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.

9/19-16/82

United States Steel Corporation

GARY WORKS - M.S. 188
1 NORTH BROADWAY
GARY, INDIANA 46402

September 24, 1982

Mr. Larry Kertcher
U. S. Environmental Protection Agency
Region V
230 South Dearborn Street
Chicago, Illinois 60604

Mr. Harry D. Williams, Technical Secretary
Air Pollution Control Board
Indiana State Board of Health
1330 West Michigan Street
P. O. Box 1964
Indianapolis, Indiana 46206

Gentlemen:

Gary Works
No. 3 Coke Battery
Mobile Pushing Emission
Control System
Particulate Emission Measurement

This is forwarding the final report of a particulate emission measurement (USEPA RM5) conducted at the subject facility on September 14, 15 and 16, 1982.

During this testing the average particulate emission concentration was 0.017 grains/dscf with an average volume of 37,520 dscfm for the three test runs. The average mass emission rate was 0.004 pounds of particulate per ton of coke pushed.

Any questions concerning this test program should be directed to W. S. Kubiak, (219)-944-3385.

Very truly yours,

P K Morrison

P. K. Morrison
Chief Engineer

WSK:ce

Attachment

cc: Richard Matuschkovitz, USEPA - Region V
Donald Kuh, Indiana APCD
Dennis McGuire, Gary APC
David Pluhar, Acurex Corp.

TABLE OF CONTENTS

	Section
Certification Sheet	1
Introduction	1
Summary of Results	2
Process Information	3
Testing Procedures	4

Appendix

A. Test Section and Sampling Port Orientation

B. Sample Train Diagram

C. Laboratory Analysis Data

D. Calibration Data

E. Nomenclature and Calculation Formulae

F. Raw Field Data Sheets

G. Visible Emissions Data

H. Facility Operating Data

UNITED STATES STEEL CORPORATION
ENGINEERING-STEEL

PLANT ENGINEERING
GARY WORKS

CERTIFICATION SHEET

Having supervised this test program described in this report, and having written this report, I hereby certify the data, information and results in this report to be accurate and true according to the methods and procedures used.

William S. Kubick

Supervisor
United States Steel Corporation
Gary Works

INTRODUCTION
Section 1

The purpose of this study was to measure the concentration of particulate matter in the exhaust gases from No. 3 Coke Battery Mobile Pushing Emission Control Car [illegible] at the Gary Works of United States Steel Corporation in Gary, Indiana on the dates of September 14, 15, 16, 1982.

The study was conducted by the following United States Steel Corporation, Gary Works, Plant Engineering personnel:

Name	Title	Function
W. S. Kubiak	Engineer	Test Engineer
P. K. Murphy	Field Technician	Sampling Team Leader
R. W. Elkins	" "	Sampling Technician
G. W. Hammar	" "	" "
R. E. Trezak	Process Observer	Visible Emission Observer
T. Sandidge	Process Observer	" " "

During the test program the operation of this facility was normal with no apparent problems. Unit operating data were recorded and are appended. Pushing emissions were read from ground level on the coke side of the battery. Readings began with the first movement of coke, observing the emissions above the battery top. Emissions from the quench car during the travel were read at the source until the car entered the quench tower or until the car was no longer clearly visible.

The exhaust stack from the mobile scrubber car was not read due to the presence of heavy steam.

SUMMARY OF RESULTS
Section 2

During this test program the average particulate emission rate was .017 grains/dscf, with an average volume of 37,520 dscfm, with an average temperature of 139.9 degrees F., for the three test runs. Table 2-1 is a summary of various parameters measured during this test program.

The mass emission limitation for this source is 0.04 lb. of particulate per ton of coke pushed. During this test the mass emission rate was 0.004 lb. of particulate per ton of coke pushed.

