-------
		16	-----	-	----	------	--------	--------	-------
		17	-----	-	----	------	--------	--------	-------
		18	-----	-	----	------	--------	--------	-------
		19	-----	-	----	------	--------	--------	-------
		20	-----	-	----	------	--------	--------	-------

WEIGH SHEET # 2

RDS	RUN	WT #	IDENTIFIER	FBT	WASH ML	CORR.	GROSS	TARE	NET
		1	BLANK	B	200	0.0000	93.4551	93.4537	.0014
		2	63	B	175	.0012	101.8278	101.8258	.0008
03	3	3	2035	F	----	------	.1045	.1020	.0025
03	3	4	2032	F	----	------	.1028	.1013	.0015
01	1	5	2031	F	----	------	.1028	.1009	.0019
02	2	6	2033	F	----	------	.1026	.1007	.0019
03	3	7	52	B	386	.0027	103.5774	103.5402	.0345
01	1	8	1001	B	432	.0030	108.6918	108.6819	.0069
02	2	9	12	B	385	.0027	102.8241	102.8033	.0181
03	3	10	END	-	----	------	--------	--------	-------
		11	--------	-	----	------	--------	--------	-------
		12	--------	-	----	------	--------	--------	-------
		13	--------	-	----	------	--------	--------	-------
		14	--------	-	----	------	--------	--------	-------
		15	--------	-	----	------	--------	--------	-------
		16	--------	-	----	------	--------	--------	-------
		17	--------	-	----	------	--------	--------	-------
		18	--------	-	----	------	--------	--------	-------
		19	--------	-	----	------	--------	--------	-------
		20	--------	-	----	------	--------	--------	-------

EAN AIR ENGINEERING, INC.

LANCE: PITT

OPERATOR: NAZAREK

EET # 2 of 2

PLANT: WPSC - MONESSEN

UNIT: COKE OVEN - BAGHOUSE

RUN(S):

DATE:

WEIGH SHEET

#	WT#	FILTER # OR IDENTIFICATION	T,F,B	WASH ML	WASH CORR.	GROSS	TARE	NET
	1	107 BLANK H_2O	B	200	----	93.4551	93.4537	0.0014
	2							
	3	63 FRONT 1/2 H_2O	B	175	.0012	101.8278	101.8258	
3	4	2035 FRONT 1/2 H_2O	F			0.1045	0.1020	0.0025
	5							
	6	2032 BACK 1/2 INSOLUBLES	F			0.1028	0.1013	0.0015
2	7	2031 "	F			0.1028	0.1009	0.0019
J	8	2033 "	F			0.1026	0.1007	0.0019
	9							
L	10	52 BACK 1/2 H_2O	B	386/200	.0014	103.5595	103.5402	0.0345
	11	1001 "	B	432/200	.0014	108.6865	108.6819	.0069 0.0032
3	12	12 "	B	385/200	.0014	102.81~~55~~ 41 TN	102.8033	0.018Φ
	13							
	14							
	15							
	16							
	17							
	18							
	19							
	20							

EAN AIR ENGINEERING, INC.

LANCE: PITT

OPERATOR: NAZAREK

EET # 1 of 2

PLANT: WPSC- MONESSEN

UNIT: COKE OVEN - BAGHOUSE

RUN(S): 1-3

DATE: MARCH 14,15,16, 1984

WEIGH SHEET

#	WT#	FILTER # OR IDENTIFICATION	T,F,B	WASH ML	WASH CORR.	GROSS	TARE	NET
	1	34 BLANK ACETONE	B	200	----	102.3436	102.3436	0.0000
	2							
	3	60 FRONT ½ ACETONE	B	300	—	106.6045	106.5778	0.0267
2	4	1 "	B	300	—	84.5221	84.4751	0.0470
5	5	2 "	B	300	—	95.3425	95.3321	0.0104
	6							
1	7	225	F			0.6049	0.5935	0.0114
x	8	226	F			0.6096	0.5912	0.0184
	9	227	F			0.6398	0.5888	0.0510
	10							
	11	100 BACK ½ ACETONE	B	115	—	92.9360	92.9325	0.0035
2	12	15	B	110	—	104.0965	104.0921	0.0044
5	13	11	B	125	—	108.8209	108.8080	0.0129
	14							
	15							
	16							
	17							
	18							
	19							
	20							

CALIBRATION DATA

DATE: 3-2-83

OPERATOR: [signature]

Meter Box: B

BAROMETRIC PRESSURE (Pb): 29.13

Q	ΔH	ΔP	Yds	STANDARD METER GAS VOLUME (ft³) INITIAL	FINAL	Vds/NET	METER BOX GAS VOLUME (ft³) INITIAL	FINAL	VD/NET	STANDARD METER TEMP. (°F) IN	OUT	Tds/AVG	METER BOX TEMP. (°F) IN	OUT	Td/AVG	TIME (MIN) θ	Yd	ΔH@
9	.5	-.6	1.0023	17.002	23.194	6.192	28.400	34.700	6.300	65 66	65 66	65.5	84 90	70 76	80	15.58	1.0095	1.743
9	.5	-.6	1.0023	23.194	30.815	7.621	34.700	42.500	7.800	66 66	66 66	66	90 93	76 79	84.5	19.17	1.0109	1.731
9	1.7	-1.4	.9955	30.815	43.166	12.351	42.500	55.100	12.600	66 66	66 67	66.2	93 101	79 82	88.8	17.57	1.0098	1.895
9	1.7	-1.4	.9955	43.166	54.795	11.629	55.100	67.000	11.900	66 66	67 66	66.2	101 101	82 82	91	16.52	1.0108	1.882
2	3.0	-2.3	.9872	54.795	73.790	18.995	67.000	86.300	19.300	66 66	66 66	66	101 105	82 84	93	20.17	1.0080	1.879
2	3.0	-2.3	.9872	73.790	85.478	11.688	86.300	98.200	11.900	66 66	66 66	66	105 104	84 83	94	12.43	1.0077	1.881

$\overline{Y_d}$ 1.0094

$\overline{\Delta H}$ = 1.835

ΔH@ = Orifice pressure differential that gives 0.75 cfm at 70°F and 29.92" Hg (in. H_2O)

- Flow Rate (cfm)
- Orifice Pressure differential (in. H_2O)
- Standard Meter [illegible] differential [illegible]

POST TEST CALIBRATION CHECK

DATE 3-16-84

METER BOX: R

OPERATOR: NAZAREK

METER BOX VACUUM: 13

BAROMETRIC PRESSURE (Pb): 29.43

METER BOX Yd 1.0094

ΔH	ΔP	Yds	Standard Meter Gas Volume (ft³) INITIAL	FINAL	(Vds) NET	Meter Box Gas Volume (ft³) INITIAL	FINAL	(Vd) NET	Standard Meter Temperature (°F) IN	OUT	Tds AVG	Meter Box Temperature (°F) IN	OUT	Td AVG	TIME (Min.) θ	Yd	
2.3	-2.0	.9921	55.28	64.70	9.42	32.30	42.06	9.76	~~107~~ 67 67	68 67	67	107 113	95 96	103	11.75	1.0120	
2.3	-2.0	.9920	64.70	75.54	10.84	42.06	53.30	11.24	67 66	67 66	67	113 112	96 96	104	13.50	1.0129	
2.3	-2.0	.9920	75.54	86.76	11.22	53.30	~~56~~ 64.975	11.675	66 66	66 66	66	112 112	96 96	104	14.0	1.011	

