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.

I. INTRODUCTION

Three tests for particulate emissions and opacity were performed at the "C" Coke Oven Pushing Shed Baghouse over a three-day period from March 25-27, 1987. The survey was conducted to fulfill requirements of operating condition 2c of Installation Permit No. C-6562 issued to Rouge Steel Company on December 10, 1984. Results of the test program are included herein.

A previous survey was performed at this source in July, 1986, but results indicated that the system was not operating as efficiently as expected. Compartments were rebagged prior to performing this series of tests.

The survey was performed by the Ford Motor Company Stationary Source Environmental Control Office. Opacity readings were made by Messrs. D. O'Connor and R. Dawson of Rouge Steel. The test was witnessed by Messrs. T. Alcamo, and M. Farrell from the Wayne County APCD.

All testing was performed during active periods when ovens in the battery were being pushed and charged. Included with the report are operating data pertaining to each test and charge weights for each oven pushed during the course of the survey.

ROUGE STEEL COMPANY
"C" COKE OVEN PUSHING SHED BAGHOUSE
PARTICULATE COMPLIANCE SURVEY

Table of Contents

	Subjects	Page
I.	INTRODUCTION	1
II.	PROCESS DESCRIPTION	2
III.	SUMMARY	3
IV.	RESULTS	4
V.	DISCUSSION	7

List of Appendices

A.	Location of Sampling Ports and Points	8
B.	Sampling Procedures	12
C.	Analytical Procedures	17
D.	Field Data Sheets	20
E.	Process Operating Parameters Data Sheets	34
F.	Laboratory Data Sheets	37
G.	Sample Calculations	39
H.	Equipment Calibration	44
I.	Opacity Data Sheets	47

List of Tables

I.	Summary of Results - Particulate/Flow Data	3
II.	Stack Gas Velocity and Flow Results	5
III.	Particulate Sampling Results	6

List of Figures

1.	Schematic of Pushing Shed Baghouse and Port Location	10
3.	Sampling Point Location	11
4.	Particulate Sampling Train	14

ROUGE STEEL COMPANY
"C" COKE OVEN PUSHING SHED BAGHOUSE
PARTICULATE COMPLIANCE SURVEY

March 25-27, 1987

Conducted by

STATIONARY SOURCE ENVIRONMENTAL CONTROL OFFICE
Survey & Compliance Assurance

SURVEY CONDUCTED BY:

J. M. Miller

D. K. Russell

D. S. Wood

REPORT PREPARED BY:

D. K. Russell

CONCUR:

J. M. Reinke, Manager

II. PROCESS DESCRIPTION

Coke oven pushes occur on the "C" Battery at 10-15 minute intervals. Push emissions are captured in a shed enclosure which extends over the entire length of the oven. When a push occurs, emissions from the oven are vented upwards to the top of the shed where they are captured and ducted over to a baghouse. The push control system is activated by the door machine operator shortly before each push occurs, and is placed on a standby mode when ovens are not actively being pushed.

The baghouse serving the system is a six-compartment, Flakt Norfelt, Model 6NF378-12 fabric filter dust collector. Two 450 HP fans provide the air flow for the system. Bags are cleaned on a cyclical basis whenever the pressure drop across a compartment reaches a predetermined set point. The compartment being serviced is temporarily "removed" from operation until bag cleaning is completed.

During this survey fan inlet pressures were approximately 16 in H_2O and fan amperages were approximately 40 amps (idle) and 50-55 amps during push conditions. The bag cleaning cycle was set to start at a pressure differential of 5 in H_2O during the first test day, and increased to 6 in H_2O for the remainder of the survey.

III. SUMMARY

Results from this survey are summarized below in Table I. The table includes emission results relative to the amount of coke pushed from ovens during the test periods.

TABLE I

SUMMARY OF RESULTS
"C" COKE OVEN PUSHING SHED BAGHOUSE
PARTICULATE COMPLIANCE SURVEY
MARCH 25-27, 1987

	Units	T-1	T-2	T-3	Avg.
Particulate Emissions					
Rel. to Coke Pushed	lb/ton	0.05	0.02	0.02	0.03
Concentration	$lb/10001b_w$	0.02	0.009	0.009	0.013
Flowrate	lb/hr	17.9	8.14	8.46	11.5
Stack Gas Flowrate					
Actual Conditions	ACFM	226,000	229,000	227,000	227,000
Standard Conditions	$SCFM_w$	203,000	207,000	207,000	205,000
Stack Temperature	^oF	113	110	108	110

Particulate concentrations and flowrates represent conditions which exist during the brief periods when ovens are pushed. They should not be interpreted as continuous emission rates from the stack.

IV. RESULTS

The individual test results from this survey are presented in Tables II and III which follow. These tables include measured and calculated results from the stack survey. Field opacity data sheets are included in Appendix D, and oven charge weights and coking times are included in Appendix F.

TABLE NO. II

ROUGE STEEL COMPANY 'C' PUSHING SHED BAGHOUSE STUDY

STACK GAS VELOCITY AND FLOW RESULTS

		TEST NUMBER 1	2	3	AVERAGE
PHYSICAL DATA					
DATE OF TEST		3-25-87	3-26-87	3-27-87	
START TIME		0853	0847	0847	
FINISH TIME		1338	1330	1324	
NUMBER OF TRAVERSE POINTS		16	16	16	
PITOT TUBE COEFFICIENT		0.80	0.80	0.80	
MEASURED DATA					
BAROMETRIC PRESSURE	IN HG	29.15	29.13	29.31	
STACK DIAMETER	IN	108.0	108.0	108.0	
STACK STATIC PRESSURE	IN H2O	-0.25	-0.25	-0.25	
STACK GAS TEMPERATURE	DEG F	113	110	108	110
MOLECULAR WEIGHT DRY	LB/LB-MOLE	29.00	29.00	29.00	
CALCULATED DATA					
STACK GAS PRESSURE	IN HG	29.13	29.11	29.29	
MOISTURE	VOLUME %	2.8	3.5	1.8	2.7
WET MOLECULAR WEIGHT	LB/LB-MOLE	28.70	28.61	28.80	28.70
AV. SQRT. OF VEL. PRESS.	IN H2O^.5	1.045	1.063	1.060	1.056
STACK CROSS SEC. AREA	SQ FT	63.62	63.62	63.62	
STACK GAS VEL.-STK. COND.	FT/MIN	3550	3610	3570	3570
STACK GAS VEL.-STD. COND.	FT/MIN	3180	3250	3250	3230
STACK GAS FLOW-STK. COND.	ACFM	226,000	229,000	227,000	227,000
STACK GAS FLOW-DRY COND.	DSCFM	197,000	200,000	203,000	200,000
STACK GAS FLOW-WET COND.	WSCFM	203,000	207,000	207,000	205,000

++
STANDARD CONDITIONS: 68 DEG F AND 29.92 IN HG
++

TABLE NO. III

ROUGE STEEL COMPANY 'C' PUSHING SHED BAGHOUSE STUDY

FILTERABLE PARTICULATE SAMPLING RESULTS

		TEST NUMBER 1	2	3	AVERAGE
PHYSICAL DATA					
DATE OF TEST		3-25-87	3-26-87	3-27-87	
START TIME		0853	0847	0847	
FINISH TIME		1338	1330	1324	
NOZZLE DIAMETER	IN	0.250	0.250	0.250	
MEASURED DATA					
METERED SAMPLE VOLUME	CU FT	34.911	35.764	35.668	
AVERAGE METER TEMPERATURE	DEG F	57.3	52.0	56.3	
METER CORRECTION FACTOR		0.9999	0.9999	0.9999	
AVE. ORIFICE PRESSURE DROP	IN H2O	3.85	4.00	4.00	
VOLUME OF H2O CONDENSATE	ML	13.0	21.0	8.0	
WEIGHT OF H2O ADSORBED	GRAMS	8.0	7.2	6.0	
TOTAL SAMPLE TIME	MIN	32.0	32.0	32.0	
PROBE WASH WEIGHT	GRAMS	0.0237	0.0106	0.0112	
FILTER CATCH WEIGHT	GRAMS	0.0004	0.0006	0.0002	
WEIGHT OF COAL CHARGED	LB	558,640	543,900	560,980	
COAL TO COKE CONVERSION		0.75	0.75	0.75	
CALCULATED DATA					
METER SAM. VOL.-STD. COND.	CU FT	35.047	36.269	36.086	
TOTAL SAM. VOL.-CORR. STD.	CU FT	36.038	37.600	36.747	
TOTAL PARTICULATE WEIGHT	GRAMS	0.0241	0.0112	0.0114	
PART. CONC.-STACK COND.	GR/ACF	0.0093	0.0041	0.0044	0.0059
PART. WT. CONC.-DRY STD.	#/1000#D	0.020	0.009	0.009	0.013
PART. WT. CONC.-WET STD.	#/1000#W	0.020	0.009	0.009	0.013
PARTICULATE FLOW RATE	LB/HR	17.9	8.14	8.46	11.5
WEIGHT OF COKE PUSHED	LB	418,980	407,925	420,735	415,880
EMISSIONS PER TON OF COKE	LB/TON	0.0455	0.0213	0.0214	0.0294
NOZZLE AREA	SQ FT	0.000341	0.000341	0.000341	
ISOKINETIC RATIO	%	104	106	104	

++
STANDARD CONDITIONS: 68 DEG F AND 29.92 IN HG
++

V. DISCUSSION

Three particulate tests were performed on the Pushing Shed Baghouse Stack on March 25-27, 1987. Emission results ranged from 0.2 to 0.5 lb/ton of coke pushed. Opacity readings varied between 0 and 5%. Approximately 97 percent of the particulate was retained in the probe, and the remaining three percent of the catch was on the filter.

Test No. 1 is not representative of baghouse operations. The setpoint for cleaning of compartments was at 5 in H_2O which resulted in nearly continuous cleaning of the system throughout the day whenever a push occurred. Some bleed-through from the dirty side to the clean side of the compartments was realized and test results were affected adversely.

After the first test was completed, the problem was evaluated and the setpoint was raised to 6 in H_2O. This eliminated the continuous cleaning of compartments during pushes, and the system performed as designed for the remainder of the survey.

Sampling was performed isokinetically for a period of two minutes during 16 consecutive pushes utilizing 16 individual sampling points. Sample volumes were in excess of 30 cubic feet for each test. All sampling train leak-checks were within the allowable 0.02 CFM limit, and isokinetic sampling ratios were within the allowable range of 90-110%.

APPENDIX A

LOCATION OF SAMPLING PORTS AND POINTS

APPENDIX A

LOCATION OF SAMPLING PORTS AND POINTS

Figures 1 and 2 which follow show the locations of the sampling ports and points for the "C" Coke Oven Pushing Shed Baghouse Stack. This location is nearly seven duct diameters upstream and approximately 1.3 diameters downstream from the nearest flow disturbances as shown in Figure 1.

Figure 2 shows the relative location of the sixteen sampling points used for this survey. Sixteen points equals the number required for a sampling location of this configuration according to the September 30, 1983 Federal Register.

