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 201

#3 Bat Stack

EMISSION TESTING

FOR

U. S. STEEL
GARY, INDIANA

MARCH 19, 1980

BY

KEMRON ENVIRONMENTAL SERVICES
16550 HIGHLAND ROAD
BATON ROUGE, LOUISIANA 70808

80-15183-08

511137

Borg Warner Corporation

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EMMISION TESTING

FOR

UNITED STATES STEEL

Abstract

On February 6, 1980 KEMRON Environmental Services conducted emission tests for front half particulates and sulfate matter on the number three coke battery exhaust stack servicing United States Steel, Gary, Indiana.

Coke Oven Gas:

The test results indicate an average grain loading of 0.0437 GR/DSCF and an average emission rate of 26.2 LBS/HR for total particulate. The particulate minus sulfate grain loading is 0.0246 GR/DSCF and the emission rate is 15.3 LB/HR.

Blast Furnace Gas:

The test results indicate an average grain loading of 0.0102 GR/DSCF and an emission rate of 8.84 LB/HR the particulate minus sulfate grain loading is 0.00913 GR/DSCF and on average emission rate of 7.84 LB/HR.

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TABLE

SUMMARY OF RESULTS

COKE BATTERY COMBUSTION STACK TESTS
BATTERY NUMBER THREE COKE OVEN GAS

RUN#	1	2	3
DATE	02/06/80	02/06/80	02/06/80
TIME (APPROX)	0945-1107	1145-1332	1440-1623
GAS TEMPERATURE (%F)	327	330	329
MOISTURE CONTENTS (% BY VOLUME)	15.1	13.1	15.4
GAS VOLUME			
ACFM	123099	121487	121487
DSCFM	69998	70535	68676
PARTICULATE CONCENTRATION			
FRONT CATCH	~~0.01~~		
GR/DSCF	0.0343	0.0525	0.0443
LB/HR	20.6	31.9	26.1
TOTAL CATCH - SULFATES	0.0143		
GR/DSCF	~~0.0325~~	0.0308	0.0316
LB/HR	8.62	18.7	18.6
$\%O_2$	7	7	7
~~$\%O_3$~~ CO_2	5	4.5	4.5
% Isokinetic	103	100	103

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TABLE

SUMMARY OF RESULTS

COKE BATTERY COMBUSTION STACK TESTS
BATTERY NUMBER THREE BLAST FURNACE GAS

RUN#	1	2	3
DATE	02/01/80	02/02/80	02/02/80
TIME (APPROX)	1518-1722	1045-1237	1450-1637
GAS TEMPERATURE (%F)	334	338	340
MOISTURE CONTENTS (% BY VOLUME)	2.5	3.13	2.96
GAS VOLUME			
ACFM	155353	151948	152127
DSCFM	102321	98744	98786
PARTICULATE CONCENTRATION			
FRONT CATCH			
GR/DSCF	0.0117	0.0096	0.00940
LB/HR	10.4	8.18	7.99
TOTAL CATCH - SULFATES			
GR/DSCF	0.0105	0.0086	0.0083
LB/HR	9.23	7.26	7.04
$\%O_2$	5.7	7.7	7.6
$\%CO_2$	13.3	19.8	19.8
% Isokinetic	99.9	102	103

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APPENDIX

ΔH	-	Pressure differential across orifice, (" H_2O)
P_M	-	Pressure at meter ($\frac{\Delta H avg}{13.6} + P_B$), (" Hg)
P_s	-	Average static stack pressure, " Hg)
V_s	-	Velocity of stack gas, (fps)
ΔP	-	Velocity head, (" H_2O)
$V_{M\ STD}$	-	Volume through dry gas meter, corrected to standard conditions, (DSCF)
$V_{W\ STD}$	-	Volume of water collected, corrected to standard conditions, (DSCF)
V_{lc}	-	Volume of water collected, (ml)
B_{ws}	-	Moisture in stack gas fraction
$1-B_{WS}$	-	Dry gas fraction in stack gas
M_s	-	Average molecular weight of stack gas (wet), (lb/lb- mole)
Q_{SD}	-	Average stack gas dry volumetric flow rate, (DSCFH)
A	-	Area of stack, ($ft.^2$)
θ	-	Total sampling time, (min.)
I	-	Isokinetic ratio, (%)
C_{SO_2}	-	Concentration of sulfur dioxide, dry basis corrected to standard condition, (lb/DSCF)
V_t	-	Volume of barium perchlorate titrant used for sample, (ml)
V_{tb}	-	Volume of barium perchlorate titrant used for blank, (ml)

GLOSSARY

P_B	-	Barometric Pressure, (" Hg.)
d_N	-	Diameter of Nozzle, (")
A_N	-	Area of Nozzle, (ft.^{2})
C_P	-	Calibration factor for pitot tube
Equivalent Diameter	-	Adjusted diameter for rectangular ducts
Upstream Disturbance	-	Location of sampling ports from nearest upstream disturbance (in terms of equivalent diameter)
Downstream Disturbance	-	Location of sampling ports from nearest downstream disturbance (in terms of equivalent diameter)
T_{STD}	-	Standard Temperature (528° R)
P_{STD}	-	Standard Pressure (29.92 " Hg)
$T_{s\ Avg}$	-	Average Stack Temperature, (° R)
K Factor	-	Correction factor for nomograph setting
V_M	-	Volume through meter at meter conditions, (SCF)
Y	-	Dry gas meter correction factor
T_i	-	Inlet temperature at dry gas meter, (° R)
T_o	-	Outlet temperature at dry gas meter, (° R)
T_m	-	Temperature of meter (average of T_i and T_o), (° R)

N	-	Normality of barium perchlorate titrant.
V_{solu}	-	Total volume of solution in which sulfur dioxide sample is contained, (ml)
V_a	-	Volume of sample aliquot titrated, (ml)
V_{SC}	-	Sample volume at standard conditions (dry basis), (ml)
V_f	-	Volume of flask and valve, (ml)
P_i	-	Initial absolute pressure of flask, (" Hg)
P_f	-	Final absolute pressure of flask, (" Hg)
T_{if}	-	Inital absolute temperature of flask, (° R)
T_{ff}	-	Final absolute temperature of flask, (° R)
M	-	Total milligrams NO_2 per sample
A_s	-	Absorbance of sample
F	-	Dilution factor
C_{H2SO4}	-	Concentration of sulfuric acid mist, (lb/DSCF)
K_c	-	Spectrophometer calibration factor

EQUATIONS

Sample gas volume corrected to standard conditions (ft^3)

$$V_{M\ STD} = \frac{K_M\ Y\ V_M\ P_M}{T_M}$$

Volume of water vapor condensed corrected to standard conditions (ft^3)

$$V_{W\ STD} = K_W\ V_{1c}$$

Percent moisture of stack gas (%)

$$B_{WS} = \frac{V_{W\ STD}}{V_{W\ STD} + V_{M\ STD}}$$

Average molecular weight of stack gas (lb/lb mole)

$$M_S = 0.44\ (\%CO_2)(1-B_{WS}) + 0.32\ (\%O_2)(1-B_{WS}) + 0.28\ (\%N_2 + \%CO)(1-B_{WS}) + 18\ (B_{WS})$$

Average stack velocity (fps)

$$V_S = K_P\ C_P\ (\Delta P)^{\frac{1}{2}}_{Avg} \left[\frac{T_{S\ (Avg)}}{P_S\ M_S}\right]^{\frac{1}{2}}$$

Dry volumetric flow rate (DSCFH)

$$Q_{SD} = 3600\ (1-B_{WS})\ V_S\ A \left[\frac{T_{STD}}{T_S}\right]\left[\frac{P_S}{P_{STD}}\right]$$

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Isokinetic Ratio (%)

$$I = \frac{K_i \; V_{M\ STD} \; T_S}{P_S \; V_S \; A_N \; \theta \; (1-B_{WS})}$$

Sulfur dioxide concentration (lb/DSCF)

$$C_{SO_2} = K_S \frac{(V_t - V_{tb}) \; N \; (V_{solu}/V_a)}{V_{M\ STD}}$$

Sample volume for NO_2 (ml^3)

$$V_{SC} = K_M \; (V_f - 25 \text{ ml}) \left[\frac{P_f}{T_{ff}} - \frac{P_i}{T_{if}}\right]$$

Total milligrams NO_2 per sample (mg)

$$M = 2 \; K_C \; A_S \; F$$

Sample concentration for NO_2 (lb/DSCF)

$$C = K_N \frac{M}{V_{SC}}$$

Concentration of sulfuric acid mist (lb/DSCF)

$$C_{H_2SO_4} = K_H \; N \frac{(V_t - V_{tb})(V_{solu}/V_a)}{V_{M\ STD}}$$

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Total Flow Of Stack Gas

Qa = As x Vs x 60

Particulate Concentration, Front Catch

$$GR/DSCF = \frac{(15.43)\ (Mn\ Front)}{Vmstd}$$

LB/HR = #/DSCF * QSD

Particulate Concentration, Total Catch Minus Sulfates

$$GR/DSCF = \frac{(15.43)\ (Mn\ Total\text{-}S)}{Vmstd}$$

LB/HR = #/DSCF * QSD

CONSTANTS

K_P - Constant in velocity equation

$$85.49 \ \frac{\text{ft.}}{\text{sec.}} \left[\frac{(\text{lb/lb mole}) \ (\text{"Hg})}{(^\circ \text{R}) \ (\text{"}H_2O)} \right]^{\frac{1}{2}}$$

K_M - Constant in meter volume equation

$$17.64 \ \frac{^\circ \text{R}}{\text{"Hg}}$$

K_W - Constant in water volume equation

$$0.04707 \ \frac{\text{ft.}^3}{\text{ml}}$$

K_i - Constant in isokinetic equation

$$0.09450 \ \frac{\text{"Hg}}{^\circ \text{R}}$$

K_S - Constant in sulfur dioxide equation

$$7.061 \times 10^{-5} \ \frac{\text{lb}}{\text{meg}}$$

K_N - Constant in NO_2 equation

$$6.243 \times 10^{-5} \ \frac{\text{lb/scf}}{\text{mg/ml}}$$

K_H - Constant in sulfuric acid mist equation

$$1.081 \times 10^{-4} \ \frac{\text{lb}}{\text{meg}}$$

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PARAMETER SHEET
COKE BATTERY COMBUSTION STACK TESTS
BATTERY NUMBER THREE COKE OVEN GAS

Run #	1	2	3
Pb	30.00	30.00	30.00
Ps	29.87	29.87	29.87
Vlc	134.3	111	129
M Front	0.07910	0.1180	0.09970
M Minus Sulfate	0.03303	0.06907	0.07092
θ	96	96	96
% O_2	7	7	7
% CO_2	5	4.5	4.5
ΔH	0.4383	0.4241	0.4195
Cp	0.82	0.82	0.82
Tm	511	522	519
$\overline{\Delta P}$	0.0099	0.0097	0.0096
Ts	787	790	789
Vm	34.23	34.11	34.7
Dn	0.529	0.529	0.529
Vmstd	35.51	34.64	24.7
Vwstd	6.32	5.22	6.07
Bwo	15.1	13.1	15.4
Md	29.08	29.0	29.0
Ms	27.41	27.56	27.31
Vs	6.87	6.78	6.78
An	0.001526	0.001526	0.001526

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PARAMETER SHEET
COKE BATTERY COMBUSTION STACK TESTS
BATTERY NUMBER FIVE BLAST FURNACE GAS

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Run #	1	2	3
Pb	30.5	30.44	30.44
Ps	30.38	30.32	30.32
Vlc	25.1	31.2	29.6
M Front	0.03520	0.02840	0.01079
M Minus Sulfate	0.03138	0.02519	0.007466
θ	96	96	96
% O_2	5.7	7.7	7.6
% CO_2	13.3	19.8	19.8
$\overline{\Delta H}$	0.7812	0.7625	0.77
Cp	0.82	0.82	0.82
Tm	505	515	512
$\overline{\Delta P}$	0.0175	0.0172	0.0172
Ts	794	798	800
Vm	43.16	43.44	43.49
Dn	0.507	0.507	0.507
Vmstd	46.04	45.34	45.66
Vwstd	1.18	1.47	1.39
Bwo	2.5	3.13	2.97
Md	30.35	31.47	31.47
Ms	30.04	31.05	31.07
Vs	8.67	8.48	8.49
An	0.001402	0.001402	0.001402

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PARTICULATES

Borg Warner Corporation

Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70503

STACK SAMPLING DATA REDUCTION
FOR REFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE BATTERY

OPERATORS	: LANIER - JOSHI
DATE OF THIS SAMPLE	: FEBRUARY 6, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 1
FILE NAME	: USTE33
AMBIENT TEMPERATURE (DEG F)	: 20
BAROMETRIC PRESS. (IN. HG.)	: 30

GAS ANALYSIS AT SAMPLING POINT
(DRY BASIS)

% CARBON DIOXIDE	: 5
% CARBON MONOXIDE	: 0.2
% OXYGEN	: 7
% NITROGEN	: 87.8
MOLECULAR WEIGHT (DRY)	: 29.08
% MOISTURE THIS RUN	: 15.1
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 128
WT INCREASE OF SILICA GEL(G)	: 5.8
VOLUME OF GAS SAMPLE (DSCF)	: 35.51

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 0.0449
PROBE RESIDUE(GM)	: 0.0342
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK RESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 0.0342
FILTER CATCH	: 0.0449

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.529
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

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CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	ORIFICE PRES DROP (IN H20)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	TEMP OUTLET (F)	TEMP IMP (F)
				PORT # 1				
945	-1.80	321	0.02	0.64	473.05	41	39	30
947	-1.80	321	0.01	0.42	473.93	43	39	30
949	-1.80	323	0.01	0.42	474.66	44	39	30
951	-1.80	324	0.01	0.21	475.37	46	39	30
953	-1.80	328	0.01	0.21	475.92	45	40	30
955	-1.80	332	0.01	0.21	476.43	46	40	30
957	-1.80	335	0.01	0.42	479.64	48	41	30
959	-1.80	338	0.01	0.42	477.66	50	41	30
1001	-1.80	338	0.02	0.64	478.35	51	42	30
1003	-1.80	336	0.02	0.64	479.17	53	43	30
1005	-1.80	332	0.02	0.64	480.04	54	43	30
1007	-1.80	297	0.01	0.23	480.94	54	44	30
		FINAL DRY GAS VOLUME			481.48			
				PORT # 2				
843	-1.80	324	0.02	0.64	481.48	50	45	30
845	-1.80	326	0.02	0.64	482.38	54	45	30
847	-1.80	328	0.02	0.64	483.24	55	46	30
849	-1.80	324	0.02	0.64	484.10	56	46	30
850	-1.80	330	0.01	0.42	484.98	56	40	30
851	-1.80	335	0.01	0.42	485.67	56	47	30
853	-1.80	331	0.01	0.42	486.39	56	47	30
855	-1.80	329	0.01	0.42	487.11	56	47	30
857	-1.80	331	0.01	0.42	487.83	56	47	30
859	-1.80	338	0.01	0.22	488.53	56	47	30
901	-1.80	332	0.01	0.42	489.09	56	47	30
903	-1.80	297	0.01	0.23	489.79	56	47	30
		FINAL DRY GAS VOLUME			490.37			
				PORT # 3				
1015	-1.80	326	0.02	0.64	490.37	52	48	30
1017	-1.80	327	0.02	0.64	491.19	56	48	30
1019	-1.80	331	0.02	0.64	492.06	57	48	30
1021	-1.80	328	0.01	0.42	492.92	57	49	30
1023	-1.80	323	0.01	0.42	493.65	57	49	30
1025	-1.80	331	0.01	0.42	494.37	57	49	30
1027	-1.80	326	0.01	0.42	495.10	58	49	30
1029	-1.80	333	0.01	0.23	495.80	58	49	30

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1031	-1.80	342	0.01	0.42	496.36	56	50	30
1033	-1.80	328	0.01	0.42	497.07	58	50	30
1035	-1.80	341	0.01	0.42	497.75	58	50	30
1037	-1.80	293	0.01	0.23	498.48	58	50	30

FINAL DRY GAS VOLUME 499.03

PORT # 4

1045	-1.80	323	0.02	0.64	499.03	55	50	30
1047	-1.80	328	0.02	0.64	499.87	57	50	30
1049	-1.80	336	0.01	0.42	500.74	59	50	30
1051	-1.80	329	0.01	0.42	501.46	59	51	30
1053	-1.80	331	0.01	0.42	502.18	59	51	30
1055	-1.80	336	0.01	0.42	502.90	60	51	30
1057	-1.80	328	0.01	0.42	503.62	60	51	30
1059	-1.80	336	0.01	0.42	504.35	60	51	30
1101	-1.80	342	0.01	0.22	505.06	58	52	30
1103	-1.80	341	0.01	0.42	505.60	59	52	30
1105	-1.80	318	0.01	0.42	506.31	61	52	30
1107	-1.80	288	0.01	0.23	507.04	61	52	30

FINAL DRY GAS VOLUME 507.59

AVG ORIFICE DROP (IN H2O) : 0.4383
TEMP OF METER (DEGREES R) : 510.7
AVG. STATIC STK PRESS (IN H2O) :-1.8
AVG STACK PRESSURE (IN HG.) : 29.867
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES R) : 787.3
AVG VELOCITY HEAD (IN H2O) : 9.90000E-03
AVG VELOCITY (FPS) : 6.87
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR): 4199883

CONC. OF FILT. PART. IN STK (GR/DSCF) : 0.0343
CONC. OF FILT. PART. IN STK (#/DSCF) : 4.91098E-06
#/HR OF FILT. PART (DRY BASIS) : 20.6255

ISOKINETIC VARIATION (%) : 103.45

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EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :1
UNIT DESCRIPTION :#3 COKE BATTERY

PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 6, 1980
TEMPERATURE OF STACK(F)	787.3
VELOCITY OF STACK GAS(FPS)	6.87
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFH)	4199883
STATIC PRESSURE(INCHES OF H2O	-1.8
MOISTURE CONTENT(% VOLUME)	15.1
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	29.08
ISOKINETIC RATIO(%)	103.45
FILTERABLE PARICULATE EMISSION RATE(#/HOUR)	20.6255
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	0.0343

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Baton Rouge, Louisiana 70808

STACK SAMPLING DATA REDUCTION FOR REFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE BATTERY

OPERATORS	: LANIER - JOSHI
DATE OF THIS SAMPLE	: FEBRUARY 6, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 2
FILE NAME	: USTE34
AMBIENT TEMPERATURE (DEG F)	: 20
BAROMETRIC PRESS. (IN. HG.)	: 30

GAS ANALYSIS AT SAMPLING POINT (DRY BASIS)

% CARBON DIOXIDE	: 4.5
% CARBON MONOXIDE	: 0.3
% OXYGEN	: 7
% NITROGEN	: 88.2
MOLECULAR WEIGHT (DRY)	: 29
% MOISTURE THIS RUN	: 13.1
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 104
WT INCREASE OF SILICA GEL(G)	: 6.2
VOLUME OF GAS SAMPLE (DSCF)	: 34.64

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 0.0533
PROBE RESIDUE(GM)	: 0.0647
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK RESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 0.0647
FILTER CATCH	: 0.0533

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.529
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

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CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	ORIFICE PRES DROP (IN H2O)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	TEMP OUTLET (F)	TEMP IMP (F)
				PORT # 1				
1145	-1.80	324	0.02	0.64	510.65	61	59	30
1147	-1.80	327	0.02	0.64	511.45	65	58	30
1149	-1.80	336	0.01	0.42	512.42	67	59	30
1151	-1.80	331	0.01	0.42	513.16	66	59	30
1153	-1.80	342	0.01	0.42	513.87	66	59	30
1155	-1.80	328	0.01	0.42	514.58	66	59	30
1157	-1.80	330	0.01	0.42	515.30	66	59	30
1159	-1.80	336	0.01	0.22	516.01	66	59	30
1201	-1.80	337	0.01	0.42	516.59	64	58	30
1203	-1.80	341	0.01	0.42	517.29	66	58	30
1205	-1.80	318	0.01	0.42	518.00	66	58	30
1207	-1.80	288	0.01	0.23	518.72	66	58	30
		FINAL DRY GAS VOLUME			519.26			
				PORT # 2				
1210	-1.80	328	0.02	0.64	519.26	65	58	30
1212	-1.80	327	0.02	0.64	520.16	67	58	30
1214	-1.80	331	0.01	0.42	521.04	68	59	30
1216	-1.80	334	0.01	0.42	521.87	67	60	30
1218	-1.80	330	0.01	0.42	522.48	66	59	30
1220	-1.80	336	0.01	0.42	523.22	65	58	30
1222	-1.80	341	0.01	0.42	523.92	65	58	30
1224	-1.80	342	0.01	0.42	524.64	65	58	30
1226	-1.80	336	0.01	0.22	525.36	64	57	30
1228	-1.80	324	0.01	0.42	525.92	62	57	30
1230	-1.80	320	0.01	0.42	526.62	65	57	30
1232	-1.80	306	0.01	0.23	527.36	65	57	30
		FINAL DRY GAS VOLUME			527.89			
				PORT # 3				
1240	-1.80	342	0.02	0.64	527.89	58	56	30
1242	-1.80	338	0.02	0.64	528.74	64	56	30
1244	-1.80	327	0.01	0.42	529.61	65	57	30
1246	-1.80	321	0.01	0.42	530.35	64	57	30
1248	-1.80	326	0.01	0.42	531.05	64	57	30
1250	-1.80	327	0.01	0.42	531.77	64	57	30
1252	-1.80	333	0.01	0.42	532.48	64	55	30
1254	-1.80	341	0.01	0.42	533.20	64	55	30

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1256	-1.80	338	0.01	0.22	533.93	64	[illegible]	30
1258	-1.80	332	0.01	0.42	534.46	61	55	30
1300	-1.80	329	0.01	0.42	535.17	64	56	30
1302	-1.80	297	0.01	0.23	535.90	64	55	30

FINAL DRY GAS VOLUME 536.45

PORT # 4

1310	-1.80	327	0.02	0.64	536.45	58	58	30
1312	-1.80	328	0.02	0.64	537.30	66	57	30
1314	-1.80	336	0.01	0.42	538.17	68	58	30
1316	-1.80	346	0.01	0.42	538.92	67	59	30
1318	-1.80	341	0.01	0.42	539.66	68	59	30
1320	-1.80	338	0.01	0.42	540.35	68	59	30
1322	-1.80	346	0.01	0.42	541.11	68	60	30
1324	-1.80	329	0.01	0.22	541.79	68	60	30
1326	-1.80	332	0.01	0.42	542.35	65	60	30
1328	-1.80	336	0.01	0.42	543.06	68	60	30
1330	-1.80	331	0.01	0.42	543.78	68	59	30
1332	-1.80	306	0.01	0.23	544.53	69	60	30

FINAL DRY GAS VOLUME 545.07

AVG OPIFICE DROP (IN H2O) : 0.4241
TEMP OF METER (DEGREES R) : 521.5
AVG. STATIC STK PRESS (IN H2O) :-1.8
AVG STACK PRESSURE (IN HG.) : 29.867
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES R) : 790
AVG VELOCITY HEAD (IN H2O) : 9.70000E-03
AVG VELOCITY (FPS) : 6.78
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR): 4232092

CONC. OF FILT. PART. IN STK (GR/DSCF) : 0.0525
CONC. OF FILT. PART. IN STK (#/DSCF) : 7.51067E-06
#/HR OF FILT. PART (DRY BASIS) : 31.7858

ISOKINETIC VAPIATION (%) : 100.14

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Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70808

EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :2
UNIT DESCRIPTION :#3 COKE BATTERY

PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 6, 1980
TEMPERATURE OF STACK(R)	790
VELOCITY OF STACK GAS(FPS)	6.78
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFH)	4232092
STATIC PRESSURE(INCHES OF H2O	-1.8
MOISTURE CONTENT(% VOLUME)	13.1
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	29
ISOKINETIC RATIO(%)	100.14
FILTERABLE PARICULATE EMISSION RATE(#/HOUR)	31.7858
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	0.0525

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Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70816

STACK SAMPLING DATA REDUCTION
FOR REFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE BATTERY

OPERATORS	: LANIER - JOSHI
DATE OF THIS SAMPLE	: FEBRUARY 6, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 3
FILE NAME	: USTE35
AMBIENT TEMPERATURE (DEG F)	: 20
BAROMETRIC PRESS. (IN. HG.)	: 30

GAS ANALYSIS AT SAMPLING POINT
(DRY BASIS)

% CARBON DIOXIDE	: 4.5
% CARBON MONOXIDE	: 0.2
% OXYGEN	: 7
% NITROGEN	: 88.3
MOLECULAR WEIGHT (DRY)	: 29
% MOISTURE THIS RUN	: 15.44
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 128
WT INCREASE OF SILICA GEL(G)	: 6.2
VOLUME OF GAS SAMPLE (DSCF)	: 34.7

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 0.0507
PROBE RESIDUE(GM)	: 0.049
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK RESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 0.049
FILTER CATCH	: 0.0507

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.529
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

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CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	ORIFICE PRES DROP (IN H20)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	OUTLET (F)	IMP (F)
				PORT # 1				
1440	-1.80	327	0.02	0.64	548.58	62	61	30
1442	-1.80	328	0.01	0.42	549.49	63	60	30
1444	-1.80	331	0.01	0.42	550.38	64	60	30
1446	-1.80	341	0.01	0.42	551.10	64	60	30
1448	-1.80	338	0.01	0.42	551.82	64	60	30
1450	-1.80	327	0.01	0.42	552.54	64	59	30
1452	-1.80	329	0.01	0.42	553.25	64	59	30
1454	-1.80	336	0.01	0.22	553.98	65	58	30
1456	-1.80	334	0.01	0.42	554.49	62	58	30
1458	-1.80	342	0.01	0.42	555.19	64	58	30
1500	-1.80	351	0.01	0.42	555.93	64	58	30
1502	-1.80	292	0.01	0.23	556.64	65	58	30
		FINAL DRY GAS VOLUME			557.17			
				PORT # 2				
1505	-1.80	336	0.02	0.64	557.17	61	57	30
1507	-1.80	351	0.01	0.42	558.03	64	57	30
1509	-1.80	342	0.02	0.64	558.78	64	57	30
1511	-1.80	334	0.01	0.42	559.62	64	57	30
1513	-1.80	336	0.01	0.42	560.35	64	57	30
1515	-1.80	329	0.01	0.42	561.06	64	57	30
1517	-1.80	327	0.01	0.42	561.78	64	57	30
1519	-1.80	338	0.01	0.42	562.58	64	57	30
1521	-1.80	341	0.01	0.42	563.20	64	57	20
1523	-1.80	331	0.01	0.22	563.93	64	57	30
1525	-1.80	327	0.01	0.42	564.50	63	56	30
1527	-1.80	281	0.01	0.23	565.20	63	56	30
		FINAL DRY GAS VOLUME			565.82			
				PORT # 3				
1534	-1.80	329	0.02	0.64	565.82	60	56	30
1536	-1.80	332	0.02	0.64	566.68	60	56	30
1538	-1.80	338	0.01	0.42	567.57	65	56	30
1540	-1.80	341	0.01	0.42	568.30	63	56	30
1542	-1.80	333	0.01	0.42	569.00	64	56	30
1544	-1.80	327	0.01	0.42	569.73	64	56	30
1546	-1.80	326	0.01	0.42	570.47	64	56	30
1548	-1.80	321	0.01	0.42	571.17	64	56	30

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1550	-1.80	327	0.01	0.22	571.90	63	56	30
1552	-1.80	338	0.01	0.42	572.43	62		
1554	-1.80	328	0.01	0.42	573.16	63	56	30
1556	-1.80	284	0.01	0.23	573.87	63	56	30
		FINAL DRY GAS VOLUME			574.42			