Q = Flow Rate (cfm)
ΔH = Orifice pressure differential (in. H_2O)
ΔP = Inlet pressure differential standard meter (in. H_2O)
Yds = Standard meter correction factor (unitless)
Yd = Meter box correction factor (unitless)
ΔH@ = Orifice pressure differential that gives 0.75 cfm of air at 70°F and 29.92" Hg (in. H_2O)

$$Yd = (Yds)\left(\frac{Yds}{Yd}\right)\left(\frac{Td + 460}{Tds + 460}\right)\left(\frac{Pb + \Delta P/13.6}{Pb + \Delta H/13.6}\right)$$

$$\Delta H@ = \frac{0.0317\ \Delta H}{Pb(Td + 460)}\left[\frac{(Tds + 460)\ \theta}{Vds.\ Yds}\right]^2$$

clean air engineering

PALATINE, ILLINOIS

WPSC
Monessen Pa
Coke Oven Baghouse
3-14-84

NOZZLE CALIBRATION

TEST # 1

MISC. READING #	1	2	3	4	5	6	7	8	9	10	AVG.
BEFORE TEST	.184	.184	.183	.184	.184	.183	.183				.184
AFTER TEST											

TEST # 2 & 3

MISC. READING #	1	2	3	4	5	6	7	8	9	10	AVG.
BEFORE TEST	.191	.190	.192	.192	.193	.192	.191	.192	.192		.192
AFTER TEST											

TEST #

MISC. READING #	1	2	3	4	5	6	7	8	9	10	AVG.
BEFORE TEST											
AFTER TEST											

COMPUTER PRINT OUT

RAW DATA SET # 1

1) Plant	WPSC - MONESSEN PA	17) Heater Box Setting	70
2) Location	COKE BAGHOUSE	18) Probe Length',' Ft.	7'
3) Operator	DOERLE	19) Nozzle Diameter','In.	.184
4) Date	3-14-84	20) Probe Heater Setting	85
5) Run No.	1	21) % O2	19.25
6) Sample Box No.	A	22) % CO2	0.0
7) Meter Box No.	R	23) Ml. H2O	6.0
8) Meter H@	1.835	24) GM. Silica Gel	13.0
9) K Factor	1.05	25) Total	19.0
10) Pitot Factor	.84	26) Start Time	10:56 A
11) Leak Rate Before	.006@22	27) Finish Time	5:18 PM
12) Leak Rate After	.00@7	28) Yd.	1.0094
13) Static Pres., in H2O	-0.5	29) Stack Area	28.27
14) Ambient Temperature	45	30) Sampling Time (MIN/PT)	2.76
15) Barometric Pressure	29.43	31) Initial Volume	87.60
16) Assumed Moisture','%	3	32) FILTER & BEAKER #'S	60B
		225F 2032F 52B 100B	

Pt. #	0	Vac.	Ts	DPs	DH	Vm	Tm in	Tmout	Tc	Tb	%I	
0 - 0						87.60					DOERLE	
1 - 1	1.73	4	82	2.2	2.3	89.116	64	52	48	274	100.6	
1 - 2	2.97	4	80	2.2	2.3	91.453	64	52	50	271	89.5	
1 - 3	3.68	5	88	2.3	2.6	94.474	68	54	50	270	91.3	
1 - 4	3.03	6	88	2.4	2.8	97.183	62	52	48	270	98.3	
1 - 5	3.47	6	88	2.5	2.9	100.361	66	53	48	260	98.0	
1 - 6	2.85	6	86	2.5	2.9	102.974	62	51	50	273	98.7	
1 - 7	2.80	5	81	2.0	2.3	105.250	60	52	50	268	97.5	
1 - 8	3.80	5	73	1.8	2.1	107.647	62	52	46	260	78.9	*
1 - 9	2.95	4	79	1.6	1.8	109.792	61	52	46	270	97.2	
1 - 10	3.18	4	77	1.6	1.8	112.145	62	52	50	268	98.5	
1 - 11	2.60	2	76	1.0	1.1	113.620	59	52	50	265	96.3	
1 - 12	3.08	3	79	1.4	1.6	115.702	60	51	51	270	96.8	
2 - 1	2.83	5	86	2.0	2.3	117.987	64	52	54	267	96.9	
2 - 2	3.12	0	86	.25	.29	118.932	57	53	54	273	104.8	
2 - 3	3.07	0	90	.24	.28	119.850	57	52	56	270	106.2	
2 - 4	2.93	6	99	2.0	2.3	122.224	60	52	56	265	98.7	
2 - 5	2.35	5	84	2.2	2.5	124.228	60	52	50	256	98.0	
2 - 6	2.10	5	96	2.2	2.5	126.000	60	51	50	247	97.5	
2 - 7	2.48	5	89	2.2	2.5	128.100	63	52	53	255	97.4	
2 - 8	2.03	5	88	2.1	2.4	129.788	62	52	53	264	98.2	
2 - 9	2.43	5	94	2.0	2.3	131.743	62	52	51	269	97.7	
2 - 10	2.13	5	96	1.9	2.2	133.445	58	52	51	265	100.3	
2 - 11	2.57	4	100	1.8	2.1	135.420	61	51	47	263	99.0	
2 - 12	1.97	4	95	1.7	2.0	136.905	58	51	47	266	100.2	

66.15	86	1.317	2.07	49.305	57
Total	Avg.	Root	Avg.	Volume	Avg.

RAW DATA SET # 2

1) Plant	WPSC MONESSEN	17) Heater Box Setting	70
2) Location	COKE BAGHOUSE	18) Probe Length',' Ft.	7'
3) Operator	DOERLE	19) Nozzle Diameter','In.	.192
4) Date	3-15-84	20) Probe Heater Setting	85
5) Run No.	2	21) % O2	19.5
6) Sample Box No.	A	22) % CO2	0.0
7) Meter Box No.	R	23) Ml. H2O	20
8) Meter H@	1.835	24) GM. Silica Gel	2
9) K Factor	1.3	25) Total	22
10) Pitot Factor	.84	26) Start Time	7:43 AM
11) Leak Rate Before	.00@2	27) Finish Time	2:27 PM
12) Leak Rate After	.00@10	28) Yd.	1.0094
13) Static Pres., in H2O	-.9	29) Stack Area	28.27
14) Ambient Temperature	50	30) Sampling Time (MIN/PT)	4.75
15) Barometric Pressure	29.65	31) Initial Volume	37.500
16) Assumed Moisture','%	3	32) FILTER & BEAKER #'S	1B
		226F 2031F 1001B 15B	