FIGURE NO.1
PUSHING SHED BAGHOUSE
ROUGE STEEL COMPANY

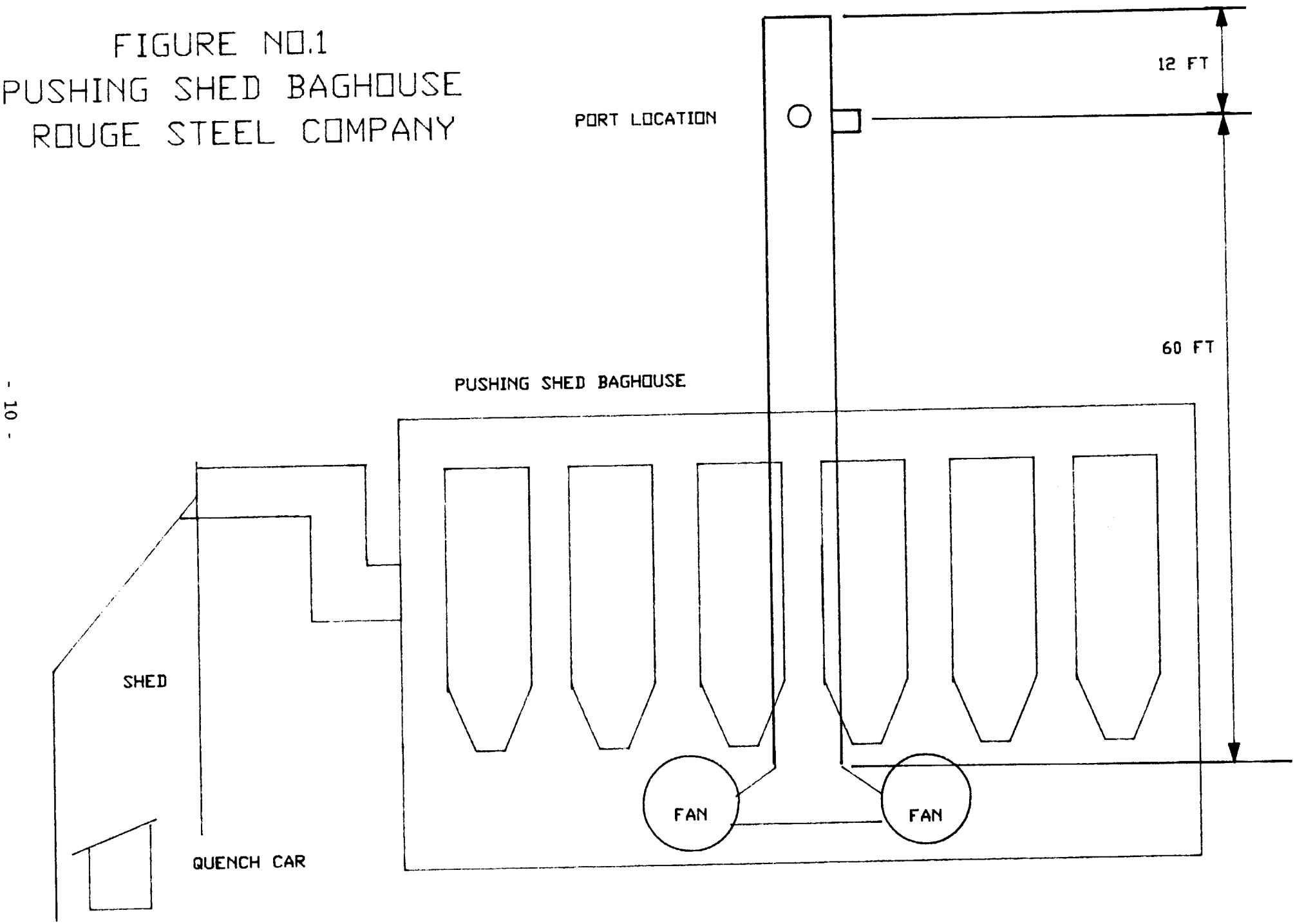
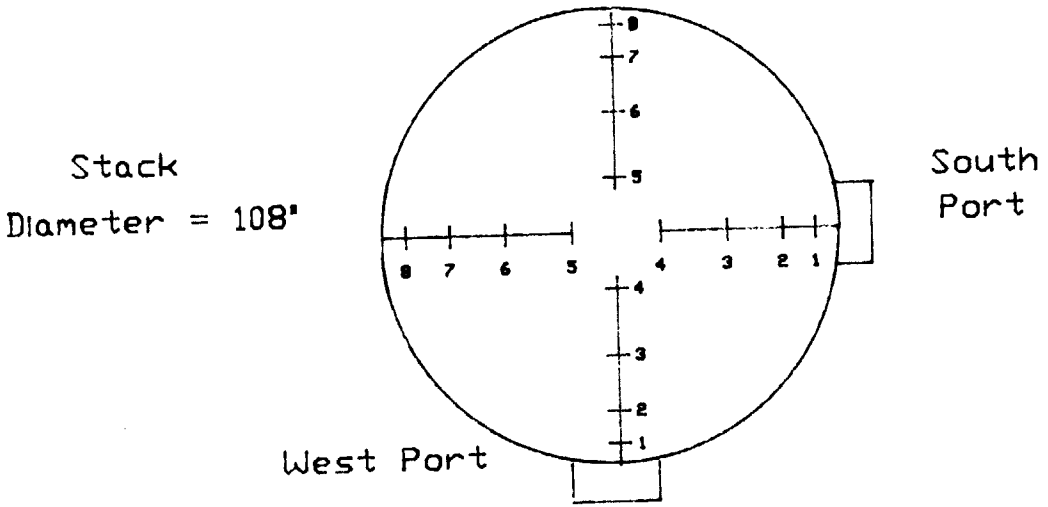


Figure 2

Location of Sampling Points



Traverse Point No.	Distance from Stack Wall
1	3 1/2"
2	11 3/8"
3	21"
4	34 7/8"
5	73 1/8"
6	87"
7	96 5/8"
8	104 1/2"

APPENDIX B

SAMPLING PROCEDURES

APPENDIX B

SAMPLING PROCEDURES

Three complete tests are run over a three-day period. During each test the following parameters are measured:

- o Exhaust gas velocity and flow
- o Exhaust gas temperature
- o Moisture content of exhaust gas
- o Particulate flowrate

The sampling procedures used to measure the exhaust gas velocity and particulate concentrations are consistent with EPA Test Methods 1, 2, and 5.*

A. Sampling Train

The sampling train used in this survey appears in Figure 3. As shown, the front half consists of a stainless steel nozzle, glass probe liner, cyclone bypass, and a 110mm glass fiber filter. This portion of the train is heated to a maximum temperature of 250°F ± 25°F.

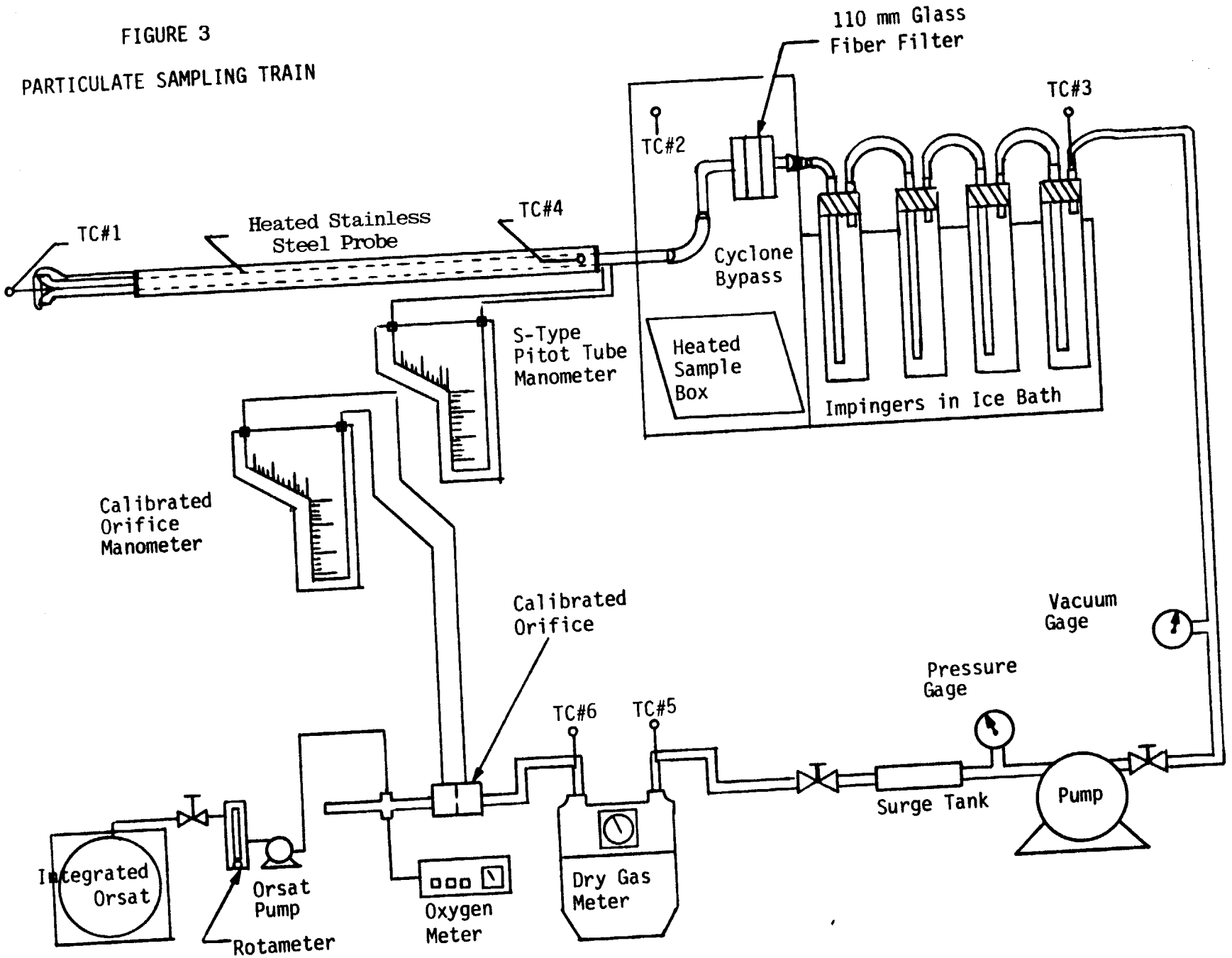
The condenser portion of the train consists of four plastic "impingers", connected in series with Tygon tubing, placed in an ice bath. The first two contain 150 ml distilled water, the third is empty and the fourth contains approximately 200 grams of preweighed silica gel.

---

*CFR Part 60, Subpart A, Appendix A - Reference Method

FIGURE 3

PARTICULATE SAMPLING TRAIN



The dry, filtered exhaust gas exits the condenser section and goes to the metering portion of the sampling train. This consists of a leakless vacuum pump, dry gas meter and orifice. After exiting the orifice, a portion of the sample gas is analyzed instantaneously on a Sybron/Taylor Model 0A 570 portable oxygen meter. Oxygen readings are recorded at each sampling point.

Six thermocouples are located throughout the sampling train as shown in Figure 3. They are connected to a multipoint potentiometer with digital readout, mounted on the face of the meter box. Also on the face of the box is a twin-tube manometer which is used in measuring stack velocity pressures and orifice pressure differentials.

B. Particulate Sampling Procedures

1. Stack Gas Velocity and Flow

Stack gas velocity is measured with a calibrated S-type pitot tube on the probe assembly. The stack temperature is monitored using a thermocouple at the tip of the probe.

2. Particulate Concentration

Particulate from the exhaust stream is captured in the front half of the sampling train and the net gain of material is measured gravimetrically after following a routine clean-up and evaporation procedure.

3. Moisture Content

The moisture content of the exhaust gas is determined by measuring the volume of the condensate in the first three "impingers" and the weight gain of silica gel in the fourth. Results are calculated based on condensate and gas volumes measured during the test.