PORT # 4

1601	-1.80	326	0.02	0.64	574.42	58	54	30
1603	-1.80	332	0.02	0.64	575.24	61	54	30
1605	-1.80	328	0.01	0.42	576.10	60	54	30
1607	-1.80	335	0.01	0.42	576.80	60	54	30
1609	-1.80	329	0.01	0.42	577.51	60	54	30
1611	-1.80	341	0.01	0.42	578.22	60	53	30
1613	-1.80	341	0.01	0.42	578.95	60	53	30
1615	-1.80	329	0.01	0.42	579.88	60	53	30
1617	-1.80	327	0.01	0.42	580.40	60	53	30
1619	-1.80	323	0.01	0.42	581.12	60	52	30
1621	-1.80	321	0.01	0.22	581.85	57	52	30
1623	-1.80	284	0.01	0.23	582.36	56	52	30
		FINAL DRY GAS VOLUME			582.91			

AVG ORIFICE DROP (IN H2O) : 0.4195
TEMP OF METER (DEGREES R) : 519.3
AVG. STATIC STK PRESS (IN H2O) :-1.8
AVG STACK PRESSURE (IN HG.) : 29.867
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES R) : 788.9
AVG VELOCITY HEAD (IN H2O) : 9.60000E-03
AVG VELOCITY (FPS) : 6.78
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR): 4120567

CONC. OF FILT. PART. IN STK (GR/DSCF) : 0.0443
CONC. OF FILT. PART. IN STK (#/DSCF) : 6.33485E-06
#/HR OF FILT. PART (DRY BASIS) : 26.1031

ISOKINETIC VARIATION (%) : 103.03

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Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70808

EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :3
UNIT DESCRIPTION :#3 COKE BATTERY

PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 6, 1980
TEMPERATURE OF STACK(R)	788.9
VELOCITY OF STACK GAS(FPS)	6.78
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFH)	4120567
STATIC PRESSURE(INCHES OF H2O	-1.8
MOISTURE CONTENT(% VOLUME)	15.44
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	29
ISOKINETIC RATIO(%)	103.03
FILTERABLE PARTICULATE EMISSION RATE(#/HOUR)	26.1031
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	0.0443

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SULFATES

Environmental Services Division
16550 Highland Road
Baton Rouge, Louisiana 70808

STACK SAMPLING DATA REDUCTION
FOR PEFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE BATTEFY

OPEFATORS	: LANIER - JOSHI
DATF OF THIS SAMPLE	: FEBFUARY 6, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 1
FILE NAMF	: USTE33
AMBIENT TEMPEFATURE (DEG F)	: 20
BAROMETRIC PRESS. (IN. HG.)	: 30

GAS ANALYSIS AT SAMPLING POINT
(DRY BASIS)

% CARBON DIOXIDE	: 5
% CARBON MONOXIDE	: 0.2
% OXYGEN	: 7
% NITROGEN	: 87.8
MOLECULAR WEIGHT (DRY)	: 29.08
% MOISTURE THIS RUN	: 15.1
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 128
WT INCREASE OF SILICA GEL(G)	: 5.8
VOLUME OF GAS SAMPLE (DSCF)	: 35.51

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 0.038146
PROBE PESIDUE(GM)	: 7.92800E-03
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK PESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 7.92800E-03
FILTER CATCH	: 0.038146

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.529
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

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CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	ORIFICE PRES DROP (IN H2O)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	OUTLET (F)	IMP (F)
				PORT # 1				
945	-1.80	321	0.02	0.64	473.05	41	39	30
947	-1.80	321	0.01	0.42	473.93	43	39	30
949	-1.80	323	0.01	0.42	474.66	44	39	30
951	-1.80	324	0.01	0.21	475.37	46	39	30
953	-1.80	328	0.01	0.21	475.92	45	40	30
955	-1.80	332	0.01	0.21	476.43	46	40	30
957	-1.80	335	0.01	0.42	479.64	48	41	30
959	-1.80	338	0.01	0.42	477.66	50	41	30
1001	-1.80	338	0.02	0.64	478.35	51	42	30
1003	-1.80	336	0.02	0.64	479.17	53	43	30
1005	-1.80	332	0.02	0.64	480.04	54	43	30
1007	-1.80	297	0.01	0.23	480.94	54	44	30
		FINAL DRY GAS VOLUME			481.48			
				PORT # 2				
843	-1.80	324	0.02	0.64	481.48	50	45	30
845	-1.80	326	0.02	0.64	482.38	54	45	30
847	-1.80	328	0.02	0.64	483.24	55	46	30
849	-1.80	324	0.02	0.64	484.10	56	46	30
850	-1.80	330	0.01	0.42	484.98	56	40	30
851	-1.80	335	0.01	0.42	485.67	56	47	30
853	-1.80	331	0.01	0.42	486.39	56	47	30
855	-1.80	329	0.01	0.42	487.11	56	47	30
857	-1.80	331	0.01	0.42	487.83	56	47	30
859	-1.80	338	0.01	0.22	488.53	56	47	30
901	-1.80	332	0.01	0.42	489.09	56	47	30
903	-1.80	297	0.01	0.23	489.79	56	47	30
		FINAL DRY GAS VOLUME			490.37			
				PORT # 3				
1015	-1.80	326	0.02	0.64	490.37	52	48	30
1017	-1.80	327	0.02	0.64	491.19	56	48	30
1019	-1.80	331	0.02	0.64	492.06	57	48	30
1021	-1.80	328	0.01	0.42	492.92	57	49	30
1023	-1.80	323	0.01	0.42	493.65	57	49	30
1025	-1.80	331	0.01	0.42	494.37	57	49	30
1027	-1.80	326	0.01	0.42	495.10	58	49	30
1029	-1.80	333	0.01	0.23	495.80	58	49	30

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Baton Rouge, Louisiana 70808

1031	-1.80	342	0.01	0.42	496.36	56	49	30
1033	-1.80	328	0.01	0.42	497.07	58	50	30
1035	-1.80	341	0.01	0.42	497.75	58	50	30
1037	-1.80	293	0.01	0.23	498.48	58	50	30
		FINAL DRY GAS VOLUME			499.03			

PORT # 4

1045	-1.80	323	0.02	0.64	499.03	55	50	30
1047	-1.80	328	0.02	0.64	499.87	57	50	30
1049	-1.80	336	0.01	0.42	500.74	59	50	30
1051	-1.80	329	0.01	0.42	501.46	59	51	30
1053	-1.80	331	0.01	0.42	502.18	59	51	30
1055	-1.80	336	0.01	0.42	502.90	60	51	30
1057	-1.80	328	0.01	0.42	503.62	60	51	30
1059	-1.80	336	0.01	0.42	504.35	60	51	30
1101	-1.80	342	0.01	0.22	505.06	58	52	30
1103	-1.80	341	0.01	0.42	505.60	59	52	30
1105	-1.80	318	0.01	0.42	506.31	61	52	30
1107	-1.80	288	0.01	0.23	507.04	61	52	30
		FINAL DRY GAS VOLUME			507.59			

AVG ORIFICE DROP (IN H2O) : 0.4383
TEMP OF METER (DEGREES R) : 510.7
AVG. STATIC STK PRESS (IN H2O) :-1.8
AVG STACK PRESSURE (IN HG.) : 29.867
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES R) : 787.3
AVG VELOCITY HEAD (IN H2O) : 9.90000E-03
AVG VELOCITY (FPS) : 6.87
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR): 4199883

CONC. OF FILT. PART. IN STK (GR/DSCF) : 0.02
CONC. OF FILT. PART. IN STK (#/DSCF) : 2.86054E-06
#/HR OF FILT. PART (DRY BASIS) : 12.0139

ISOKINETIC VARIATION (%) : 103.45

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Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70808

EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :1
UNIT DESCRIPTION :#3 COKE BATTERY

PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 6, 1980
TEMPERATURE OF STACK(F)	787.3
VELOCITY OF STACK GAS(FPS)	6.87
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFH)	4199883
STATIC PRESSURE(INCHES OF H2O	-1.8
MOISTURE CONTENT(% VOLUME)	15.1
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	29.08
ISOKINETIC RATIO(%)	103.45
FILTERABLE PARICULATE EMISSION RATE(#/HOUR)	12.0139
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	0.02

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Environmental Services Division
16550 Highland Road
Baton Rouge, Louisiana 70808

STACK SAMPLING DATA REDUCTION
FOR REFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE BATTERY

OPERATORS	: LANIER - JOSHI
DATE OF THIS SAMPLE	: FEBRUARY 6, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 2
FILE NAME	: USTE34
AMBIENT TEMPERATURE (DEG F)	: 20
BAROMETRIC PRESS. (IN. HG.)	: 30

GAS ANALYSIS AT SAMPLING POINT
(DRY BASIS)

% CARBON DIOXIDE	: 4.5
% CARBON MONOXIDE	: 0.3
% OXYGEN	: 7
% NITROGEN	: 88.2
MOLECULAR WEIGHT (DRY)	: 29
% MOISTURE THIS RUN	: 13.1
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 104
WT INCREASE OF SILICA GEL(G)	: 6.2
VOLUME OF GAS SAMPLE (DSCF)	: 34.64

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 0.030404
PROBE RESIDUE(GM)	: 0.018522
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK RESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 0.018522
FILTER CATCH	: 0.030404

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.529
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

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Baton Rouge, Louisiana 70815

CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	OPIFICE PRES DROP (IN H20)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	OUTLET (F)	IMP (F)
				PORT # 1				
1145	-1.80	324	0.02	0.64	510.65	61	59	30
1147	-1.80	327	0.02	0.64	511.45	65	58	30
1149	-1.80	336	0.01	0.42	512.42	67	59	30
1151	-1.80	331	0.01	0.42	513.16	66	59	30
1153	-1.80	342	0.01	0.42	513.87	66	59	30
1155	-1.80	328	0.01	0.42	514.58	66	59	30
1157	-1.80	330	0.01	0.42	515.30	66	59	30
1159	-1.80	336	0.01	0.22	516.01	66	59	30
1201	-1.80	337	0.01	0.42	516.59	64	58	30
1203	-1.80	341	0.01	0.42	517.29	66	58	30
1205	-1.80	318	0.01	0.42	518.00	66	58	30
1207	-1.80	288	0.01	0.23	518.72	66	58	30
		FINAL DRY GAS VOLUME			519.26			
				PORT # 2				
1210	-1.80	328	0.02	0.64	519.26	65	58	30
1212	-1.80	327	0.02	0.64	520.16	67	58	30
1214	-1.80	331	0.01	0.42	521.04	68	59	30
1216	-1.80	334	0.01	0.42	521.87	67	60	30
1218	-1.80	330	0.01	0.42	522.48	66	59	30
1220	-1.80	336	0.01	0.42	523.22	65	58	30
1222	-1.80	341	0.01	0.42	523.92	65	58	30
1224	-1.80	342	0.01	0.42	524.64	65	58	30
1226	-1.80	336	0.01	0.22	525.36	64	57	30
1228	-1.80	324	0.01	0.42	525.92	62	57	30
1230	-1.80	320	0.01	0.42	526.62	65	57	30
1232	-1.80	306	0.01	0.23	527.36	65	57	30
		FINAL DRY GAS VOLUME			527.89			
				PORT # 3				
1240	-1.80	342	0.02	0.64	527.89	58	56	30
1242	-1.80	338	0.02	0.64	528.74	64	56	30
1244	-1.80	327	0.01	0.42	529.61	65	57	30
1246	-1.80	321	0.01	0.42	530.35	64	57	30
1248	-1.80	326	0.01	0.42	531.05	64	57	30
1250	-1.80	327	0.01	0.42	531.77	64	57	30
1252	-1.80	333	0.01	0.42	532.48	64	55	30
1254	-1.80	341	0.01	0.42	533.20	64	55	30

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1256	-1.80	338	0.01	0.22	533.93	64	55	30
1258	-1.80	332	0.01	0.42	534.46	61		
1300	-1.80	329	0.01	0.42	535.17	64	56	30
1302	-1.80	297	0.01	0.23	535.90	64	55	30
		FINAL DRY GAS VOLUME			536.45			

PORT # 4

1310	-1.80	327	0.02	0.64	536.45	58	58	30
1312	-1.80	328	0.02	0.64	537.30	66	57	30
1314	-1.80	336	0.01	0.42	538.17	68	58	30
1316	-1.80	346	0.01	0.42	538.92	67	59	30
1318	-1.80	341	0.01	0.42	539.66	68	59	30
1320	-1.80	338	0.01	0.42	540.35	68	59	30
1322	-1.80	346	0.01	0.42	541.11	68	60	30
1324	-1.80	329	0.01	0.22	541.79	68	60	30
1326	-1.80	332	0.01	0.42	542.35	65	60	30
1328	-1.80	336	0.01	0.42	543.06	68	60	30
1330	-1.80	331	0.01	0.42	543.78	68	59	30
1332	-1.80	306	0.01	0.23	544.53	69	60	30
		FINAL DRY GAS VOLUME			545.07			

AVG ORIFICE DROP (IN H2O) : 0.4241
TEMP OF METER (DEGREES R) : 521.5
AVG. STATIC STK PRESS (IN H2O) :-1.8
AVG STACK PRESSURE (IN HG.) : 29.867
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES R) : 790
AVG VELOCITY HEAD (IN H2O) : 9.70000E-03
AVG VELOCITY (FPS) : 6.78
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR): 4232092

CONC. OF FILT. PART. IN STK (GR/DSCF) : 0.0217
CONC. OF FILT. PART. IN STK (#/DSCF) : 3.11413E-06
#/HR OF FILT. PART (DRY BASIS) : 13.1792

ISOKINETIC VARIATION (%) : 100.14

Borg Warner Corporation

Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70805

EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :2
UNIT DESCRIPTION :#3 COKE BATTERY

PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 6, 1980
TEMPERATURE OF STACK(R)	790
VELOCITY OF STACK GAS(FPS)	6.78
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFH)	4232092
STATIC PRESSURE(INCHES OF H2O	-1.8
MOISTURE CONTENT(% VOLUME)	13.1
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	29
ISOKINETIC RATIO(%)	100.14
FILTERABLE PARICULATE EMISSION RATE(#/HOUR)	13.1792
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	0.0217

Borg-Warner Corporation

Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70805

STACK SAMPLING DATA REDUCTION
FOR REFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE BATTERY

OPERATORS	: LANIER - JOSHI
DATE OF THIS SAMPLE	: FEBRUARY 6, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 3
FILE NAME	: USTE35
AMBIENT TEMPERATURE (DEG F)	: 20
BAROMETRIC PRESS. (IN. HG.)	: 30

GAS ANALYSIS AT SAMPLING POINT
(DRY BASIS)

% CARBON DIOXIDE	: 4.5
% CARBON MONOXIDE	: 0.2
% OXYGEN	: 7
% NITROGEN	: 88.3
MOLECULAR WEIGHT (DRY)	: 29
% MOISTURE THIS RUN	: 15.44
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 128
WT INCREASE OF SILICA GEL(G)	: 6.2
VOLUME OF GAS SAMPLE (DSCF)	: 34.7

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 0.01899
PROBE RESIDUE(GM)	: 9.79100E-03
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK RESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 9.79100E-03
FILTER CATCH	: 0.01899

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.529
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

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CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	ORIFICE PRES DROP (IN H2O)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	TEMP OUTLET (F)	TEMP IMP (F)
				PORT # 1				
1440	-1.80	327	0.02	0.64	548.58	62	61	30
1442	-1.80	328	0.01	0.42	549.49	63	60	30
1444	-1.80	331	0.01	0.42	550.38	64	60	30
1446	-1.80	341	0.01	0.42	551.10	64	60	30
1448	-1.80	338	0.01	0.42	551.82	64	60	30
1450	-1.80	327	0.01	0.42	552.54	64	59	30
1452	-1.80	329	0.01	0.42	553.25	64	59	30
1454	-1.80	336	0.01	0.22	553.98	65	58	30
1456	-1.80	334	0.01	0.42	554.49	62	58	30
1458	-1.80	342	0.01	0.42	555.19	64	58	30
1500	-1.80	351	0.01	0.42	555.93	64	58	30
1502	-1.80	292	0.01	0.23	556.64	65	58	30
		FINAL DRY GAS VOLUME			557.17			
				PORT # 2				
1505	-1.80	336	0.02	0.64	557.17	61	57	30
1507	-1.80	351	0.01	0.42	558.03	64	57	30
1509	-1.80	342	0.02	0.64	558.78	64	57	30
1511	-1.80	334	0.01	0.42	559.62	64	57	30
1513	-1.80	336	0.01	0.42	560.35	64	57	30
1515	-1.80	329	0.01	0.42	561.06	64	57	30
1517	-1.80	327	0.01	0.42	561.78	64	57	30
1519	-1.80	338	0.01	0.42	562.58	64	57	30
1521	-1.80	341	0.01	0.42	563.20	64	57	20
1523	-1.80	331	0.01	0.22	563.93	64	57	30
1525	-1.80	327	0.01	0.42	564.50	63	56	30
1527	-1.80	281	0.01	0.23	565.20	63	56	30
		FINAL DRY GAS VOLUME			565.82			
				PORT # 3				
1534	-1.80	329	0.02	0.64	565.82	60	56	30
1536	-1.80	332	0.02	0.64	566.68	60	56	30
1538	-1.80	338	0.01	0.42	567.57	65	56	30
1540	-1.80	341	0.01	0.42	568.30	63	56	30
1542	-1.80	333	0.01	0.42	569.00	64	56	30
1544	-1.80	327	0.01	0.42	569.73	64	56	30
1546	-1.80	326	0.01	0.42	570.47	64	56	30
1548	-1.80	321	0.01	0.42	571.17	64	56	30

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1550	-1.80	327	0.01	0.22	571.90	63	56	30
1552	-1.80	338	0.01	0.42	572.43	62	56	30
1554	-1.80	328	0.01	0.42	573.16	63	56	30
1556	-1.80	284	0.01	0.23	573.87	63	56	30
		FINAL DRY GAS VOLUME			574.42			

PORT # 4

1601	-1.80	326	0.02	0.64	574.42	58	54	30
1603	-1.80	332	0.02	0.64	575.24	61	54	30
1605	-1.80	328	0.01	0.42	576.10	60	54	30
1607	-1.80	335	0.01	0.42	576.80	60	54	30
1609	-1.80	329	0.01	0.42	577.51	60	54	30
1611	-1.80	341	0.01	0.42	578.22	60	53	30
1613	-1.80	341	0.01	0.42	578.95	60	53	30
1615	-1.80	329	0.01	0.42	579.88	60	53	30
1617	-1.80	327	0.01	0.42	580.40	60	53	30
1619	-1.80	323	0.01	0.42	581.12	60	52	30
1621	-1.80	321	0.01	0.22	581.85	57	52	30
1623	-1.80	284	0.01	0.23	582.36	56	52	30
		FINAL DRY GAS VOLUME			582.91			

AVG ORIFICE DROP (IN H2O) : 0.4195
TEMP OF METER (DEGREES R) : 519.3
AVG. STATIC STK PRESS (IN H2O) :-1.8
AVG STACK PRESSURE (IN HG.) : 29.867
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES R) : 788.9
AVG VELOCITY HEAD (IN H2O) : 9.60000E-03
AVG VELOCITY (FPS) : 6.78
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR): 4120567

CONC. OF FILT. PART. IN STK (GR/DSCF) : 0.0127
CONC. OF FILT. PART. IN STK (#/DSCF) : 1.82872E-06
#/HR OF FILT. PART (DRY BASIS) : 7.5353

ISOKINETIC VARIATION (%) : 103.03

Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70808

EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :3
UNIT DESCRIPTION :#3 COKE BATTERY

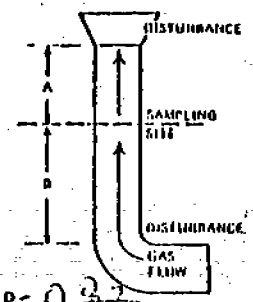
PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 6, 1980
TEMPERATURE OF STACK(P)	788.9
VELOCITY OF STACK GAS(FPS)	6.78
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFH)	4120567
STATIC PRESSURE(INCHES OF H2O	-1.8
MOISTURE CONTENT(% VOLUME)	15.44
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	29
ISOKINETIC RATIO(%)	103.03
FILTERABLE PARICULATE EMISSION RATE(#/HOUR)	7.5353
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	0.0127

PARTICULATE FIELD DATA

SCHEMATIC OF STACK

Site 33 (4,12)



CROSS SECTION

Cp = 0.84

γ = 0.991 or 1.000 and .996

PLANT: U.S. Steel

DATE: 2/6/80

LOCATION: Gary Ind.

OPERATOR: Lawler + Josh

STACK NO.: #3 Coke

RUN NO.: 1-Part (Coke Oven Gas)

SAMPLE BOX NO.: 7

METER BOX NO.: 479

AMBIENT TEMPERATURE: 20°F

BAROMETRIC PRESSURE: 30.00

ASSUMED MOISTURE, %: 15%

PROBE LENGTH, in.: 16

NOZZLE DIAMETER, in.: .529

STACK DIAMETER, in.:

PROBE HEATER SETTING:

HEATER BOX SETTING:

METER $\Delta H_@$: 1.956

C FACTOR: 42 at 320°F

PROCESS WEIGHT RATE:

WEIGHT OF PARTICULATE COLLECTED, m

SAMPLE	FILTER	PROBE W
FINAL WEIGHT		
TARE WEIGHT	[illegible]	
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOC fps
1	[illegible]	145	321	.015	.1224	.64		473.045	41	39	242	30	4	
2	947		321	.01	.1	.42		473.73	43	39	246	30	4	
3	49		323	.01	.1	.42		474.66	44	39	248	30	4	
4	51		324	.005	.07	.21		475.37	46	39	242	30	4	
5	53		328	.005	.07	.21		475.92	45	40	258	30	4	
6	55		332	.005	.07	.21		476.43	46	40	273	30	4	
7	57		335	.01	.1	.42		477.14	48	41	268	30	4	
8	59		338	.01	.1	.42		477.66	50	41	271	30	4	
9	1001		338	.015	.1224	.64		478.35	51	42	276	30	4	
10	03		33[illegible]	.015	.1224	.64		479.17	53	43	271	30	4	
11	05		337	.015	.1224	.64		480.04	54	43	256	30	4	
12	07		277	.005	.07	.23		480.94	50	44	241	30	4	
								481.485						
TOTAL														
AVERAGE			3325		1.1665				575	440				

	VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
CO	FINAL	817.5	731.1		9[illegible].6	654.9
	INITIAL	[illegible]	[illegible]		[illegible]	[illegible]

1.172

Subtracted

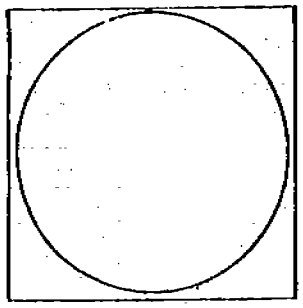
ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1		4.5	7.0	3.2	
2		4.5	5.5	[illegible]	

COMMENTS: 0167

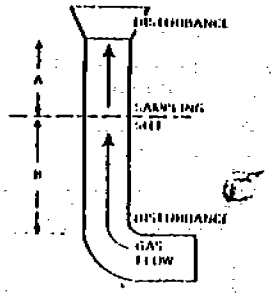
PARTICULATE FIELD DATA

2 of 4

SCHEMATIC OF STACK



CROSS SECTION



PLANT U.S. Steel

DATE 2/6/80

LOCATION Gary, Ind.

OPERATOR LAMBR + OTHERS

STACK NO. #3 Coke

RUN NO. 1 - Part (Coke Oven Gas)

SAMPLE BOX NO.

METER BOX NO.

AMBIENT TEMPERATURE 20°F

BAROMETRIC PRESSURE

ASSUMED MOISTURE, %

PROBE LENGTH, in.

NOZZLE DIAMETER, in.

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER $\Delta H_@$ 1.956

C FACTOR 42 at 320°

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
	TOTAL	

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in_{H_2O})	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	~~[illegible]~~		324	.015	.122	.64		481.475	50	45	248	30	4	
2	845		326	.015	.122	.64		482.38	54	45	247	30	4	
3	47		328	.015	.122	.64		483.24	55	46	248	30	4	
4	49		324	.015	.122	.64		484.10	56	46	247	30	4	
5	50		330	.010	.1	.42		484.78	56	47	249	30	4	
6	51		335	.01	.1	.42		485.67	56	47	246	30	4	
7	53		331	.010	.1	.42		486.39	56	47	243	30	4	
8	55		329	.010	.1	.42		487.11	56	47	248	30	4	
9	57		331	.01	.1	.42		487.83	56	47	252	30	4	
10	59		338	.005	.07	.22		488.53	56	47	261	30	4	
11	901		332	.01	.1	.42		489.03	56	47	241	30	4	
12	03		297	.005	.070	.23		489.77	56	47	253	30	4	
								490.21						
TOTAL														
AVERAGE			3925		~~5.76~~ 1.228	5.53			663	558				

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

1.23/3

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

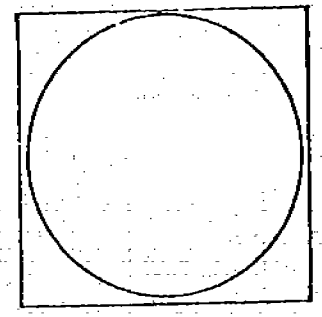
COMMENTS:

511170

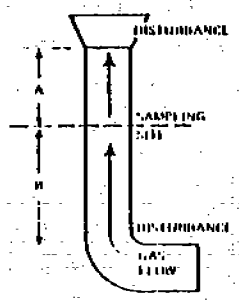
3614

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT U.S. Steel

DATE 2/6/80

LOCATION

OPERATOR

STACK NO. #3 Coke

RUN NO. 1-Part Coke Oven Gas

SAMPLE BOX NO.

METER BOX NO.

AMBIENT TEMPERATURE

BAROMETRIC PRESSURE

ASSUMED MOISTURE, %

PROBE LENGTH, in.

NOZZLE DIAMETER, in.