Pt. #	0	Vac.	Ts	DPs	DH	Vm	Tm in	Tmout	Tc	Tb	%I
0 - 0						37.500					DOERLE
2 - 1	2.67	5	80	2.1	2.7	39.837	63	52	48	266	94.4
2 - 2	5.38	5	81	2.0	2.6	44.579	73	58	48	245	95.3
2 - 3	6.15	5	77	2.1	2.7	49.948	78	61	50	260	91.1
2 - 4	6.72	5	67	2.0	2.6	55.778	76	63	50	268	91.8
2 - 5	7.33	5	73	2.2	3.1	62.614	78	64	52	274	94.4
2 - 6	1.72	5	90	2.1	2.9	64.249	70	63	52	270	102.4
2 - 7	5.57	5	90	2.0	2.8	69.280	78	65	53	275	97.4
2 - 8	6.25	5	86	2.0	2.8	74.915	84	68	53	271	96.0
2 - 9	8.45	4	91	1.9	2.7	82.437	88	70	57	269	97.0
2 - 10	7.10	4	89	1.8	2.5	88.567	88	73	57	271	96.2
2 - 11	3.13	4	85	1.7	2.4	91.196	83	76	63	260	96.9
2 - 12	5.07	4	93	1.5	2.1	95.143	87	78	63	258	95.3
1 - 1	2.80	5	101	2.0	2.8	97.656	89	80	68	265	96.1
1 - 2	1.95	5	103	1.9	2.7	99.426	90	81	66	269	100.3
1 - 3	4.42	5	110	2.2	3.1	103.629	92	81	66	260	97.0
1 - 4	3.42	5	117	2.1	2.9	106.800	88	80	64	263	98.1
1 - 5	5.43	5	110	2.3	3.2	112.121	90	80	64	242	97.9
1 - 6	2.47	5	100	2.4	3.4	114.577	94	84	67	245	96.5
1 - 7	2.63	5	115	2.0	2.8	117.009	95	84	67	253	99.4
1 - 8	2.03	4	114	1.5	2.1	118.752	90	83	64	253	107.5
1 - 9	12.673		119	1.4	2.0	128.666	96	84	64	260	99.5
1 - 10	4.25	4	105	1.5	2.1	131.990	93	84	63	271	95.8
1 - 11	1.27	3	115	1.4	2.0	132.975	91	86	63	269	101.8
1 - 12	5.10	3	111	1.3	1.8	135.971	94	87	64	268	77.5 *
	113.98		95	1.363	2.59	98.471		80			
	Total		Avg.	Root	Avg.	Volume		Avg.			

RAW DATA SET # 3

1)	Plant	WPSC MONESSEN	17)	Heater Box Setting	70
2)	Location	COKE BAGHOUSE	18)	Probe Length',' Ft.	7'
3)	Operator	DOERLE	19)	Nozzle Diameter','In.	.192
4)	Date	3-16-84	20)	Probe Heater Setting	85
5)	Run No.	3	21)	% O2	19.5
6)	Sample Box No.	A	22)	% CO2	0.0
7)	Meter Box No.	R	23)	Ml. H2O	3
8)	Meter H@	1.835	24)	GM. Silica Gel	35
9)	K Factor	1.4	25)	Total	38
10)	Pitot Factor	.84	26)	Start Time	7:37 AM
11)	Leak Rate Before	.00@10	27)	Finish Time	2:22 PM
12)	Leak Rate After	.00@12	28)	Yd.	1.0094
13)	Static Pres., in H2O	-.8	29)	Stack Area	28.27
14)	Ambient Temperature	60	30)	Sampling Time (MIN/PT)	6.20
15)	Barometric Pressure	29.42	31)	Initial Volume	38.70
16)	Assumed Moisture','%	3	32)	FILTER & BEAKER #'S	2B
				227F 63B 2035F 2033F 12B	

Pt. #	0	Vac.	Ts	DPs	DH	Vm	Tm in	Tmout	Tc	Tb	%I
0 - 0						38.70					DOERLE
2 - 1	5.35	9	85	2.2	3.1	43.740	66	64	60	263	97.8
2 - 2	4.07	9	100	2.0	2.8	47.490	75	68	60	270	100.8
2 - 3	5.90	9	94	1.9	2.7	53.670	84	73	59	269	114.6
2 - 4	3.17	9	101	2.0	2.8	56.548	80	72	59	264	99.0
2 - 5	5.28	9	106	2.0	2.8	61.369	86	74	58	259	98.5
2 - 6	5.25	9	97	2.0	2.8	66.033	87	74	58	266	95.0
2 - 7	5.73	9	98	2.0	2.8	71.294	86	75	63	256	98.1
2 - 8	6.73	8	96	1.8	2.5	77.195	89	77	63	262	98.0
2 - 9	8.67	7	110	1.6	2.2	84.200	85	75	63	242	97.2
2 - 10	1.17	7	101	1.5	2.1	85.283	75	72	63	267	121.0 *
2 - 11	2.80	7	88	1.6	2.2	87.550	74	70	66	256	98.7
2 - 12	5.83	7	99	1.5	2.1	92.090	78	70	66	255	97.4
1 - 1	8.12	10	112	2.1	2.9	99.552	79	69	66	241	97.9
1 - 2	3.43	10	113	2.1	2.9	102.744	77	68	66	272	100.6
1 - 3	8.30	10	98	2.1	2.9	110.149	78	68	65	268	94.1
1 - 4	9.37	10	102	2.0	2.8	118.639	80	69	65	253	97.8
1 - 5	5.67	10	98	2.0	2.8	123.794	79	68	64	249	98.5
1 - 6	12.27	10	85	2.0	2.8	134.922	74	72	61	267	96.5
1 - 7	7.72	7	99	1.5	2.1	140.887	74	69	61	271	96.7
1 - 8	4.95	7	88	1.5	2.1	144.721	71	60	60	273	97.6
1 - 9	10.02	7	90	1.5	2.1	152.441	73	61	60	265	96.3
1 - 10	5.38	6	101	1.4	2.0	156.473	70	60	61	267	98.9
1 - 11	7.23	6	94	1.3	1.8	161.633	72	60	61	266	96.6
1 - 12	6.45	5	80	1.2	1.7	166.200	71	60	60	266	98.7

148.86	97	1.332	2.5	127.5	73
Total	Avg.	Root	Avg.	Volume	Avg.

VISIBLE EMISSIONS READINGS

COKE OVEN BAGHOUSE

Run 1

Clean Air Engineering, Inc.

P. O. Box 525 Morgan, PA 15064 412-221-0966

VISIBLE EMISSION RECORDING FORM

Company Name: W.P.S.C.	Company ID Number:
Address: MONESSEN	Observation Date: 3/14/84
State: PA. ZIP: Phone:	Observer's Name: KARL R. TEITT
Source/Process: BAG HOUSE STACK	Certified By: Date: / /
Control Equipment: BAG HOUSE	Operating Mode: INTERMITTENT
Describe Emission Point: START 11:07	
Emission Point Height Above Ground Level:	Emission Point Height Relative to Observer: STOP 11:10
Distance to Emission Point: APPROX. 130 yds	Direction to Emission From Observer: START 11:18 TO NORTH
Describe Emission: STOP 11:22	
Color of Emission:	Continuous Fugitive Intermittent 11:32
Water Vapor Present: ✓ Yes ___	If Yes, Is Plume Attached ___ Detached ___ 11:33
Point Where Opacity Was Determined: 11:44	
Describe Background: HAZY OVERCAST SKY	
Color of Background:	Sky Condition: HAZY OVERCAST 12:00
Wind Speed: ≈ 5-8 MPH	Wind Direction: TO SOUTH EAST
Ambient Temperature: ≈ 35°	Relative Humidity:

Time Start 10:56 Time Stop 12:12

	0	15	30	45			15	30	45
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3					33				
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					37				
8			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				
12					42	0	0	0	0
13			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		
16	0	0	0		46				
17					47	0	0	0	0
18	11:45	0	0		48	0	0	0	0
19	0	0	0	0	49	0	0		
20	0	0	0	0	50				
21	0	0	0	0	51				
22					52	0		0	0
23	12:00 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	
26					56				
27					57				
28					58				
29					59				

Range of Opacity ___% to ___% Number of Readings Above ___% were ___

Layout Sketch of Source (Show North Arrow, Location of Sun, Emission Point, Wind Direction, etc.)