APPENDIX C

ANALYTICAL PROCEDURES

APPENDIX C

ANALYTICAL PROCEDURES

A. Field Procedures

At the completion of each test the nozzle and probe liner are washed with known quantities of acetone into a clean, appropriately labeled sample bottle. The filter holder and cyclone bypass from each test are capped with rubber stoppers in the field and placed in a protective glassware box for shipment to our laboratory.

All impinger liquids are measured for total volume after each test and then discarded. Silica gel is removed from the fourth impinger and placed in its original container for transport.

A blank acetone sample is collected at the site and returned to the laboratory for processing with survey samples.

B. Laboratory Procedures

1. Particulate Concentration

In the laboratory, the acetone rinse from the sampling train nozzle and probe wash is placed in a tared evaporating dish. Added to this are acetone rinses from the corresponding cyclone bypass and front filter half from the train.

Dish contents are evaporated to dryness over a water bath maintained at 130°F, desiccated to constant weight at room temperature, and weighed on a Torbal analytical balance with a sensitivity of 0.1 mg.

The glass fiber filter from each test is removed from its holder and transferred to its original aluminum foil envelope. The filter is oven-dried for two hours at 105°C, placed in a desiccator overnight and weighed on a Torbal balance.

The weight gains of the acetone rinse and filter are added and reported as particulate catch.

2. Moisture Content

The silica gel from the fourth impinger is weighed on an analytical balance having a sensitivity of 0.1 gram. The resulting weight gain is converted to volume and added to the volumes of water condensate measured in the impingers after each test in order to determine the moisture content of the exhaust gas.

APPENDIX D

FIELD DATA SHEETS

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL CONTROL OFFICE

SOURCE C Push Control Bag House
PLANT Rouge
DATE 3-25-87
INITIALS DSW JMM
TEST NO. 1

STACK Temp 115°F

NOTES

NOZZLE SIZE
.249
.250 } .250
.250

ORIFICE COEFFICIENT CHECK

	SAMPLE TIME (Min.)	P_{bar} (In Hg)	Orifice Δh (In H_2O)	Meter Reading (ft^3)	Meter Inlet Temp. (°F)	Meter Outlet Temp. (°F)
FINISH	259.0	29.50	1.0	190.788	58/58	57/56
START	249.0	29.50	1.0	185.069	57/58	57/58
AVG/NET	10.0	29.50	1.0	5.719	57.8	57

$$\Delta H = \frac{(0.03175)\ (\Delta h)\ (P_{bar})}{(T_{m\text{-}out} + 460)} \left[\frac{(T_{m\text{-}avg} + 460)\ \theta}{(V_m)\ (P_{bar} + \Delta h/13.6)} \right]^2$$

$$\Delta H = \frac{(0.03175)(1.0)(29.50)}{517} \left[\frac{(57.4 + 460)\ 10}{5.719\ (29.5 + 1.0/13.6)} \right]^2$$

ΔH = 1.70 / 1.73

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL CONTROL OFFICE

PITOT TUBE CALIBRATION DATA

SOURCE C Push Control Bag House
PLANT Rouge
DATE 3 25-87
INITIALS DSW · JMM
TEST NO. 1

STACK DIMENSIONS 108"
NIPPLE LENGTH 6"
STATIC PRESSURE -.25
BAROMETRIC PRESSURE 2.31
TIME

Port/ Point	Percent Diameter	Decimal Equiv.	Fraction Equiv.	Total Incl. Nipple	Standard Pitot Tube		"S" Pitot Tube No. 1		"S" Pitot Tube No. 2		Stack Temperature	
					ΔP	√ΔP	ΔP	√ΔP	ΔP	√ΔP	Dry Bulb	Wet Bulb
1	3.2	3.46	3 1/2	9 1/2								
2	10.5	11.34	11 3/8	17 3/8								
3	19.4	20.95	21	27								
4	32.3	34.88	34 7/8	40 7/8								
5	67.7	73.12	73 1/8	79 1/8								
6	80.6	87.05	87	93								
7	89.5	96.66	96 5/8	102 5/8								
8	96.8	104.54	104 1/2	110 1/2								
Total												
Average												

Pitot Tube No. 1 $Cp = \frac{\sqrt{\Delta P_{stnd}}}{\sqrt{\Delta P_{S-1}}}$ = _____ = _____

Pitot Tube No. 2 $Cp = \frac{\sqrt{\Delta P_{stnd}}}{\sqrt{\Delta P_{S-2}}}$ = _____ = _____

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL
CONTROL OFFICE

Source: C Press Control Bag House
Plant: Rouge
Date: 3-25-87
Initials: DSW - JMM Test No.: 1

Sampling Train Information

Filter Type	110 mm A/E	Sample Box No.	1	Nozzle Diameter	.252
Filter No.	39	Probe No.	1	Nozzle Material	SS
Cyclone & Flask No.	Bypass	Probe Material	SS	Meter Box No.	1
Silica Gel No.	24	Probe Length	10'	Meter Box ΔH	1.81

Leak Test Data

	Prelim. Reading	Time / Date	Initial Reading	Time	Final Reading	Time
Meter and Orifice	ok 7.5" H_2O	3/23/87	→		ok	3/25/87
Pump and Surge Tank	ok 22" Hg	3/23/87	→		ok	3/25/87
Meter Box, Cord, Sample Box, Probe	0.005 CFM @ 20" Hg	3/23/87	0.005 CFM @ 21" Hg	3/25/87	0.005 CFM @ 23" Hg	1343 3/25/87
Pitot Tube Total Pressure Line	ok 7.2" H_2O	3/23/87	ok 8.6" H_2O	3/25/87	ok 4.8" H_2O	1344 3/25/87
Pitot Tube Static Pressure Line	ok 6.5" H_2O	3/23/87	ok 7.1" H_2O	3/25/87	ok 5.8" H_2O	1345 3/25/87

Impinger Data

Impinger Number	1	2	3	4
Impinger Contents	H_2O	H_2O	—	Silica Gel
Final Volume (ml)	148	145	20	241.3
Initial Volume (ml)	150	150	—	233.3
Volume Collected(ml)	-2	-5	20	8.0
			Total	

13 + 8.0 = 21.0

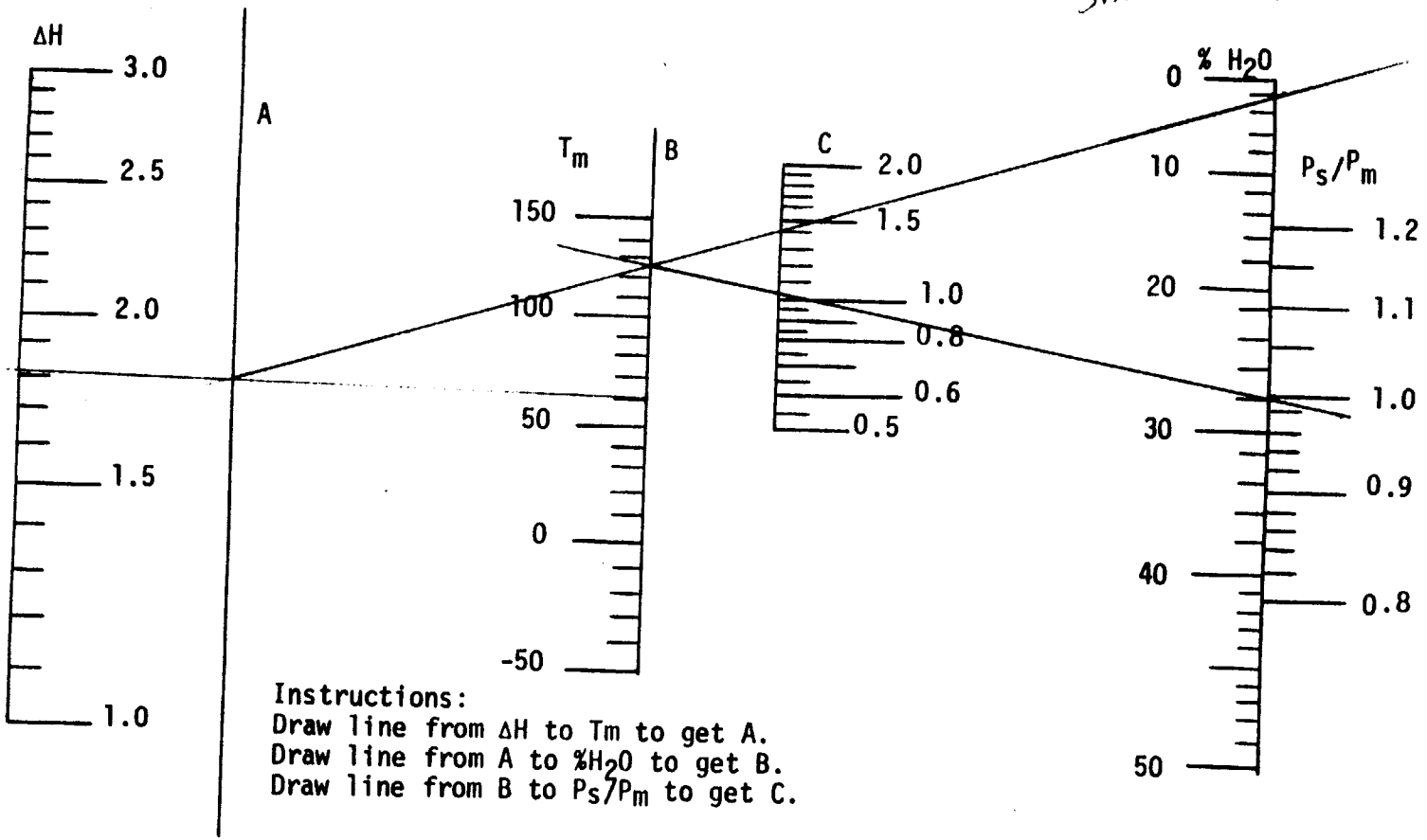
FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL CONTROL OFFICE

Meter Temp 60° F

% H_2O = 2%

Stack Temp = 115 °F

NOMOGRAPH C FACTOR DETERMINATION



Instructions:
Draw line from ΔH to Tm to get A.
Draw line from A to %H_2O to get B.
Draw line from B to P_s/P_m to get C.