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER $\Delta H_@$

C FACTOR

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
	TOTAL	

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	10:15		326	.015	.122	.64		490.37	52	48	247	30	4	
2	17		327	.015	.122	.64		491.19	56	48	241	30	4	
3	19		331	.015	.122	.64		492.06	57	48	238	30	4	
4	21		328	.01	.1	.42		492.92	57	49	252	30	4	
5	23		323	.01	.1	.42		493.65	57	49	265	30	4	
6	25		331	.01	.1	.42		494.37	57	49	266	30	4	
7	27		326	.01	.1	.42		495.10	58	49	238	30	4	
8	29		333	.005	.07	.23		495.80	58	49	241	30	4	
9	31		342	.01	.1	.42		496.36	56	49	249	30	4	
10	33		328	.01	.1	.42		497.07	58	50	258	30	4	
11	35		341	.01	.1	.42		497.75	58	50	243	30	4	
12	37		293[illegible]	.005	.07	.23		498.48	58	50	2[illegible]	30	4	
								499.025						
TOTAL														
AVERAGE			3929		1.206	5.32			682	588				

1.2088

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

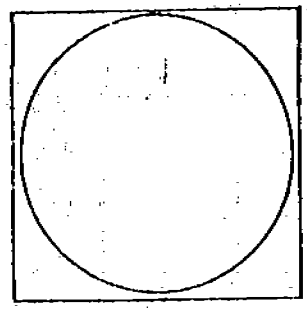
ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

COMMENTS:

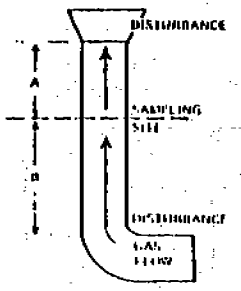
511179A

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT U.S. Steel
DATE 2/6/80
LOCATION Gary, Ind.
OPERATOR LANIER
STACK NO. #3 Coke
RUN NO. 1 - Part/Coke Oven Gas
SAMPLE BOX NO.
METER BOX NO. 479N

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
PROBE LENGTH, in.
NOZZLE DIAMETER, in.
STACK DIAMETER, in.
PROBE HEATER SETTING
HEATER BOX SETTING

METER ΔH@
C FACTOR
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg

SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1		10:45	323	.015	.1224	.64		499.025	55	50	248	30	4	
2	47		328	.015	.1224	.64		499.87	57	50	250	30	4	
3	49		336	.010	.1	.67		500.74	59	50	252	30	4	
4	51		329	.01	.1	.42		501.46	59	51	256	30	4	
5	53		331	.01	.1	.42		502.18	59	51	258	30	4	
6	55		336	.01	.1	.47		502.90	60	51	262	30	4	
	1		328	.01	.1	.42		503.62	60	51	241	30	4	
	57		336	.01	.1	.42		504.35	60	51	238	30	4	
7	11 01		347	.005	.07	.22		505.06	58	52	256	30	4	
10	03		341	.01	.1	.42		505.60	59	52	258	30	4	
11	05		318	.01	.1	.42		506.34	61	52	262	30	4	
12	07		288	.005	.07	.22		507.04	61	52	241	30	4	
								507.59						
TOTAL														
AVERAGE			3936		1.18	5.09		34.545	789	613				

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

ORSAT MEASUREMENTS

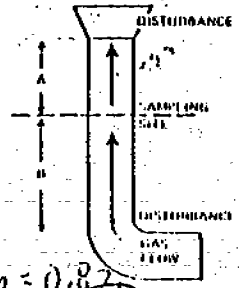
LINE	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

COMMENTS:

PARTICULATE FIELD DATA

SCHEMATIC OF STACK

Ute 34 (4,12)



CROSS SECTION

C_p = 0.82

8-0.99/0 1.000 or .996

PLANT	U.S. Steel	AMBIENT TEMPERATURE	20°F
DATE	2/6/80	BAROMETRIC PRESSURE	30.00
LOCATION	Gary, Ind	ASSUMED MOISTURE, %	15%
OPERATOR	Lanieroslaski	PROBE LENGTH, in.	14
STACK NO.	#3 Coke	NOZZLE DIAMETER, in.	.529
RUN NO.	2-Part (Coke Oven Gas)	STACK DIAMETER, in.	
SAMPLE BOX NO.	8	PROBE HEATER SETTING	
METER BOX NO.	479	HEATER BOX SETTING	

METER $\Delta H_@$ 1.956

C FACTOR 42.0/320°F

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT	0.6577	
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s) ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	11:45	-1.8	324	.015	.64		510.65	61	57	246	30	4	
2	47		327	.015	.62		511.45	65	58	238	30	4	
3	49		336	.01	.42		512.42	67	59	232	30	4	
4	51		331	.01	.42		513.16	66	59	228	30	4	
5	53		342	.01	.42		513.87	66	57	248	30	4	
6	55		328	.01	.42		514.58	66	59	252	30	4	
7	57		330	.01	.42		515.30	66	59	264	30	4	
8	59		336	.005	.22		516.01	66	59	277	30	4	
9	12:01		337	.01	.42		516.59	64	58	278	30	4	
10	03		341	.01	.42		517.29	66	58	267	30	4	
11	05		318	.01	.42		518.00	66	58	267	30	4	
12	07		288	.005	.23		518.72	66	58	270	30	4	
							519.26						
TOTAL				1.1863	5.09								
AVERAGE			3938					851	703				

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	714.6	705.15		422.5	662.8
INITIAL	616.4	575.4		411.8	656.6
LIQUID COLLECTED	98.2	129.7		1.7	6.2

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1		6.5	7.0	0.2	
2		5.9	7.0	0.2	
3		6.3	7.0	0.3	

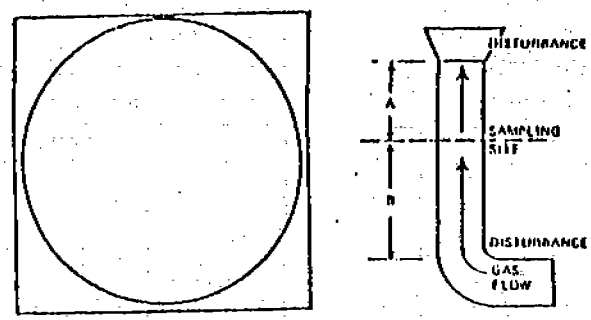
COMMENTS: 18.2 g 21 0168 1/104.7 10 2/2

67

PARTICULATE FIELD DATA

2 of 4

SCHEMATIC OF STACK



CROSS SECTION

PLANT U.S. Steel

DATE 7/6/80

LOCATION Gary, Ind.

OPERATOR Lanier & Josh

STACK NO. #3 Coke

RUN NO. 2-Port (Coke Oven Gas)

SAMPLE BOX NO. 8

METER BOX NO.

AMBIENT TEMPERATURE

BAROMETRIC PRESSURE

ASSUMED MOISTURE, %

PROBE LENGTH, in.

NOZZLE DIAMETER, in.

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER $\Delta H_@$

C FACTOR

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED,		
SAMPLE	FILTER	PROBE W
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
	TOTAL	

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELO
1	12:10		328	.015		.64	.64	519.26	65	58	242	30	4	
2	12		327	.015		.64	.64	520.16	67	58	238	30	4	
3	14		331	.01		.42	.42	521.04	68	59	231	30	4	
4	16		334	.01		.41	.42	521.87	67	60	242	30	4	
5	18		330	.01		.42	.42	522.48	66	57	246	30	4	
6	20		336	.01		.42		523.22	65	58	237	30	4	
7	22		341	.01		.41		523.92	65	58	256	30	4	
8	24		342	.01		.42		524.64	65	58	259	30	4	
9	26		336	.005		.22		525.36	64	57	262	30	4	
10	28		324	.01		.42		525.92	62	57	271	30	4	
11	30		320	.01		.41		526.62	65	57	247	30	4	
12	1232		306	.005		.23		527.36	65	57	236	30	4	
								527.85						
TOTAL														
AVERAGE			3955		1.1863	5.09			784	834 696				

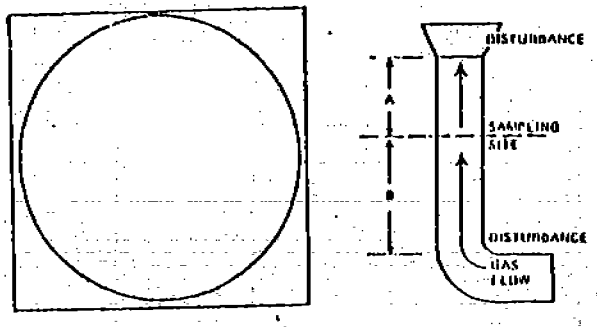
VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					

COMMENTS:

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION

PLANT U.S. Steel
DATE 2/6/80
LOCATION Gary, Ind.
OPERATOR Lanier & Joshi
STACK NO. #3 Coke
RUN NO. 2 - Part
SAMPLE BOX NO. 8
METER BOX NO.

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
PROBE LENGTH, in.
NOZZLE DIAMETER, in.
STACK DIAMETER, in.
PROBE HEATER SETTING
HEATER BOX SETTING

METER $\Delta H_@$
C FACTOR
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, m

SAMPLE	FILTER	PROBE W
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELO (p_s)
1	12:40		342	.015		.64		527.335	58	56	248	30	4	
2	42		338	.015		.64		528.74	64	56	236	30	4	
3	44		327	.01		.42		529.61	65	57	238	30	4	
4	46		321	.01		.42		530.35	64	57	242	30	4	
5	48		326	.01		.42		531.05	64	57	256	30	4	
6	50		327	.01		.42		531.77	64	57	262	30	4	
7	52		333	.01		.42		532.48	64	56 55	278	30	4	
8	54		341	.01		.42		533.20	64	56 55	244	30	4	
9	56		338	.005		.22		533.93	64	55	257	30	4	
10	58		332	.01		.42		534.46	61	56	263	30	4	
11	1200		329	.01		.42		535.17	64	56	261	30	4	
12	02		277	.005		.23		535.90	64	55	252	30	4	
								536.75						
TOTAL														
AVERAGE			3951		1.183	509			760	672				

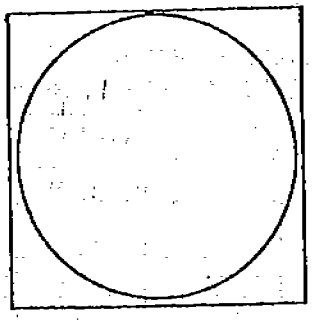
VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					

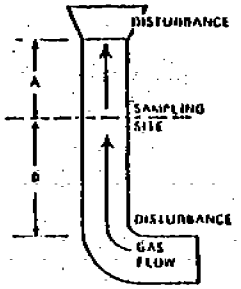
COMMENTS:

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT: U.S. Steel
DATE: 2/6/80
LOCATION: Gary, Ind.
OPERATOR: Lanier & Joshi
STACK NO.: #3 Coke
RUN NO.: 2-Part (Coke Oven Gas)
SAMPLE BOX NO.:
METER BOX NO.:

AMBIENT TEMPERATURE:
BAROMETRIC PRESSURE:
ASSUMED MOISTURE, %:
PROBE LENGTH, in.:
NOZZLE DIAMETER, in.:
STACK DIAMETER, in.:
PROBE HEATER SETTING:
HEATER BOX SETTING:

METER $\Delta H_@$:
C FACTOR:
PROCESS WEIGHT RATE:

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WA
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELOC fps
1	13:10		327	.015		.64		536.45	58	58	242	30	4	
2	12		328	.015		.64		537.30	66	57	236	30	4	
3	14		336	.01		.42		538.17	68	58	248	30	4	
4	16		346	.01		.42		538.92	67	59	256	30	4	
5	18		341	.01		.42		539.66	68	59	252	30	4	
6	20		339	.01		.42		540.35	68	59	264	30	4	
7	22		346	.01		.42		541.11	68	60	273	30	4	
8	24		329	.005		.22		541.79	68	60	271	30	4	
9	26		332	.01		.42		542.35	65	60	261	30	4	
10	28		336	.01		.42		543.06	68	60	256	30	4	
11	30		331	.01		.42		543.78	68	59	242	30	4	
12	32		306	.005		.23		544.53	69	60	238	30	4	
								545.06						
TOTAL														
AVERAGE			3996			509			801	709				

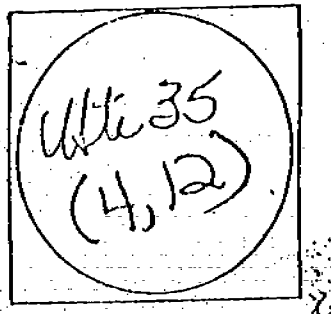
VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					

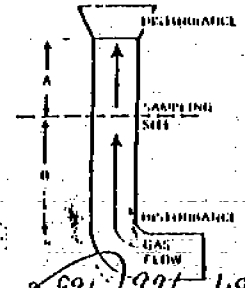
COMMENTS:

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



γ = 0.991, .996, 1.000

C_p = 0.82

PLANT U.S. Steel

DATE ~~4/6/80~~

LOCATION Gary, Ind

OPERATOR Lanier + Jacki

STACK NO. #3 Coke

RUN NO. #3 PART - Coke Oven Gas

SAMPLE BOX NO. 10

METER BOX NO. 479

AMBIENT TEMPERATURE 20°F

BAROMETRIC PRESSURE 30.00

ASSUMED MOISTURE, % 16

PROBE LENGTH, in. 146

NOZZLE DIAMETER, in. .529

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER $\Delta H_@$ 1.956

C FACTOR 47 at 320°F

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WAS
FINAL WEIGHT		
TARE WEIGHT	0.6560	
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	14:40	-1.8	327	.015	.1224	.64		548.58	62	61	30	246	4	
2	1442		328	.01	.1	.42		549.49	63	60	30	241	4	
3	44		331	.01	.1	.42		550.38	64	60	30	238	4	
4	46		341	.01	.1	.42		551.10	64	60	30	237	4	
5	48		338	.01	.1	.42		551.82	64	60	30	242	4	
6	50		327	.01	.1	.42		552.54	64	59	30	256	4	
7	52		327	.01	.1	.42		553.25	64	59	30	258	4	
8	54		336	.005	.0707	.22		553.98	65	58	30	254	4	
9	56		334	.01	.1	.42		554.49	62	58	30	276	4	
10	58		342	.01	.1	.42		555.14	64	58	30	277	4	
11	1500		351	.01	.1	.42		555.73	64	58	30	272	4	
12	02		292 [illegible]	.005	[illegible]	.23		556.64	65	58	30	260	4	
								557.165						
			3476	.115	[illegible]	[illegible]		34 33						
						4157								
TOTAL									1491					
AVERAGE														

SUBTRACTED

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	716.5	681.4		[illegible]	558.7
INITIAL	620.0	651.8		[illegible]	652.6
LIQUID COLLECTED	[illegible]	[illegible]		[illegible]	[illegible]

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1		6.5	7.0	0.2	
2		5.0	6.5	0.2	
3		4.5	7.0	0.2	

COMMENTS: 96.5 29.6 2.4 6.5

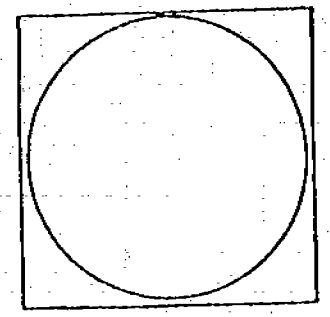
128.5

0169

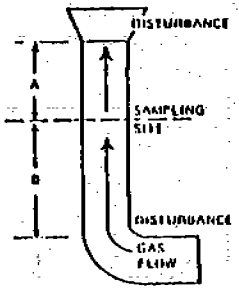
511185

PARTICULATE DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT U.S. Steel

DATE 2/6/80

LOCATION

OPERATOR LAMBD + JOSAI

STACK NO. #3

RUN NO. 3 PART - Coke Oven Gas

SAMPLE BOX NO.

METER BOX NO.

AMBIENT TEMPERATURE

BAROMETRIC PRESSURE

ASSUMED MOISTURE, %

PROBE LENGTH, in.

NOZZLE DIAMETER, in.

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER $\Delta H_@$

C FACTOR

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED,		
SAMPLE	FILTER	PROBE W
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELO
1	3.05		336	.015	.124	.64		557.165	61	57	246	30	4	
2	5.07		351	.01	.1	.42		558.03	64	57	244	30	4	
3	09		342	.015		.64		558.78	64	57	238	30	4	
4	11		334	.01		.42		559.62	64	57	262	30	4	
5	13		336	.01		.42		560.35	64	57	272	30	4	
6	15		329	.01		.42		561.06	64	57	251	30	4	
7	17		320	.01		.42		561.78	64	57	261	30	4	
8	19		338	.01		.42		562.58	64	57	253	30	4	
9	21		341	.01		.42		563.20	64	57	243	30	4	
10	23		321	.005	.069	.22		563.93	64	57	248	30	4	
11	25		327	.01		.42		564.5	63	56	252	30	4	
12	27		281	.005		.23		565.2	63	56	260	30	4	
								565.82						
			3473	.25										
				.12		.09								
TOTAL					.1766									
AVERAGE														

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					

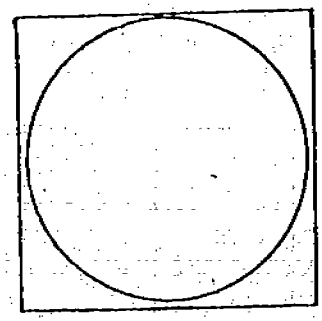
ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					

COMMENTS:

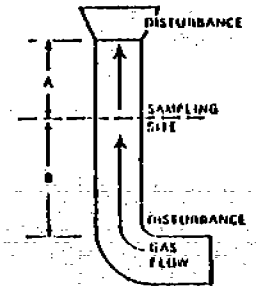
PARTICULATE FIELD DATA

3 of 4

SCHEMATIC OF STACK



CROSS SECTION



PLANT U.S. Steel

DATE 2/26

LOCATION

OPERATOR Lanier + Josh

STACK NO. #3 Coke

RUN NO. #3 PART - Coke Oven Gas

SAMPLE BOX NO.

METER BOX NO.

AMBIENT TEMPERATURE

BAROMETRIC PRESSURE

ASSUMED MOISTURE, %

PROBE LENGTH, in.

NOZZLE DIAMETER, in.

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER $\Delta H_@$

C FACTOR

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE W/
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELOC fps
1	15.34		329	.015		.64		565.82	60	56	246	30	4	
2	1536		332	.015		.64		566.68	60	56	242	30	4	
3	1538		338	.01		.42		567.57	65	56	244	30	4	
4	40		341	.01		.42		568.3	63	56	242	30	4	
5	42		333	.01		.42		569.0	64	56	238	30	4	
6	44		327	.01		.42		569.73	64	56	239	30	4	
7	46		326	.01		.42		570.47	64	56	239	30	4	
8	48		327	.01		.42		571.17	64	56	242	30	4	
9	50		327	.005		.22		571.90	63	56	248	30	4	
10	52		338	.01		.42		572.43	62	56	244	30	4	
11	54		328	.01		.42		573.16	63	56	242	30	4	
12	56		284	.005		.23		573.87	63	56	241	30	4	
			3974	.12	1.1866	5.49		574.415	142					
TOTAL														
AVERAGE														

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					

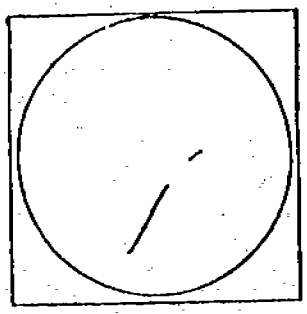
ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					

COMMENTS:

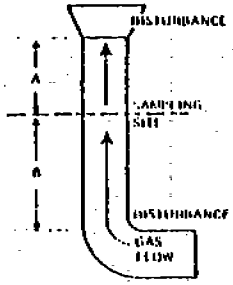
13

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT U.S. Steel

DATE 2/22/80

LOCATION

OPERATOR Joshi + Daniel

STACK NO. #3

RUN NO. #3 PART - Coke Oven Gas

SAMPLE BOX NO.

METER BOX NO.

AMBIENT TEMPERATURE

BAROMETRIC PRESSURE

ASSUMED MOISTURE, %

PROBE LENGTH, in.

NOZZLE DIAMETER, in.

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER $\Delta H_@$

C FACTOR

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	1601		326	.015		.64		574.415	58	54	242	30	4	
2	1603		333	.015		.64		575.29	61	54	240	30		
3	1605		328	.01		.42		576.1	60	54	238	30		
4	07		335	.01		.42		576.8	60	54	244	30		
5	09		329	.01		.42		577.51	60	54	239	30		
6	1611		334	.01		.42		578.22	60	53	238	30		
7	13		341	.01		.42		578.95	60	53	241	30		
8	15		329	.01		.42		579.68	60	53	242	30		
9	17		327	.01		.42		580.4	60	53	240	30		
10	19		323	.01		.42		581.12	60	52	238	30		
11	21		321	.005		.22		581.85	57	52	239	30		
12	23		284	.005		.23		582.36	56	52	240	30	4	
			2910	.12	1.166	5.09		582.510	15	0				
TOTAL								3.33						
AVERAGE														

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

Hemron Environmental Services

Isokinetic Field Calculations

Ts (°R)	798.291	Vm	43.875	δ	0.991	CO_2	19.43
Tm (°R)	511.88	Vw	29.6	Cp	0.82	O_2	7.633
Ps ("Hg)	30.323	Pb	30.44	θ	96	CO	0
Pm ("Hg)	30.4966	$(\Delta P)^{\frac{1}{2}}$	.1314	An	.001401	N_2	72.9367

$Vm_{std} = (17.64)(\delta)(Vm)(Pm)/Tm = (17.64)(\quad)(\quad)(\quad)/(\quad) = 45.695$

$Vw_{std} = (0.04707)(Vw) = (0.04707)(\quad) = 1.393$

$\%H_2O = Vw_{std} / Vm_{std} + Vw_{std} = (\quad) / (\quad) + (\quad) = 2.958$ .02958

$DGF = 1 - \%H_2O = 1 - (\quad) = .9704$

$Mw = [(44)(CO_2)(DGF) + (32)(O_2)(DGF) + (28)(CO)(DGF) + (28)(N_2)(DGF) + (18)(\%H_2O)] =$
$[(44)(19.43)(.9704) + (32)(7.633)(.9704) + (28)(0)(\quad) + (28)(\quad)(\quad) +$
$(18)(\quad)] =$ _____

72.9367 × .9704

.02958

8.296 + 2.370 + 19.81 + .5324 = 31.008

$Vs = (85.49)(Cp)(\Delta P)^{\frac{1}{2}}\left[\frac{Ts}{Mw\ Ps}\right]^{\frac{1}{2}} = (85.49)(.82)(\quad)^{\frac{1}{2}}\left[\frac{(\quad)}{(\quad)(\quad)}\right]^{\frac{1}{2}} =$ 8.4836

.1314 798.291 31.008 × 30.323 .921

$\%I = \frac{(0.0945)(Vm_{std})(Ts)}{(Ps)(Vs)(An)(\theta)(DGF)} = \frac{(0.0945)(\quad)(\quad)}{(\quad)(\quad)(\quad)(\quad)(\quad)} =$ _____

45.695 798.291 30.323 8.4836 .001401 96 .9704

102.6713 ..1.401 / 1000

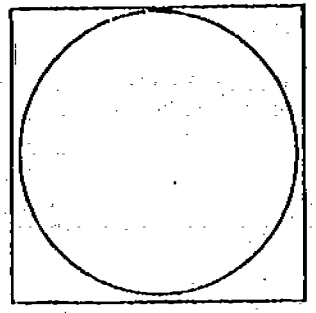
.04225 .505 $\pi/4\left(\frac{.507}{12}\right)^2$ .001785 .001401

47.088

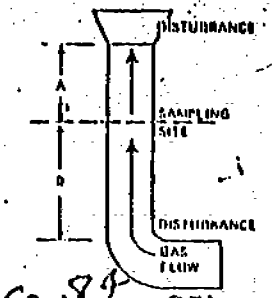
511189

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



Cp .84
DCMCF .991

PLANT U S STEEL
DATE 1/24/80
LOCATION GARY IND.
OPERATOR BROWNING/MEYER
STACK NO. #3 BATTERY
RUN NO. MOISTURE
SAMPLE BOX NO. —
METER BOX NO. 479N

AMBIENT TEMPERATURE 27°
BAROMETRIC PRESSURE 29.40
ASSUMED MOISTURE, %
PROBE LENGTH, in. 120"
NOZZLE DIAMETER, in.
STACK DIAMETER, in. 234"
PROBE HEATER SETTING —
HEATER BOX SETTING —

METER $\Delta H_@$ 1.956
C FACTOR 44 @ 340°P
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, g

SAMPLE	FILTER	PROBE W
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min. (5.00 5 MIN PTS.)	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELOC fps
1		-1.55"	360	.02	.14	2.0		218.29	47	41	180	33	4	
2			366	.015	.12			221.96	53	42	170	36	4	
3			370	.005	.07			225.58	54	42	185	37	3	
4			334	.01	.1			229.16	56	43		38	4	
5			337	.015	.12			232.84	56	44		36	4	
6			287	.005	.07			236.49	58	44		35	4	
								240.23						
				.012										
		AVG	342.3	.0116	.12			21.94		48°				
			802°						AvgT	508°R				
TOTAL														
AVERAGE			342.3		.103			21.94		48.3				

VOLUME OF LIQUID WATER COLLECTED		IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
	FINAL	[illegible]	[illegible]	[illegible]		657.1
	INITIAL	[illegible]	[illegible]	[illegible]		657.1

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

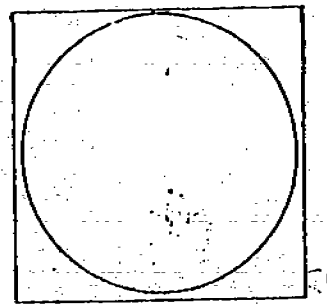
COMMENTS:

511150

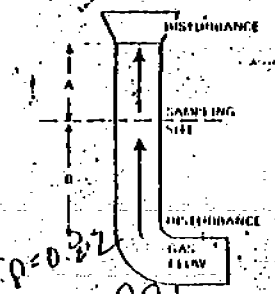
75

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



$\rho = 0.82$

$\gamma = 0.991$

PLANT U.S. Steel

DATE 2/5/80

LOCATION

OPERATOR [illegible]

STACK NO. #3 Boke Coke Wa Gas

RUN NO. Temp. Vel.

SAMPLE BOX NO.

METER BOX NO. 479

AMBIENT TEMPERATURE 20°F

BAROMETRIC PRESSURE 29.56

ASSUMED MOISTURE, %

PROBE LENGTH, in.

NOZZLE DIAMETER, in.