Comments: RECORDED ALONG W/OPACITY READINGS ARE THE START AND STOP TIMES OF THE COKE REMOVAL PROCESS WHICH COINCIDES W/ METHOD 5 TEST

Observer's Signature: Karl R. Teitt Date 3/14/84

190 REV. 10/

Run 1

CAE Engineering, Inc.

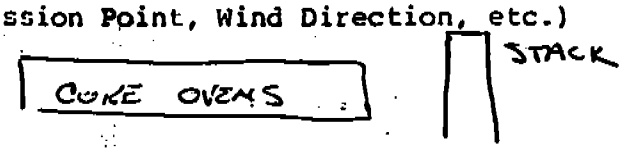
P O. Box 525 Morgan PA 15064 412-221-0966

VISIBLE EMISSION RECORDING FORM

Company Name: U.P.S.C.	Company ID Number:
Observation Date: 3/14/84	
Address: MONESSEN	Observer's Name: KARL R. TEITT
State: PA. ZIP: Phone:	Certified By: Date: / /
Source/Process: BAG HOUSE B-7	
Control Equipment:	Operating Mode: 2:01 INTERMITTENT
Describe Emission Point: 2:55	
Emission Point Height Above Ground Level:	Emission Point Height Relative to Observer: STACK HEIGHT C-14
Distance to Emission Point:	Direction to Emission From Observer: EAST B-9
Describe Emission: 2:26	
Color of Emission: 2:29	Continuous Fugitive Intermittent C-11
Water Vapor Present: ___ Yes ___	If Yes, Is Plume Attached ___ Detached ___ 3:44 5:
Point Where Opacity Determined: AT EXIT POINT 3:55 B-13	
Describe Background: HAZY OVERCAST	
Color of Background:	Sky Condition: 4:07
Wind Speed:	Wind Direction: TO SOUTH EAST C-13
Ambient Temperature:	Relative Humidity: 4:

Time Start 0	15	30	45		Time Stop 0	15	30	
			0	30	B-15	-428		
0	0	0	0	31		0	0	
0	0	0	0	32	0	0	0	
0	0	0	0	33	0	0	0	
		~~0~~	~~0~~	34	4:31	STOP		
		0	0	35				
0	0	0	0	36	C-15	START	4:	
0	0	0	0	37		0	0	
0	0	2:17		38	0	0	0	
				39	0	0	0	
0	0	0	0	40	0	0	STOP 4:	
0	0	0	0	41				
0	0	0	0	42	B-17	START	4:	
				43	0	0	0	
				44	0	0	0	
	0	0	0	45	0	0	0	STOP
0	0	0	0	46				
0	0	0	0	47	C-17	START	5:	
0	0			48		0	0	
				49	0	0	0	
				50	0	0	0	
			0	51	0	0	STOP 5:	
0	0	0	0	52				
0	0	0	0	53	B-19	START	5:	
0	0	3:58		54		0	0	
				55	0	0	0	
0	0	0	0	56	0	0	0	
0	0	0	0	57	STOP	5:19		
0	0	0	0	58				
0	— 4:10			59				

Layout Sketch of Source
(Show North Arrow, Location of Sun, Emission Point, Wind Direction, etc.)



Range of Opacity ___% to ___% Number of Readings Above ___% were ___

Comments

Observer's Signature

Date ___/___/___

CAE

Engineering, Inc.

Run 2

P O. Box 525 Morgan PA 15064 412-221-0966

VISIBLE EMISSION RECORDING FORM

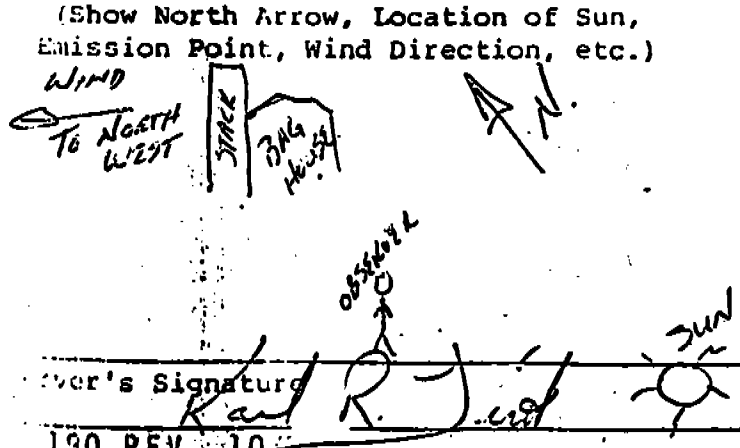
Company Name: W.P.S.C.	Company ID Number:
Observation Date: 3/15/84	
Address: MONESSEN	Observer's Name: KARL R. TEITT
State: PA ZIP: Phone:	Certified By:
	Date: / /
Place/Process:	
Control Equipment: BAG HOUSE	Operating Mode: INTERMITTENT
Describe Emission Point:	
Emission Point Height Above Ground Level:	Emission Point Height Relative to Observer: STACK HEIGHT.
Distance to Emission Point: 130 Yds APPROX	Direction to Emission From Observer: N.N.W.
Describe Emission: NONE APPARENT	
Color of Emission:	Continuous Fugitive Intermittent
Water Vapor Present: Yes ___	If Yes, Is Plume Attached Detached
Point Where Opacity Determined: AT EXIT POINT OF STACK	
Describe Background: SUNNY BLUE SKIES W/FEW CLOUDS	
Color of Background: LIGHT BLUE	Sky Condition: /
Wind Speed: 1-3 MPH APPROX	Wind Direction: TO WEST
Ambient Temperature: APPROX 38°	Relative Humidity:

Time Start	0	15	30	45	Time Stop	0	15	30	
0	C-9	START	7:45		30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0		33	0	0	0	0
4	STOP	7:47			34	0	0	0	0
5					35	0	STOP	8:40	
6	B-18	START	7:55		36				
7			0	0	37	B-15	START	8:	
8	0	0	0	0	38		0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0		40	0	0	STOP	8:
11	STOP	7:58			41				
12					42	C-15	START	8:	
13	C-N	START	8:09		43				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		46	0	0	0	0
17	STOP	8:N			47	0	0	0	0
18					48	0	0	0	0
19	B-13	START	8:17		49	0	0	STOP	9:
20		0	0	0	50				
21	0	0	0	0	51	B-17	START	9:	0
22	0	0	0	0	52			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	STOP	8:22	55	0	0	0	0
26					56	0	0	0	0
27	C-18	START	8:33		57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	STOP	9:14		

Range of Opacity ___% to ___% Number of Readings Above ___% were ___

Comments: STARTING W/B-13 OPACITY READINGS WERE TAKEN THE SAME TIME THE DAMPERS WERE OPENED ON BAG HOU (IE. SAME TIME METHOD STARTED) READINGS WERE STOPED WHEN COVE

Layout Sketch of Source
(Show North Arrow, Location of Sun, Emission Point, Wind Direction, etc.)