SOURCE TEST DATA SUMMARY
U. S. STEEL CORPORATION - GARY WORKS
PLANT ENGINEERING

DIVISION: Coke and Chemicals SOURCE: No. 3 Battery mobile pushing emission scrubber car #9123

TEST NUMBER		1	2	3	AVERAGE
DATE		9-14-82	9-15-82	9-16-82	
TIME		0904 1442	0750 1330	0745 1442	
PARTICULATE CONCENTRATION (GR/DSCF)	C_s	.021	.018	.013	.017
LB. OF PARTICULATE PER TON OF COKE PUSHED		.005	.004	.003	.004
MASS EMISSION RATE (Lb./Hr.)	PMR	6.82	5.91	4.07	5.60
DRY VOLUMETRIC STACK GAS FLOW RATE AT STANDARD CONDITIONS (DSCF/MIN.)	Q_s	37,812	38.259	36,458	37,520
STACK GAS TEMPERATURE (°F)	t_s	144.2	139.5	136.0	139.9
STACK GAS VELOCITY (FPS)	V_s	150.02	151.23	142.37	147.87
ABSOLUTE STACK GAS PRESSURE (In. Hg)	P_s	29.85	29.63	29.95	
BAROMETRIC PRESSURE AT TEST SITE (In. Hg)	P_{bar}	29.82	29.60	29.92	
CROSS-SECTIONAL AREA OF STACK (Ft.^{2})	A_s	5.556	5.556	5.556	
CROSS-SECTIONAL AREA OF NOZZEL (Ft.^{2})	A_n	8.522 x 10^{-5}	8.522 x 10^{-5}	8.522 x 10^{-5}	
ABSOLUTE AVERAGE DRY GAS METER TEMPERATURE (°R)	T_m	545.42	536.88	530.91	
AVERAGE PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (In. H_2O)	ΔH	1.089	1.110	1.077	
AVERAGE $\sqrt{\ }$ OF STACK VELOCITY HEAD MEASUREMENTS (In. H_2O)	$\sqrt{\Delta P}$ AVE.	2.4279	2.449	2.323	
STACK GAS COMPONENTS (%)	O_2	15%	15%	15%	
	CO_2	1%	1%	1%	
AVERAGE MOLECULAR WEIGHT OF STACK GAS - DRY BASIS (LB./LB. MOLE)	M_d	28.76	28.76	28.76	
AVERAGE MOLECULAR WEIGHT OF STACK GAS - WET BASIS (LB./LB. MOLE)	M_s	27.34	27.36	27.32	
VOLUME OF GAS SAMPLED AT METER CONDITIONS (FT.^{3})	Vm	13.79	13.45	17.19	
VOLUME OF H_2O COLLECTED IN IMPINGER TRAIN (Ml)	Vi	43.0	41.5	56.0	
TOTAL SAMPLING TIME (MINUTES)	θ	21.60	21.60	28.8	
PERCENT WATER VAPOR IN GAS STREAM (BY VOLUME)	Bws	.1321	.1299	.1337	13.2%
VOLUME OF WATER VAPOR IN GAS SAMPLE AT STANDARD CONDITIONS (FT.^{3})	Vwstd	2.038	1.967	2.654	
VOLUME OF GAS SAMPLED AT STANDARD CONDITIONS (FT.^{3})	Vmstd	13.39	13.17	17.20	
GRAMS OF PARTICULATE COLLECTED DURING TEST		.0182	.0150	.0144	
PERCENT OF ISOKINETIC SAMPLING RATE	I	106.40	103.52	106.41	105.4

PROCESS INFORMATION

Section 3

At the coke battery facility of U. S. Steel Corporation, Gary Works, coke is produced by the distillation of a mixture of two or more low, medium and high volitile coals in a chemical retort or oven. The coal mixture is charged through holes in the top of the oven and the lids are then sealed with a wet clay mixture. Heat for the coking operation is supplied by the regeneration combustion system, located below the ovens and a flue system located between the ovens. Coking time is determined by the coal mixture, moisture control, rate of underfiring, and desired properties of the coke. The oven doors are removed when the desired coking time has been achieved and the incandescent coke is then pushed into a rail car and quenched with water.