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER $\Delta H_@$ 1.956

C FACTOR

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WAS
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELOCIT fps
1			343	.01		2.0		439.495	43	43			6	
2			342	.010		2.0		443.15	53	43			6	
3			344	.005		2.0		446.38	58	46			6	
4			343	.01		2.0		450.56	62	48			6	
5			343	.005		2.0		454.25	64	51			6	
6			342	.005		2.0		457.95	66	53			6	
7			342	.010				461.68						
8			330	.010					52.5					
9			322	.015				22.185						
10			300	.015										
11			283	.010										
12			198	.005										
			320.25			2.00	340	70						
TOTAL														
AVERAGE														

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	696.0	705.5		444.8	664.5
INITIAL	664.2	670.3		432.4	653.2
[illegible] COLLECTED	31.8	[illegible]		12.4	11.3

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

511191

Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70808

STACK SAMPLING DATA REDUCTION
FOR REFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE - BLAST FURNACE GAS

OPERATORS	: LANIER - JOSHI
DATE OF THIS SAMPLE	: FEBRUARY 01, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 1
FILE NAME	: USTE36
AMBIENT TEMPERATURE (DEG F)	: 20
BAROMETRIC PRESS. (IN. HG.)	: 30.5

GAS ANALYSIS AT SAMPLING POINT
(DRY BASIS)

% CARBON DIOXIDE	: 13.3
% CARBON MONOXIDE	: 0
% OXYGEN	: 5.7
% NITROGEN	: 81
MOLECULAR WEIGHT (DRY)	: 30.35
% MOISTURE THIS RUN	: 2.5
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 18
WT INCREASE OF SILICA GEL(G)	: 6.2
VOLUME OF GAS SAMPLE (DSCF)	: 46.04

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 0.0138
PROBE RESIDUE(GM)	: 0.0214
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK RESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 0.0214
FILTER CATCH	: 0.0138

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.507
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

511192

Environmental Services Division
16550 Highland Road
Baton Rouge, Louisiana 70508

CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	ORIFICE PRES DROP (IN H2O)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	TEMP OUTLET (F)	TEMP IMP (F)
				PORT # 1				
1518	-1.70	339	0.02	0.87	245.44	42	38	20
1520	-1.70	340	0.02	0.87	246.40	44	38	22
1522	-1.70	342	0.02	0.87	247.35	46	38	22
1524	-1.70	336	0.02	0.66	248.30	46	39	21
1526	-1.70	348	0.02	0.66	249.15	47	39	25
1528	-1.70	353	0.02	0.66	249.99	48	39	26
1530	-1.70	358	0.02	0.87	250.84	49	39	27
1532	-1.70	361	0.02	0.87	251.80	50	39	29
1534	-1.70	365	0.02	0.66	252.75	49	40	29
1536	-1.70	364	0.02	0.66	253.61	49	40	27
1538	-1.70	362	0.02	0.66	254.45	50	40	25
1540	-1.70	203	0.01	0.53	255.28	50	40	25
		FINAL DRY GAS VOLUME			256.08			
				PORT # 2				
1550	-1.70	339	0.02	0.87	256.08	45	40	30
1552	-1.70	334	0.02	0.87	257.03	49	41	31
1554	-1.70	338	0.02	0.87	257.98	51	41	31
1556	-1.70	340	0.02	0.87	258.94	52	41	30
1558	-1.70	340	0.02	0.87	260.00	52	42	29
1600	-1.70	341	0.02	0.87	260.80	52	41	28
1602	-1.70	343	0.02	0.66	261.70	51	42	27
1604	-1.70	341	0.02	0.66	262.60	51	41	27
1606	-1.70	349	0.02	0.66	263.50	51	41	25
1608	-1.70	354	0.02	0.87	264.30	52	41	25
1610	-1.70	337	0.02	0.87	265.30	53	41	25
1612	-1.70	208	0.02	0.80	266.20	53	41	25
		FINAL DRY GAS VOLUME			267.17			
				PORT # 3				
1628	-1.70	340	0.02	0.87	267.18	44	42	21
1630	-1.70	338	0.02	0.87	268.10	50	43	26
1632	-1.70	335	0.02	0.87	269.10	51	43	28
1634	-1.70	335	0.02	0.87	270.10	52	43	30
1636	-1.70	335	0.02	0.87	271.00	52	43	31
1638	-1.70	336	0.02	0.66	271.90	51	42	31
1640	-1.70	337	0.02	0.66	272.80	51	42	31
1642	-1.70	337	0.02	0.66	273.60	51	42	33

Environmental Services Division
16550 Highland Road
Baton Rouge, Louisiana 70808

1644	-1.70	233	0.02	0.87	274.50	51	41	34
1646	-1.70	236	0.02	0.87	275.36	52	41	31
1648	-1.70	231	0.02	0.66	276.30	51	41	31
1650	-1.70	200	0.02	0.66	277.20	51	41	31

FINAL DRY GAS VOLUME 278.10

PORT # 4

1700	-1.70	368	0.02	0.87	278.10	44	40	36
1702	-1.70	374	0.02	0.87	279.03	49	41	36
1702	-1.70	377	0.02	0.87	279.03	49	41	36
1704	-1.70	377	0.02	0.66	280.00	49	41	37
1708	-1.70	331	0.02	0.66	281.60	50	41	37
1710	-1.70	331	0.02	0.87	282.50	51	41	37
1712	-1.70	332	0.02	0.87	283.46	52	41	37
1714	-1.70	332	0.02	0.66	284.40	50	41	37
1716	-1.70	333	0.02	0.66	285.30	50	41	37
1718	-1.70	314	0.02	0.87	286.20	51	41	36
1720	-1.70	311	0.02	0.87	287.20	51	40	36
1722	-1.70	314	0.02	0.80	288.10	51	40	37

FINAL DRY GAS VOLUME 288.99

AVG ORIFICE DROP (IN H2O) : 0.7812
TEMP OF METER (DEGREES F) : 505.2
AVG. STATIC STK PRESS (IN H2O) :-1.7
AVG STACK PRESSURE (IN HG.) : 30.375
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES F) : 793.7
AVG VELOCITY HEAD (IN H2O) : 0.0175
AVG VELOCITY (FPS) : 8.67
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR) : 6139278

CONC. OF FILT. PART. IN STK (GR/DSCF) : 0.0117
CONC. OF FILT. PART. IN STK (#/DSCF) : 1.68579E-06
#/HR OF FILT. PART (DRY BASIS) : 10.3495

ISOKINETIC VARIATION (%) : 99.88

Borg-Warner Corporation

Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70805

EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :1
UNIT DESCRIPTION :#3 COKE - BLAST FURNACE GAS

PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 01, 1980
TEMPERATURE OF STACK(F)	793.7
VELOCITY OF STACK GAS(FPS)	8.67
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFH)	6139278
STATIC PRESSURE(INCHES OF H2O	-1.7
MOISTURE CONTENT(% VOLUME)	2.5
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	30.35
ISOKINETIC RATIO(%)	99.88
FILTERABLE PARICULATE EMISSION RATE(#/HOUR)	10.3495
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	0.0117

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Environmental Services Division
16550 Highland Road
Baton Rouge, Louisiana 70808

STACK SAMPLING DATA REDUCTION
FOR REFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE - BLAST FURNACE GAS

OPERATORS	: LANIER - JOSHI
DATE OF THIS SAMPLE	: FEBRUARY 01, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 1
FILE NAME	: USTE36
AMBIENT TEMPERATURE (DEG F)	: 20
BAROMETRIC PRESS. (IN. HG.)	: 30.5

GAS ANALYSIS AT SAMPLING POINT
(DRY BASIS)

% CARBON DIOXIDE	: 13.3
% CARBON MONOXIDE	: 0
% OXYGEN	: 5.7
% NITROGEN	: 81
MOLECULAR WEIGHT (DRY)	: 30.35
% MOISTURE THIS RUN	: 2.5
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 18
WT INCREASE OF SILICA GEL(G)	: 6.2
VOLUME OF GAS SAMPLE (DSCF)	: 46.04

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 2.28900E-03
PROBE RESIDUE(GM)	: 1.52800E-03
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK RESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 1.52800E-03
FILTER CATCH	: 2.28900E-03

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.507
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

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CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	ORIFICE PRES DROP (IN H2O)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	TEMP OUTLET (F)	TEMP IMP (F)
				PORT # 1				
1518	-1.70	339	0.02	0.87	245.44	42	38	20
1520	-1.70	340	0.02	0.87	246.40	44	38	22
1522	-1.70	342	0.02	0.87	247.35	46	38	22
1524	-1.70	336	0.02	0.66	248.30	46	39	21
1526	-1.70	348	0.02	0.66	249.15	47	39	25
1528	-1.70	353	0.02	0.66	249.99	48	39	26
1530	-1.70	358	0.02	0.87	250.84	49	39	27
1532	-1.70	361	0.02	0.87	251.80	50	39	29
1534	-1.70	365	0.02	0.66	252.75	49	40	29
1536	-1.70	364	0.02	0.66	253.61	49	40	27
1538	-1.70	362	0.02	0.66	254.45	50	40	25
1540	-1.70	203	0.01	0.53	255.28	50	40	25
		FINAL DRY GAS VOLUME			256.08			
				PORT # 2				
1550	-1.70	339	0.02	0.87	256.08	45	40	30
1552	-1.70	334	0.02	0.87	257.03	49	41	31
1554	-1.70	338	0.02	0.87	257.98	51	41	31
1556	-1.70	340	0.02	0.87	258.94	52	41	30
1558	-1.70	340	0.02	0.87	260.00	52	42	29
1600	-1.70	341	0.02	0.87	260.80	52	41	28
1602	-1.70	343	0.02	0.66	261.70	51	42	27
1604	-1.70	341	0.02	0.66	262.60	51	41	27
1606	-1.70	349	0.02	0.66	263.50	51	41	25
1608	-1.70	354	0.02	0.87	264.30	52	41	25
1610	-1.70	337	0.02	0.87	265.30	53	41	25
1612	-1.70	208	0.02	0.80	266.20	53	41	25
		FINAL DRY GAS VOLUME			267.17			
				PORT # 3				
1628	-1.70	340	0.02	0.87	267.18	44	42	21
1630	-1.70	338	0.02	0.87	268.10	50	43	26
1632	-1.70	335	0.02	0.87	269.10	51	43	28
1634	-1.70	335	0.02	0.87	270.10	52	43	30
1636	-1.70	335	0.02	0.87	271.00	52	43	31
1638	-1.70	336	0.02	0.66	271.90	51	42	31
1640	-1.70	337	0.02	0.66	272.80	51	42	31
1642	-1.70	337	0.02	0.66	273.60	51	42	33

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1644	-1.70	333	0.02	0.87	274.50	51	41	34
1646	-1.70	336	0.02	0.87	275.36	52	41	34
1648	-1.70	331	0.02	0.66	276.30	51	41	31
1650	-1.70	200	0.02	0.66	277.20	51	41	31

FINAL DRY GAS VOLUME 278.10

POPT # 4

1700	-1.70	368	0.02	0.87	278.10	44	40	36
1702	-1.70	374	0.02	0.87	279.03	49	41	36
1702	-1.70	377	0.02	0.87	279.03	49	41	36
1704	-1.70	377	0.02	0.66	280.00	49	41	37
1708	-1.70	331	0.02	0.66	281.60	50	41	37
1710	-1.70	331	0.02	0.87	282.50	51	41	37
1712	-1.70	332	0.02	0.87	283.46	52	41	37
1714	-1.70	332	0.02	0.66	284.40	50	41	37
1716	-1.70	333	0.02	0.66	285.30	50	41	37
1718	-1.70	314	0.02	0.87	286.20	51	41	36
1720	-1.70	311	0.02	0.87	287.20	51	40	36
1722	-1.70	314	0.02	0.80	288.10	51	40	37

FINAL DRY GAS VOLUME 288.99

AVG ORIFICE DROP (IN H2O) : 0.7812
TEMP OF METER (DEGREES R) : 505.2
AVG. STATIC STK PRESS (IN H2O) :-1.7
AVG STACK PRESSURE (IN HG.) : 30.375
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES R) : 793.7
AVG VELOCITY HEAD (IN H2O) : 0.0175
AVG VELOCITY (FPS) : 8.67
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR): 6139278

CONC. OF FILT. PART. IN STK (GR/DSCF) : 1.20000E-03
CONC. OF FILT. PART. IN STK (#/DSCF) : 1.82803E-07
#/HR OF FILT. PART (DRY BASIS) : 1.1222

ISOKINETIC VARIATION (%) : 99.88

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Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70808

EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :1
UNIT DESCRIPTION :#3 COKE - BLAST FURNACE GAS

PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 01, 1980
TEMPERATURE OF STACK(F)	793.7
VELOCITY OF STACK GAS(FPS)	8.67
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFH)	6139278
STATIC PRESSURE(INCHES OF H2O	-1.7
MOISTURE CONTENT(% VOLUME)	2.5
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	30.35
ISOKINETIC RATIO(%)	99.88
FILTERABLE PARTICULATE EMISSION RATE(#/HOUR)	1.1222
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	1.20000E-03

Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70808

STACK SAMPLING DATA REDUCTION
FOR REFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE BLAST FURNACE GAS

OPERATORS	: LANIER - JOSHI
DATE OF THIS SAMPLE	: FEBRUARY 02, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 2
FILE NAME	: USTE37
AMBIENT TEMPERATURE (DEG F)	: 7
BAROMETRIC PRESS. (IN. HG.)	: 30.44

GAS ANALYSIS AT SAMPLING POINT
(DRY BASIS)

% CARBON DIOXIDE	: 19.8
% CARBON MONOXIDE	: 0
% OXYGEN	: 7.7
% NITROGEN	: 72.5
MOLECULAR WEIGHT (DRY)	: 31.47
% MOISTURE THIS RUN	: 3.13
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 19
WT INCREASE OF SILICA GEL(G)	: 12.2
VOLUME OF GAS SAMPLE (DSCF)	: 45.34

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 0.0121
PROBE RESIDUE(GM)	: 0.0163
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK RESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 0.0163
FILTER CATCH	: 0.0121

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.507
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

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CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	ORIFICE PRES DROP (IN H2O)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	TEMP OUTLET (F)	TEMP IMP (F)
				PORT # 1				
1045	-1.60	340	0.02	0.87	304.22	42	39	32
1047	-1.60	333	0.02	0.87	305.18	47	38	31
1049	-1.60	336	0.02	0.87	306.15	50	39	30
1051	-1.60	344	0.02	0.66	307.10	50	38	30
1053	-1.60	352	0.02	0.66	307.90	51	39	30
1055	-1.60	357	0.02	0.66	308.78	53	40	30
1057	-1.60	360	0.02	0.87	309.70	53	41	30
1059	-1.60	363	0.02	0.66	310.50	56	42	30
1101	-1.60	366	0.02	0.87	311.50	56	44	30
1103	-1.60	371	0.02	0.87	312.50	56	44	30
1105	-1.60	373	0.02	0.66	313.30	56	44	30
1107	-1.60	375	0.02	0.80	314.20	56	44	30
		FINAL DRY GAS VOLUME			315.17			
				PORT # 2				
1109	-1.60	333	0.02	0.87	315.17	55	46	32
1111	-1.60	331	0.02	0.87	316.10	57	46	36
1113	-1.60	331	0.02	0.66	317.10	58	47	35
1115	-1.60	331	0.02	0.66	317.90	59	48	31
1117	-1.60	332	0.02	0.47	318.78	60	48	30
1119	-1.60	333	0.02	0.87	319.70	61	48	32
1121	-1.60	333	0.02	0.66	320.70	61	49	31
1123	-1.60	334	0.02	0.66	321.55	61	49	30
1125	-1.60	335	0.02	0.66	322.40	62	50	32
1127	-1.60	332	0.02	0.87	323.35	64	51	32
1129	-1.60	343	0.02	0.87	324.30	64	52	31
1131	-1.60	200	0.02	0.80	325.30	65	53	30
		FINAL DRY GAS VOLUME			326.25			
				PORT # 3				
1140	-1.60	361	0.02	0.87	326.25	57	55	24
1142	-1.60	369	0.02	0.87	327.19	63	54	30
1144	-1.60	372	0.02	0.66	328.16	65	54	31
1146	-1.60	368	0.02	0.66	329.04	66	55	31
1148	-1.60	332	0.02	0.87	329.99	67	56	31
1150	-1.60	330	0.02	0.66	330.87	67	58	31
1152	-1.60	336	0.02	0.87	331.75	68	58	31
1154	-1.60	331	0.02	0.87	332.73	68	58	31

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1156	-1.60	332	0.02	0.87	333.70	68	58	31
1158	-1.60	332	0.02	0.66	334.67	68	59	31
1200	-1.60	332	0.02	0.66	335.56	66	58	31
1202	-1.60	203	0.01	0.52	336.42	65	58	31
		FINAL DRY GAS VOLUME			337.21			

PORT # 4

1215	-1.60	355	0.02	0.87	337.21	59	55	32
1217	-1.60	361	0.02	0.87	338.04	62	55	31
1219	-1.60	369	0.02	0.66	339.00	63	55	33
1221	-1.60	370	0.02	0.66	339.80	63	56	31
1223	-1.60	374	0.02	0.87	340.70	64	55	34
1225	-1.60	375	0.02	0.87	341.67	64	55	32
1227	-1.60	375	0.02	0.87	342.60	63	54	31
1229	-1.60	342	0.02	0.66	343.50	63	55	30
1231	-1.60	331	0.02	0.66	344.35	63	54	31
1233	-1.60	326	0.02	0.66	345.20	63	54	32
1235	-1.60	318	0.02	0.87	346.20	63	54	30
1237	-1.60	200	0.02	0.80	347.10	63	54	31
		FINAL DRY GAS VOLUME			348.05			

AVG ORIFICE DROP (IN H2O) : 0.7625
TEMP OF METER (DEGREES R) : 515.3
AVG. STATIC STK PRESS (IN H2O) :-1.6
AVG STACK PRESSURE (IN HG.) : 30.322
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES R) : 798.1
AVG VELOCITY HEAD (IN H2O) : 0.0172
AVG VELOCITY (FPS) : 8.48
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR): 5924615

CONC. OF FILT. PART. IN STK (GR/DSCF) : 9.60000E-03
CONC. OF FILT. PART. IN STK (#/DSCF) : 1.38105E-06
#/HR OF FILT. PART (DRY BASIS) : 8.1822

ISOKINETIC VARIATION (%) : 101.93

Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70808

EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :2
UNIT DESCRIPTION :#3 COKE BLAST FURNACE GAS

PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 02, 1980
TEMPERATURE OF STACK(F)	798.1
VELOCITY OF STACK GAS(FPS)	8.48
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFM)	5924615
STATIC PRESSURE(INCHES OF H2O	-1.6
MOISTURE CONTENT(% VOLUME)	3.13
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	31.47
ISOKINETIC RATIO(%)	101.93
FILTERABLE PARICULATE EMISSION RATE(#/HOUR)	8.1822
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	9.60000E-03

511203

Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70815

STACK SAMPLING DATA REDUCTION
FOR REFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE BLAST FURNACE GAS

OPERATORS	: LANIER - JOSHI
DATE OF THIS SAMPLE	: FEBRUARY 02, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 2
FILE NAME	: USTE37
AMBIENT TEMPERATURE (DEG F)	: 7
BAROMETRIC PRESS. (IN. HG.)	: 30.44

GAS ANALYSIS AT SAMPLING POINT
(DRY BASIS)

% CARBON DIOXIDE	: 19.8
% CARBON MONOXIDE	: 0
% OXYGEN	: 7.7
% NITROGEN	: 72.5
MOLECULAR WEIGHT (DRY)	: 31.47
% MOISTURE THIS RUN	: 3.13
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 19
WT INCREASE OF SILICA GEL(G)	: 12.2
VOLUME OF GAS SAMPLE (DSCF)	: 45.34

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 2.06400E-03
PROBE RESIDUE(GM)	: 1.14800E-03
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK RESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 1.14800E-03
FILTER CATCH	: 2.06400E-03

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.507
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

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CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	ORIFICE PRES DROP (IN H2O)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	TEMP [illegible] (F)	TEMP [illegible] (F)
				PORT # 1				
1045	-1.60	340	0.02	0.87	304.22	42	39	32
1047	-1.60	333	0.02	0.87	305.18	47	38	31
1049	-1.60	336	0.02	0.87	306.15	50	39	30
1051	-1.60	344	0.02	0.66	307.10	50	38	30
1053	-1.60	352	0.02	0.66	307.90	51	39	30
1055	-1.60	357	0.02	0.66	308.78	53	40	30
1057	-1.60	360	0.02	0.87	309.70	53	41	30
1059	-1.60	363	0.02	0.66	310.50	56	42	30
1101	-1.60	366	0.02	0.87	311.50	56	44	30
1103	-1.60	371	0.02	0.87	312.50	56	44	30
1105	-1.60	373	0.02	0.66	313.30	56	44	30
1107	-1.60	375	0.02	0.80	314.20	56	44	30
		FINAL DRY GAS VOLUME			315.17			
				PORT # 2				
1109	-1.60	333	0.02	0.87	315.17	55	46	32
1111	-1.60	331	0.02	0.87	316.10	57	46	36
1113	-1.60	331	0.02	0.66	317.10	58	47	35
1115	-1.60	331	0.02	0.66	317.90	59	48	31
1117	-1.60	332	0.02	0.47	318.78	60	48	30
1119	-1.60	333	0.02	0.87	319.70	61	48	32
1121	-1.60	333	0.02	0.66	320.70	61	49	31
1123	-1.60	334	0.02	0.66	321.55	61	49	30
1125	-1.60	335	0.02	0.66	322.40	62	50	32
1127	-1.60	332	0.02	0.87	323.35	64	51	32
1129	-1.60	343	0.02	0.87	324.30	64	52	31
1131	-1.60	200	0.02	0.80	325.30	65	53	30
		FINAL DRY GAS VOLUME			326.25			
				PORT # 3				
1140	-1.60	361	0.02	0.87	326.25	57	55	24
1142	-1.60	369	0.02	0.87	327.19	63	54	30
1144	-1.60	372	0.02	0.66	328.16	65	54	31
1146	-1.60	368	0.02	0.66	329.04	66	55	31
1148	-1.60	332	0.02	0.87	329.99	67	56	31
1150	-1.60	330	0.02	0.66	330.87	67	58	31
1152	-1.60	336	0.02	0.87	331.75	68	58	31
1154	-1.60	331	0.02	0.87	332.73	68	58	31

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Environmental Services Division
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1156	-1.60	332	0.02	0.87	333.70	68	59	31
1158	-1.60	332	0.02	0.66	334.67	68		
1200	-1.60	332	0.02	0.66	335.56	66		
1202	-1.60	203	0.01	0.52	336.42	65	58	31
		FINAL DRY GAS VOLUME			337.21			

PORT # 4

1215	-1.60	355	0.02	0.87	337.21	59	55	32
1217	-1.60	361	0.02	0.87	338.04	62	55	31
1219	-1.60	369	0.02	0.66	339.00	63	55	33
1221	-1.60	370	0.02	0.66	339.80	63	56	31
1223	-1.60	374	0.02	0.87	340.70	64	55	34
1225	-1.60	375	0.02	0.87	341.67	64	55	32
1227	-1.60	375	0.02	0.87	342.60	63	54	31
1229	-1.60	342	0.02	0.66	343.50	63	55	30
1231	-1.60	331	0.02	0.66	344.35	63	54	31
1233	-1.60	326	0.02	0.66	345.20	63	54	32
1235	-1.60	318	0.02	0.87	346.20	63	54	30
1237	-1.60	200	0.02	0.80	347.10	63	54	31
		FINAL DRY GAS VOLUME			348.05			

AVG ORIFICE DROP (IN H2O) : 0.7625
TEMP OF METER (DEGREES R) : 515.3
AVG. STATIC STK PRESS (IN H2O) :-1.6
AVG STACK PRESSURE (IN HG.) : 30.322
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES R) : 798.1
AVG VELOCITY HEAD (IN H2O) : 0.0172
AVG VELOCITY (FPS) : 8.48
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR): 5924615

CONC. OF FILT. PART. IN STK (GR/DSCF) : 1.00000E-03
CONC. OF FILT. PART. IN STK (#/DSCF) : 1.56195E-07
#/HR OF FILT. PART (DRY BASIS) : 0.9253

ISOKINETIC VARIATION (%) : 101.93

511206

Environmental Services Division
16550 Highland Road
Baton Rouge, Louisiana 70808

EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :2
UNIT DESCRIPTION :#3 COKE BLAST FURNACE GAS

PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 02, 1980
TEMPERATURE OF STACK(R)	798.1
VELOCITY OF STACK GAS(FPS)	8.48
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFH)	5924615
STATIC PRESSURE(INCHES OF H2O	-1.6
MOISTURE CONTENT(% VOLUME)	3.13
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	31.47
ISOKINETIC RATIO(%)	101.93
FILTERABLE PARTICULATE EMISSION RATE(#/HOUR)	0.253
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	1.0000E-03

511207

Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70808

STACK SAMPLING DATA REDUCTION
FOR REFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE BLAST FURNACE GAS

OPERATORS	: LANIER - JOSHI
DATE OF THIS SAMPLE	: FEBRUARY 02, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 3
FILE NAME	: USTE38
AMBIENT TEMPERATURE (DEG F)	: 15
BAROMETRIC PRESS. (IN. HG.)	: 30.44

GAS ANALYSIS AT SAMPLING POINT
(DRY BASIS)

% CARBON DIOXIDE	: 19.8
% CARBON MONOXIDE	: 0
% OXYGEN	: 7.6
% NITROGEN	: 72.6
MOLECULAR WEIGHT (DRY)	: 31.47
% MOISTURE THIS RUN	: 2.97
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 20
WT INCREASE OF SILICA GEL(G)	: 9.6
VOLUME OF GAS SAMPLE (DSCF)	: 45.66

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 8.80000E-03
PROBE RESIDUE(GM)	: 0.0191
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK RESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 0.0191
FILTER CATCH	: 8.80000E-03

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.507
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

511208

Environmental Services Division
16550 Highland Road
Baton Rouge, Louisiana 70808

CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	ORIFICE PRES DROP (IN H2O)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	TEMP OUTLET (F)	TEMP IMP (F)
				PORT # 1				
1450	-1.60	361	0.02	0.87	348.42	46	45	25
1452	-1.60	363	0.02	0.87	349.37	49	45	34
1454	-1.60	365	0.02	0.66	350.33	51	45	35
1456	-1.60	367	0.02	0.87	351.18	52	45	35
1458	-1.60	370	0.02	0.66	352.15	53	46	35
1500	-1.60	363	0.02	0.66	352.99	54	46	35
1502	-1.60	332	0.02	0.87	353.85	55	46	35
1504	-1.60	329	0.02	0.66	354.81	57	47	35
1506	-1.60	328	0.02	0.66	355.67	56	47	35
1508	-1.60	327	0.02	0.87	356.52	57	48	35
1510	-1.60	317	0.02	0.87	357.48	58	48	35
1512	-1.60	203	0.02	0.78	358.48	58	48	35
		FINAL DRY GAS VOLUME			359.42			
				PORT # 2				
1516	-1.60	361	0.02	0.87	359.42	58	48	30
1518	-1.60	354	0.02	0.87	360.40	58	48	31
1520	-1.60	341	0.02	0.87	361.36	58	48	32
1522	-1.60	367	0.02	0.66	362.34	58	48	33
1524	-1.60	345	0.02	0.66	363.22	57	48	34
1526	-1.60	352	0.02	0.87	364.05	57	48	35
1528	-1.60	356	0.02	0.66	364.99	58	48	35
1530	-1.60	360	0.02	0.66	365.86	57	48	35
1532	-1.60	361	0.02	0.87	366.71	57	48	35
1534	-1.60	362	0.02	0.87	367.66	58	48	35
1536	-1.60	365	0.02	0.66	368.61	57	48	35
1538	-1.60	268	0.02	0.78	369.46	57	48	35
		FINAL DRY GAS VOLUME			370.37			
				PORT # 3				
1546	-1.60	366	0.02	0.87	370.40	58	47	35
1548	-1.60	343	0.02	0.87	371.35	58	47	35
1550	-1.60	330	0.02	0.87	372.31	58	48	35
1552	-1.60	329	0.02	0.66	373.29	58	48	35
1554	-1.60	329	0.02	0.66	374.15	58	48	35
1556	-1.60	331	0.02	0.66	374.98	58	48	35
1558	-1.60	331	0.02	0.87	375.84	58	48	35
1600	-1.60	330	0.02	0.87	376.79	58	48	35

Environmental Services Division
16550 Highland Road
Baton Rouge, Louisiana 70808

1602	-1.60	332	0.02	0.66	377.76	58	48	35
1604	-1.60	332	0.02	0.87	378.63	58	48	35
1006	-1.60	332	0.02	0.87	379.59	58	48	35
1508	-1.60	198	0.01	0.52	380.56	58	48	35
		FINAL DRY GAS VOLUME			381.35			

PORT # 4

1615	-1.60	368	0.02	0.87	381.35	54	47	31
1617	-1.60	358	0.02	0.87	382.28	56	47	32
1619	-1.60	361	0.02	0.66	383.20	56	48	33
1621	-1.60	367	0.02	0.66	384.05	56	48	34
1623	-1.60	367	0.02	0.66	385.00	57	48	35
1625	-1.60	368	0.02	0.87	386.00	58	48	35
1627	-1.60	368	0.02	0.87	386.92	57	48	35
1629	-1.60	345	0.02	0.87	387.89	57	47	35
1631	-1.60	328	0.02	0.66	388.85	56	48	35
1633	-1.60	325	0.02	0.66	389.70	56	47	33
1635	-1.60	323	0.02	0.66	390.52	55	47	36
1637	-1.60	330	0.02	0.80	391.35	56	46	31
		FINAL DRY GAS VOLUME			392.30			

AVG ORIFICE DROP (IN H2O) : 0.77
TEMP OF METER (DEGREES R) : 511.8
AVG. STATIC STK PRESS (IN H2O) :-1.6
AVG STACK PRESSURE (IN HG.) : 30.322
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES R) : 799.7
AVG VELOCITY HEAD (IN H2O) : 0.0172
AVG VELOCITY (FPS) : 8.49
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR): 5927158

CONC. OF FILT. PART. IN STK (GR/DSCF) : 9.40000E-03
CONC. OF FILT. PART. IN STK (#/DSCF) : 1.34723E-06
#/HR OF FILT. PART (DRY BASIS) : 7.9852

ISOKINETIC VARIATION (%) : 102.61

Environmental Services Division

16550 Highland Road
Baton Rouge, Louisiana 70808

EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :3
UNIT DESCRIPTION :#3 COKE BLAST FURNACE GAS

PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 02, 1980
TEMPERATURE OF STACK(F)	799.7
VELOCITY OF STACK GAS(FPS)	8.49
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFM)	5927158
STATIC PRESSURE(INCHES OF H2O	-1.6
MOISTURE CONTENT(% VOLUME)	2.97
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	31.47
ISOKINETIC RATIO(%)	102.61
FILTERABLE PARTICULATE EMISSION RATE(#/HOUR)	7.9852
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	9.40000E-03