Observer's Signature: Karl R. Teitt

Date 3/15/84

190 REV 10

Run 2

Engineering, Inc.

P O. Box 525 Morgan PA 15064 412-221-0966

VISIBLE EMISSION RECORDING FORM

PAGE 2 OF

Company Name: W.P.S.C.	Company ID Number / Observation Date: 3/15/84
Address: MONESSEN	Observer's Name: KARL R. TEITT
State: PA. ZIP Phone	Certified By / Date / /
Source/Process: COKE OVEN BAG HOUSE STACK.	
Control Equipment: BAG HOUSE	Operating Mode: INTERMITTENT
Describe Emission Point	
Emission Point Height Above Ground Level	Emission Point Height Relative to Observer
Distance to Emission Point	Direction to Emission From Observer
Describe Emission	
Color of Emission	Continuous Fugitive Intermittent
Water Vapor Present Yes ____	If Yes, Is Plume Attached ____ Detached ____
Point Where Opacity Determined	
Describe Background	
Color of Background	Sky Condition
Wind Speed	Wind Direction
Ambient Temperature	Relative Humidity

	Time Start 0	15	30	45		Time Stop 0	15	30	
0	C-17	START		9:19	30	B-21	START		11:
1	0	0	0	0	31		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	STOP	11:12:00		
6	0	0	0	0	36				
7	0	0	0	0	37	C-21	START		11:2
8	0	0	0	0	38		0	0	0
9	0	0	0	STOP 9:27	39	0	0	0	0
10					40	0	0	0	0
11	B-19	START		9:32	41	0	STOP	11:27	
12				0	42				
13	0	0	0	0	43	B-23	START		11:35
14	0	0	0	0	44		0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	STOP	11:3
17	0	0	0	0	47				
18	0	0	0	0	48	C-23	START		11
19	0	0	0	0	49			0	0
20	9:40		STOP.		50	0	0	0	0
21					51	0	0	0	0
22	C-19	START		10:55	52	0	0	0	0
23				0	53	0	0	0	0
24	0	0	0	0	54	STOP	11:49		
25	0	0	0	0	55				
26	0	0	0	0	56				
27	STOP	10:59:00			57				
28					58				
29					59				

Range of Opacity ____% to ____% Number of Readings Above ____% were ____

Comments

Layout Sketch of Source
(Show North Arrow, Location of Sun, Emission Point, Wind Direction, etc.)

Observer's Signature: Karl R. Teitt Date 3/15/84

190 REV. 10

Run 2

CAE Engineering, Inc.

P O. Box 525 Morgan PA 15064 412-221-0966

VISIBLE EMISSION RECORDING FORM

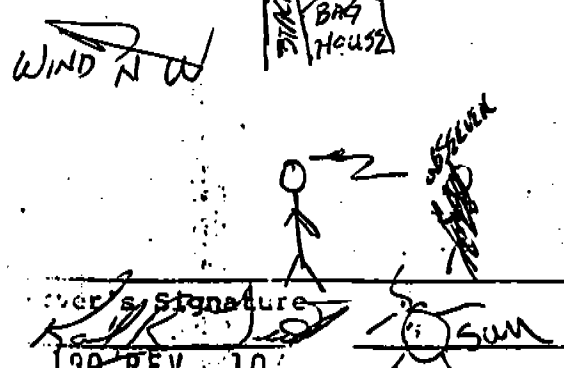
Company Name: W.P.S.C.	Company ID Number / Observation Date / /
Address: MONESSEN	Observer's Name
State: PA ZIP Phone	Certified By / Date / /
Source/Process: COKE OVEN BAG HOUSE STACK	
Control Equipment: BAG HOUSE	Operating Mode: INTERMITTENT
Describe Emission Point	
Emission Point Height Above Ground Level	Emission Point Height Relative to Observer
Distance to Emission Point	Direction to Emission From Observer
Describe Emission	
Color of Emission	Continuous Fugitive Intermittent
Water Vapor Present Yes ____	If Yes, Is Plume Attached ____ Detached ____
Point Where Opacity Determined	
Describe Background	
Color of Background	Sky Condition
Wind Speed	Wind Direction
Ambient Temperature	Relative Humidity

	Time Start 0	15	30	45		Time Stop 0	15	30	
0	B-25	START		11:58	30	B-27	START	1:3	
1				0	31		0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	
4	0	0	0	0	34	STOP 1:34			
5	0	STOP 12:02			35				
6					36	B-2	START	1:4	
7	C-25	START	12:11		37		0	0	0
8		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	STOP	1:45	
11	0	0	[illegible]	[illegible]	41				
12	0	0	0	0	42	C-2	START	1:5	
13	0	0	0	0	43			0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	STOP 12:19				46		STOP	1:52	
17					47				
18	B-27	START		1:09	48	B-4	START	2:	
19			0	0	49		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	STOP	1:12	52	0	0	0	0
23					53	0	0	0	
24	C-27	START		1:19	54	STOP 2:06			
25			0	0	55	C-4	START	2:	
26	0	0	0	0	56			0	0
27	0	0	0	0	57	0	0	0	0
28	0	STOP	1:22		58	STOP	2:17		
29					59				

Range of Opacity ____% to ____% Number of Readings Above ____% were ____

Comments

Layout Sketch of Source
(Show North Arrow, Location of Sun, Emission Point, Wind Direction, etc.)



Observer's Signature

Date 3/15/84

100 REV. 10

Clean Air
Engineering, Inc.

P. O. Box 525 Morgan, PA 15064 412-221-0966

Run 2

VISIBLE EMISSION RECORDING FORM

PAGE 4 OF 4

...pany Name	Company ID Number / Observation Date / /
...ress	Observer's Name
State ZIP Phone	Certified By / Date / /
...rce/Process	
...rol Equipment / Operating Mode	
...ribe Emission Point	
...sion Point Height ...e Ground Level / Emission Point Height Relative to Observer	
...ance to ...sion Point / Direction to Emission From Observer	
...ribe Emission	
...t of Emission / Continuous Fugitive Intermittent	
...r Vapor Present ___ Yes ___ / If Yes, Is Plume Attached ___ Detached ___	
... Where Opacity Determined	
...ribe Background	
...r of Background / Sky Condition	
... Speed / Wind Direction	
...ent Temperature / Relative Humidity	

Time Start	0	15	30	45	Time Stop	0	15	30	45
0	B-6	START		2:21	30				
1				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	STOP	2:26			36				
7					37				
8					38				
9					39				
10					40				
11					41				
12					42				
13					43				
14					44				
15					45				
16					46				
17					47				
18					48				
19					49				
20					50				
21					51				
22					52				
23					53				
24					54				
25					55				
26					56				
27					57				
28					58				
29					59				

Layout Sketch of Source
(Show North Arrow, Location of Sun, ...mission Point, Wind Direction, etc.)

Range of Opacity ___% to ___% Number of Readings Above ___% were ___

Comments

...rver's Signature

Date ___/___/___

190 REV. 10/8...

CAE

Engineering, Inc.