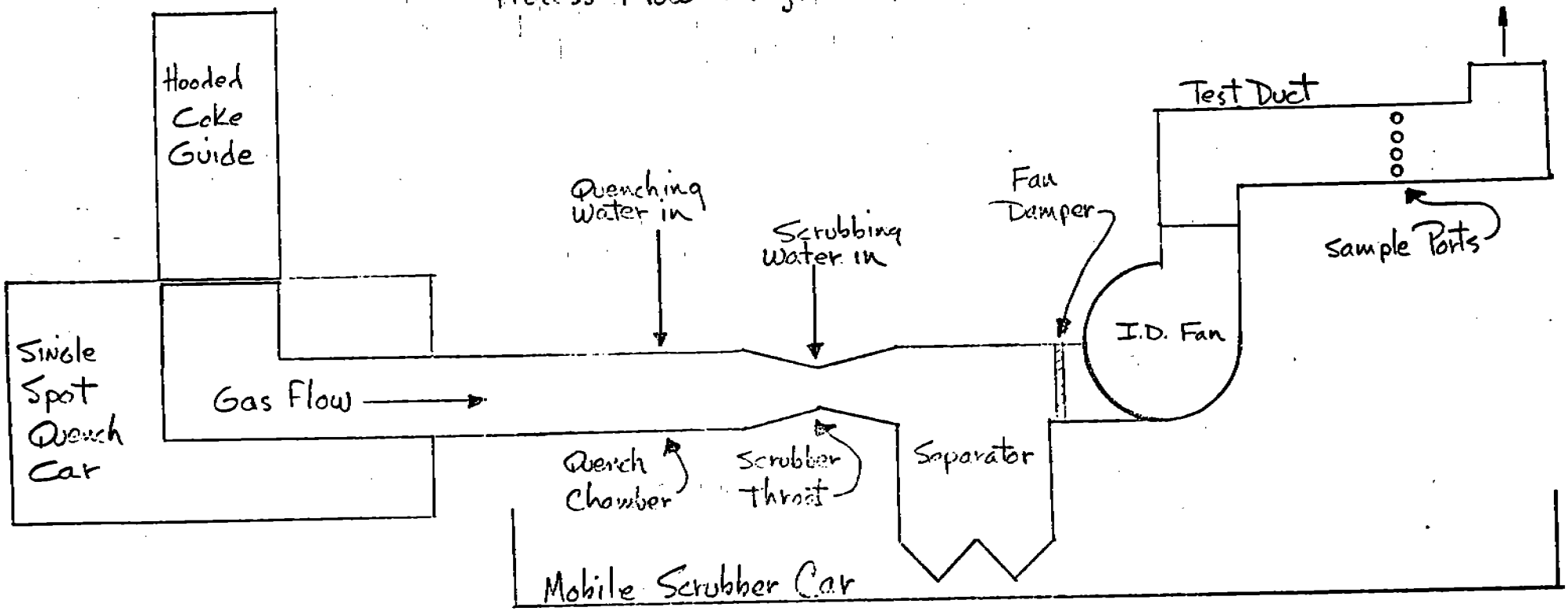
At Gary Works No. 3 Coke Battery, emissions generated during the pushing operation are collected and removed by means of a mobile pushing emission control system consisting of a hooded coke guide, a single spot quench car and a rail car mounted wet scrubber system with associated ductwork. The hooded coke guides were constructed by the American Bridge Division of U. S. Steel Corporation. The single spot quench cars and mobile scrubber cars were designed and constructed by U. S. Steel Corporation at its Johnstown Works utilizing a Ducon scrubbing system.

The hooded coke guide is first aligned with the oven to be pushed and the single spot quench car is positioned under the collection hood, forming an enclosed unit. An articulating duct elbow is then raised into place, connecting the hooded coke guide/single spot quench car unit to the mobile scrubber car. When the pushing mode of operation is signaled by the quench car operator, the quencher and venturi sprays are automatically started and the ID Fan damper opens to provide full system

flow. As coke is pushed from the oven into the single spot quench car, emissions are contained by the hooded coke guide. The particulate laden air passes through the duct to the quencher section where the gas is cooled with water sprays, reducing its volume. The gases then pass through the venturi where particulate and water introduced at the venturi throat are mixed at high energy, impacting the suspended particulate into the water droplets. The cleaned gas and particulate laden water droplets then pass through the separator section where the water droplets are removed and the cleaned gases are drawn through the induced draft fan and are discharged through a stack to the atmosphere.

No. 3 Coke Battery mobile pushing emission control system discharges its gases to the stack which was sampled according to the protocol developed by the USEPA for this sampling program.