511211

Environmental Services Division
16550 Highland Road
Baton Rouge, Louisiana 70808

STACK SAMPLING DATA REDUCTION
FOR REFERNCE METHOD 5

UNITED STATES STEEL
GARY, INDIANA
#3 COKE BLAST FURNACE GAS

OPERATORS	: LANIER - JOSHI
DATE OF THIS SAMPLE	: FEBRUARY 02, 1980
TODAY'S DATE	: FEBRUARY 21, 1980
RUN #	: 3
FILE NAME	: USTE38
AMBIENT TEMPERATURE (DEG F)	: 15
BAROMETRIC PRESS. (IN. HG.)	: 30.44

GAS ANALYSIS AT SAMPLING POINT
(DRY BASIS)

% CARBON DIOXIDE	: 19.8
% CARBON MONOXIDE	: 0
% OXYGEN	: 7.6
% NITROGEN	: 72.6
MOLECULAR WEIGHT (DRY)	: 31.47
% MOISTURE THIS RUN	: 2.97
% MOIST. @ SATURATION	: 100

# MLS OF H2O IN IMPINGERS	: 20
WT INCREASE OF SILICA GEL(G)	: 9.6
VOLUME OF GAS SAMPLE (DSCF)	: 45.66

FILTERABLE PARTICULATE

WEIGHT INCREASE OF FILTER(GRM)	: 2.59400E-03
PROBE RESIDUE(GM)	: 7.30000E-04
TOTAL MASS OF PROBE SAMPLE(GM)	: 1
BLANK RESIDUE(GM)	: 0
TOTAL MASS OF BLANK(GM)	: 1
PROBE CATCH	: 7.30000E-04
FILTER CATCH	: 2.59400E-03

PROBE LENGTH (IN)	: 146
NOZZLE DIAMETER (IN.)	: 0.507
DRY GAS METER CORRECTION FACTOR	: 0.991
PITOT TUBE CALIB. COEF.	: 0.82

511212

CLOCK TIME (H.M)	STATIC PRESS (IN H2O)	STACK TEMP (F)	VELOCITY HEAD (IN H2O)	ORIFICE PRES DROP (IN H2O)	DRY GAS VOLUME (F^3)	TEMP INLET (F)	OUTLET	IMP
				PORT # 1				
1450	-1.60	361	0.02	0.87	348.42	46	45	25
1452	-1.60	363	0.02	0.87	349.37	49	45	34
1454	-1.60	365	0.02	0.66	350.33	51	45	35
1456	-1.60	367	0.02	0.87	351.18	52	45	35
1458	-1.60	370	0.02	0.66	352.15	53	46	35
1500	-1.60	363	0.02	0.66	352.99	54	46	35
1502	-1.60	332	0.02	0.87	353.85	55	46	35
1504	-1.60	329	0.02	0.66	354.81	57	47	35
1506	-1.60	328	0.02	0.66	355.67	56	47	35
1508	-1.60	327	0.02	0.87	356.52	57	48	35
1510	-1.60	317	0.02	0.87	357.48	58	48	35
1512	-1.60	203	0.02	0.78	358.48	58	48	35
		FINAL DRY GAS VOLUME			359.42			
				PORT # 2				
1516	-1.60	361	0.02	0.87	359.42	58	48	30
1518	-1.60	354	0.02	0.87	360.40	58	48	31
1520	-1.60	341	0.02	0.87	361.36	58	48	32
1522	-1.60	367	0.02	0.66	362.34	58	48	33
1524	-1.60	345	0.02	0.66	363.22	57	48	34
1526	-1.60	352	0.02	0.87	364.05	57	48	35
1528	-1.60	356	0.02	0.66	364.99	58	48	35
1530	-1.60	360	0.02	0.66	365.86	57	48	35
1532	-1.60	361	0.02	0.87	366.71	57	48	35
1534	-1.60	362	0.02	0.87	367.66	58	48	35
1536	-1.60	365	0.02	0.66	368.61	57	48	35
1538	-1.60	268	0.02	0.78	369.46	57	48	35
		FINAL DRY GAS VOLUME			370.37			
				PORT # 3				
1546	-1.60	366	0.02	0.87	370.40	58	47	35
1548	-1.60	343	0.02	0.87	371.35	58	47	35
1550	-1.60	330	0.02	0.87	372.31	58	48	35
1552	-1.60	329	0.02	0.66	373.29	58	48	35
1554	-1.60	329	0.02	0.66	374.15	58	48	35
1556	-1.60	331	0.02	0.66	374.98	58	48	35
1558	-1.60	331	0.02	0.87	375.84	58	48	35
1600	-1.60	330	0.02	0.87	376.79	58	48	35

511215

Environmental Services Division
16550 Highland Road
Baton Rouge, Louisiana 70808

1602	-1.60	332	0.02	0.66	377.76	58		
1604	-1.60	332	0.02	0.87	378.63	58		
1006	-1.60	332	0.02	0.87	379.59	58	48	35
1508	-1.60	198	0.01	0.52	380.56	58		
		FINAL DRY GAS VOLUME			381.35			

PORT # 4

1615	-1.60	368	0.02	0.87	381.35	54	47	31
1617	-1.60	358	0.02	0.87	382.28	56	47	32
1619	-1.60	361	0.02	0.66	383.20	56	48	33
1621	-1.60	367	0.02	0.66	384.05	56	48	34
1623	-1.60	367	0.02	0.66	385.00	57	48	35
1625	-1.60	368	0.02	0.87	386.00	58	48	35
1627	-1.60	368	0.02	0.87	386.92	57	48	35
1629	-1.60	345	0.02	0.87	387.89	57	47	35
1631	-1.60	328	0.02	0.66	388.85	56	48	35
1633	-1.60	325	0.02	0.66	389.70	56	47	33
1635	-1.60	323	0.02	0.66	390.52	55	47	36
1637	-1.60	330	0.02	0.80	391.35	56	46	31
		FINAL DRY GAS VOLUME			392.30			

AVG ORIFICE DROP (IN H2O) : 0.77
TEMP OF METER (DEGREES R) : 511.8
AVG. STATIC STK PRESS (IN H2O) :-1.6
AVG STACK PRESSURE (IN HG.) : 30.322
TOTAL SAMPLING TIME THIS SAMPLE : 96
AVG TEMP OF STK GAS (DEGREES R) : 799.7
AVG VELOCITY HEAD (IN H20) : 0.0172
AVG VELOCITY (FPS) : 8.49
DIAMETER OF STACK (IN.) : 234
CROSS-SECT AREA OF STACK (SF) : 298.64
VOLUMETRIC FLOW OF STK (DSCF/HR): 5927158

CONC. OF FILT. PART. IN STK (GR/DSCF) : 1.10000E-03
CONC. OF FILT. PART. IN STK (#/DSCF) : 1.60509E-07
#/HR OF FILT. PART (DRY BASIS) : 0.9513

ISOKINETIC VARIATION (%) : 102.61

511214

Environmental Services Division
16550 Highland Road
Baton Rouge, Louisiana 70808

EMISSION TESTING
FOR
UNITED STATES STEEL

RESULTS

SAMPLING METHOD : 1
RUN NUMBER :3
UNIT DESCRIPTION :#3 COKE BLAST FURNACE GAS

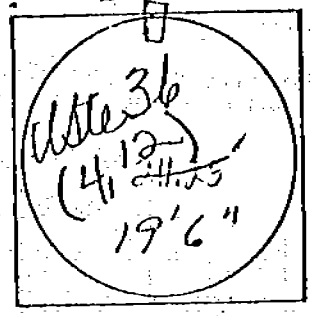
PHYSICAL CONSTANTS
OF
STACK

DATE OF SAMPLING	FEBRUARY 02, 1980
TEMPERATURE OF STACK(F)	799.7
VELOCITY OF STACK GAS(FPS)	8.49
CROSS-SECTIONAL AREA OF STACK(SF)	298.64
VOLUMETRIC FLOW(DSCFH)	5927158
STATIC PRESSURE(INCHES OF H2O	-1.6
MOISTURE CONTENT(% VOLUME)	2.97
MOLECULAR WEIGHT OF STACK GAS(#/#-MOLE,DRY)	31.47
ISOKINETIC RATIO(%)	102.61
FILTERABLE PARICULATE EMISSION RATE(#/HOUR)	0.9513
FILTERABLE PARTICULATE CONCENTRATION(GR/DSCF)	1.10000E-03

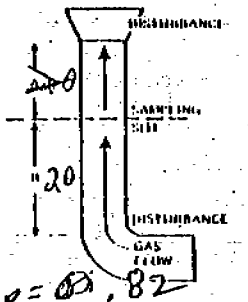
511215

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



$c_p = .82$
$\gamma = 0.99$

PLANT U.S. Steel
DATE 2/1/80
LOCATION Gary Ind
OPERATOR Lanier + Joshi
STACK NO. #3 Coke Wat Furnace Gas
RUN NO. #1 - Particulate
SAMPLE BOX NO. 2
METER BOX NO. 479

AMBIENT TEMPERATURE 20 w/o W.C
BAROMETRIC PRESSURE 30.50 "
ASSUMED MOISTURE, % 3.5%
PROBE LENGTH, in. 146"
NOZZLE DIAMETER, in. .507
STACK DIAMETER, in. 19'6"
PROBE HEATER SETTING
HEATER BOX SETTING

METER $\Delta H_@$ 1.456
C FACTOR 44 at 340°F
53 at 200°F
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg

SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT	.5759	
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	~~3.18~~	1518	339	.02	.1414	.87		245.44	42	38	254	20	4	
2	1520	-1.7	340	.02	.1414	.87		246.40	44	38	273	22	4	
3	1522		342	.02	.1414	.87		247.35	46	38	276	22	4	
4	24		336	.015	.1224	.66		248.30	46	39	276	22	4	
5	26		348	.015	.1224	.66		249.15	47	39	264	25	4	
6	28		353	.015	.1224	.66		249.99	48	39	255	26	4	
7	30		358	.02	.1414	.87		250.84	49	39	242	27	4	
8	32		361	.02	.1414	.87		251.80	50	39	246	29	4	
9	34		365	.015	.1224	.66		252.75	49	40	247	29	4	
10	36		364	.015	.1224	.66		253.61	49	40	247	27	4	
11	38		362	.015	.1224	.66		254.45	50	40	248	25	4	
12	40		203	.01	.1	.53		255.28	50	40	277	25	4	
								256.08						
			4101	0.2	1.5414	6.44			1039					
TOTAL														
AVERAGE														

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	668.4	659.1		425.4	641.4
INITIAL	660.9	649.2		424.8	635.2
LIQUID COLLECTED	7.9	9.9		1.1	6.2
TOTAL VOLUME COLLECTED					

SUBTRACTED

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1	3:10	13.3	5.7	0	
2					
3					
4					

COMMENTS: 4 ports
12 pts. per port
2 min per pt.
Total sampling time = 96

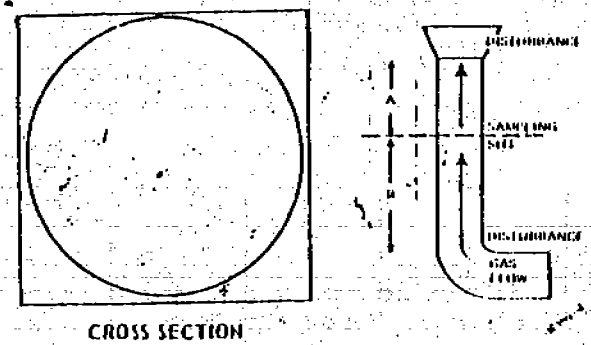
0170

102

PARTICULATE FIELD DATA

Pg 2 of 4

SCHEMATIC OF STACK



CROSS SECTION

PLANT U.S. Steel
DATE 2/1/80
LOCATION
OPERATOR
STACK NO. 3-Coke
RUN NO. 1-PART Blast Furnace Gas
SAMPLE BOX NO.
METER BOX NO.

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
PROBE LENGTH, in.
NOZZLE DIAMETER, in.
STACK DIAMETER, in.
PROBE HEATER SETTING 1
HEATER BOX SETTING

METER $\Delta H_@$
C FACTOR 44 at 340°F
PROCESS WEIGHT RATE 53 at 200

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WAS
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
	TOTAL	

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	3:50	1550	339	.02	.144	.87		256.08	45	40	242	30	4	
2	1552		334	.02		.87		257.03	49	41	240	31	4	
3	54		330	.02		.87		257.98	51	41	242	31	4	
4	56		340	.02		.87		258.94	52	41	248	30	4	
5	58		346	.02		.87		260.0	52	42	250	29	4	
6	1600		340	.02		.87		260.8	52	41	236	28	4	
7	02		343	.015		.66		261.7	51	42	238	27	4	
8	04		341	.015	.122	.66		262.6	51	41	240	27	4	
9	06		349	.015		.66		263.5	51	41	242	25	4	
10	08		354	.02		.87		264.3	52	41	243	25	4	
11	10		337	.02		.87		265.3	53	41	240	25	4	
12	12		208	.015	.80	[illegible]		266.2	53	41	241	25	4	
								267.17						
			3964	.22	1.624	9.71			1157					
TOTAL														
AVERAGE									45.76					

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL VOLUME COLLECTED					

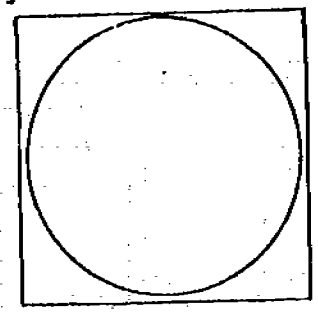
ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

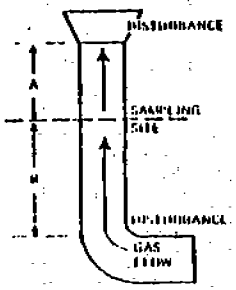
CHICAGO SCIENTIFIC INC.

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT U.S. STEEL
DATE 2-1-80
LOCATION GARY
OPERATOR Ramier Joshi
STACK NO. 3 Coke
RUN NO. 1 Part Blast F. Gas
SAMPLE BOX NO. 2
METER BOX NO. 479 N.

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
PROBE LENGTH, in.
NOZZLE DIAMETER, in.
STACK DIAMETER, in.
PROBE HEATER SETTING
HEATER BOX SETTING

METER $\Delta H_@$
C FACTOR 44 at 340°F
53 at 200°
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

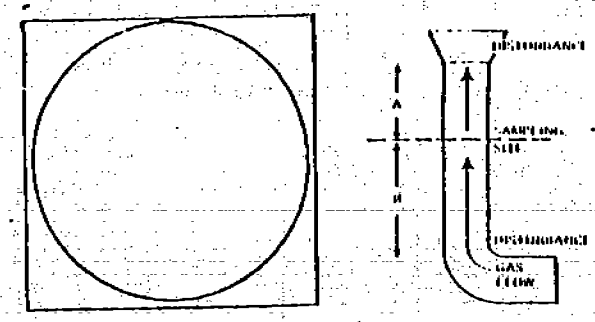
TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	14.28		340	.02	.0	.87		267.175	44	42	260	21	4	
2	16.30		338	.02	.1414	.87		268.1	50	43	279	26	4	
3	16.32		335	.02		.87		269.1	51	43	281	28	4	
4	34		335	.02		.87		270.1	52	43	275	30	4	
5	36		335	.02		.87		271.0	52	43	271	31	4	
6	38		336	.015		.66		271.9	51	42	261	31	4	
7	40		337	.015		.66		272.8	51	42	254	31	4	
8	42		337	.015	.1204	.66		273.5	51	42	250	33	4	
9	44		333	.02		.87		274.5	51	41	243	34	4	
10	46		336	.02		.87		275.36	52	41	236	34	4	
11	48		331	.015		.66		276.3	51	41	226	31	4	
12	16.50		200	.015		.87		277.2	51	41	215	36	4	
								278.10						
			3893	.215	1.6014	9.53								
TOTAL														
AVERAGE		333.604	333.604	.0176	.1323	.7746		43.55	45.76					

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

SCHEMATIC OF STACK



CROSS SECTION

PLANT U.S. STEEL

DATE 2-1-80

LOCATION GARY

OPERATOR Conrad, Josh

STACK NO. #3 COLCR 1991.

RUN NO. 1 Blast F. GAS.

SAMPLE BOX NO. 2

METER BOX NO. 479 H.

AMBIENT TEMPERATURE

BAROMETRIC PRESSURE

ASSUMED MOISTURE, %

PROBE LENGTH, in.

NOZZLE DIAMETER, in.

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER ΔH@

C FACTOR 44@ 340°F

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	1700 5:00	-1.7	368	.02	.1414	.87		278.1	44	40	242	36	4	
2	1702		374	.02		.87		279.03	49	41	241	36	4	
3	04		377	.02	.015	.66		280.0	49	41	240	37	4	
4	06		338	.02	.015	.66		280.8	49	41	244	37	4	
5	08		331	.02	.015	.66		281.6	50	41	241	37	4	
6	10		331	.02		.87		282.5	51	41	240	37	4	
7	12		332	.02		.87		283.46	52	41	239	37	4	
8	14		332	.015	.015	.66		284.4	50	41	241	37	4	
9	16		333	.015	.1224	.66		285.3	50	41	240	37	4	
10	18		314	.02		.87		286.2	51	41	240	36	4	
11	20		311	.02		.87		287.2	51	40	241	36	4	
12	1722		314	.015		.66		288.1	51	40	241	37	4	
			337.916	.0175	.1319	.776		285.86						
								288.99	108.6					
TOTAL			4054.992	0.21	1.582									
AVERAGE						9.312		14.89 43.55						

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL VOLUME					

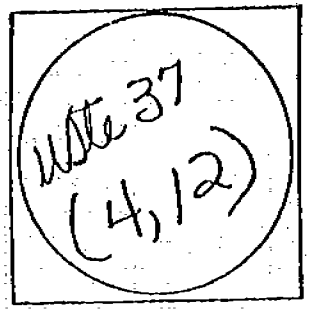
ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

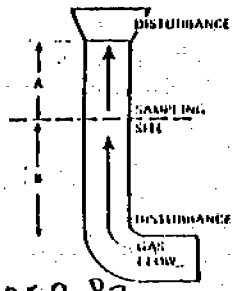
105

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



$C_p = 0.82$
$\gamma = 0.991$

PLANT U.S. Steel
DATE 2/2/80
LOCATION GARY, IND.
OPERATOR Jashi + Lanier
STACK NO. #3 Coke
RUN NO. 2-Part-Blast Furnace Gas
SAMPLE BOX NO. 3
METER BOX NO. 479 N.

AMBIENT TEMPERATURE 7°F
BAROMETRIC PRESSURE 30.44
ASSUMED MOISTURE, % 4
PROBE LENGTH, in. 146
NOZZLE DIAMETER, in. .507
STACK DIAMETER, in. 19'6"
PROBE HEATER SETTING 9
HEATER BOX SETTING

METER $\Delta H_@$ 1.956
C FACTOR 44 at 340°F / 53 at 200
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT	.5607	
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	10:45	-1.6	340	.02		.87		304.22	42	39	247	32	5	
2	47		333	.02		.87		305.18	47	38	242	31	4	
3	49		336	.02		.87		306.15	50	39	236	30	4	
4	51		344	.015		.66		307.10	50	38	246	30	4	
5	53		352	.015		.66		307.90	51	39	252	30	4	
6	55		357	.015		.66		308.78	53	40	247	30	4	
7	57		360	.02		.87		309.7	53	41	266	30	4	
8	59		363	.015		.66		310.5	56	42	272	30	4	
9	1101		366	.02		.87		311.5	56	44	248	30	4	
10	03		371	.02		.87		312.5	56	44	256	30	4	
11	05		373	.015		.66		313.3	56	44	258	30	4	
12	07		375	.015		.8		314.2	56	44	260	30	4	
								315.165						
TOTAL														
AVERAGE														

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	646.4	681.3		442.8	656.6
INITIAL	643.8	666.4		442.8	648.4
LIQUID COLLECTED	2.6	14.9		2.0	10.2
TOTAL VOLUME COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1		19.6	7.8	/	/
2		19.4	7.9	/	/
3		19.8	7.7	/	/
4					

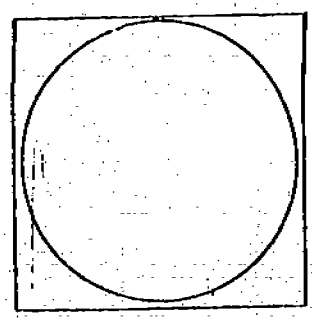
COMMENTS:

0171

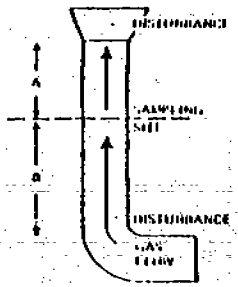
106

[illegible] FIELD DATA [illegible]

SCHEMATIC OF STACK



CROSS SECTION



PLANT U.S. Steel

DATE 2/2/80

LOCATION GARY

OPERATOR Jerri Collin

STACK NO. #3 Coke

RUN NO. 2-Part Blast Furnace Gas

SAMPLE BOX NO. 3

METER BOX NO. 4791V

AMBIENT TEMPERATURE

BAROMETRIC PRESSURE

ASSUMED MOISTURE, %

PROBE LENGTH, in.

NOZZLE DIAMETER, in.

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER ΔH@ 1.456

C FACTOR

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg

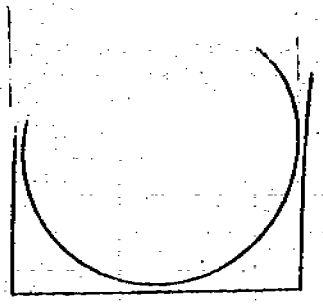
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	$(\sqrt{\Delta P_s})$	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	11:09		333	.02			.47	315.165	54/55	46	242	32	4	
2	111		331	.02			.47	316.1	57	46	240	36		
3	13		331	.015			.66	317.1	58	47	243	35		
4	15		331	.015			.66	317.9	59	48	240	31		
5	17		332	.02			.47	318.78	60	48	244	30		
6	19		333	.02			.47	319.7	61	48	239	32		
7	21		333	.015			.66	320.7	61	49	240	31		
8	23		334	.015			.66	321.55	61	49	241	30		
9	25		335	.015			.66	322.4	62	50	242	32		
10	27		332	.02			.47	323.35	64	51	241	33		
11	29		343	.02			.47	324.3	64	52	243	31		
12	1131		200	.015			.8	325.3	65	53	241	30		
								326.25						
TOTAL														
AVERAGE														

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:



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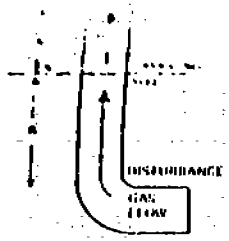


OPERATOR _____

STACK NO. #3 Coke

RUN NO. 2-Part Blast Furnace Gas

SAMPLE BOX NO. _____

METER BOX NO. _____

PROBE LENGTH, in. _____

NOZZLE DIAMETER, in. _____

STACK DIAMETER, in. _____

PROBE HEATER SETTING _____

HEATER BOX SETTING _____

WEIGHT OF PARTICULATE COLLECTED

SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

	CLOCK TIME, min	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	11:40		361	.02		.87		326.25	57	55	241	24	4	
2	42		369	.02		.87		327.19	63	54	238	30	4	
3	44		372	.015		.66		328.16	65	54	231	31	4	
4	46		368	.015		.66		329.04	66	55	256	31	4	
5	48		332	.02		.87		329.99	67	56	258	31	4	
6	50		330	.015		.66		330.87	67	58	272	31	4	
7	52		336	.02		.87		331.75	68	58	251	31	4	
8	54		331	.02		.87		332.73	68	58	256	31	4	
9	56		332	.02		.87		333.70	68	58	241	31	4	
10	58		332	.015		.66		334.67	68	59	248	31	4	
11	12:00		332	.015		.66		335.56	68	58	250	31	4	
12	12:02		203	.010		.52		336.42	65	58	263	31	4	
								337.20						
TOTAL														
AVERAGE														

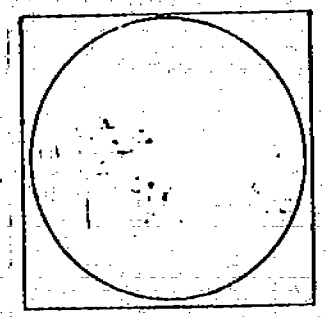
VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

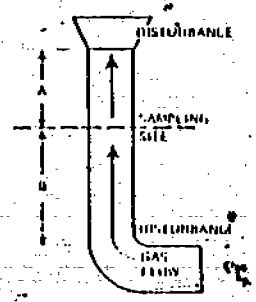
COMMENTS:

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT U.S. Steel

DATE 2/2/80

LOCATION

OPERATOR

STACK NO. #3 Coke

RUN NO. 2-Part Blast Furnace Gas

SAMPLE BOX NO.

METER BOX NO.

AMBIENT TEMPERATURE

BAROMETRIC PRESSURE

ASSUMED MOISTURE, %

PROBE LENGTH, in.

NOZZLE DIAMETER, in.

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER $\Delta H_@$

C FACTOR

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg

SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)		PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{IN}}$), °F	OUTLET ($T_{m_{OUT}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	12-15		355	.02		.87		337.205	59	55	240	32	.4	
2	17		361	.02		.87		338.001	62	55	241	31		
3	19		369	.025	.05	.66		339.0	63	55	~~359~~ 242	33		
4	21		370	.015		.66		339.8	63	56	241	31		
5	23		374	.02		.87		340.7	64	55	242	34		
6	25		375	.02		.87		341.67	64	55	240	32		
7	27		375	.02		.87		342.6	63	54	243	31		
8	29		342	.015		.66		343.5	63	55	241	30		
9	31		331	.015		.66		344.35	63	54	242	31		
10	33		326	.015		.66		345.2	63	54	241	32		
11	35		318	.02		.87		346.2	63	54	240	30		
12	37		200	.015		.4		347.1	63	54	241	31		
			4096					348.05						
TOTAL														
AVERAGE														

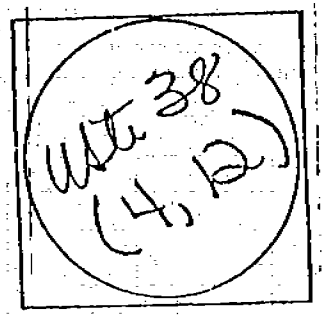
	VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
	FINAL					
	INITIAL					
	LIQUID COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

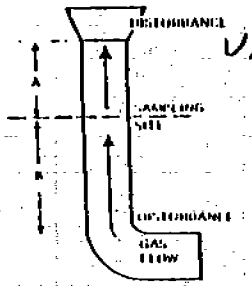
COMMENTS:

EPA METHOD 5 FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT U.S. Steel

DATE 2/2/80

LOCATION #3 Coke Battery Gary, IND

OPERATOR Lanier + Others

STACK NO. #3 Coke Blast Furnace Gas

RUN NO. 3-Coke Blast Furnace Gas

SAMPLE BOX NO. _____

METER BOX NO. _____

AMBIENT TEMPERATURE _____

BAROMETRIC PRESSURE _____

ASSUMED MOISTURE, % _____

PROBE LENGTH, in. _____

NOZZLE DIAMETER, in. _____

STACK DIAMETER, in. _____

PROBE HEATER SETTING _____

HEATER BOX SETTING _____

METER ΔH@ _____

C FACTOR 44 at 340°F / 53 at 200°F

PROCESS WEIGHT RATE _____

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	3:16		361	.02	.141	.87		359.42	58	48	246	30	4	
2	15:18		354	.02		.87		360.40	58	48	237	31	4	
3	15:20		341	.02		.87		361.36	58	48	258	32	4	
4	22		367	.015		.66		362.34	58	48	241	33	4	
5	24		345 338	.015		.66		363.22	57	48	252	34	4	
6	26		352	.02		.87		364.05	57	48	236	35	4	
7	28		356	.015	.122	.66		364.99	58	48	241	35	4	
8	30		360	.015		.66		365.86	57	48	256	35	4	
9	32		361	.020		.87		366.71	57	48	247	35	4	
10	34		362	.02		.87		367.66	58	48	272	35	4	
11	36		365	.015		.66		368.61	57	48	253	35	4	
12	38		288	.015		.70		369.46	57	48	247	35	4	
			4132					310.37	—	—				
				.21	1.58	9.3			1266					
TOTAL														
AVERAGE														

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					

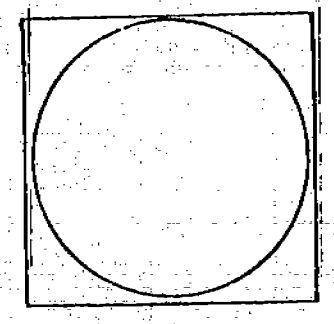
ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					

COMMENTS:

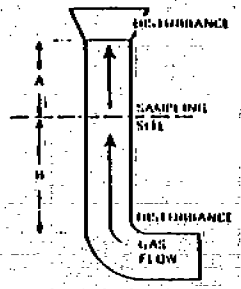
6172

EPA TRAIN FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION



PLANT U.S. Steel

DATE 2/2/80

LOCATION #3 Coke Battery Gas Ind.