P O. Box 525 Morgan PA 15064 412-221-0966 Run 3

VISIBLE EMISSION RECORDING FORM

PAGE 1 OF 4

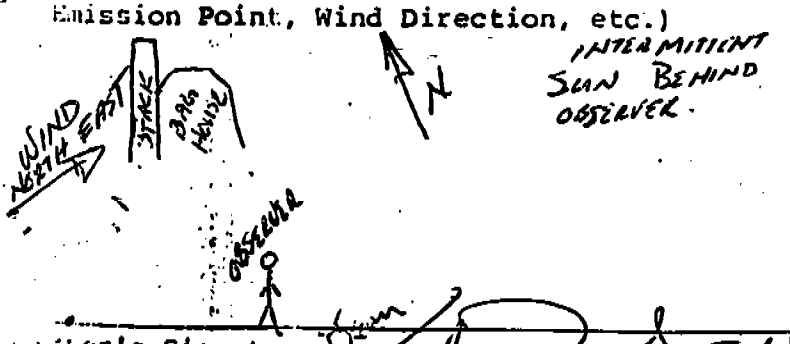
Company Name: W.P.S.C.	Company ID Number:
Observation Date: 3/16/84	
Address: MONESSEN	Observer's Name: KARL R. TETT
State: PA. ZIP: Phone:	Certified By:
	Date: / /
Source/Process: COKE OVEN BAG HOUSE STACK	
Control Equipment: BAG HOUSE	Operating Mode: INTERMITTENT
Describe Emission Point:	
Emission Point Height Above Ground Level:	Emission Point Height Relative to Observer: STACK HEIGHT.
Distance to Emission Point: 130 yds APPROX	Direction to Emission From Observer:
Describe Emission:	
Color of Emission:	Continuous Fugitive Intermittent
Water Vapor Present: Yes	If Yes, Is Plume: Attached Detached
Point Where Opacity Determined: AT EXIT POINT OF STACK	
Describe Background: VERY HAZY CLOUDY SKY	
Color of Background: GRAY	Sky Condition: VERY OVERCAST
Wind Speed: APPROX 10-20 MPH.	Wind Direction: TO NORTH EAST
Ambient Temperature: 60 APPROX	Relative Humidity:

Time Start	0	15	30	45	Time Stop	0	15	30
0	C-6	START		7:37	30	0	0	0
1			0	0	31	0	0	0
2	0	0	0	0	32	STOP 8:15		
3	0	0	0	0	33			
4	0	0	0	0	34	C-10		8:22
5	0	0	0	0	35		0	0
6	0	0	0		36	0	0	0
7	STOP		7:43		37	0	0	0
8					38	0	0	0
9	B-8	START		7:48	39	0	0	0
10				0	40	0	0	0
11	0	0	0	0	41	STOP		8:27
12	0	0	0	0	42			
13	0	0	0	0	43	B-12	START	8:
14	0	0	0	0	44	0	0	0
15	0	STOP		7:53	45	0	0	0
16					46	0	0	0
17	C-8	START		7:58	47	0	0	0
18				0	48	0	0	0
19	0	0	0	0	49	0	STOP	8:39
20	0	0	0	0	50			
21	0	0	0	0	51	C-12	START	8:45
22	0	0	0	0	52	0	0	0
23	0	0	0	0	53	0	0	0
24	0	0	0	0	54	0	0	0
25	0	0	STOP	8:05	55	0	0	0
26					56	0	0	0
27	B-10	START		8:12	57	0	0	0
28		0	0	0	58	0	STOP	8:51
29	0	0	0	0	59			

Range of Opacity ___% to ___% Number of Readings Above ___% were ___

Comments

Layout Sketch of Source
(Show North Arrow, Location of Sun, Emission Point, Wind Direction, etc.)



Observer's Signature: Karl R. Tett

Date 3/15/84

CAE

Engineering, Inc.

P O. Box 525 Morgan PA 15064 412-221-0966

Run 3

VISIBLE EMISSION RECORDING FORM

PAGE 2 OF 4

Company Name: W. P. S. C.	Company ID Number / Observation Date: 3/16/84
Address: MONESSEN	Observer's Name: KARL R. TEITT
State: PA ZIP Phone	Certified By / Date: / /
Source/Process: COKE OVEN BAG HOUSE STACK	
Control Equipment: BAG HOUSE	Operating Mode: INTERMITTENT
Describe Emission Point	
Emission Point Height Above Ground Level	Emission Point Height Relative to Observer
Distance to Emission Point	Direction to Emission From Observer
Describe Emission	
Color of Emission	Continuous Fugitive Intermittent
Water Vapor Present Yes ____	If Yes, Is Plume Attached ____ Detached ____
Point Where Opacity Determined	
Describe Background	
Color of Background	Sky Condition
Wind Speed	Wind Direction
Ambient Temperature	Relative Humidity

	Time Start 0	15	30	45		Time Stop 0	15	30	
0	B-14 START 8:57				30	0	0 STOP 10:4		
1		0	0	0	31				
2	0	0	0	0	32	B-18 START 10:5			
3	0	0	0	0	33		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	STOP 9:04			38	0	0	0	0
9					39	0	STOP 10:5		
10	C-14 START 9:11				40				
11			0	0	41	C-18 START 11:0			
12	0	0	0	0	42		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 STOP 9:19			49	0	0	0	0
20					50	0	0 STOP 11:		
21	B-16 START 9:27				51				
22				0	52	B-20 START 11:			
23	0	0	0	0	53	0	0	0	0
24	0	0 STOP 9:29			54	0	0	0	0
25					55	0	0	0	0
26	C-16 START 10:41				56	0	0		
27			0	0	57	STOP 11:28			
28	0	0	0	0	58				
29	0	0	0	0	59				

Range of Opacity ____% to ____% Number of Readings Above ____% were ____

Comments

Layout Sketch of Source
(Show North Arrow, Location of Sun, Emission Point, Wind Direction, etc.)

Observer's Signature: Karl R. Teitt

Date 3/16/84

100 REV. 10

Engineering, Inc.

P O. Box 525 Morgan PA 15064 412-221-0966

Run 3

VISIBLE EMISSION RECORDING FORM

PAGE 3 OF 4

...pany Name W. P. S. C.	Company ID Number
	Observation Date 3/16/84
...ress MONESSEN	Observer's Name KARL R. TEITT
State PA. ZIP Phone	Certified By Date / /
...ce/Process COKE OVEN	
...trol Equipment BAG HOUSE	Operating Mode INTERMITTENT
...cribe Emission Point	
...ission Point Height ...ove Ground Level	Emission Point Height Relative to Observer
...tance to ...ssion Point	Direction to Emission From Observer
...cribe Emission	
...r of Emission	Continuous Fugitive Intermittent
...ter Vapor Present ___ Yes ___	If Yes, Is Plume Attached ___ Detached ___
...nt Where Opacity Determined	
...cribe Background	
...r of Background	Sky Condition
... Speed	Wind Direction
...ent Temperature	Relative Humidity APPROX 68%

	Time Start 0	15	30	45		Time Stop 0	15	30
0	C-20 ST. 11:26				30	0	0	0
1		0	0	0	31	0 STOP 12:01		
2	0	0	0	0	32			
3	0	0	0	0	33	B-24 START 12:...		
4	0	0	0	0	34		0	0
5	0	0	0	0	35	0	0	0
6	0	0	0	0	36	0	0	0
7	0	0	0	0	37	0	0	0
8	0	0	0	0	38	0	0	0
9	0 STOP 11:34				39	0	0	0
10					40	0	0	0
11	B-22 START 11:39				41	0	0	0
12				0	42	0	0	0
13	0	0	0	0	43	0	0	0
14	0	0	0	0	44	0	0	0
15	0	0	0	0	45	0	0	0
16	0	0	0	0	46	0	0 STOP 1:...	
17	0	0	0	0	47			
18	0	0	0	0	48	C-24 START 1...		
19	0	0	0	0	49	0	0	0
20	0	0	0	0	50	0	0	0
21	0	0	0	0	51	0	0	0
22	STOP 11:49				52	0	0	0
23					53	0	0	0
24	C-22 START 11:55				54	0	0	0
25			0	0	55	0	0	0
26	0	0	0	0	56	0	0	0
27	0	0	0	0	57	STOP 1:17		
28	0	0	0	0	58			
29	0	0	0	0	59			

Layout Sketch of Source
(Show North Arrow, Location of Sun, Emission Point, Wind Direction, etc.)