SOURCE C Push Control Bag House
PLANT Rawsonville
DATE 3-25-87
INITIALS DSW-JAM
TEST NO. 1
METER BOX NO. 1
ΔH ORIFICE 1.51

AMBIENT TEMPERATURE ~~83.75~~
BAROMETRIC PRESSURE (P_{bar}) 29.15
STATIC PRESSURE (P_{sp}) -.25
$P_s = P_{bar} + P_{sp}$ = 29.15 + -.25 = 28.9
(Assumed Δh) 1.5 Δh/13.6= .11
$P_m = P_{bar} + \Delta h/13.6$ = 29.15 + .11 = 29.26
P_s/P_m = 28.9/29.26 = .99

C FACTOR 1.03
PITOT TUBE Cp .80
CORRECTED C FACTOR, (C_c)=
$(C)(^{Cp}/_{.85})^2$ = 1.03 $(^{.80}/_{.85})^2$
C_c = .91

FORD MOTOR CO[illegible]NY
STATIONARY SOURCE ENVIRONMENTAL CONTROL OFFICE

SOURCE C Rush Control Bag House TEST NO. 1
PLANT Rouge MIN/PNT 2 CORR. C FACTOR .91 P_{Bar} = 29.15 MCF .9999
DATE 3-25-87 INITIALS DSW - JMM NOM. SET POINT ~~.55~~ .53

Traverse Point Number	Clock Time	Meter Box Clock Time	Percent O_2 at Sample Point	Velocity Head, ΔP	$\sqrt{\Delta P}$	Nomograph ΔH Orifice	Meter Reading	Pump Vacuum	Selector Switch Number 1: Stack Temperature	2: Sample Box Temperature	3: Gas Temp. Leaving Last Impinger	4: Probe Temperature	5: Gas Temperature at Meter	6:
	Actual	Min	%	In.H_2O	In.$H_2O^{1/2}$	In.H_2O	Ft^3	In Hg	°F	°F	°F	°F	Inlet °F	Outlet °F
S-1	0853	262.0	—	.94		3.7	191.932	6.0	114	268	47	264	53	54
2	0910	264.0	20.3	1.1		3.90	193.860	8.5	114	266	46	263	54	54
3	0921	266.0	20.3	1.1		3.90	195.977	8.5	118	254	49	267	54	55
4	1000	268.0	20.3	1.1		3.90	197.998	9.0	115	262	50	263	58	57
5	1019	270.0	20.5	1.1		3.90	200.257	9.0	108	269	52	261	57	58
6	1029	272.0	20.4	1.1		3.90	202.429	9.2	113	267	52	262	57	58
7	1041	274.0	20.3	1.1		3.90	204.651	9.3	116	267	54	269	57	58
8	1052	276.0	20.5	1.1		3.90	206.880	9.3	111	264	56	267	57	58
W-1	1108	278.0	20.4	.94		3.20	209.122	7.3	110	254	48	261	58	58
2	1120	280.0	20.3	1.1		3.90	211.152	9.2	114	269	48	264	58	59
3	1225	282.0	20.5	1.1		3.90	213.343	9.2	110	263	46	263	58	59
4	1236	284.0	20.4	1.2	4.2[illegible]	[illegible]	215.517	10.0	115	262	44	265	58	59
5	1250	286.0	20.5	1.2	4.20	[illegible]	217.798	10.0	111	269	44	267	58	59
6	1304	288.0	20.4	1.1		3.90	220.176	9.2	113	267	45	269	58	59
7	1317	290.0	20.4	1.1		3.90	222.425	9.3	114	269	44	264	58	59
8	1336	292.0	20.4	1.1		3.90	224.628	9.4	106	262	43	262	58	60
	1338	294.0					226.843							
Total														
Average														

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL CONTROL OFFICE

SOURCE C Fuse Control Bag house
PLANT Rouge
DATE 3 26 87
INITIALS DCW JMM
TEST NO. 2

NOTES

STACK TEMP = 115 °F

NOZZLE SIZE

.249
.250
.250
} .250

ORIFICE COEFFICIENT CHECK

	SAMPLE TIME (Min.)	P_{bar} (In Hg)	Orifice Δh (In H_2O)	Meter Reading (ft^3)	Meter Inlet Temp. (°F)	Meter Outlet Temp. (°F)
FINISH						
START						
AVG/NET						

$$\Delta H = \frac{(0.03175)\ (\Delta h)\ (P_{bar})}{(T_{m\text{-}out} + 460)}$$

$$\left[\frac{(T_{m\text{-}avg} + 460)\ \theta}{(V_m)\ (P_{bar} + \Delta h/13.6)}\right]^2$$

$$\Delta H = \frac{(0.03175)}{\quad}$$

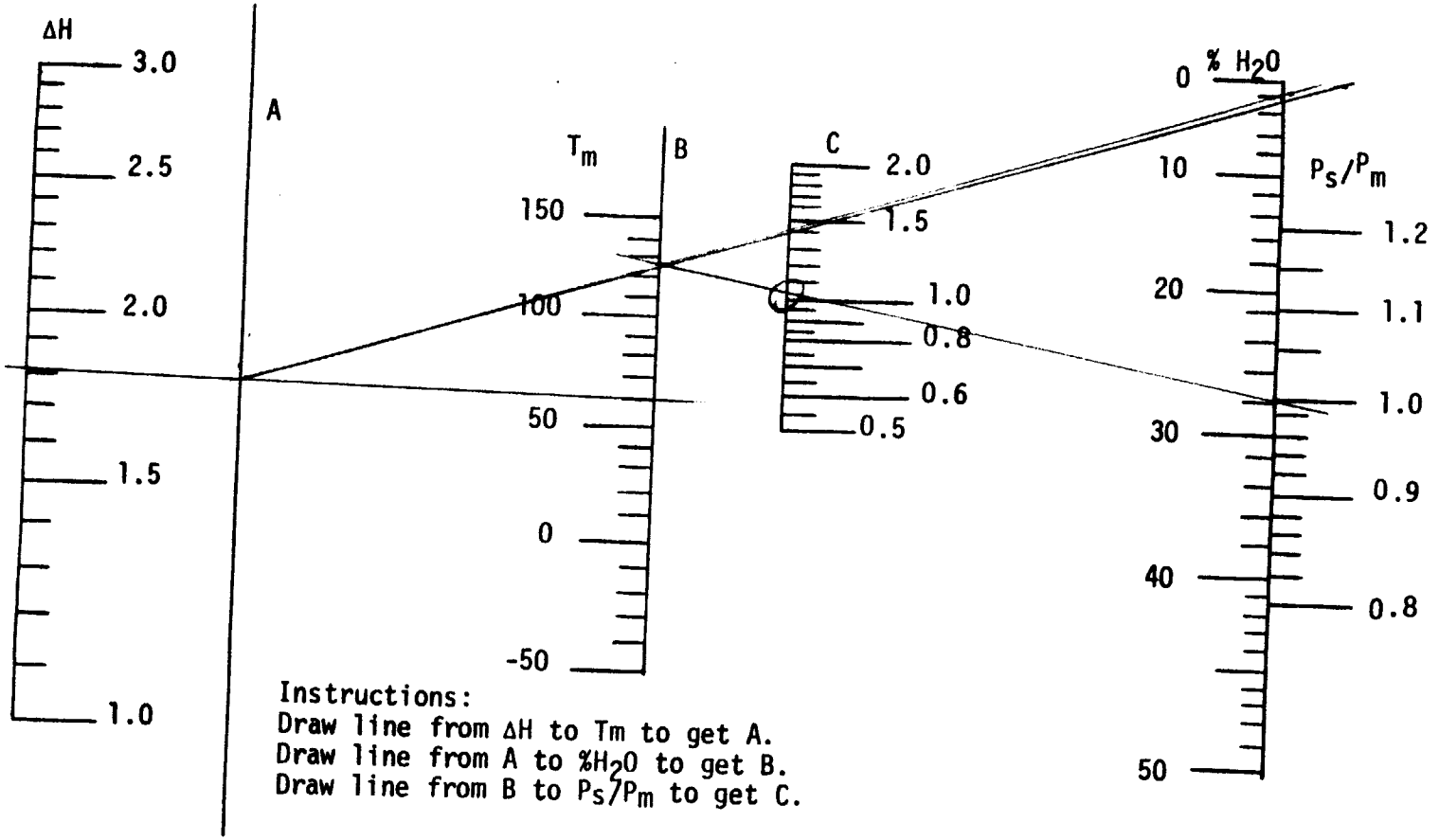
$$\left[\quad\right]^2$$

$\Delta H =$ 1.70/1.73

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL CONTROL OFFICE

$\%H_2O = 2$
Meter Temp = 60°F

NOMOGRAPH C FACTOR DETERMINATION



Instructions:
Draw line from ΔH to Tm to get A.
Draw line from A to $\%H_2O$ to get B.
Draw line from B to P_s/P_m to get C.

SOURCE Push Control / Bag House
PLANT Levee
DATE 3-26-87
INITIALS DSW - JAM
TEST NO. 2
METER BOX NO. 1
ΔH ORIFICE 1.81

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE (P_{bar}) 29.13
STATIC PRESSURE (P_{sp}) -.25
$P_s = P_{bar} + P_{sp}$ = 29.13 + -.25 = 28.88
(Assumed Δh) 1.5 $\Delta h/13.6$ = .11
$P_m = P_{bar} + \Delta h/13.6$ = 29.13 + .11 = 29.24
P_s/P_m = 28.88/29.24 = .99

C FACTOR 1.03
PITOT TUBE Cp .80
CORRECTED C FACTOR, (C_c) =
$(C)(C_p/.85)^2$ = 1.03 $(.80/.85)^2$
C_c = .91

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL
CONTROL OFFICE

Source: C Fish Control Bag house
Plant: Rouge
Date: 3/26/87
Initials: DSW - JMM Test No.: 2

Sampling Train Information

Filter Type	A/E	Sample Box No.	1	Nozzle Diameter	.250
Filter No.	46	Probe No.	1	Nozzle Material	SS
Cyclone & Flask No.	Bypass	Probe Material	S.S.	Meter Box No.	1
Silica Gel No.	13	Probe Length	10'	Meter Box ΔH	1.81

Leak Test Data

	Prelim. Reading	Time / Date	Initial Reading	Time	Final Reading	Time
Meter and Orifice	6.5" H_2O ok	3/26/87	—	→	ok	3/26/87
Pump and Surge Tank	25" Hg ok 23" Hg	3/26/87		→	ok	3/26/87
Meter Box, Cord, Sample Box, Probe	ok 2,005 CFM @ 20" Hg	3/26/87	ok 2,005 CFM @ 20" H_2O	3/26/87 810	ok 2,005 CFM @ 23" Hg	1338 3/26/87
Pitot Tube Total Pressure Line	5.8" H_2O	3/25/87	6.0" H_2O	3/26/87 811	ok 5.7" H_2O	1339 3/26/87
Pitot Tube Static Pressure Line	ok 5.6" H_2O	3/25/87	7.5" H_2O	3/26/87 812	ok 6.6" H_2O	1340 3/26/87

Impinger Data

Impinger Number	1	2	3	4
Impinger Contents	H_2O	H_2O	—	Silica Gel
Final Volume (ml)	137	124	60	230.4
Initial Volume (ml)	150	150	0	223.2
Volume Collected(ml)	-13	-26	60	7.2
			Total	

21 + 7.2 = 28.2

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL CONTROL OFFICE

SOURCE C Area Central Boiler House TEST NO. 2 CORR. C FACTOR .91 P_{Bar} = 29.13 MCF .9922
PLANT Rouge MIN/PNT 2 NOM. SET POINT .5
DATE 3-26-87 INITIALS DSW - SMM