OPERATOR Lanier + Others

STACK NO. #3 Coke B

RUN NO. 3-Part Blast Furnace Gas

SAMPLE BOX NO.

METER BOX NO.

AMBIENT TEMPERATURE

BAROMETRIC PRESSURE

ASSUMED MOISTURE, %

PROBE LENGTH, in.

NOZZLE DIAMETER, in.

STACK DIAMETER, in.

PROBE HEATER SETTING

HEATER BOX SETTING

METER $\Delta H_@$

C FACTOR .44 at 340°F / 530 200°

PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	1546		366	.02	.141	.87		370.37	58	47	35	246	4	
2	1548		343	.02		.87		371.35	58	48	35	252	4	
3	1550		330	.02		.87		372.31	58	48	35	264	4	
4	52		329	.015	.122	.66		373.29	58	48	35	239	4	
5	54		329	.015		.66		374.15	58	48	35	242	4	
6	56		331	.015		.66		374.98	58	48	35	248	4	
7	58		331	.02		.87		375.84	58	48	35	256	4	
8	1600		330	.02		.87		376.79	58	48	35	261	4	
9	02		332	.015		.66		377.76	58	48	35	264	4	
10	04		332	.02		.87		378.63	58	48	35	263	4	
11	06		332	.02		.87		379.59	58	48	35	268	4	
12	08		198	.010		.52		380.56	58	48	35	246	4	
								381.36						
			3483	.21	.5744	9.25								
TOTAL	51								1270					
AVERAGE	12													

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL VOLUME COLLECTED					

ORSAT MEASUREMENT

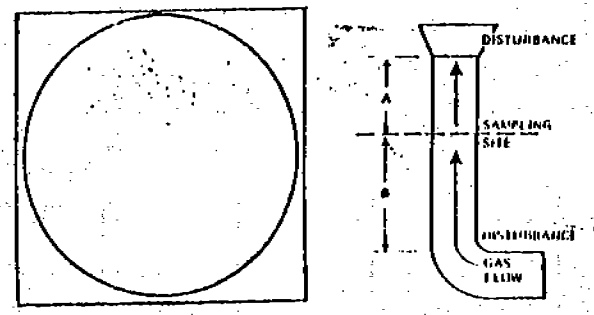
POINT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS:

111

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION

PLANT U.S. Steel
DATE 2/2/80
LOCATION Gary, Ind.
OPERATOR
STACK NO. 3 Coke-Blast Furnace Gas
RUN NO. 3 Part-Blast Furnace Gas
SAMPLE BOX NO.
METER BOX NO.

AMBIENT TEMPERATURE
BAROMETRIC PRESSURE
ASSUMED MOISTURE, %
PROBE LENGTH, in.
NOZZLE DIAMETER, in.
STACK DIAMETER, in.
PROBE HEATER SETTING
HEATER BOX SETTING

METER $\Delta H_@$
C FACTOR 44 at 390°F / 53 at 200F
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER °F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	1615	-1.6	368	.02	.1414		.87	381.345	54	47	241	31	4	
2	1617		354	.02			.87	382.27	56	47	242	32	4	
3	1619		361	.015			.66	383.2	56	48	240	33	4	
4	1621		367	.015	.1224		.66	384.05	56	48	251	34	4	
5	23		367	.016			.68	385.	57	48	263	35	4	
6	25		368	.02			.87	386	54	48	272	35	4	
7	27		368	.02			.87	386.92	57	48	258	35	4	
8	29		345	.02			.87	387.89	57	47	243	35	4	
9	31		328	.015			.66	388.85	56	48	237	35	4	
10	33		326	.015			.66	389.7	56	47	261	33	4	
11	35		323	.015			.66	390.52	55	47	259	36	4	
12	37		330	.015			.8	391.35	56	46	252	31	4	
			4198					392.25						
				.205				393.225						
					1.5638		9.11	11		1243				
TOTAL					.1314			43.875						
AVERAGE			334.291				.77		51.88					

.01739

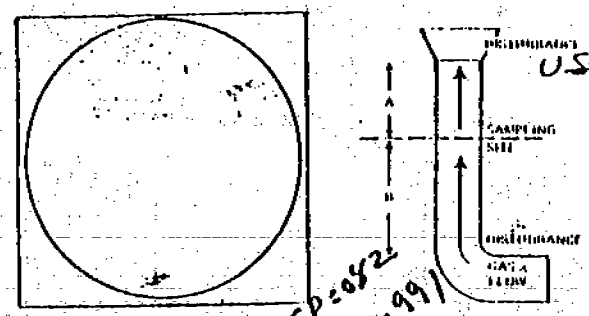
VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME, ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL					
INITIAL					
LIQUID COLLECTED					
TOTAL VOLUME COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1					
2					
3					
4					

COMMENTS: .117 .0511

PARTICULATE FIELD DATA

SCHEMATIC OF STACK



CROSS SECTION

CP=.082
F=0.991

PLANT U.S. Steel
DATE ~~[illegible]~~ 2/2/80
LOCATION #3 Coke Battery Gary Ind
OPERATOR LANIER & OTHERS
STACK NO. #3 Coke Blast Furnace Gas
RUN NO. Maintenance 3-Part-Blast Furnace Gas
SAMPLE BOX NO. #5
METER BOX NO. 479N

AMBIENT TEMPERATURE 15°F
BAROMETRIC PRESSURE ~~[illegible]~~ 30.44
ASSUMED MOISTURE, % ~~[illegible]~~ 4%
PROBE LENGTH, in. 146
NOZZLE DIAMETER, in. .037, .507
STACK DIAMETER, in. 19.0 ~~[illegible]~~
PROBE HEATER SETTING 9
HEATER BOX SETTING

METER ΔH@ 1.956
C FACTOR 44 at 340°F / 53 at 200°
PROCESS WEIGHT RATE

WEIGHT OF PARTICULATE COLLECTED, mg		
SAMPLE	FILTER	PROBE WASH
FINAL WEIGHT		
TARE WEIGHT	-5544	
WEIGHT GAIN		
TOTAL		

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (in. H_2O)	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F	SAMPLE BOX TEMPERATURE °F	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER F	PUMP VACUUM in. Hg gauge	VELOCITY fps
1	1450		361	.02	.1414	.87		348.42	46	45	246	25	4	
2	1452		363	.02		.87		349.37	49	45	248	34	4	
3	54		365	.015		.66		350.33	51	45	243	35	4	
4	56		367	.02		.87		351.18	52	45	256	35	4	
5	58		370	.015	.1214	.66		352.15	53	46	266	35	4	
6	1500		363	.015		.66		352.99	54	46	2702	35	4	
7	02		332	.02		.87		353.85	55	46	261	35	4	
8	04		329	.015		.66		354.81	57	47	253	35	4	
9	06		328	.015		.66		355.67	56	47	241	35	4	
10	08		327	.02		.87		356.52	57	48	231	35	4	
11	10		317	.02		.87		357.48	58	48	229	35	4	
12	12		263	.015		.66	.78	358.48	58	48	232	35	4	
			4025	.21	1.5808	9.3		359.42	1202					
TOTAL														
AVERAGE														

4 ports - 12 pts per port
2 min per port. Total Sampling Time 96 min

VOLUME OF LIQUID WATER COLLECTED	IMPINGER VOLUME ml 1	2	3	4	SILICA GEL WEIGHT, g
FINAL	621.5	651.8		436.4	660.6
INITIAL	622	635.0		433.1	651.1
LIQUID COLLECTED	621.5				
TOTAL VOLUME COLLECTED					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO	N_2
1		19.2	7.5		
2		19.3	7.8		
3		19.0	7.6		
4					

COMMENTS:

U.S. Steel
Gary
#13 Coke
Run 1 Part

$V_{w_{STD}} = (V_w)(0.04707)$

Isokinetic Field Calculations

DECIMAL FRACTION

Ts (°R)	830.6	Vm (FT^3)	38.61	δ (DGMCF)	.999	CO_2	
Tm (°R)	518.4	Vw (FT^3)	2.321	Cp (PITOT)	.84	O_2	
ΔPs ("H_2O)	29.70	Pb ("Hg)	29.81	θ (MIN)	96	CO	
Pm ("H_2O)	29.85	$(\Delta P)^{1/2}$	0.150	An (FT^2)	0.001032	N_2	

$$An = \left(\frac{dn}{2*12}\right)^2 \pi$$

Pm = ΔH/13.6 + Pb = ( )/13.6 + Pb = _____

Ps = ΔPs/13.6 + Pb = ( )/13.6 + Pb = _____

1.3124958

Vm_{std} = (17.64) (δ) (Vm) (Pm)/Tm = (17.64) ( ) ( )/( ) = 39.178

$\%H_2O = Vw_{std}/(Vm_{std} + Vw_{std})$ = [( )/( ) + ( )] *100 = 5.59

DGF = 1 - $\%H_2O$/100 = 1-( )/100 = 0.9441

Mw = (44) (CO_2) (DGF) + (28) (CO) (DGF) + (28) (N_2) (DGF) + (18) ($\%H_2O$/100) = _____

(44) ( ) (.9441) + (32) ( ) (.9441) + (28) ( ) (.9441) + (28) ( ) (.9441)

+ (18) (0.0559) = _____

$$Vs = (85.49)(Cp)(\Delta P)^{1/2}\left[\frac{Ts}{Mw\ Ps}\right]^{1/2} = (85.49)(\quad)(\quad)\left[\frac{(\quad)}{(\quad)(\quad)}\right]$$

$$\%I = \frac{(0.0945)(Vm_{std})(Ts)}{(Ps)(Vs)(An)(\theta)(DGF)} = \frac{(0.0945)(\quad)(\quad)}{(\quad)(\quad)(\quad)(\quad)(\quad)} = \_\_\_\_$$

41.499

38.66+

2.541228

#3 Coke Battery

TRAVERSE POINT LOCATION SHEET

Stack Diameter (inches) 234

Distance A (inches) > 2 dia

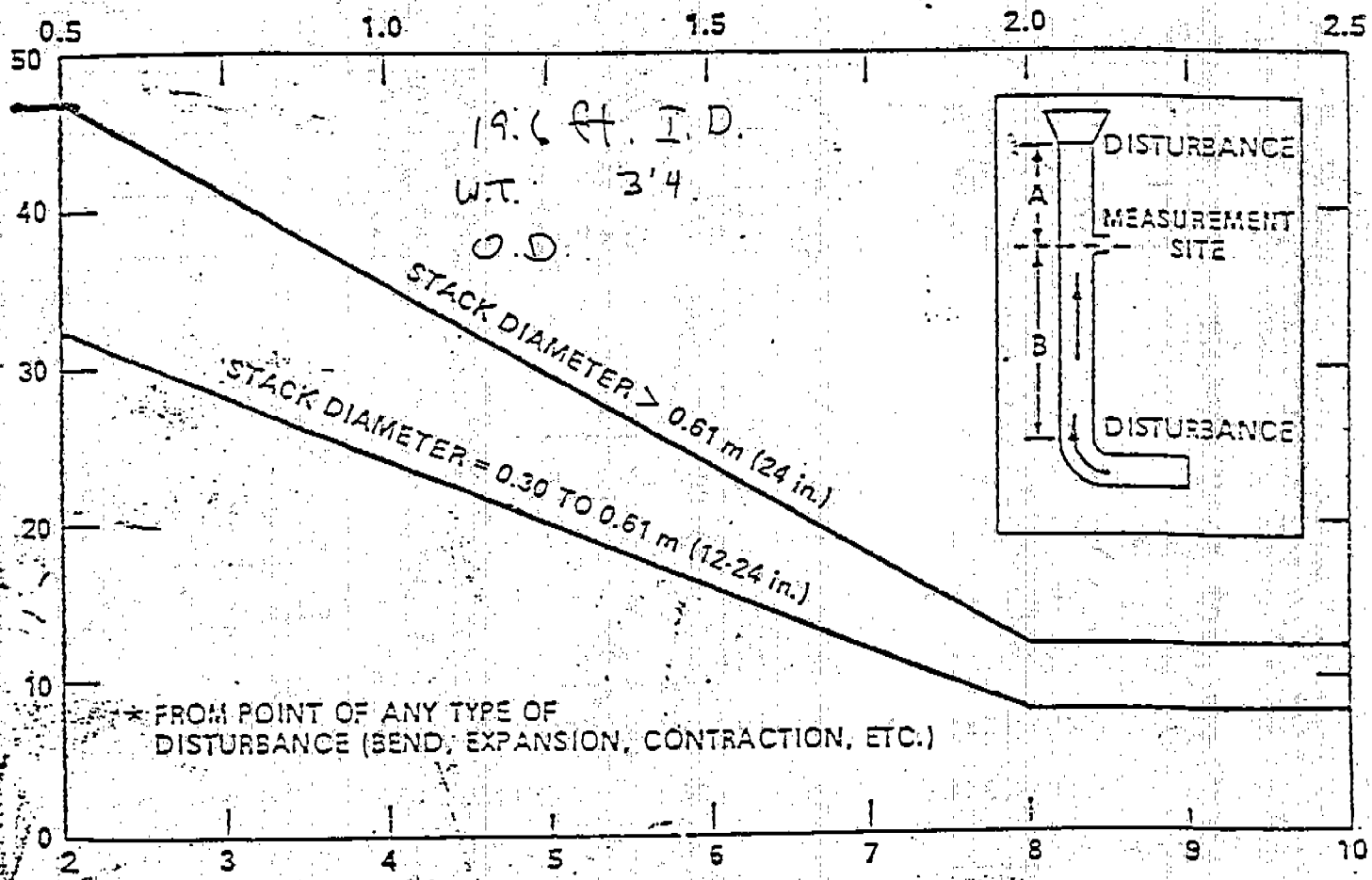
Distance A (diameters) > 2 dia

Port Extension (inches) 38 in + 12 in wt.

Distance B (inches) 468 in

Distance B (diameters) 2 dia.

DUCT DIAMETERS UPSTREAM FROM FLOW DISTURBANCE (DISTANCE A)



DUCT DIAMETERS DOWNSTREAM FROM FLOW DISTURBANCE* (DISTANCE B)

143 1/8 / 120

Total Number of Traverse Points 48

Number of Points per Traverse 24

12 pts per port

Probe Markings (Inches)

1	52.5	7	87 5/8	13		19	
2	57.5	8	95 1/3	14		20	
3	62 5/8	9	103 7/8	15		21	
4	18 1/2	10	163 5/8	16		22	
5	7[illegible]4 1/2	11	175 1/2	17		23	
6	870 7/8	12	143 1/8	18		24	

511229

Isokinetic Field Calculations

DECIMAL FRACTION

Ts (°R)	748.912	Vm (FT^3)	34.33	δ (DGMCF)	.996	CO_2	.0533
Tm (°R)	519.333	Vw (FT^3)	13.47	Cp (PITOT)	.842	O_2	.0833
ΔPs ("H_2O)	.00989	Pb ("Hg)	30.00	θ (MIN)	96	CO	.002
ΔHm ("H_2O)	.419 / .03045	$(\Delta P)^{1/2}$	.09632	An (FT^2)	.04152 6	N_2	7.637

$$An = \left(\frac{dn}{2*12}\right)^2 \pi$$

Vw_{std} = .0967 / .07707 Vw

Vw std = 5.616 / 6.34 / 11.21

Pm = ΔH/13.6 + Pb = ( )/13.6 + Pb = 30.03045

Ps = ΔPs/13.6 + Pb = ( )/13.6 + Pb = 29.8877

Vm_{std} = (17.64) (δ) (Vm) (Pm)/Tm = (17.64) ( ) ( )/( ) = 34.874

$\%H_2O = Vw_{std}/(Vm_{std} + Vw_{std})$ = [( )/( ) + ( )] *100 = 13.868 / 15.34

DGF = 1 - $\%H_2O$/100 = 1-( )/100 = .86132

Mw = (44) (CO_2) (DGF) + (28) (CO) (DGF) + (28) (N_2) (DGF) + (18) ($\%H_2O$/100) = _____

(44) (.0533) (.86132) + (32) (.0833) (.8613) + (28) (.002) (.8613) + (28) (.7637) (.8613) + (18) (.1386) = 26.164 = 27.84

$$Vs = (85.49)(Cp)(\Delta P)^{1/2}\left[\frac{Ts}{Mw\ Ps}\right]^{1/2} = (85.49)(.842)(.0963)\left[\frac{(\ )}{(\ )(\ )}\right]^{1/2} = \_\_\_$$

$$\%I = \frac{(0.0945)(Vm_{std})(Ts)}{(Ps)(Vs)(An)(\theta)(DGF)} = \frac{(0.0945)(34.874)(748.912)}{(\ )(\ )(\ )(\ )(\ )} = \_\_\_$$

29.8877 x 6.741 x .04152 x 96 x .86132

101.735 / 104.336

2.019
1.443
.044
21.018
1.10
26.164

103.55

.0036

511230

Date: 9-20-79

Box No. 481N

Barometric Pressure, Pb = 29.73 in. Hg

Orifice Manomer Setting ΔH In. H_2O	Gas Volume Wet Test Meter Vw, ft3 (Int)	Gas Volume Dry Gas Meter Vd, ft3 (Final)	WET TEST Wet Test Meter °F TW	DRY GAS METER Inlet tdi °F (Int)	Inlet tdi °F (Final)	Outlet tdo °F °F (Int)	Outlet tdo °F. (Final)	Average Td, °F	Time θ, Min.	Y	ΔHθ
0.5	5	586.83 / 581.36	70.5	127	130	115	120	123	11.92	1.003	1.46
0.0	5	580.27 / 574.835	70.5	124	128	110	115	119.25	10.35	1.003	1.7
1.0	5	541.97 / 536.95	70.5	70	90	77	73	77.5	8.83	1.007	1.74
1.5	6 7	550.175 / 542.98	70.5	89	108	78	84	89.75	10.60	1.004	1.87
2.0	10	561.815 / 551.22	70.5	107	123	87	97	103.50	13.42	.998	1.918
3.0	10	573.75 / 562.885	70.6	121	135	100	110	116.50	10.93	.993	1.86
									Average	1.001	1.77

CALCULATIONS

H	ΔH / 13.6	Y: vw Pb (td + 460) / vd [Pb + (ΔH ÷ 13.6)]	ΔHθ: 0.0317 ΔH / Pb(td + 460) [(tw + 460) θ / vw]²
5	0.0368		
0	0.0500		
0	0.0737		
5	0.110		
0	0.147		
0	0.221		

[illegible] accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

[illegible] Tolerance = ± 0.

117

Date: 9-18-79 Box No. 479N

Barometric Pressure, Pb = 30.05 in. Hg

Orifice Manomer Setting ΔH In. H_2O	Gas Volume Wet Test Meter Vw, ft^3 (Int)	Gas Volume Dry Gas Meter Vd, ft^3 (Final)	WET TEST Wet Test Meter °F TW	DRY GAS METER Inlet tdi °F (Int)	Inlet tdi °F (Final)	Outlet tdo °F (Int)	Outlet tdo °F (Final)	Average Td, °F	Time Min.	Y	ΔH@
0.5	5	175.795 / 170.56	71.5	100	100	94	95	97.25	13.17	1.000	1.855
0.0	5	169.515 / 164.245	71.0	101	103	94	95	98.5	10.60	.996	1.915
1.0	5	132.355 / 127.175	70.0	86	84	93	85	87	9.45	.994	1.934
1.5	5	138.63 / 133.40	70.5	92	99	87	88	91.5	7.83	.990	1.980
2.0	10	150.23 / 139.68	70.5	95	105	88	91	94.75	13.70	.986	2.008
3.0	10	163.185 / 152.580	71.0	103	109	92	94	99.5	11.32	.982	2.014
									Average	.991	1.956

CALCULATIONS

	ΔH / 13.6	Y: $\frac{Vw\ Pb\ (td + 460)}{Vd\ [Pb + (\Delta H \div 13.6)](tw+460)}$	ΔH@: $\frac{0.0317\ \Delta H}{Pb(td + 460)} \left[\frac{(tw + 460)\ \theta}{Vw}\right]^2$
	0.0360		
	0.0500		
	0.0737		
	0.110		
	0.147		
	0.221		

Ratio of accuracy of wet test meter to dry test meter. Tolerance = + 0.01

[illegible] differential that gives 0.75 cfm of air at 70° F and 29.92 in. of mercury. In H_2O Tolerance = + 0.15

118

Date: 2.25.80 Box No. 479N

Barometric Pressure, Pb = 30.31 in. Hg

Orifice Manomer Setting ΔH In. H_2O	Gas Volume Wet Test Meter Vw, ft^3 (Int)	Gas Volume Dry Gas Meter Vd ft^3 (Final)	WET TEST Wet Test Meter °F Tw	DRY GAS METER Inlet tdi °F (Int)	Inlet tdi °F (Final)	Outlet tdo °F °F (Int)	Outlet tdo °F (Final)	Average Td, °F	Time θ, Min.	γ	ΔH@
0.5	5	866.18 / 871.29	67.5	87	82	90	84	85.75	14.33	1.011	2.1[illegible]
0.0	5	900.25 / 905.42	68.5	95	89	87	94	91.25	10.41	1.012	1.83
1.0	5	853.91 / 859.03	67	84	79	91	81	83.75	9.316	1.004	1.85[illegible]
1.5	5	880.55 / 885.72	68	95	85	92	87	89.75	7.65	1.003	1.65[illegible]
2.0	10	886.71 / 891.91	68.5	96	86	97	87	91.5	6.7	1.004	1.90[illegible]
3.0	10	906.97 / 911.67	68.5	97	87	101	87	93	5.56	.9965	1.95
									Average	1.0054	1.93[illegible]

CALCULATIONS

H	ΔH / 13.6	γ = vw Pb (td + 460) / vd [Pb + (ΔH ÷ 13.6)]	ΔH@ = 0.0317 ΔH / Pb(td + 460) [(tw + 460) θ / vw]²
5	0.0368		
0	0.0588		
0	0.0737		
5	0.110		
0	0.147		
0	0.221		

[illegible] racy of wet test meter to dry test meter. Tolerance = ± 0.01

Date: 9-19-79 Box No. 482N

Barometric Pressure, Pb = 30.01 in. Hg

Orifice Manomer Setting ΔH In. H_2O	Gas Volume Wet Test Meter Vw, ft^3 (Int)	Gas Volume Dry Gas Meter Vd, ft^3 (Final)	WET TEST Wet Test Meter °F tw	DRY GAS METER Inlet tdi °F (Int)	Inlet tdi °F (Final)	Outlet tdo °F °F (Int)	Outlet tdo °F (Final)	Average Td, °F	Time θ, Min.	Y	ΔH@
0.5	5	319.015 / 313.885	70.5	88	91	84	85	87	14.37	1.001	2.24
0.0	5	306.665 / 301.58	70	81	88	79	79	81.75	10.87	1.003	2.07
1.0	5	259.325 / 254.280	67.5	73	80	69	70	73	9.83	.999	2.131
1.5	5	288.155 / 282.995	67	87	93	79	80	84.75	8.27	.998	2.21C
2.0	10	299.55 / 289.195	67	87	97	79	81	86	14.58	.995	2.28
3.0	10	270.585 / 260.35	67.5	81	94	73	76	81	11.85	.995	2.28
									Average	.999	2.20

CALCULATIONS

	$\frac{\Delta H}{13.6}$	Y $\frac{vw\ Pb\ (td + 460)}{vd\ [Pb + (\Delta H \div 13.6)]}$	ΔH@ $\frac{0.0317\ \Delta H}{Pb(td + 460)} \left[\frac{(tw + 460)\ \theta}{vw}\right]^2$
	0.0360		
	0.0580		
	0.0737		
	0.110		
	0.147		
	0.221		

Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01

Orifice pressure differential that gives 0.75 cfm of air at 70°F and 29.92 In. of mercury, In H_2O Tolerance = ± 0.1

Date: [illegible] Box No. [illegible]

Barometric Pressure, Pb = 30.12 in. Hg

Orifice Manomer Setting ΔH In. H_2O	Gas Volume Wet Test Meter Vw, ft^3 (Int)	Gas Volume Dry Gas Meter Vd, ft^3 (Final)	WET TEST Wet Test Meter °F TW	DRY GAS METER Inlet tdi °F (Int)	Inlet tdi °F (Final)	Outlet tdo °F °F (Int)	Outlet tdo °F, (Final)	Average Td, °F	Time θ, Min.	Y	ΔH@
0.5	5	782.97 / 777.86	68	78	86	93	82	84.75	13.5	1.0082	1.9
0.8	5	789.163 / 784.00	69	83	94	86	97	90	11.00	1.0045	2.0
1.0	5	796.49 / 791.23	70	98	87	87	99	92.75	9.75	1.0022	2.0
1.5	5	802.633 / 797.96	70.5	87	99	87	102	93.75	8.00	1.0048	2.0
2.0	10	809.91 / 804.70	70.5	87	100	103	88	94.5	6.833	.9982	1.9
3.0	10	817.22 / 812.0	71	87	104	89	104	97		1.0233	2.11
									Average	1.0065	2.0

CALCULATIONS

	ΔH / 13.6	Y: $\frac{vw\ Pb\ (td + 460)}{vd\ [Pb + (\Delta H \div 13.6)](tw + 460)}$	ΔH@: $\frac{0.0317\ \Delta H}{Pb(td + 460)} \left[\frac{(tw + 460)\ \theta}{vw}\right]^2$
	0.0368		
	0.0500		
	0.0737		
	0.110		
	0.147		
	0.221		

Ratio of accuracy of wet test meter to dry test meter. Tolerance = + 0.01

[illegible] differential that gives 0.75 [illegible]

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TABLE

GRAVIMETRIC ANALYSIS BREAKDOWN - FRONT CATCH
(ALL WEIGHTS ARE NET, CORRECTED FOR BLANKS)
BATTERY NUMBER THREE COKE OVEN GAS

TEST	FILTER	PROBE WASH	TOTAL FRONT
1	0.0449	0.0342	0.07910
2	0.0533	0.0647	0.1180
3	0.0507	0.0490	0.09970

TABLE

GRAVIMETRIC ANALYSIS BREAKDOWN - TOTAL CATCH
(ALL WEIGHTS ARE NET, CORRECTED FOR BLANK)
BATTERY NUMBER THREE COKE OVEN GAS

TEST GAS STACK RUN #	TOTAL FRONT	-	SULFATES	=	TOTAL CATCH MINUS SULFATES
1	0.0791		0.04607		0.03303
2	0.1180		0.04893		0.06907
3	0.09970		0.02878		0.07092

TABLE

GRAVIMETRIC ANALYSIS BREAKDOWN - FRONT CATCH
(ALL WEIGHTS ARE NET, CORRECTED FOR BLANKS)
BATTERY NUMBER THREE BLAST FURANCE GAS