Range of Opacity ___% to ___%

Number of Readings Abov... ___% were ___

Comments

THE TEMP. DROPPED THROUGH THE COURSE OF THE DAY. IT IS PRESE... (1:00 PM) ABOUT 46°-50°. THE SKY CONDITION REMAINS FULLY OVERC...

...ver's Signature Karl R. Teitt

Date 3/16/84

190 REV 10/...

CAE

Engineering, Inc.

Run 3

P O. Box 525 Morgan PA 15064 412-221-0966

VISIBLE EMISSION RECORDING FORM

PAGE 4 OF 4

Company Name: W.P.S.C.	Company ID Number / Observation Date / /
Address: MONESSEN	Observer's Name: MARC R. TEITT
State: PA ZIP Phone	Certified By / Date / /
Source/Process: COKE OVEN	
Control Equipment: BAG HOUSE	Operating Mode: INTERMITTENT
Describe Emission Point	
Emission Point Height Above Ground Level: ABOUT 100 FT.	Emission Point Height Relative to Observer
Distance to Emission Point	Direction to Emission From Observer
Describe Emission	
Color of Emission	Continuous Fugitive Intermittent
Water Vapor Present: Yes ___	If Yes, Is Plume Attached ___ Detached ___
Point Where Opacity Determined	
Describe Background	
Color of Background	Sky Condition
Wind Speed	Wind Direction
Ambient Temperature	Relative Humidity

	Time Start 0	15	30	45		Time Stop 0	15	30
0	B-26	START		1:24	30	B-1	START	2:0
1		0	0	0	31			0
2	0	0	0	0	32	0	0	0
3	0	0	0	0	33	0	0	0
4	0	0	0	0	34	0	0	0
5	0	0	0	0	35	0	0	0
6	0	0	STOP	1:29	36	0	0	0
7					37	0	0	0
8	0-26	START		1:34	38	0	0	0
9				0	39	STOP	2:09	
10	0	0	0	0	40			
11	0	0	0	0	41	0-1	START	2:
12	0	0	0	0	42			0
13	0	0	0	0	43	0	0	0
14	0	0	0	0	44	0	0	0
15	0	0	0	0	45	0	0	0
16	0	0	0	0	46	0	0	0
17	0	0	0	0	47	0	0	0
18	0	0	0	0	48	0	0	0
19	0	0	0	0	49	0	STOP	2:2
20	STOP		1:45		50			
21					51			
22	B-28	START		1:50	52			
23			0	0	53			
24	0	0	0	0	54			
25	0	0	0	0	55			
26	0	0	0	0	56			
27	0	0	0	0	57			
28	0	0	0	0	58			
29	STOP		1:56		59			

Layout Sketch of Source
(Show North Arrow, Location of Sun, Emission Point, Wind Direction, etc.)

Range of Opacity ___% to ___% Number of Readings Above ___% were ___

Comments

Observer's Signature: [signature] Date 3/16/84

190 REV. 10

HOOD AND TRAVEL EMISSIONS

3-14-84

Coke Oven Push Schedule

	Push St	Transf St	Hood Discon.	Quench
0 o'clock Hr.				
B22	55 59	56 59	58 13	58 30
0 o'clock Hr.				
B24	06 57	07 57	08 34	08 50
C24	18 19	19 24	20 40	20 57
B26	32 44	33 45	34 17	34 41
C26	45 36	46 17	47 44	48 05
0 o'clock HR.				
B28	00 07	00 48	01 46	01 58
B1	12 16	13 14	13 37	13 53
0 o'clock HR				
C1	60 00	61 04	61 42	02 22
B3	12 07	13 09	13 30	14 10
C3	25 20	26 26	27 00	27 43
B5	38 02	39 05	39 24	39 50
C5	51 47	52 47	53 29	54 10
0 o'clock HR				
B7	02 00	03 01	03 26	04 17
C7	14 43	15 32	16 13	16 52
B9	26 31	27 26	27 49	28 30
C9	38 42	39 37	40 34	41 11
B11	49 51	50 49	51 12	51 51

Clean Air Engineering, Inc.

P O. Box 525 Morgan, PA 15064 412-221-0966

Run 1

VISIBLE EMISSION RECORDING FORM

Company Name: WHEELING - PGH STEEL

Address: MONESSON

State: PA ZIP: Phone:

Source/Process: COKE OVEN

Control Equipment: BAG HOUSE

Operating Mode: INTERMITTENT

Describe Emission Point: COKE OVEN & ACCESSORIES

Emission Point Height above Ground Level: Approx 25 FT

Emission Point Height Relative to Observer: APPROX 25 FT.

Distance to Emission Point: Approx 50-50 FT.

Direction to Emission From Observer: SE TO NW

Describe Emission

Color of Emission: Continuous Fugitive Intermittent

Water Vapor Present: Yes ____ If Yes, Is Plume Attached ____ Detached ____

Point Where Opacity Determined: AT THE SOURCE WILL VARY DEPENDING UPON LOCATION & AT WHAT POINT

Describe Background: COKE OVEN BATTERY

Color of Background: SHADES - GREY & BLACK

Sky Condition: 0.9 UP COVERED

Wind Speed: Approx 5-8 MPH

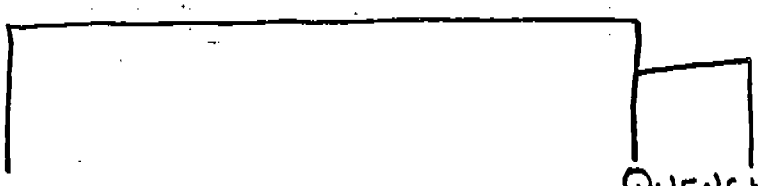
Wind Direction: TO SE

Ambient Temperature: 35 APPROX.

Relative Humidity: APPROX 65% ↑

Layout Sketch of Source (Show North Arrow, Location of Sun, Emission Point, Wind Direction, etc.)

COKE RECIEVING SIDE



BATTERY COKE OVEN

Observer's Signature: William M. Bizila

Company ID Number:

Observation Date: 3 / 14 / 84

Observer's Name: WILLIAM M. BIZILA

Certified By: ETA Date: 10 / 6 / 83

Time Start: 10:55:59 Time Stop:

STEAM

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

STEAM

Range of Opacity ____% to ____% Number of Readings Above ____% were ____

Comments: 12 PUSH (COKE) READINGS WILL BE READING AT THREE DIFFERENT POINTS

LUNCH - START UP 12:59

Date: 3 / 14 / 84

190 REV. 10/80

Rev 1

CAE Engineering, Inc.