Traverse Point Number	Clock Time	Meter Box Clock Time	Percent O_2 at Sample Point	Velocity Head, ΔP	$\sqrt{\Delta P}$	Nomograph ΔH Orifice.	Meter Reading	Pump Vacuum	Selector Switch Number 1: Stack Temperature	2: Sample Box Temperature	3: Gas Temp. Leaving Last Impinger	4: Probe Temperature	5: Gas Temperature at Meter	6
	Actual	Min	%	In.H_2O	In.$H_2O^{1/2}$	In.H_2O	Ft^3	In Hg	°F	°F	°F	°F	Inlet °F	Outlet °F
W-1	0847	303.0	20.5	1.0		3.55	234.464	4.0	110	262	36	263	49	49
2	0905	305.0	20.2	1.0		3.55	236.531	4.1	107	256	36	263	49	49
3	0916	307.0	20.3	1.2		4.23	238.631	5.1	111	268	35	267	49	50
4	0926	309.0	20.3	1.2		4.23	240.933	5.0	109	261	34	264	50	50
5	1006	311.0	20.4	1.2		4.23	243.244	4.9	104	262	34	264	51	51
6	1031	313.0	20.3	1.2		4.23	245.554	4.9	107	262	36	265	51	51
7	1041	315.0	20.3	1.1		3.90	247.868	4.0	109	257	36	268	51	51
8	1051	317.0	20.3	1.1		3.90	250.082	4.0	106	272	36	265	52	52
S-1	1101	319.0	20.2	1.1		3.90	252.290	4.1	110	259	38	261	51	52
2	1112	321.0	20.2	1.0		3.55	254.504	3.9	110	260	38	267	52	52
3	1219	323.0	20.3	1.2		4.23	256.618	5.0	108	312	37	272	53	54
4	1230	325.0	20.4	1.2		4.23	258.882	5.0	107	261	40	266	53	53
5	1240	327.0	20.3	1.2		4.23	261.179	5.0	113	271	40	265	54	54
6	1257	329.0	20.2	1.2		4.23	263.476	5.0	116	256	41	262	55	55
7	1310	331.0	20.4	1.1		3.90	265.776	4.9	112	260	40	268	55	55
8	1328	333.0	20.3	1.1		3.90	267.995	4.9	116	271	41	267	55	55
	1330	335.0					270.228							
Total,														
Average														

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL CONTROL OFFICE

SOURCE C Fish Control Bag House
PLANT Rouge
DATE 3-27-87
INITIALS DSW-JMM
TEST NO. 3

NOTES

STACK TEMP = 110°F

NOZZLE SIZE

.249
.250 } .250
.250

ORIFICE COEFFICIENT CHECK

	SAMPLE TIME (Min.)	P_{bar} (In Hg)	Orifice Δh (In H_2O)	Meter Reading (ft^3)	Meter Inlet Temp. (°F)	Meter Outlet Temp. (°F)
FINISH						
START						
AVG/NET						

$$\Delta H = \frac{(0.03175)\ (\Delta h)\ (P_{bar})}{(T_{m\text{-}out} + 460)} \left[\frac{(T_{m\text{-}avg} + 460)\ \theta}{(V_m)\ (P_{bar} + \Delta h/13.6)} \right]^2$$

$$\Delta H = \frac{(0.03175)}{\quad} \left[\frac{\quad}{\quad} \right]^2$$

ΔH = 1.70/1.73

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL
CONTROL OFFICE

Source: C Press Control Bag House
Plant: Rouge
Date: 3-27-87
Initials: DSJ-JMM Test No.: 3

Sampling Train Information

Filter Type	110mm A/E	Sample Box No.	1	Nozzle Diameter	25c
Filter No.	1	Probe No.	1	Nozzle Material	SS
Cyclone & Flask No.	BYPASS	Probe Material	SS	Meter Box No.	1
Silica Gel No.	12	Probe Length	10'	Meter Box ΔH	1.81

Leak Test Data

	Prelim. Reading	Time / Date	Initial Reading	Time	Final Reading	Time
Meter and Orifice	ok	3/27/87	→	→	ok	3/27/87
Pump and Surge Tank	ok	3/27/87	→	→	ok	3/27/87
Meter Box, Cord, Sample Box, Probe	ok 2.005 CFM @ 2" Hg	3/26/87	ok 2.005 CFM @ 21" Hg	800 3/27/87	ok 2.005 CFM	1336 3/27/87
Pitot Tube Total Pressure Line	ok 5.6" H2O	3/26/87	ok 6.4" H2O	800 3/27/87	ok 6.3" H2O	1337 3/27/87
Pitot Tube Static Pressure Line	ok 7.6" H2O	3/26/87	ok 6.4" H2O	800 3/27/87	ok 6.9" H2O	1337 3/27/87

Impinger Data

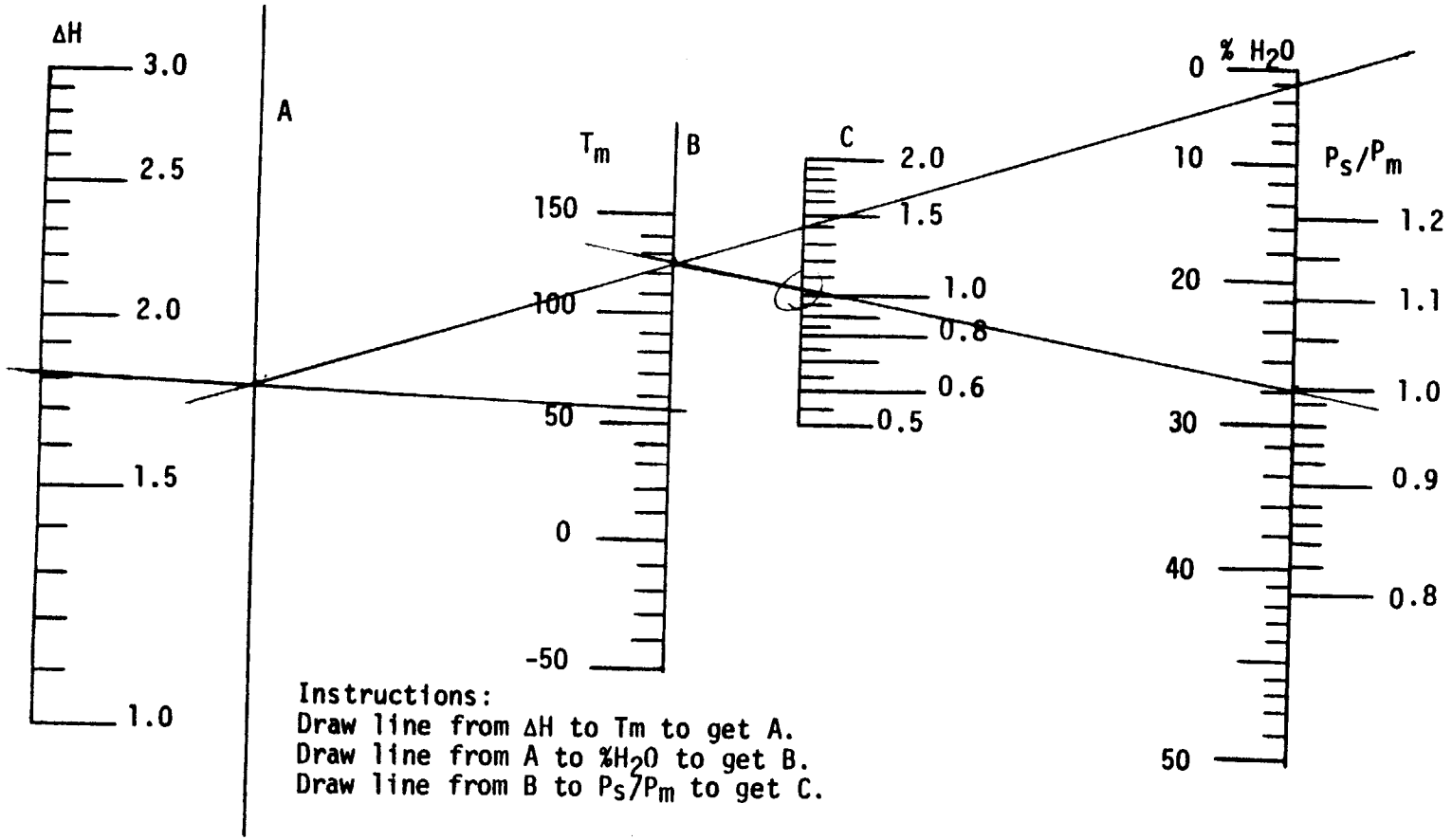
Impinger Number	1	2	3	4
Impinger Contents	H_2O	H_2O	—	Silica Gel
Final Volume (ml)	148	145	15	226.3
Initial Volume (ml)	150	150	0	220.3 g
Volume Collected(ml)	-2	-5	15	6.0 g
			Total	g

8 + 6 = 14

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL CONTROL OFFICE

% H_2O = 2
T_{max} = 55°F

NOMOGRAPH C FACTOR DETERMINATION



Instructions:
Draw line from ΔH to Tm to get A.
Draw line from A to %H_2O to get B.
Draw line from B to P_s/P_m to get C.

SOURCE C Push Control Bag House
PLANT Rouge
DATE 3-27-87
INITIALS DSW-JMA
TEST NO. 3
METER BOX NO. 7
ΔH ORIFICE 1.81

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE (P_{bar}) 29.31
STATIC PRESSURE (P_{sp}) -.25
$P_s = P_{bar} + P_{sp}$ = 29.31 + -.25 = 29.06
(Assumed Δh) 1.5 Δh/13.6= .11
$P_m = P_{bar} + \Delta h/13.6$ = 29.31 + .11 = 29.42
P_s/P_m = 29.06/29.42 = .99

C FACTOR 1.02
PITOT TUBE Cp .85
CORRECTED C FACTOR, (C_c)=
(C)(C_p/.85)^2 = 1.02 (.85/.85)^2
C_c = .90

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL CONTROL OFFICE

SOURCE Push Control Bar Hood TEST NO. 3 CORR. C FACTOR .90 P_{Bar} = 29.31 MCF .9999
PLANT Rouge MIN/PNT 2 NOM. SET POINT .53
DATE 3-27-87 INITIALS DJO-SMH

Traverse Point Number	Clock Time	Meter Box Clock Time	Percent O_2 at Sample Point	Velocity Head, ΔP	$\sqrt{\Delta P}$	Nomograph ΔH Orifice	Meter Reading	Pump Vacuum	Selector Switch Number 1: Stack Temperature	2: Sample Box Temperature	3: Gas Temp. Leaving Last Impinger	4: Probe Temperature	5: Gas Temperature at Meter	6: Gas Temperature at Meter
	Actual	Min	%	In.H_2O	In.$H_2O^{1/2}$	In.H_2O	Ft^3	In Hg	°F	°F	°F	°F	Inlet °F	Outlet °F
S-1	0847	340.0	20.5	.90		3.18	273.724	5.1	105	269	34	265	52	53
2	0858	342.0	20.4	1.1		3.90	275.668	6.5	107	259	34	267	54	54
3	0909	344.0	20.4	1.1		3.90	277.863	6.8	111	263	35	269	55	55
4	0920	346.0	20.4	1.2		4.28	280.061	7.5	108	255	36	267	56	57
5	1003	348.0	20.4	1.2		4.28	282.365	8.0	108	268	31	266	57	58
6	1013	350.0	20.3	1.1		3.90	284.677	7.0	110	255	36	266	58	59
7	1024	352.0	20.4	1.1		3.90	286.908	7.1	108	264	37	265	58	58
8	1037	354.0	20.6	1.1		3.90	289.113	7.2	106	257	39	265	57	59
W-1	1049	356.0	20.4	1.0		3.52	291.318	6.5	108	261	37	264	57	59
2	1106	358.0	20.5	1.2		4.28	293.447	7.5	105	260	36	261	58	59
3	1120	360.0	20.5	1.2		4.28	295.741	7.7	106	259	36	265	56	58
4	1225	362.0	20.4	1.2		4.28	298.050	7.7	110	271	37	268	53	54
5	1236	364.0	20.4	1.2		4.28	300.357	7.8	110	254	37	269	55	55
6	1252	366.0	20.3	1.1		3.90	302.670	7.1	111	259	37	266	55	56
7	1305	368.0	20.4	1.2		4.28	304.881	8.2	108	264	37	267	56	57
8	1322	370.0	20.5	1.1		3.90	307.177	7.0	109	249	37	269	56	58
	1324	372.0					309.392							
Total														
Average														