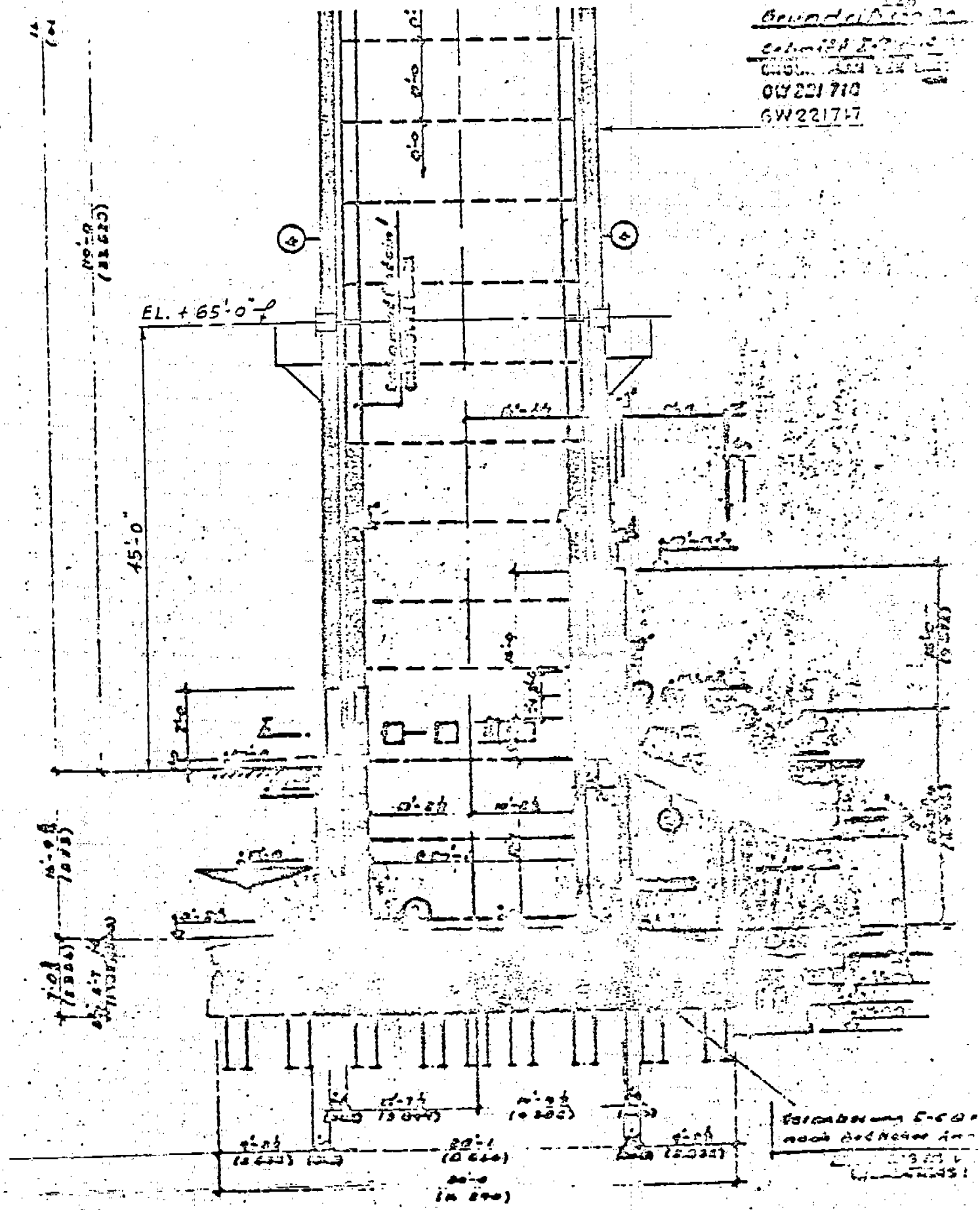
TEST	FILTER	PROBE WASH	TOTAL FRONT
1	0.0138	0.0214	0.03520
2	0.0121	0.0163	0.02840
3	0.0888	0.0191	0.1079

TABLE

GRAVIMETRIC ANALYSIS BREAKDOWN - TOTAL CATCH
(ALL WEIGHTS ARE NET, CORRECTED FOR BLANK)
BATTERY NUMBER THREE BLAST FURNACE GAS

TEST	TOTAL FRONT	- SULFATES	= TOTAL CATCH MINUS SULFATES
GAS STACK RUN # Blast Furance			
1	0.03520	0.003817	0.03138
2	0.02840	0.003212	0.02519
3	0.01079	0.003324	0.007466

511239



NO 3 COKE BATTERY STACK
KEY NO. 121
LOOKING WEST

511240

Smoke Evaluation Form
U. S. Steel Corp.
Gary Works

Facility: #3 Battery - Underfire Stack
Blast Furnace Gas
Run #1 - Page 1

Date: 2-1-80
U.S.S.C. Observer: K. Hursey
Inspecting Agency: Kemron

B.F.G.

Observation Point: NW of source ground level

Distance from stack: 200 yds.
Stack Height: 225'
Color of Emission:
Reading Conditions: Good
Observation Began 3:15 Ended 3:59
Background: Sky
Sky Condition: Clear
Temperature: 32° Wind: NE @5-10
Humidity:
Regulatory Personnel:

Comments:
- = View obscured by emissions from #5 - #7 Quench Station

Signature: [signature]

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

511241

Smoke Evaluation Form
U. S. Steel Corp.
Gary Works

Facility: #3 Battery - Under Fire Stack
Blast Furnace Gas
Row #1 - Page 2

Date: 2-1-80
U.S.S.C. Observer: K. Hurley
Inspecting Agency: Cameron

Observation Point: NW of source
ground level

Distance from stack: 200 yds.
Stack Height: 225'
Color of Emission:
Reading Conditions: Good
Observation Began 4:00 Ended 4:59
Background: Sky
Sky Condition: Clear
Temperature: 22° Wind: NE @ 5-10
Humidity:
Regulatory Personnel:

Comments:
- = view obscured by emissions
from #5 - #7 Quench Station

Signature: K. S. H

	0	15	30	45		0	15	30	45	Color
0	30	60	25	-	30	0	0	0	0	
1	10	10	5	0	31	0	0	0	0	
2	5	5	5	0	32	0	0	0	0	
3	0	0	0	0	33	0	0	0	0	
4	-	0	-	-	34	0	0	0	-	
5	0	0	0	0	35	-	-	0	0	
6	0	0	0	0	36	0	0	0	0	
7	0	0	0	0	37	0	0	0	0	
8	0	0	0	0	38	0	0	0	0	
9	0	0	0	0	39	0	0	0	0	
Black 10	0	-	0	10	40	0	0	0	0	
11	25	30	30	15	41	0	0	-	-	
12	15	10	10	10	42	-	0	0	0	
13	5	5	5	5	43	0	0	0	0	
14	5	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	-	-	-	-	
19	0	0	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	52	0	0	0	0	
23	0	0	0	0	53	0	-	0	-	
24	0	0	0	0	54	0	0	0	0	
25	0	0	0	0	55	0	0	0	0	
26	0	0	0	0	56	0	0	0	0	
27	0	0	0	0	57	0	0	0	0	
28	0	0	-	-	58	0	0	0	0	
29	0	0	0	0	59	0	0	0	0	

SMOKE EVALUATION FORM
U. S. STEEL CORP.
GARY WORKS

FACILITY: #3 Battery - Underfire Stack
Blast Furnace Gas
Run #1 - Page 3

DATE: 2-1-80
U.S.S.C. OBSERVER: K. Horsey
INSPECTING AGENCY: Komrow

OBSERVATION POINT: NW of Source ground level

DISTANCE FROM STACK: 200 yds.
STACK HEIGHT: 225'
COLOR OF EMISSION:
READING CONDITIONS: Good
OBSERVATION BEGAN 5:00 ENDED 5:15
BACKGROUND: Sky
SKY CONDITION: Clear
TEMPERATURE: 22° WIND: NE @ 5-10
HUMIDITY:
REGULATORY PERSONNEL:

COMMENTS:
- View obscured by emissions from #5-#7 Quench Station

SIGNATURE:

	COLOR	0	15	30	45		0	15	30	45	COLOR
0		O	O	O	-	30					
1		-	-	O	O	31					
2		O	O	O	O	32					
3		-	O	O	O	33					
4		O	O	O	O	34					
5		O	O	O	O	35					
6		O	O	-	O	36					
7		O	O	O	O	37					
8		O	O	O	O	38					
9		O	O	O	O	39					
10		O	O	O	O	40					
11		O	O	O	O	41					
12		O	-	-	O	42					
13		O	O	O	O	43					
14		O	O	O	O	44					
15		O	O	O	O	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					

SMOKE EVALUATION FORM
U. S. STEEL CORP.
GARY WORKS

FACILITY: #3 Battery - Underfire Stack
Blast Furnace Gas
Run #2 - Page 1

DATE: 2-2-80
U.S.S.C. OBSERVER: K. Horsel
INSPECTING AGENCY: Lemrow

B.F.G.

OBSERVATION POINT: NE of source ground level

DISTANCE FROM STACK: 150 yds.
STACK HEIGHT: 225'
COLOR OF EMISSION:
READING CONDITIONS: FAIR
OBSERVATION BEGAN 10:45 ENDED 10:57
BACKGROUND: Sky
SKY CONDITION: Partly Cloudy
TEMPERATURE: 12° WIND: NW @ 5-10
HUMIDITY:
REGULATORY PERSONNEL:

COMMENTS:

SIGNATURE: [signature]

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

Smoke Evaluation Form
U. S. Steel Corp.
Gary Works

Facility: #3 Battery Underfire Stack
Blast Furnace Gas
Run #2 - Page 2

Date: 2-2-80
U.S.S.C. Observer: K. Hursey
Inspecting Agency: Kemron

Observation Point: NE of Source
Ground level

Distance from stack: 150 yds.
Stack Height: 225'
Color of Emission:
Reading Conditions: Fair
Observation Began 11:00 Ended 11:59
Background: SEly
Sky Condition: Partly Cloudy
Temperature: 12° Wind: NW @ 5-10
Humidity:
Regulatory Personnel:

Comments:

Signature: S. K

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

511245

SMOKE EVALUATION FORM
U. S. STEEL CORP.
GARY WORKS

FACILITY: #3 Battery underfire stack
Blast Furnace Gas
Run # 2 - Page 3

DATE: 2-2-80
U.S.S.C. OBSERVER: K. Hursey
INSPECTING AGENCY: Kemron

OBSERVATION POINT: NE x E Source ground level

DISTANCE FROM STACK: 150 yds
STACK HEIGHT: 225'
COLOR OF EMISSION:
READING CONDITIONS: FAIR
OBSERVATION BEGAN 12:00 ENDED 12:45
BACKGROUND: Sky
SKY CONDITION: Partly Cloudy
TEMPERATURE: 12° WIND: NW @ 5-10
HUMIDITY:
REGULATORY PERSONNEL:

COMMENTS:

SIGNATURE: [signature]

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

511246

SMOKE EVALUATION FORM
U. S. STEEL CORP.
GARY WORKS

FACILITY: #3 Battery Unwaffire Stacks
Blast Furnace Gas
Row #3 - Page 1

DATE: 2-2-80
U.S.S.C. OBSERVER: K. Hursey
INSPECTING AGENCY: Kemron

B.F.G.

OBSERVATION POINT: 1FT of source
ground level

DISTANCE FROM STACK: 200 yds.
STACK HEIGHT: 225'
COLOR OF EMISSION:
READING CONDITIONS: GOOD
OBSERVATION BEGAN 3:00 ENDED 3:55
BACKGROUND: SKY
SKY CONDITION: Clear
TEMPERATURE: 20° WIND: SW @ 5-10
HUMIDITY:
REGULATORY PERSONNEL:

COMMENTS:

SIGNATURE: K. Hursey

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

51124

Smoke Evaluation Form
U.S. Steel Corp.
Gary Works

Facility: #3 Battery Underfire Stack
Blast Furnace Gas
Run #3 - Page 2

Date: 2-2-80
U.S.S.C. Observer: K. Hursey
Inspecting Agency: Kemron

Observation Point: 1/4 of source ground level

Distance from stack: 200 yds.
Stack Height: 225'
Color of Emission:
Reading Conditions: Good
Observation Began 4:20 Ended 4:59
Background: Sky
Sky Condition: Clear
Temperature: 20° Wind: SW @ 5-10
Humidity: 50% Bar 30.42
Regulatory Personnel:

Comments:

Signature: K. S. Hursey

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

P. 1

SMOKE EVALUATION FORM
U.S. STEEL CORP.
GARY WORKS

DATE: 2/6/80

FACILITY: #2 BATTERY
STACK TEST
TEST #2 RUN #1

U.S.S.C. OBSERVER: [illegible]

INSPECTING AGENCY:

C.O.G.

OBSERVATION POINT: EAST OF STACK

DISTANCE FROM STACK: [illegible]

STACK HEIGHT:

COLOR OF EMISSION:

READING CONDITIONS: FAIR

OBSERVATION BEGAN [illegible] ENDED [illegible]

BACKGROUND: SKY

SKY CONDITION: CLOUDY

TEMPERATURE: 20 WIND: NE @ 15

HUMIDITY:

REGULATORY PERSONNEL:

COMMENTS:

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

SIGNATURE:

P.K. [illegible]

511249

SMOKE EVALUATION FORM
U.S. STEEL CORP.
GARY WORKS

FACILITY: # 3 BATTERY STACK TEST TEST #1 RUN #1

DATE: 2/6/80

U.S.S.C. OBSERVER: [illegible]

INSPECTING AGENCY:

P.O.#

OBSERVATION POINT: EAST OF STACK

DISTANCE FROM STACK: 200 YD.

STACK HEIGHT:

COLOR OF EMISSION:

READING CONDITIONS: FLIR

OBSERVATION BEGAN 9:32A ENDED 1:32A

BACKGROUND: SKY

SKY CONDITION: CLOUDY

TEMPERATURE: 20 WIND: NE@15

HUMIDITY:

REGULATORY PERSONNEL:

COMMENTS:

SIGNATURE: P.K. [illegible]

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

SMOKE EVALUATION FORM
U.S. STEEL CORP.
GARY WORKS

FACILITY: #3 BATTERY
STACK TEST
TEST #2 RUN #2

DATE: 2/6/80
U.S.S.C. OBSERVER: [illegible]
INSPECTING AGENCY:

C.O.C.

OBSERVATION POINT: EAST OF STACK

DISTANCE FROM STACK: 21 [illegible]
STACK HEIGHT:
COLOR OF EMISSION:
READING CONDITIONS: FAIR
OBSERVATION BEGAN 11:45 ENDED 1:45
BACKGROUND: SKY
SKY CONDITION: DTL V SUNNY
TEMPERATURE: 25 WIND: NE @ [illegible]
HUMIDITY:
REGULATORY PERSONNEL:

COMMENTS:

SIGNATURE: D. [illegible]

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

511251

P.2

SMOKE EVALUATION FORM
U.S. STEEL CORP.
GARY WORKS

DATE: 2/6/80

FACILITY: #2 BATTERY
STEEL TEST
TEST #2 RUN

U.S.S.C. OBSERVER: MURPHY

INSPECTING AGENCY:

1.0.6

OBSERVATION POINT: EAST OF STACK

DISTANCE FROM STACK: 200 YD.

STACK HEIGHT:

COLOR OF EMISSION:

READING CONDITIONS: FAIR

OBSERVATION BEGAN 1145 ENDED 1[illegible]

BACKGROUND: SKY

SKY CONDITION: PTLY SUNNY

TEMPERATURE: 25 WIND: NE@10

HUMIDITY:

REGULATORY PERSONNEL:

COMMENTS:

SIGNATURE:

D.K. Murphy

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

511252

U.S. STEEL CORP.
- GARY WORKS

FACILITY: #3 BATTERY
STACK TEST
TEST 2 RUN #3

DATE: 2/6/80
U.S.S.C. OBSERVER: M. [illegible]
INSPECTING AGENCY:

OBSERVATION POINT: EAST OF STACK

DISTANCE FROM STACK: 200 ft.

STACK HEIGHT:

COLOR OF EMISSION:

BACKGROUND: SKY

OBSERVATION BEGAN 2:45 ENDED 3:15

READING CONDITIONS: FAIR

SKY CONDITION: PTLY CLOUDY

TEMPERATURE: 1C WIND: N @ 1C

HUMIDITY:

REGULATORY PERSONNEL:

COMMENTS:

SIGNATURE: P.K. [illegible]

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

511253

SMOKE EVALUATION FORM
U.S. STEEL CORP.
GARY WORKS

DATE: 2/4/90

FACILITY: #3 BOTTOM STACK TEST TRETAL RUN 3

U.S.S.C. OBSERVER: [illegible]

INSPECTING AGENCY: /

C.O.G.

OBSERVATION POINT: EAST OF STACK

DISTANCE FROM STACK: 700 YD

STACK HEIGHT:

COLOR OF EMISSION:

READING CONDITIONS: FAIR

OBSERVATION BEGAN 2:50 PM ENDED 1:45 PM

BACKGROUND: SKY

SKY CONDITION: PTLY CLDY.

TEMPERATURE: 25 WIND: N @ 10

HUMIDITY:

REGULATORY PERSONNEL:

COMMENTS:

SIGNATURE: [illegible]

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

BATTERY NO. 3 NO. OF OVENS 57 BATTERY NO. _____ NO. OF OVENS _____

	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS		OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS
1	39		3-40		1				
2	41		55		2				
3	43			42 mtg Repair	3				
4	45		4.05		4				
5	47		40	TEST #1	5				
6	49	4.35	50	RUN #1	6				
7	51	40	55		7				
8	53	50	5-10		8				
9	55	55	20		9				
10	57	5-05	45		10				
11	2	15	55		11				
12	4	35	6.10		12				
13	6	45	20		13				
14	8	50	30		14			50	Heats Lost
15	10	6.00	40		15			30	Heats Pushed
16	12	05	50		16			52	Ovens in use
17	14	15	7-00		17				E Williams
18	16	20	50		18				
19	18	30	8.05		19				
20	20	7-10	15		20				
21	22	8-00	25		21				
22	24	05	40		22				
23	26	20	45		23				
24	28	30	55		24				
25	30	45	9.10		25				
26	32			32 mtg Repair	26				
27	34			34 mtg Repair	27				
28	36	55	20		28				
29	38			38 mtg Repair	29				
30	40	9-05	35	33 mtg Repair	30				
31	42	10	45		31				
32	44	20	50		32				
33	46	30	10.00		33				
34	48	35	20		34				
35	50	45			35				
36	52	10-00			36				
37	54	15			37				
38	56	35			38				
39					39				

BATTERY NO. 3 NO. OF OVENS 57 BATTERY NO. _____ NO. OF OVENS _____

	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS
1	55	8:00	8:15	
2	57	05	9:15	
3	2	9:20	45	
4	4	30	10:40	
5	6	10:35	50	
6	8	45	11:35	
7	10	50	45	Test #1
8	12	11:30	55	Real #2
9	14	40	12:05	
10	16	45	15	
11	18	55	20	
12	20	12:05	30	
13	22	10	35	
14	24	15	40	
15	26	30	1:00	
16	28	40	10	
17	30	45	30	
18	32			
19	34			
20	36	1:05	35	
21	38			
22	40	25	45	
23	42	30	2:10	
24	44	40	15	
25	46	45	20	
26	48	55	25	
27	50	2:00	35	
28	52	05		
29	54	15		
30	56	20		
31	1	50		
32				
33				
34				
35				
36				
37				
38				

	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS
1				
2				
3				
4				
5				
6				
7				
8				
9			28	Heats Pushed
10				
11			28	Heats Scheduled
12				
13			52	Ovens in Use
14				
15				2 Missed
16				
17	32, 33, 34 & 38			mty c/s p/s
18				
19	049			mty p/s oven Repair
20				
21				
22				
23				
24				
25				✓
26				
27				✓
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				

2-2-80

BATTERY NO. 5 NO. OF OVENS 57 BATTERY NO. _____ NO. OF OVENS _____

	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS		OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS
1	52		3.30		1				
2	54		45	TEST #1	2				
3	56		50	Rul #3	3				
4	1		4.00		4				
5	3	3.45	15		5				
6	5	4.00	20		6				
7	7	10	30		7				
8	9	15	35		8				
9	11	20	40		9				
10	13	30	5.10		10				
11	15	45	25		11				
12	17	5.00	35		12				
13	19	15	55		13				
14	21	30	6.05		14				
15	23	45	25		15				28 Heats [illegible]
16	25	6.00	7.35		16				28 Heats [illegible]
17	27	15	50		17				52 [illegible]
18	29	30	8.10		18				E. Williams
19	31	7.45	15	32 mtg Repair	19				-2 Coking Time
20	33			33 mtg Repair	20				
21	35	8.05	25	34 mtg Repair	21				
22	37	10	40	38 mtg Repair	22				
23	39	20	45		23				
24	41	30	9.20		24				
25	43			43 mtg Repair	25				
26	45	40	30		26				
27	47	9.05	35		27				
28	49	15	10.00		28				
29	51	30	15		29				
30	53	50	35		30				
31	55	10.00			31				
32	57	05			32				
33	2	25			33				
34	4	40			34				
35					35				
36					36				
37					37				
38					38				

511257

TURN 7-3
2-6-80

BATTERY NO. 3 NO. OF OVENS 57 BATTERY NO. _____ NO. OF OVENS _____

	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS		OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS
1	33			33 mtg Repair	1				
2	35		7.50		2				
3	37		8.00		3				
4	39		15		4				
5	41		25		5				
6	43			43 mtg Repair	6				
7	45	7.50	40		7				
8	47	8.00	50		8				
9	49	10	9.05		9				
10	51	20	15		10				
11	53	30	35		11				
12	55	40	45	TEST #2	12				30 [illegible]
13	57	50	55	RUN #1	13				30 [illegible]
14	2	9.30	10.10		14				51 [illegible]
15	4	40	25		15				[illegible]
16	6	50	35		16				
17	8	10.00	50		17				
18	10	25	55		18				
19	12	35	10.10		19				
20	14	40	20	TEST #2	20				
21	16	50	55	RUN #2	21				
22	18	11.00	1.05		22				
23	20	12.00	25		23				
24	22	45		22 mtg C/S [illegible]	24				
25	24	12.45	35		25				
26	26	1.05	45		26				
27	28	15	55		27				
28	30	[illegible]	2.10		28				
29	32			32 mtg Repair	29				
30	34			34 mtg Repair	30				
31	36	[illegible]	20		31				
32	38			38 mtg Repair	32				
33	40	35	30		33				
34	42	[illegible]	45	TEST #2	34				
35	44	[illegible]	50	RUN #3	35				
36	46	[illegible]			36				
37	48	[illegible]			37				
38	50	[illegible]			38				
39	52	35			39				
40	54	45			40				

511258

RECORD OF OVENS PUSHED

2-6-80

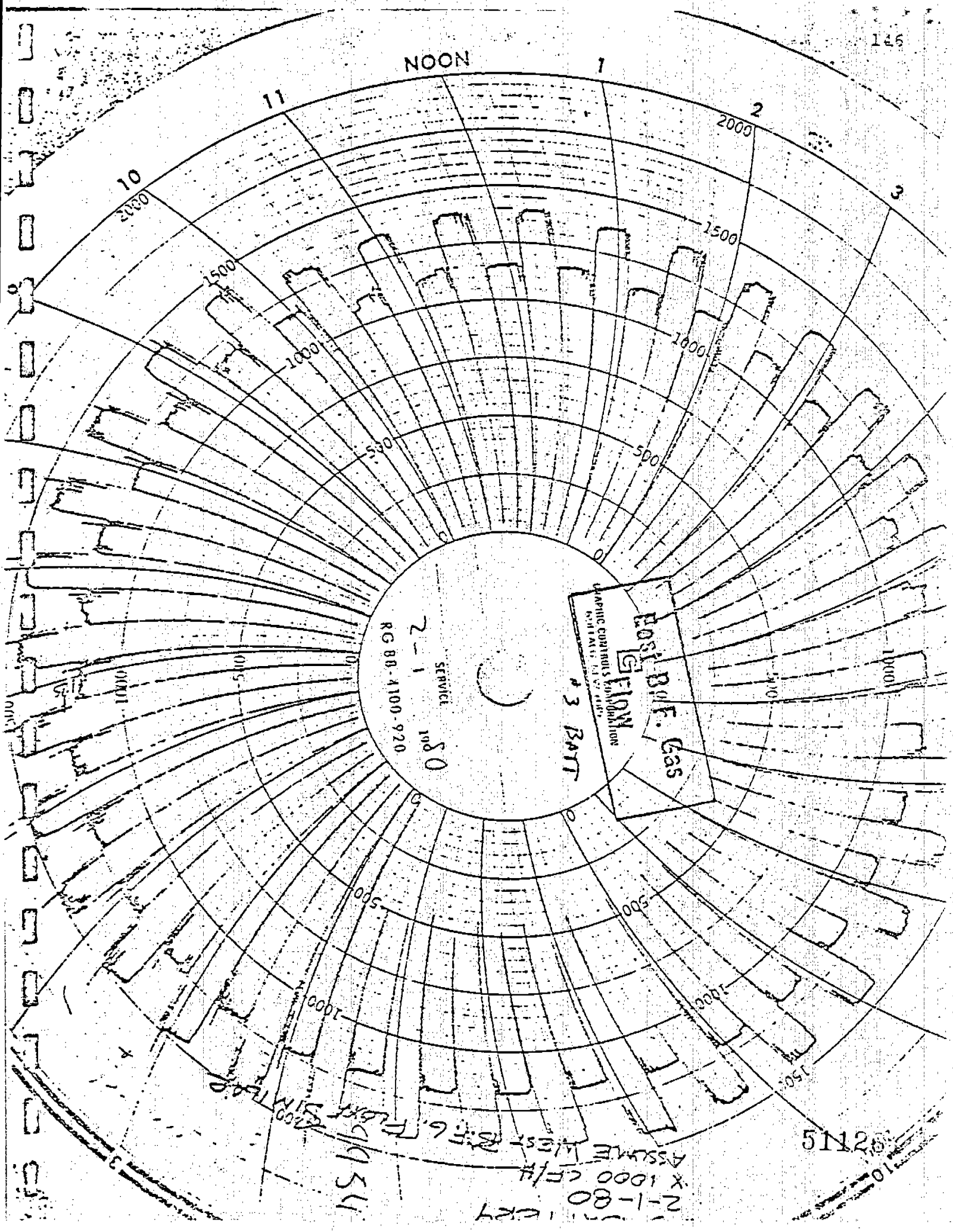
TURN 3-11

BATTERY NO. 3 NO. OF OVENS 57 BATTERY NO. _____ NO. OF OVENS _____

	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS (LEFT)		OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS
	46		3:32		1				
	48		45		2				
2	50		4:44		3				
	52		55		4				
6	54		5:07		5				
	56	3:24	20		6				
	1	4:33	37		7				
8	3	44	48		8				
	5	5:17	58		9				
	7	24	6:10		10				
11	9	32	22		11				
	11	40	34		12				
13	13	49	44		13				
	15	58	54		14				
3	17	6:07	7:05		15				
16	19	17	52		16				
7	21	26	8:04		17				
18	23	50	15		18				
9	25	58	27		19				
1	27	7:04	38		20	30			Hours Started
21	29	54	48		21				
2	31	8:04	58		22	30			Hours [illegible]
3	33			Mfg C/S Repair	23				
24	35	31	9:09		24	51			Hours [illegible]
5	37	40	20		25				
26	39	48	30		26				[illegible] 31 & 38
7	41	56	42		27				[illegible]
8	43			Mfg P/S Repair	28				
29	45	9:05	51		29				[illegible]
10	47	13	10:03		30				[illegible]
31	49	31	13		31				
2	51	39	25		32				[illegible]
3	53	48	37		33				
34	55	57			34				[illegible]
5	57	10:06			35				
36	2	19			36				
7	4	29			37				
8					38				