P. O. Box 525 Morgan PA 15064 412-221-0966

VISIBLE EMISSION RECORDING FORM

Company Name: WHEELING-PGH STEEL	Company ID Number:
Observation Date: 3 / 14 / 84	
Address: MONESSON	Observer's Name: WILLIAM M. BIJILA
State: PA ZIP: Phone:	Certified By: Date: / /
Source/Process: COKE OVEN	
Control Equipment	Operating Mode
Describe Emission Point	
Emission Point Height Above Ground Level	Emission Point Height Relative to Observer
Distance to Emission Point	Direction to Emission From Observer
Describe Emission	
Color of Emission	Continuous Fugitive Intermittent
Water Vapor Present ____ Yes ____	If Yes, Is Plume Attached ____ Detached ____
Point Where Opacity Determined	
Describe Background	
Color of Background	Sky Condition
Wind Speed	Wind Direction
Ambient Temperature	Relative Humidity

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

Layout Sketch of Source
(Show North Arrow, Location of Sun, Emission Point, Wind Direction, etc.)

Range of Opacity ____% to ____% Number of Readings Above ____% were ____

Comments

page 2 of 7

Observer's Signature: William M. Bijila

Date 3/14/84

190 REV. 10/80

BACK HALF SULFATE ANALYSIS

4.803×10^{-2} Grams SO_4 /ml titrant

Run #1 Grams SO_4 $= (4.803 \times 10^{-2})\ (.925 - .10)\ (.0051) \left(\frac{386}{25}\right)$

$= .0031$

Run #2 Grams SO_4 $= (4.803 \times 10^{-2})\ (.60 - .10)\ (.0051) \left(\frac{432}{25}\right)$

$= .0021$

Run #3 Grams SO_4 $= (4.803 \times 10^{-2})\ (4.85 - .10)\ (.0051) \left(\frac{385}{25}\right)$

$= .0179$

COMPANY WPSC Monessen

TEST # Coke Oven Baghouse Runs 1-3

DATE MARCH 14,15,16 1984

METHOD 6 SO_2 ANALYSIS

STANDARDIZATION

Normality Of H_2SO_4 Standard		0.020
Mℓ Of H_2SO_x Standard		10 mℓ
	Trial 1	Trial 2
Mℓ Of Barium Titrant Used	39.20 mℓ	39.10 mℓ
Average	39.15	

SAMPLE ANALYSIS

Sample #	Vsoln/Va	Trial 1 (mℓ)	Trial 2 (mℓ)	Average
1	386/25	0.90	0.95	0.925
2	432/25	0.60	0.60	0.60
3	385/25	4.90	4.80	4.85
Blank	25	.10	.10	.10

Clean Air Engineering, Inc.

STATISTICAL ANALYSIS

STATISTICAL ANALYSIS WPSC -- MONESSEN PA

LOCATION - COKE BAGHOUSE

RUN	DATE OF RUN	AVERAGE SQ. RT. VEL	AVERAGE PRES	AVERAGE TEMP	STANDARD DEVIATION SQ. RT. VEL	STANDARD DEVIATION PRES	STANDARD DEVIATION TEMP	VARIANCE SQ. RT. VEL	VARIANCE PRES	VARIANCE TEMP	RMS DEVIATION SQ. RT. VEL	RMS DEVIATION PRES	RMS DEVIATION TEMP
1	3-14-84	1.326	86.3		0.288	7.2		0.083	51.2		21.706	8.3	
2	3-15-84	1.371	96.8		0.116	15.3		0.013	233.8		8.430	15.8	
3	3-16-84	1.331	97.3		0.115	8.4		0.013	70.8		8.605	8.6	

SOTDAT/STEEL LIBRARY SYSTEM

Report Title: Report on the Particulate Emissions Testing with Visible Emissions Readings conducted for the Wheeling Pittsburgh Steel Corp. at their Monessen Work's Coke Oven Baghouse.

Plant and Location: Wheeling - Pittsburgh, Monessen

SCC: 30300303

Testing Date(s): 3/14-16/84

By Whom: CAE

Stack Test Review Attached: No

Reviewed By:

Problems Seen by Reviewer:

Confidentiality Status: Unknown

If status is confidential, list confidential pages or sections:

Source of Determination of the Confidentiality Status:

Report Encoded By:

Date Encoded:

Form Numbers:

Comments:

RECEIVED
MAY
AIR ENFORCEMENT BRANCH
EPA Region III

Wheeling Pittsburgh
STEEL CORPORATION

May 21, 1984

U. S. Environmental Protection Agency
Region III - Curtis Building, 2nd Floor
6th and Walnut Streets
Philadelphia, PA 19106
Att: Air Enforcement Section, 3AW14

Commonwealth of Pennsylvania
Bureau of Air Quality Control
Department of Environmental Resources
Highland Building
121 So. Highland Avenue
Pittsburgh, PA 15206

Re: MONESSEN COKE PLANT
PUSHING EMISSION CONTROLS
DEMONSTRATION OF COMPLIANCE

Gentlemen:

The Environmental Consent Decree of Wheeling-Pittsburgh Steel Corporation, the United States of America, the Commonwealth of Pennsylvania and the States of Ohio and West Virginia, as amended July 17, 1983, specifies that compliance demonstrations be conducted for selected sources following resumption of operations at the Monessen Coke Plant. Among these sources is our Pushing Emission Control System which serves Coke Batteries No. 1 and No. 2 at our Monessen Plant.

In accordance with our proposal to evaluate this source, dated February 16, 1984, the testing was conducted for us by Clean Air Engineering during the week of March 11. A copy of their report is attached.

Emissions from pushing are limited by Pa.DER Regulations 123.13(b) and 122.15. Regulation 123.13(b) limits emissions from the baghouse which serves to remove particulates from gases collected during the pushing by a process weight formula. Regulation 129.15 prohibits emissions from air cleaning devices installed for control of pushing emissions in excess of twenty percent opacity and from the transport of coke in the open atmosphere in excess of 10 percent opacity.

The report of Clean Air Engineering states that the particulate emissions from the baghouse cleaning device for three runs were 4.11, 3.67 and 3.71 pounds per hour. The allowable emissions as calculated by the process weight formula of Pa.DER regulation 123.13(b) were 3.8, 3.7 and 3.6 pounds per hour. The average actual emissions were 3.8, while the average allowable emissions were 3.7 pounds per hour - an exceedance of only about 0.1 pounds per hour or about 3 percent. We would hope that such a small apparent exceedance would be considered insignificant.

MONESSEN COKE PLANT
PUSHING EMISSION CONTROLS
DEMONSTRATION OF COMPLIANCE

During the particulate testing of the baghouse stack, concurrent observations of the stack opacity were performed by Clean Air Engineering. During some four to five hours of observation, only zero opacities were noted. In addition, visible emissions were observed to evaluate the capture efficiency of the system at the hot car and during travel for twelve individual pushes. Again, only zero opacities were noted.

While the particulate emissions from the baghouse may be marginal, visible emissions observations indicate that both the capture of emissions by the system and the cleansing of the gases by the baghouse complied easily with the specified regulations.

If you have any questions, please let us know.

Very truly yours,

WHEELING-PITTSBURGH STEEL CORPORATION

W. R. Samples
Manager - Environmental Control

WRS/ng
Attachment