APPENDIX E

PROCESS OPERATING PARAMETERS DATA SHEETS

Rouge Steel Company
"C" Coke Oven Push Control Baghouse
Particulate Emission Survey
March 25, 1987

TEST 1

PUSH NO.	TIME PUSHED	OVEN NO.	CHARGE TIME	CHARGE WEIGHT	COKING TIME
1	0854	B-19	1650	34,820	1604
2	0909	C-19	1703	34,500	1606
3	0922	A-21	1712	34,460	1610
4	1002	B-21	1721	34,160	1641
5	1020	A-2	1803	33,900	1617
6	1030	B-2	1812	35,100	1618
7	1042	C-2	1823	35,180	1619
8	1054	A-4	1834	35,720	1620
9	1109	B-4	1843	35,340	1626
LUNCH — 10	1121	C-4	1857	35,680	1624
11	1226	B-6	2029	35,460	1557
12	1237	C-6	2040	35,360	1557
13	1252	A-8	2048	33,660	1604
14	1305	B-8	2102	35,240	1603
15	1319	C-8	2113	35,060	1606
16	1339	A-10	2123	(NO DET. ~35,000)	1616

(558640 X .75) = 418,980

Rouge Steel Company
"C" Coke Oven Push Control Baghouse
Particulate Emission Survey
March 26, 1987

TEST 2

	PUSH NO	TIME PUSHED	OVEN NO	TIME CHARGED	CHARGE WEIGHT	COKING TIME
	1	0847	A-14	1637	34,080	1610
	2	0906	C-14	1700	34,220	1606
	3	0916	A-16	1710	34,860	1606
BT —	4	0927	B-16	1723	34,080	1604
	5	1006	C-16	1733	34,200	1633
	6	1032	A-18	1807	32,960	1625
	7	1042	B-18	1815	33,720	1627
	8	1053	C-18	1825	33,720	1628
	9	1102	A-20	1837	34,140	1625
LUNCH —	10	1112	B-20	1853	34,140	1619
	11	1220	B-1	1917	33,480	1703
	12	1231	C-1	2023	33,820	1608
	13	1241	A-3	2031	33,660	1610
	14	1258	B-3	2041	34,120	1617
	15	1310	C-3	2052	34,280	1618
	16	1324	A-5	2101	33,920	1623

(5-3900)(.75) = 407,735

Rouge Steel Company
"C" Coke Oven Push Control Baghouse
Particulate Emission Survey
March 27, 1987

TEST 3

	PUSH NO	TIME PUSHED	OVEN NO.	CHARGE TIME	CHARGE WEIGHT	COKING TIME
	1	0845	B-7	1526	34,940	1719
	2	0855	C-7	1535	35,120	1720
	3	0907	A-9	1622	34,660	1645
BT —	4	0918	B-9	1631	35,620	1647
	5	1001	A-11	1649	35,700	1712
	6	1012	B-11	1658	35,240	1714
	7	1022	C-11	1707	35,700	1715
	8	1035	A-13	1717	35,840	1718
	9	1048	B-13	1806	35,860	1642
	10	1105	C-13	1815	35,820	1650
LN —	11	1119	A-15	1823	34,760	1656
	12	1223	C-15	1846	34,120	1737
	13	1235	A-17	1901	34,500	1734
	14	1250	B-17	1911	34,680	1739
	15	1305	C-17	2023	34,500	1642
	16	1321	A-19	2034	33,920	1647

(560980)(.75) = 420,735

APPENDIX F

LABORATORY DATA SHEETS

16

ROUGE STEEL COMPANY
"C" COKE OVEN BATTERY
PUSH CONTROL SHED BAGHOUSE
MARCH 24-26, 1987

TEST NO	FILTER OR DISH NO	SAMPLE ID	FILTER VOLUME	INITIAL WEIGHT (Grs)			FINAL WEIGHT (Grs)			NET GAIN (Grams)
				1	2	AVG.	1	2	AVG.	
1	39	FILTER		2.0405	2.0407	2.0406	2.0410	2.0410	2.0410	0.0004
2	46			2.0076	2.0076	2.0076	2.0082	2.0082	2.0082	0.0006
3	1			1.9631	1.9633	1.9632	1.9633	1.9634	1.9634	0.0002
1	1	NOZZLE/PROBE	502	76.3945	76.3942	76.3944	76.4181	76.4180	76.4181	0.0237
2	2		335	84.2457	84.2457	84.2457	84.2564	84.2562	84.2563	0.0106
3	3		472	80.1112	80.1111	80.1112	80.1225	80.1223	80.1224	0.0112
ACE-TUNE BLANK	4		250	64.7664	64.7665	64.7665	64.7664	64.7665	64.7665	0.0000

APPENDIX G

SAMPLE CALCULATIONS

SAMPLE CALCULATIONS

GAS FLOW ANALYSIS

TEST NUMBER 2

MEASURED DATA

STACK DIAMETER	DS	108.0	IN
STACK GAS TEMPERATURE	TS	110	DEG F
STACK STATIC PRESSURE	PSP	-0.25	IN H2O
BAROMETRIC PRESSURE	PBAR	29.13	IN HG
PITOT TUBE COEFFICIENT	CP	0.80	
AVE. SQRT. OF VELOCITY PRESS.	DELPV	1.063	IN H2O^.5
METERED SAMPLE VOLUME	VM	35.764	ACT CU FT
METER CORRECTION FACTOR	DGMCF	0.9999	
AVERAGE METER TEMPERATURE	TM	52.0	DEG F
AVERAGE ORIFICE PRESSURE DROP	DELH	4.00	IN H2O
VOLUME OF H2O CONDENSATE	VI	21.0	ML
WEIGHT OF H2O ADSORBED	VSG	7.2	GRAMS
MOLECULAR WT. OF DRY EX. GAS	MWD	29.00	LB/LB-MOLE

SAMPLE CALCULATIONS

CORRECTED VOLUME OF GAS THROUGH METER - STANDARD CONDITIONS VMSTD

VMSTD = 17.647 * VM * (PBAR + DELH/13.6)/(TM + 460) * DGMCF
VMSTD = 17.647 * 35.764 * (29.13 + 4.00/13.6)/(52.0+460)*0.9999
VMSTD = 36.269 CU FT

VOLUME OF WATER VAPOR CONDENSED - STANDARD CONDITIONS VWSTD

VWSTD = .0472 * (VI + VSG)
VWSTD = .0472 * (21.0 + 7.2)
VWSTD = 1.331 CU FT

TOTAL SAMPLE VOLUME (CORRECTED) AT STANDARD CONDITIONS VTSTD

VTSTD = VMSTD + VWSTD
VTSTD = 36.269 + 1.331
VTSTD = 37.600 CU FT

PERCENT MOISTURE IN EXHAUST GAS %M

%M = 100 * VWSTD / VTSTD
%M = 100 * 1.331/ 37.600
%M = 3.5 %

GAS FLOW CALCULATIONS

MOLECULAR WEIGHT OF WET EXHAUST GAS — MWW

```
MWW = (MWD/100) * (100-%M) + 0.18 * %M
MWW = (29.00/100 ) * (100 - 3.5) + 0.18 *  3.5
MWW = 28.61  LB/LB-MOLE
```

STACK GAS PRESSURE — PS

```
PS = PBAR + (PSP / 13.6)
PS = 29.13 + (-.25 / 13.6)
PS = 29.11  IN HG
```

STACK GAS VELOCITY AT STACK CONDITIONS — VS

```
VS = 5128.8 * CP * DELPV * SQRT((TS + 460)/(PS * MWW))
VS = 5128.8 * 0.80 * 1.063*SQRT(( 110+460)/(29.11 * 28.61))
VS = 3607  FT/MIN
```

STACK GAS VELOCITY AT STANDARD CONDITIONS — VSTD

```
VSTD = 17.647 * VS * PS / ( TS + 460 )
VSTD = 17.647*  3607 * 29.11/( ( 110 + 460 )
VSTD = 3253  FT/MIN
```

STACK AREA - ROUND — AS

```
AS = PI * (DS^2)/4/12^2
AS = 3.1417 *( 108^2)/4/144
AS =  63.62  SQ FT
```

STACK GAS FLOW AT STACK CONDITIONS — QS

```
QS = VS * AS
QS =   3607 *  63.62
QS =   229,478  ACFM
```

STACK GAS FLOW AT WET STANDARD CONDITIONS — QWSTD

```
QWSTD = VSTD * AS
QWSTD =  3253 *  63.62
QWSTD =   206,938  WSCFM
```

STACK GAS FLOW AT DRY STANDARD CONDITIONS — QDSTD

```
QDSTD = QWSTD * (1 - (%M/100))
QDSTD =   206,938 * (1 -  3.54/100))
QDSTD =   199,613  DSCFM
```

SAMPLE CALCULATIONS

PARTICULATE ANALYSIS

TEST NUMBER 2

MEASURED DATA

METERED SAMPLE VOLUME	VM	35.764	ACT CU FT
METER CORRECTION FACTOR	DGMCF	0.9999	
AVERAGE METER TEMPERATURE	TM	52.0	DEG F
AVERAGE ORIFICE PRESSURE DROP	DELH	4.00	IN H2O
VOLUME OF H20 CONDENSATE	VI	21.0	ML
WEIGHT OF H20 ADSORBED	VSG	7.2	GRAMS
NOZZLE DIAMETER	DN	0.2500	IN
TOTAL SAMPLE TIME	THETA	32.	MIN
WEIGHT OF PROBE CATCH	WPROBE	0.0106	GRAMS
WEIGHT OF FILTER CATCH	WF	0.0006	GRAMS
WEIGHT OF COAL CHARGED	COAL	543,900	LB
COAL TO COKE CONVERSION	CONV	0.75	

SAMPLE CALCULATIONS

CORRECTED VOLUME OF GAS THROUGH METER - STANDARD CONDITIONS VMSTD

```
VMSTD = 17.647 * VM * (PBAR + DELH/13.6)/(TM + 460) * DGMCF
VMSTD = 17.647 *  35.764 * (29.13 + 4.00/13.6)/( 52.0+460)*0.9999
VMSTD = 36.269  CU FT
```

VOLUME OF WATER VAPOR CONDENSED - STANDARD CONDITIONS VWSTD

```
VWSTD = .0472 * (VI + VSG)
VWSTD = .0472 * (21.0 +  7.2)
VWSTD = 1.331  CU FT
```

TOTAL SAMPLE VOLUME (CORRECTED) AT STANDARD CONDITIONS VTSTD

```
VTSTD = VMSTD + VWSTD
VTSTD =  36.269 +  1.331
VTSTD =  37.600  CU FT
```

NOZZLE AREA AN

```
AN = PI * (DN^2)/4/12^2
AN = 3.1417 * ( 0.2500^2)/4/144
AN = 0.0003409  SQ FT
```

PARTICULATE CALCULATIONS

ISOKINETIC RATIO I

I = 100 * VTSTD / (THETA * AN * VSTD)
I = 100 * 37.600 / (32 * 0.000341 * 3253)
I = 106 %

TOTAL WEIGHT OF PARTICULATE MATTER COLLECTED WPT

WPT = WPROBE + WF
WPT = 0.0106 + 0.0006
WPT = 0.0112 GRAMS

PARTICULATE CONCENTRATION AT STACK CONDITIONS CSTK

CSTK = 15.43 * 17.647 * PS * WPT/(VSTD * (TS+460))
CSTK = 15.43 * 17.647 * 29.11 * 0.0112 /(3253 * (110 + 460))
CSTK = 0.0041 GR/ACF