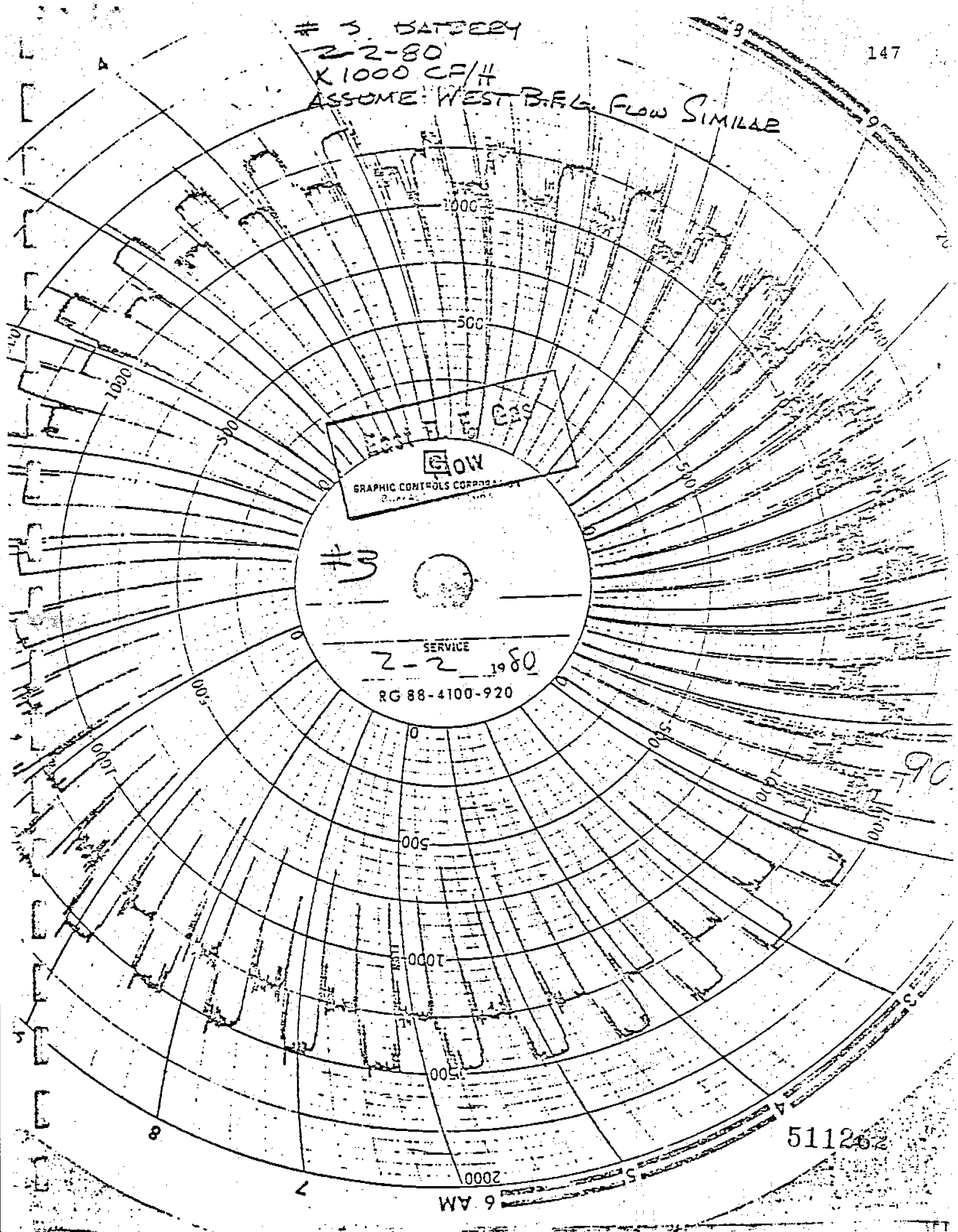
511259

511260


NOON
1
2
3
10
11
2000
1500
1000
500
0
Lost B/F. Gas
Flow
#3 BATT
SERVICE
2-1
RG 88-4100-920
2-1-80
X 1000 CF/H
ASSUME WEST B.F.G. FLOW SIMILAR

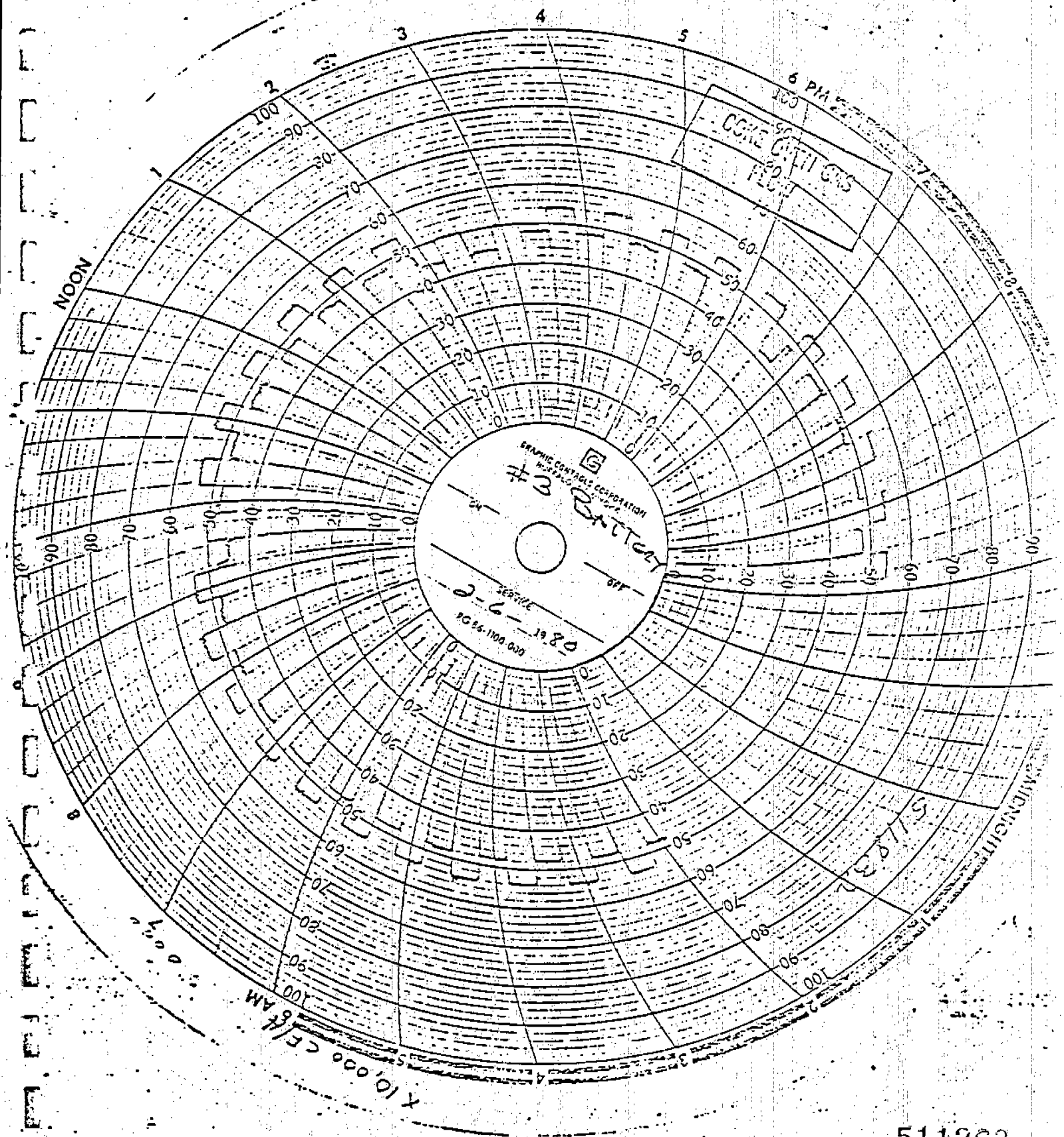
51125

3 BATTERY
2-2-80
K 1000 CF/H
ASSUME: WEST B.E.G. FLOW SIMILAR



511262

3 BATTERY
2-6-80
X 10,000 CF/H



511263

GARY COKE AND CHEMICALS DIVISION

DAILY COAL AND COKE QUALITY REPORT.

DATE SAMPLED: 2-1

DATE REPORT ISSUED: 2-[illegible]

INCOMING COALS	3-11XX TURN			11-7XX TURN			DAILY AVERAGE	
	Alpheus	Corbin		Alpheus	Corbin		Alpheus	Corbin
% Moisture	4.87	5.92		9.32	7.36		7.10	6.64
% Ash	5.03	5.80		5.81	6.72		5.42	6.26
% Volatile Matter	17.29	34.83		18.11	33.85		17.70	34.34
% Sulfur							0.65	0.88

BLENDED COAL	7P	7P	9P	3-11 Avg.	11P 1A	11P 1A	1A 3A	11-7 Avg.			DAILY AVG.
Bulk Density	46.6	48.9	44.7	46.7	45.1	44.1	46.6	45.3			46.0
% Moisture				7.50				7.33			7.42
% Ash				5.74				5.78			5.76
% Volatile Matter				28.05				27.48			27.77
% Sulfur											0.79
Oxidation Index											97.4
Pulverization % +1"											
" % +1/2"				0.4				0.3			0.4
" % +1/4"				5.8				5.7			5.8
" % -1/8"				75.5				76.2			75.9
" % -100 Mesh				11.9				13.9			12.9
% -200 Mesh				7.2				7.7			7.5

PULVERIZERS	X-1	X-3	X-5	Ag 2	Ag 1	Ab 5	Ab 3	Ab 1	Coal as received	
									Alpheus	Corbin
Pulverization % +1"									0.5	3.6
" % +1/2"									3.0	23.9
" % +1/4"									9.9	58.5
" % -1/8"									77.0	17.9
" % -100 Mesh									18.5	1.3

BLAST FURNACE COKE SCREENING STATION	+3"	+2½"	+2"	+1½"	+1"	+3/4"	-3/4"	Stab.	Hard.	Moist	Ash	V.M.
2	7.8	14.9	30.7	60.2	91.0	94.1	5.9	64	72	15.5	8.00	0.40
3	5.0	12.7	26.2	47.7	86.7	92.3	7.7	60	73	7.1	8.76	0.37
5-6	2.8	8.7	28.0	59.2	88.5	97.5	2.5	53	70	9.0	8.11	0.43
8	4.6	13.0	36.0	62.6	94.3	96.5	3.5	51	71	9.2	7.58	0.53
9	5.7	13.8	29.9	57.2	88.1	97.0	3.0	50	70	22.4	7.65	0.52
Avg.												

511264

GARY COKE AND CHEMICALS DIVISION

DAILY COAL AND COKE QUALITY REPORT

DATE SAMPLED: 2-2-[illegible]

DATE REPORT ISSUED: 2-3-[illegible]

INCOMING COALS	3-11XX TURN			11-7XX TURN			DAILY AVERAGE		
	Alpheus	Corbin		Alpheus	Corbin		Alpheus	Corbin	
% Moisture	6.82	5.96		6.61	5.92		6.72	5.94	
% Ash	5.90	6.72		5.38	6.25		5.64	6.49	
% Volatile Matter	18.47	33.71		18.33	31.42		18.40	32.57	
% Sulfur							0.66	0.83	

BLENDED COAL	3P 4P	5P 6P	6P 7P	6P 7P	6P 9P	3-11 Avg.	1A 3A	3A 5A	11-7 Avg.		DAILY AVG.
Bulk Density	46.2	48.0	43.9	45.4	45.2	45.7	45.4	45.9	45.7		45.7
% Moisture						7.08			6.65		6.87
% Ash						6.05			6.43		6.24
% Volatile Matter						29.24			26.43		27.84
% Sulfur											0.78
Oxidation Index ~~[illegible]~~											96.4
Pulverization % +1"											
" % +1/2"						0.2			0.2		0.2
" % +1/4"						5.6			2.7		4.2
" % -1/8"						77.7			85.3		81.5
" % -100 Mesh						15.5			13.7		14.6
% -200 Mesh						7.4			8.2		7.8

PULVERIZERS	X-1	X-3	X-5	Ag 2	Ag 1	Ab 5	Ab 3	Ab 1	Coal as received		
Pulverization % +1"											
" % +1/2"											
" % +1/4"											
" % -1/8"											
" % -100 Mesh											

BLAST FURNACE COKE SCREENING STATION	+3"	+2½"	+2"	+1½"	+1"	+3/4"	-3/4"	Stab.	Hard.	Moist	Ash	V.M.	[illegible]
2 + 3	4.2	10.9	21.9	54.9	91.9	95.7	4.3	57	70	21.1	7.31	0.34	0.
5-6	8.5	14.9	29.8	63.9	94.2	96.0	4.0	53	71	8.0	8.21	0.47	0.
8	3.3	10.4	24.4	52.5	88.5	95.5	4.5	51	70	11.1	8.47	0.79	0.
9	7.6	14.[illegible]	30.7	62.5	91.5	96.9	3.1	52	69	10.5	7.49	0.50	0.
Avg.													0.

511265

GARY COKE AND CHEMICALS DIVISION

DAILY COAL AND COKE
QUALITY REPORT

DATE SAMPLED: 2-6-
DATE REPORT ISSUED: 2-7-

INCOMING COALS	3-11PM TURN		11-7AM TURN		DAILY AVERAGE	
	Alpheus	Corbin	Alpheus	Corbin	Alpheus	Corbin
% Moisture	6.62	6.86	7.19	7.07	6.91	6.97
% Ash	5.73	6.60	6.01	6.91	5.87	6.75
% Volatile Matter	17.34	32.81	17.62	33.41	17.48	33.11
% Sulfur					0.64	0.85

BLENDED COAL	2B 8P	4B 5P	4B 5P	3B 8P	3-11 Avg.	1A	3A	3A	5A	11-7 Avg.	DAILY AVG.
Bulk Density	46.9	47.4	44.4	45.1	46.0	46.7	47.3	46.3	47.6	47.0	46.5
% Moisture					7.28					7.30	7.29
% Ash					6.53					6.60	6.57
% Volatile Matter					28.72					27.44	28.08
% Sulfur											0.79
Oxidation Index											97.7
Pulverization % +1"											
" % +1/2"					0.1					0.2	0.2
" % +1/4"					5.5					6.2	5.9
" % -1/8"					77.0					75.3	75.2
" % -100 Mesh					13.0					12.1	12.5
% -200 Mesh					7.0					7.0	7.0

PULVERIZERS	X-1	Y-3	Y-5	Ag 2	Ag 1	Ab 5	Ab 3	Ab 1	Coal as received		
	Alpheus			Blend of High Volatile							
Pulverization % +1"											
" % +1/2"	0.1			0.1	0.1	0.4	0.1	0.2			
" % +1/4"	6.0	4.5	6.5	4.4	5.6	11.4	10.4	13.4			
" % -1/8"	78.8	80.6	73.6	77.2	74.8	61.8	63.1	59.8			
" % -100 Mesh	14.6	15.6	14.2	11.0	10.3	8.5	8.4	8.6			

BLAST FURNACE COKE

SCREENING STATION	+3"	+2½"	+2"	+1½"	+1"	+3/4"	-3/4"	Stab.	Hard.	Moist	Ash	V.M.
2	5.9	14.9	32.1	66.8	87.5	92.9	7.1	58	71	11.6	8.00	0.52
3	4.5	10.7	21.0	51.7	84.8	91.7	8.3	56	72	14.6	8.03	0.93
7-6	10.5	21.8	38.2	65.9	87.8	96.0	4.0	52	69	6.6	8.44	0.80
8	10.6	17.6	40.7	68.6	93.7	98.2	1.8	51	69	10.1	8.37	0.52
9	6.5	13.7	35.8	64.6	89.8	97.0	3.0	49	71	13.8	8.57	0.77
Avg.												

5112

MONTH OF JANUARY 1980

MCFD - CORRECTED

DATE	NO. 1 BATT.	NO.2 BATT.	NO.3 BATT.	NO.5 BATT.	NO.7 BATT.	#13 BATT.	#15 BATT.	#16 BATT.	TOTAL CONSUMPTION
31	5281	0	10587	4885	768	5765	4463	5230	36979
1	5346		10661	4841	744	5800	4707	5327	37426
2	5042		10681	4578	742	5868	4690	5158	36759
3	5721		10457	4725	742	5890	4669	5230	37436
4	5330		10551	4900	773	6152	4877	5213	37796
5	5225		10811	4952	765	6118	4916	5395	38192
6	5306		10900	4889	768	6148	4898	5395	38304
7	6139		10980	4967	772	6092	4920	5377	39247
8	4876		11326	4739	767	6172	5008	5523	38611
9	4647		11276	4872	782	6178	4945	5520	38220
10	6378		4590	900	758	6124	4960	5546	29256
11	6424		0	867	4292	5761	4965	5477	27786
12	4813		1346	848	5231	5975	4922	5095	28230
13	4811		6240	858	5365	6019	4889	5819	34001
14	4978	0	0	876	1419	6059	4936	5444	23712
15	5435	2149	0	871	821	6120	5036	5489	25921
16	5052	1733	0	883	872	6058	5010	5411	25019
17	6160	0	119	876	845	6088	4638	5396	24122
18	6086	0	1344	885	858	6174	5161	5549	26057
19	4564	0	3831	879	850	6107	5176	5538	26945
20	4933	0	0	885	858	5798	5121	5497	23092
21	5870	0	0	897	867	5575	4800	5531	23540
22	4935	0	0	680	2052	6097	5168	5487	24419
23	5692	0	320	2241	2871	5903	4986	5476	27489
24	5455	150	0	1117	870	4766	4793	5480	22631
25	5113	0	0	885	888	6159	5037	5498	23580
26	5521	7810	0	1333	868	6207	5141	5502	32382
27	5411	5080	0	4389	872	6148	5104	5461	32435
28	5922	0	0	5059	4954	6032	4934	5532	32433
29	6331	0	0	3838	643	6223	5154	5469	27658
30	5958	0	0	1096	1538	6003	5027	5442	25064
	168755	16922	126022	79711	46215	185549	153051	168507	944732

BATTERIES C.O. GAS CONSUMPTION

MCFD - CORRECTED

MONTH OF FEBRUARY 1980

DATE	NO. 1 BATT.	NO.2 BATT.	NO.3 BATT.	NO.5 BATT.	NO.7 BATT.	#13 BATT.	#15 BATT.	#16 BATT.	TOTAL CONSUMPTION
31	6273	0	0	764	824	5981	4207	5403	23452
1	5952	0	0	747	798	6108	5061	5187	23853
2	5961	0	0	756	813	6161	5167	5095	23953
3	6059	0	0	737	790	5993	4936	5040	23555
4	6114	0	7042	762	813	5647	5076	5126	30580
5	6183 N	0 W	11350 N	756	818 J	5962 W	4123 W	4700 W	33892 W
6	6247 N	0 N	9670 W	753 J	812 W	4659 M	4894 W	4844 W	31879 W
7	6488 N	890 O	0 O	725 M	815 W	6074 W	4804 W	5079 W	24875 N
8	6496 N	0 M	0 W	788 W	829 W	6247 W	4906 N	4974 W	24240 W
9	6327 N	1074	0 N	766	817	6446 W	5053 W	5046 W	25529 W
10	5612	1064	0	787	835	6258	4731	5194	24481 N
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

511268

BATTERY USAGE

BLAST FURNACE GAS - 100 BTU/CUBIC FT.

MONTH FEBRUARY 1980 MOFD - CORRECTED

	NO. 2	NO. 3	NO. 5	NO. 7	TOTAL	% DI
31	61901	59530	29171	29278	179880	
1	59771	55329	27458	27317	169875	
2	61558	56370	27317	27622	172867	
3	59231	55997	26445	27043	168716	
4	57660	22430	28019	28277	136386	
5	55084	0	26975	27465	109524	
6	66440	5050	27986	28325	127801	
7	58113	56648	27774	27581	170116	
8	58107	59829	29959	30478	178373	
9	54350	57346	29462	28842	170000	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
TOTAL					511269	

GARY COKE AND CHEMICALS DIVISION

DAILY COAL AND COKE QUALITY REPORT

DATE SAMPLED: 2-2-80

DATE REPORT ISSUED: 2-3-80

INCOMING COALS	3-TOW TURN			11-TOW TURN			DAILY AVERAGE	
	Alpheus	Corbin		Alpheus	Corbin		Alpheus	Corbin
% Moisture	6.82	5.96		6.61	5.92		6.72	5.94
% Ash	5.90	6.72		5.38	6.25		5.64	6.49
% Volatile Matter	18.47	33.71		18.33	31.42		18.40	32.57
% Sulfur							0.66	0.88

BLENDED COAL	3P 4P	5P 6P	6P 7P	8P 7P	8P 8P	3-11 Avg.	14 A	2A 5A	11-7 Avg.		DAILY Avg.
Bulk Density	46.2	48.0	43.9	45.4	45.2	45.7	45.4	45.9	45.7		45.7
% Moisture						7.08			6.65		6.87
% Ash						6.05			6.43		6.24
% Volatile Matter						29.24			26.43		27.84
% Sulfur											0.78
Oxidation Index											96.4
Pulverization % +1"											
" % +1/2"						0.2			0.2		0.2
" % +1/4"						5.6			2.7		4.2
" % -1/2"						77.7			85.3		81.5
" % -100 Mesh						15.5			13.7		14.6
% -200 Mesh						7.4			8.2		7.8

PULVERIZERS	X-1	X-3	X-5	Ag 2	Ag 1	Ab 5	Ab 3	Ab 1	Coal as received		
Pulverization % +1"											
" % +1/2"											
" % +1/4"											
" % -1/8"											
" % -100 Mesh											

BLAST FURNACE COKE

SCREENING STATION	+3"	+2½"	+2"	+1½"	+1"	+3/4"	-3/4"	Stab.	Hard.	Moist	Ash	V.M.	S
2 + 3	4.2	10.9	21.9	54.9	91.9	95.7	4.3	57	70	21.1	7.31	0.34	0.[illegible]
5	8.5	14.9	29.8	63.9	94.2	96.0	4.0	53	71	8.0	8.21	0.47	0.[illegible]
8	3.3	10.4	24.4	52.5	88.5	95.5	4.5	51	70	11.1	8.47	0.78	0.[illegible]
9	7.6	14.9	30.7	62.5	92.5	96.9	3.1	52	69	10.5	7.49	0.60	0.[illegible]
Avg.													0.[illegible]

511270

GARY COKE AND CHEMICALS DIVISION

DAILY COAL AND COKE QUALITY REPORT

DATE SAMPLED: 2-1

DATE REPORT ISSUED: 2-2

INCOMING COALS	3-11PM TURN		11-7AM TURN		DAILY AVERAGE	
	Alpheus	Corbin	Alpheus	Corbin	Alpheus	Corbin
% Moisture	4.87	5.92	9.32	7.36	7.10	6.64
% Ash	5.03	5.80	5.81	6.72	5.42	6.26
% Volatile Matter	17.29	34.83	18.11	33.85	17.70	34.34
% Sulfur					0.65	0.88

BLENDED COAL	7P	7P	9P	3-11 Avg.	11P 1A	11P 1A	1A 7A	11-7 Avg.			DAILY AVG.
Bulk Density	46.6	48.9	44.7	46.7	45.1	44.1	46.6	45.3			46.0
% Moisture				7.50				7.33			7.42
% Ash				5.74				5.78			5.76
% Volatile Matter				28.05				27.48			27.77
% Sulfur											0.78
Oxidation Index											97.4
Pulverization % +1"											
" % +1/2"				0.4				0.3			0.4
" % +1/4"				5.8				5.7			5.8
" % -1/8"				75.5				76.2			75.9
" % -100 Mesh				11.9				13.9			12.9
% -200 Mesh				7.2				7.7			7.5

PULVERIZERS	X-1	X-3	X-5	Ag 2	Ag 1	Ab 5	Ab 3	Ab 1	Coal as received	
									Alpheus	Corbin
Pulverization % +1"									0.5	3.6
" % +1/2"									3.0	23.9
" % +1/4"									9.9	58.5
" % -1/8"									77.0	17.9
" % -100 Mesh									18.5	1.3

BLAST FURNACE COKE

SCREENING STATION	+3"	+2½"	+2"	+1½"	+1"	+3/4"	-3/4"	Stab.	Hard.	Moist	Ash	V.M.
2	7.9	14.9	30.7	60.2	91.0	94.1	5.9	64	72	15.5	8.00	0.40
3	5.0	12.7	25.2	47.7	86.7	92.3	7.7	60	73	7.1	8.76	0.37
5-6	2.8	8.7	28.0	59.2	88.5	97.5	2.5	53	70	9.0	8.11	0.47
4	4.6	13.0	36.0	62.6	94.3	96.5	3.5	52	71	9.2	7.58	0.53
7	5.7	13.6	29.9	57.2	92.1	97.0	3.0	60	70	22.4	7.65	0.72
Avg.												

511271

Kemron Environmental Services

EMISSION TESTING

FOR

U. S. STEEL

Equipment

Sampling Train: NAPP 21/Lear-Siegler PM100

Orsat Analyzer: Burrell Industro Gas Analyzer Model

The stack sampling system consists of two major units - the control unit and the sampling train unit, electrically and pneumatically connected by an umbilical cord. The sampling train unit can be broken down into three sub-units; (1) the probe with a heated pyrex liner, (2) the hot box assembly thermostatically controlled to maintained 250° F during the sampling, and (3) the cold box assembly to hold four 500 ml glass impingers in an ice bath.

The control unit contains gauges and meters to measure all parameters necessary for sampling calculations. A dry gas meter (recently calibrated to EPA specifications) is used to measure the volume of sample removed from the stack. A thermometer or thermocouple on the inlet and exit sides of the meter are

used to determine the meter temperature. A magnehelic gauge or inclined manometer is available on the control box for measuring velocity heads in inches of water from 0.0 - 10.0 inches. An inclined manometer is also available for lower velocity heads in the range of 0.0 - 0.5 inches of water. The amount of heat to the probe liner is controlled by an adjustment on the control box. The vacuum at the inlet to the dry gas meter is monitored by another gauge in inches of mercury. The stack temperature is monitored by an digital temperature indicator (0 - 2000° F) on the control box connected to the thermocouple on the probe by two chromel-alumel wires in the umbilical cord. The orifice pressure differential is indicated by another magnehelic or manometer (0 - 10 of H_2O).

The particulate-laden flue gas is vacuumed into the nozzle (stainless steel 316) at isokinetic conditions. It then passes through the heated pyrex liner (heated to prevent condensation of water vapor) into the hot box assembly. The hot box, maintained at 250 ° F, contains a 4" Type A glass fiber filter where the particulate is removed from the gas. The gas, after passing through the filter and into the cold box, is bubbled through a series

Borg-Warner Corporation

EPA - O.K.
or 3 PT CALIB (AS MARKED)

PITOT TUBE CALIBRATION

Pitot Tube Number Probe Extension CPst .99

Date 1-29-80 Calibrated By Kirk Meyer

	Standard Type Pitot P in H_2O		"S" Type Pitot P in H_2O A	B	Cps
	1.4		2.0	2.0	.828
	.56		.78	.78	.839
	.87		1.2	1.25	.834
4.	1.1		1.6	1.6	.821
5.	1.2		1.75	1.72	.823
	.29		.43	.45	.804
7.	.39	—	.56	.57	.823
8.	.45		.70	.67 ~~.65~~	.802
9.	.10	*	.16	.16	.783
10.	.19	*	.29	.29	.801
11.	.05	*	.08	.08	.783

$CP_s = CP_{st} \ (\Delta P \ st / \Delta P \ "s")^{1/2}$

$CP = \Sigma \ CPi = .81$

511276

PITOT TUBE CALIBRATION

Pitot Tube Number Probe Extension CPst 0.99

Date 1-30-79 Calibrated By Kirk Meyer

Standard Type Pitot P in H_2O	"S" Type Pitot P in H_2O A	B	Cps
1.1	1.6	1.65	.815
.78	1.2	1.25	.790
.96	1.42	1.4	.817
.46	.66	.65	.830
.69	.98	.99	.829
.53	.75	.73	.838
.33	.53	.51	.789
.24	.34	.34	.832
.14	.19	.19	.850
.08	.12	.13	.792
.87	1.3	1.3	.810

$$CP_s = CP_{st} \left(\Delta P_{st} / \Delta P_{"s"}\right)^{1/2}$$

$$CP = \frac{\Sigma CPi}{N} = .82$$

BADEK
511276

Blank

511276 A