PARTICULATE WEIGHT CONCENTRATION AT DRY STANDARD CONDITIONS WCD

WCD = 849 * WPT / (VMSTD * MWD)
WCD = 849 * 0.011 / (36.269 * 29.00)
WCD = 0.009 #/1000# DRY

PARTICULATE WEIGHT CONCENTRATION AT WET STANDARD CONDITIONS WCW

WCW = 849 * WPT / (VTSTD * MWW)
WCW = 849 * 0.0112/(37.600 * 28.61)
WCW = 0.009 #/1000# WET

PARTICULATE FLOW RATE WR

WR = 0.132 * WPT * QWSTD / VTSTD
WR = 0.132 * 0.011 * 206,938 / 37.600
WR = 8.14 LB/HR

WEIGHT OF COKE PUSHED COKE

COKE = CONV * COAL
COKE = 0.75 * 543,900
COKE = 407,925 LB

EMISSIONS PER TON OF COKE PUSHED CTON

CTON = (2000/60) * WR * THETA / COKE
CTON = (2000/60) * 8.14 * 32 / 407,925
CTON = 0.0213 LB/TON

APPENDIX H

EQUIPMENT CALIBRATION

CALIBRATION FOR "C"
PUSHING SHED BAGHOUSE
COMPLIANCE TEST

FORD MOTOR COMPANY
STATIONARY SOURCE ENVIRONMENTAL CONTROL
FORD WIND TUNNEL - PITOT TUBE CALIBRATION

INITIALS JMM PROBE ID. 10' PROBE DATE 3-13-87

FAN SPEED	STD PITOT ΔP	STD PITOT √ΔP	"S" TYPE PITOT NOZZLE SIZE	"S" TYPE PITOT ΔP	"S" TYPE PITOT √ΔP	$C_p = \frac{\sqrt{\Delta P}_{std}}{\sqrt{\Delta P}_{s}}$	REMARKS
	.22	.469	1/4	.34	.583	.80	
LOW	.22	.469	1/4	.345	.587	.80	
	.225	.474	1/4	.34	.583	.81	
	.39	.624	1/4	.61	.781	.80	
MEDIUM	.40	.632	1/4	.61	.781	.80	
	.39	.624	1/4	.62	.787	.79	
	.57	.755	1/4	.91	.954	.79	
HIGH	.58	.762	1/4	.92	.959	.79	
	.58	.762	1/4	.92	.959	.79	

FAN SPEED	C_p NOZZLE SIZE 1/4	1/4	1/4	COMPOSITE C_p
LOW	.80	.80	.81	
MEDIUM	.80	.80	.79	
HIGH	.79	.79	.79	
AVERAGE	.80	.80	.80	$\frac{44\frac{1}{2}}{} = .80$

6

SSECO METER BOX NO. 1 CALIBRATION DATA

DATE: 02-10-87
INITIALS: JMM
BAR. PRESS.: 29.45

STD. METER NO.: 916592
BOX-METER NO.: 689784
NO. OF TRIALS: 9

STANDARD METER DATA (CORR. FACTOR = 1.0065)

TEST	TIME MIN	TEMP DEG F	DEL P IN H2O	INITIAL CU FT	FINAL CU FT	NET CU FT	VOL CORR TO STD	VOL CORR TO SPIRO
1	14.0	72.0	-0.23	216.607	222.301	5.694	5.559	5.595
2	12.0	72.0	-0.25	222.301	228.258	5.957	5.816	5.854
3	10.0	72.0	-0.27	228.258	233.975	5.717	5.581	5.617
4	10.0	74.0	-0.30	233.975	240.351	6.376	6.201	6.241
5	9.0	74.0	-0.33	240.351	246.613	6.262	6.089	6.129
6	8.0	74.0	-0.36	246.613	251.876	5.263	5.118	5.151
7	7.5	74.0	-0.39	251.876	257.863	5.987	5.821	5.859
8	7.0	74.0	-0.45	257.863	264.196	6.333	6.157	6.197
9	6.5	74.0	-0.51	264.196	270.410	6.214	6.040	6.079

METER BOX DATA

TEST	T-IN DEG F	T-OUT DEG F	DEL P IN H2O	INITIAL CU FT	FINAL CU FT	VOL COR TO STP	DELTA H	CORR DELTA H	% DIFF FRM STD
1	66.0	63.0	0.50	860.197	865.860	5.620	1.73	1.74	-1.09
2	73.0	69.0	0.75	865.860	871.805	5.832	1.75	1.74	-0.28
3	77.0	73.0	1.00	871.805	877.571	5.619	1.73	1.73	-0.67
4	82.0	77.0	1.25	877.571	884.013	6.230	1.75	1.74	-0.47
5	84.0	80.0	1.50	884.013	890.368	6.122	1.75	1.75	-0.53
6	87.0	82.0	1.75	890.368	895.728	5.143	2.28	2.27	-0.51
7	87.0	83.0	2.00	895.728	901.839	5.862	1.76	1.76	-0.71
8	89.0	84.0	2.50	901.839	908.219	6.114	1.76	1.71	0.69
9	90.0	85.0	3.00	908.219	914.676	6.184	1.78	1.84	-2.39

AVERAGE METER CORRECTION FACTOR: 0.9999
AVERAGE CORRECTED CALIBRATION CONSTANT: 1.81

CORRECTED METER VOLUME =
(CU FT)*(528/(TEMP + 460))*((PBAR + (DELTA P/13.6))/29.92

CALIBRATION CONSTANT (DELTA H) =
0.03175*(DELTA P)*PBAR/((M TEMP OUT)+460)*
(((TEMP AVE)+460)*TIME/(CU FT*(PBAR+(DELTA P/13.6))))^2

DSW
3-16-87

SSECO METER BOX TEMPERATURE Readout

CALIBRATION VS. REFERENCE*

Calibrator °F	Meter Box # 1 Doric °F	Calibrator °F	Meter Box # 2 Doric °F
1	0	0	0
30	30	30	30
75	75	75	75
130	129	130	129
225	225	225	224
250	250	250	249
300	300	300	299
350	350	350	349
400	399	400	399
500	499	500	499
600	599	600	598
700	698	700	698

* Reference: TRANSMATION INC. Portable Potentiometric Calibrator

APPENDIX I

OPACITY DATA SHEETS

Visible Emissions Evaluation Form

(USEPA REGION V)

COMPLIANCE TEST

(1)

FACILITY: "C" BATTERY BAGHOUSE STACK DATE: 3-25-87

OBSERVER: D. A. O'CONNOR

START: 8:53 am X pm

FINISH: 9:29 am X pm

Source: BAGHOUSE STACK

Observation Point: DUE SOUTH, AND WEST OF OLD COKE LAB

distance from; 100 YARDS

direction from; DUE SOUTH

source height;

wind direction SW

wind speed 10-15 MPH

sky condition BLUE SKIES/CLEAR

background SKY

amb. temp. °F 59° F

rel. hum. %

color of emissions BLACK

other;

Remarks;

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

MIN	0	15	30	45	REMARKS
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53			0	0	8:53 AM
54	5	0	0	0	
55	0	0	0	0	
56					
57					
58					
59					

Observers Signature D. A. O'Connor Last Cert. Date 9-86

Visible Emissions Evaluation Form

(USEPA REGION V)

COMPLIANCE TEST

(2)

FACILITY: "C" BATTERY BAGHOUSE STACK

DATE: 3-25-87

OBSERVER: J. A. O'CONNOR

START: 10:02 am X pm

FINISH: 10:55 am X pm

Source: BAGHOUSE STACK

Observation Point: SOUTH OF STACK AND WEST OF OLD COKE LAB

distance from; 100 YARDS

direction from; DUE SOUTH

source height; ____

wind direction SW

wind speed 10-15 MPH

sky condition BLUE SKIES/CLEAR

background SKY

amb. temp. °F 60° F

rel. hum. % ____

color of emissions BLACK

other; ____

Remarks; ____

MIN	0	15	30	45	REMARKS
0					
1					
2				0	10:02 AM
3	0	0	5	0	
4	5	5	0	0	
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20			0	0	10:20 AM
21	0	5	0	5	
22	0	0	0		
23					
24					
25					
26					
27					
28					
29					

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

Observers Signature [redacted] Last Cert. Date 9-86

Visible Emissions Evaluation Form

(USEPA REGION VI

COMPLIANCE TEST

(3)

FACILITY: "C" BATTERY BAGHOUSE STACK

DATE: 3-25-87

OBSERVER: D.A. O'CONNOR

START: 11:10 am X pm

FINISH: 11:23 am X pm

Source: BAGHOUSE STACK

Observation Point: SOUTH OF STACK AND WEST OF OLD COKE LAB

distance from; 100 YARDS

direction from; DUE SOUTH

source height;

wind direction SW

wind speed 15-20 MPH

sky condition BLUE SKIES/CLEAR

background SKY

amb. temp. °F 61°

rel. hum. %

color of emissions BLACK

other;

Remarks;

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

MIN.	0	15	30	45	REMARKS
30					
31					
32					
33					
34					
35					
36					
37					L
38					U
39					N
40					C
41					H
42					
43					B
44					R
45					E
46					A
47					K
48					
49					
50					
51					
52					
53					
54					
55					
56					
57					
58					
59					

Observers Signature D.A. O'Connor Last Cert. Date 9-86

Visible Emissions Evaluation Form

(USEPA REGION V)

COMPLIANCE TEST

(4)

FACILITY: "C" BATTERY BAGHOUSE STACK

DATE: 3-25-87

OBSERVER: D.A. O'CONNOR

START: 12:25 am__ pm X

FINISH: 12:54 am__ pm X

Source: BAGHOUSE STACK

Observation Point: SOUTH OF STACK AND WEST OF OLD COKE LAB

distance from; 100 YARDS

direction from; DUE SOUTH

source height;

wind direction ..SW.....

wind speed ..15-20 MPH...

sky condition ~~OVERCAST~~ NO GREY SKIES

background SKY.....

amb. temp. °F 61°.....

rel. hum. % .....

color of emissions BLACK.....

other; _____

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

MIN.	0	15	30	45	REMARKS
30					
31					
32					
33					
34					
35					
36		0	0	0	12:36 PM
37	5	0	0	0	
38	0	0	0		
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52			0	0	12:52 PM
53	0	0	0	0	
54	5	0	0		
55					
56					
57					
58					
59					

other; _____

Remarks: FOR THE 12:36 PM PUSH THE SKIES CLEARED UP TO WHITE CLOUDS AGAINST A BLUE SKY

Observers Signature D.A. O'Connor Last Cert. Date 9-86

Visible Emissions Evaluation Form
(USEPA REGION V)

(1)

FACILITY: "C" Baghouse

DATE: 3/25/87

OBSERVER: Dawson

START: 1:06 am ___ pm ✓

FINISH: 1:44 am ___ pm ✓

Source:

Observation Point: South of 'C' baghouse stack, due west of Coke Lab.

distance from;

direction from;

source height;

wind direction NW

wind speed

sky condition cloudy sky

background

amb. temp. °F 55

rel. hum. % 100

color of emissions

other;

Remarks;

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

Observers Signature [signature] Last Cert. Date 9/87

Visible Emissions Evaluation Form

(USEPA REGION V)

COMPLIANCE TEST

(1)

FACILITY: "C" BATTERY BAGHOUSE STACK

DATE: 3-26-87

OBSERVER: D.A. O'CONNOR

START: 8:46 am X pm

FINISH: 9:28 am X pm

Source: BAGHOUSE

Observation Point: SOUTH OF STACK AND WEST OF OLD COKE LAB

distance from; 100 YARDS

direction from; DUE SOUTH

source height;

wind direction ... W

wind speed ... 5-10 MPH

sky condition ... OVERCAST

background ... SKY

amb. temp. °F ... 52° F

rel. hum. % ... LIGHT RAIN

color of emissions ... BLACK

other;

Remarks;

MIN	0	15	30	45	REMARKS
0					
1					
2					
3					
4					
5	0	0	5	0	9:05 AM
6	0	5	0	5	
7	0				
8					
9					
10					
11					
12					
13					
14					
15				0	9:15 AM
16	5	0	0	0	
17	0	5	0	0	
18					
19					
20					
21					
22					
23					
24					
25					
26		0	0	0	9:26 AM
27	0	0	0	5	
28	0	0			
29					

MIN	0	15	30	45	REMARKS
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46				0	8:46 AM
47	5	0	0	0	
48	0	0	0	0	
49					
50					
51					
52					
53					
54					
55					
56					
57					
58					
59					

Observers Signature [redacted] Last Cert. Date 9-86

Visible Emissions Evaluation Form

(USEPA REGION V)

COMPLIANCE TEST

(2)

FACILITY: "C" BATTERY BAGHOUSE STACK

DATE: 3-26-87

OBSERVER: D. A. O'CONNOR

START: 10:06 am X pm

FINISH: 10:54 am X pm

Source: BAGHOUSE STACK

Observation Point: SOUTH OF STACK AND WEST OF OLD COKE LAB

distance from; 100 YARDS

direction from; DUE SOUTH

source height;

wind direction ..... W

wind speed ..... 5-10 MPH

sky condition ..... OVERCAST

background ..... SKY

amb. temp. °F ..... 53°

rel. hum. % .....

color of emissions ..... BLACK

other; .....

Remarks; .....

MIN.	0	15	30	45	REMARKS
0					
1					
2					
3					
4					
5					
6		0	0	0	10:06 AM
7	5	5	5	0	
8	0	0			
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27			0	0	10:27 AM
28	0	0	0	0	
29	0	0	0		

MIN.	0	15	30	45	REMARKS
30					
31					
32					
33					
34					
35					
36		0	0	0	10:36 AM
37	0	0	0	0	
38	0	0			
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52				0	10:52 AM
53	0	5	0	5	
54	0	0	5	0	
55					
56					
57					
58					
59					

Observers Signature D. A. O'Connor Last Cert. Date 9-86

Visible Emissions Evaluation Form

(USEPA REGION V)

(3)

COMPLIANCE TEST

FACILITY: "C" BATTERY BAGHOUSE STACK

DATE: 3-26-87

OBSERVER: D. A. O'CONNOR

START: 11:01 am X pm

FINISH: 11:14 am X pm

Source: BAGHOUSE STACK

Observation Point: SOUTH OF STACK AND WEST OF OLD COKE LAB

distance from; 100 YARDS

direction from; DUE SOUTH

source height;

wind direction W

wind speed 5-10 MPH

sky condition OVERCAST

background SKY

amb. temp. °F 53° F

rel. hum. %

color of emissions BLACK

other;

Remarks;

MIN	0	15	30	45	REMARKS
0					
1				0	11:01 AM
2	5	5	0	0	
3	5	5	0	0	
4					
5					
6					
7					
8					
9					
10					
11					
12				0	11:12 AM
13	0	0	0	5	
14	0	0	0	0	
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					

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

Observers Signature D. A. O'Connor Last Cert. Date 9-86

Visible Emissions Evaluation Form

(USEPA REGION V)

COMPLIANCE TEST

(4)

FACILITY: "C" BATTERY BAGHOUSE STACK

DATE: 3-26-87

OBSERVER: D.A. O'CONNOR

START: 12:20 am ___ pm X

FINISH: 12:43 am ___ pm X

Source: BAGHOUSE STACK

Observation Point: SOUTH OF STACK AND WEST OF OLD COKE LAB

distance from; 100 YARDS

direction from; DUE SOUTH

source height; ___

wind direction ... W

wind speed ... 5-10 MPH

sky condition ... OVERCAST

background ... SKY

amb. temp. °F ... 53 F

rel. hum. % ...

color of emissions ... BLACK

other; ___

Remarks; ___

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

MIN	0	15	30	45	REMARKS
30			0	0	12:30 PM
31	0	5	0	5	
32	0	5	0		
33					
34					
35					
36					
37					
38					
39					
40					
41			0	0	12:41 PM
42	5	0	0	0	
43	0	0			
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					
55					
56					
57					
58					
59					

Observers Signature D.A.O'C Last Cert. Date 9-86

Visible Emissions Evaluation Form

(USEPA REGION V)

(1)

FACILITY: "C" Coke Ovens battery DATE: 3/26/87

OBSERVER: DAWSON

START: 1258 am pm ✓

FINISH: ____ am pm

Source: Range Name "C"

Observation Point: ____

distance from; ____

direction from; ____

source height; ____

wind direction NW

wind speed 5-10 mph

sky condition Cloudy Overcast

background ____

amb. temp. °F ____

rel. hum. % ____

color of emissions ____

other; ____

Remarks; ____

MIN.	0	15	30	45	REMARKS	MIN.	0	15	30	45	REMARKS
0	0	0	0	0		30					
1						31					
2						32					
3						33					
4						34					
5						35					
6						36					
7						37					
8						38					
9						39					
10	0	0	0	0	#5	40					
11	0	0	0	0		41					
12	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	0	0	0	0	#6	54					
25	0	0	0	0		55					
26	0	0	0	0		56					
27						57					
28						58	0	0	0	0	#15
29						59	0	0	0	0	

Observers Signature [signature] Last Cert. Date 9/87

Visible Emissions Evaluation Form

(USEPA REGION V)

COMPLIANCE TEST

(1)

FACILITY: "C" BATTERY BAGHOUSE STACK

DATE: 3-27-87

OBSERVER: D. A. O'CONNOR

START: 8:45 am X pm

FINISH: 9:20 am X pm

Source: BAGHOUSE STACK

Observation Point: SOUTH OF STACK AND WEST OF OLD COKE LAB

distance from; 100 YARDS

direction from; DUE SOUTH

source height;

wind direction SW

wind speed 5-10 MPH

sky condition OVERCAST

background SKY

amb. temp. °F 51° F

rel. hum. %

color of emissions BLACK

other;

Remarks;

MIN.	0	15	30	45	REMARKS
0					
1					
2					
3					
4					
5					
6					
7		0	0	0	9:07 AM
8	0	5	0	0	
9	0	0			
10					
11					
12					
13					
14					
15	✓				
16					
17					
18			0	0	9:18 AM
19	0	5	5	0	
20	0	0	0		
21					
22					
23					
24					
25					
26					
27					
28					
29					

MIN.	0	15	30	45	REMARKS
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45	0	0	0	0	8:45 AM
46	0	5	5	0	
47	0				
48					
49					
50					
51					
52					
53					
54					
55		0	0	0	8:55 AM
56	0	5	5	0	
57	0	0			
58					
59					

Observers Signature D.A.O'Connor Last Cert. Date 9-86

Visible Emissions Evaluation Form

(USEPA REGION V)

COMPLIANCE TEST

(2)

FACILITY: "C" BATTERY BAGHOUSE STACK

DATE: 3-27-87

OBSERVER: D. A. O'CONNOR

START: 10:01 am X pm

FINISH: 10:50 am X pm

Source: BAGHOUSE STACK

Observation Point: SOUTH OF STACK AND WEST OF OLD COKE LAB

distance from; 100 YARDS

direction from; DUE SOUTH

source height;

wind direction SW

wind speed 5-10 MPH

sky condition OVERCAST

background SKY

amb. temp. °F 52° F

rel. hum. %

color of emissions BLACK

other;

Remarks;

MIN.	0	15	30	45	REMARKS
0					
1			0	0	10:01 AM
2	0	5	0	0	
3	0	0	0		
4					
5					
6					
7					
8					
9					
10					
11				0	10:11 AM
12	0	0	5	0	
13	5	0	0	0	
14					
15					
16					
17					
18					
19					
20					
21	5	0	0	0	10:21 AM
22	0	0	0	0	
23	0	0			
24					
25					
26					
27					
28					
29					

MIN.	0	15	30	45	REMARKS
30					
31					
32					
33					
34					
35			0	0	10:35 AM
36	5	5	5	0	
37	0	0			
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48		0	0	0	10:48 AM
49	0	0	0	0	
50	0	0			
51					
52					
53					
54					
55					
56					
57					
58					
59					

Observers Signature D. A. O'Connor Last Cert. Date 9-86

Visible Emissions Evaluation Form

(USEPA REGION V)

COMPLIANCE TEST

(3)

FACILITY: "C" BATTERY BAGHOUSE STACK

DATE: 3-27-87

OBSERVER: D. A. O'CONNOR

START: 11:05 am X pm

FINISH: 11:20 am X pm

Source: BAGHOUSE STACK

Observation Point: SOUTH OF STACK AND WEST OF OLD COKE LAB

distance from; 100 YARDS

direction from; DUE SOUTH

source height;

wind direction SW

wind speed 5-10 MPH

sky condition OVERCAST

background SKY

amb. temp. °F 52° F

rel. hum. %

color of emissions BLACK

other;

Remarks;

MIN	0	15	30	45	REMARKS
0					
1					
2					
3					
4					
5			0	0	11:05 AM
6	0	0	0	0	
7	0	0			
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18				0	11:18 AM
19	0	5	0	0	
20	5	0	0		
21					
22					
23					
24					
25					
26					
27					
28					
29					

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

Observers Signature D. A. O'Connor Last Cert. Date 9-86

Visible Emissions Evaluation Form

(USEPA REGION V)

COMPLIANCE TEST

(4)

FACILITY: "C" BATTERY BAGHOUSE STACK

DATE: 3-27-87

OBSERVER: D.A. O'CONNOR

START: 12:23 am__ pm X

FINISH: 12:36 am__ pm X

Source: BAGHOUSE STACK

Observation Point: SOUTH OF STACK AND WEST OF OLD COKE LAB

distance from: 100 YARDS

direction from: DUE SOUTH

source height:

wind direction SW

wind speed 5-10 MPH

sky condition OVERCAST

background SKY

amb. temp. °F 53° F

rel. hum. %

color of emissions BLACK

other:

Remarks:

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

MIN	0	15	30	45	REMARKS
30					
31					
32					
33					
34				0	12:34 PM
35	0	5	0	0	
36	5	0	0	0	
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					
55					
56					
57					
58					
59					

Observers Signature D.A. O'Connor Last Cert. Date 9-86

Visible Emissions Evaluation Form

(USEPA REGION V)

(1)

FACILITY: "C" Coke Battery

DATE: 3/27/87

OBSERVER: Dubon

START: 1252 am pm ✓

FINISH: ____ am pm

Source: "C" Baghouse

Observation Point: South of "C" baghouse, west of Coke Lab.

distance from: 100 Yds

direction from: ____

source height: ____

wind direction ____

wind speed 8 mph

sky condition Gray-Cloudy

background ____

amb. temp. °F 45

rel. hum. % 84

color of emissions ____

other: ____

Remarks: ____

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

MIN	0	15	30	45	REMARKS
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52	0	0	0	0	[redacted]
53	0	0	0	0	#14
54	0	0	0	0	
55					
56					
57					
58					
59					

Observers Signature [redacted] Last Cert. Date 3/87