No. 3 Coke Battery
Mobile Pushing Emission Control System
Process Flow Diagram



Parameter	Operating Pressures Design	Actual
Static Pressure before Quencher	-4" wg	-4" wg
Venturi Δ Pressure	-24" wg	-24" wg
I.D. Fan inlet pressure	-30" wg	-30" wg

W.S. Kubiak 9-16-82

TESTING PROCEDURES
Section 4

All testing, sampling, analytical and calibration procedures used for this test program were performed as described in the Code of Federal Regulations, Title 40, Parts 60-80, July 1, 1979, using Methods 1-5 and the latest revisions thereof. Where applicable, the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, EPA 600/4-77-027b was used to determine the precise procedures.

Layout of the sampling ports in relation to flow disturbances for duct is shown by Figure 4-1 . Based on the duct diameter and the upstream and downstream distances, the required number of sampling points according to Method I of the August 18, 1977, Federal Register, Volume 42, was determined to be 24 . Sampling was conducted through 4 ports at these 24 points for 0.9 minutes per point for each run.* Figure 4-1 also shows the dimensions from the duct wall to each sampling point as directed by the previously mentioned Federal Register.

The particulate sampling train was a Model 201-100 Isokinetic Stack Sampler designed and manufactured by Nutech Corporation to meet all Environmental Protection Agency standards for source sampling equipment as outlined in the Office of Air Programs Publication No. APTD-0576.

A schematic of this sampling equipment is appended.

Prior to the start of the first particulate sampling run, stack gas temperature was measured and a velocity traverse was made in the stack. Moisture was estimated based on previous sampling data. Using the above data,

* Run no. 3 was sampled through 4 ports at 32 points for 0.9 minutes per point at the request of USEPA Region V representatives.

the appropriate nozzel diameter was calculated. Appropriate formulae are appended and exact nozzel diameter is shown on field data sheets, also appended.

Velocity pressures were determined simultaneously during sampling with a calibrated S-type pitot tube and inclined manometer. All temperatures were measured using calibrated thermocouples.

Carbon dioxide and oxygen flue gas grab samples, taken during the course of each test, were analyzed with Fyrite analyzers.

The filter media were Gelman type A/E glass fiber filters exhibiting a 99.95% efficiency on 0.3 micron DOP smoke particles in accordance with ASTM Method D 2986-1.

All sample contact surfaces of the train were washed with reagent grade acetone. These washings were placed in sealed and marked containers for analysis. Sample recovery was performed at Gary Works by the test crew. All sample analyses were performed at Gary Works by USSC personnel. Copies of all sample analysis sheets are appended in this report.

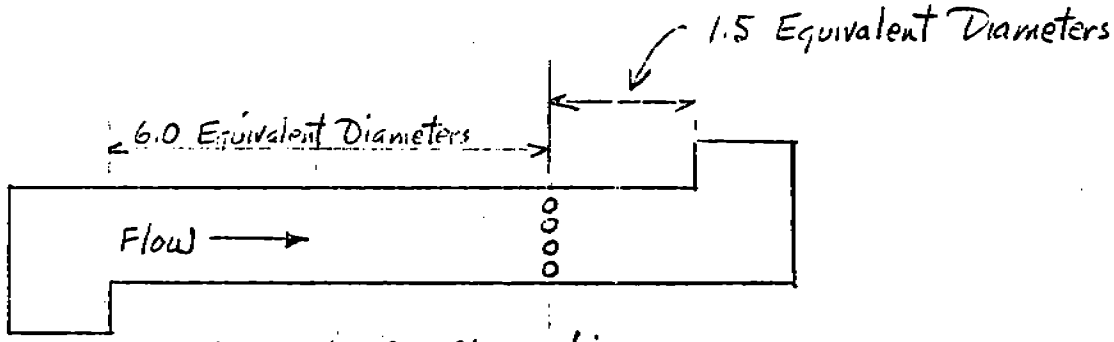
Using the field data taken during each sample run, along with corresponding laboratory data, calculations were made to determine various exhaust gas parameters and particulate emissions. A summary of these is found in section 2 and all fomulae and nomenclature used are appended.

Equal Area Traverse for Rectangular Ducts

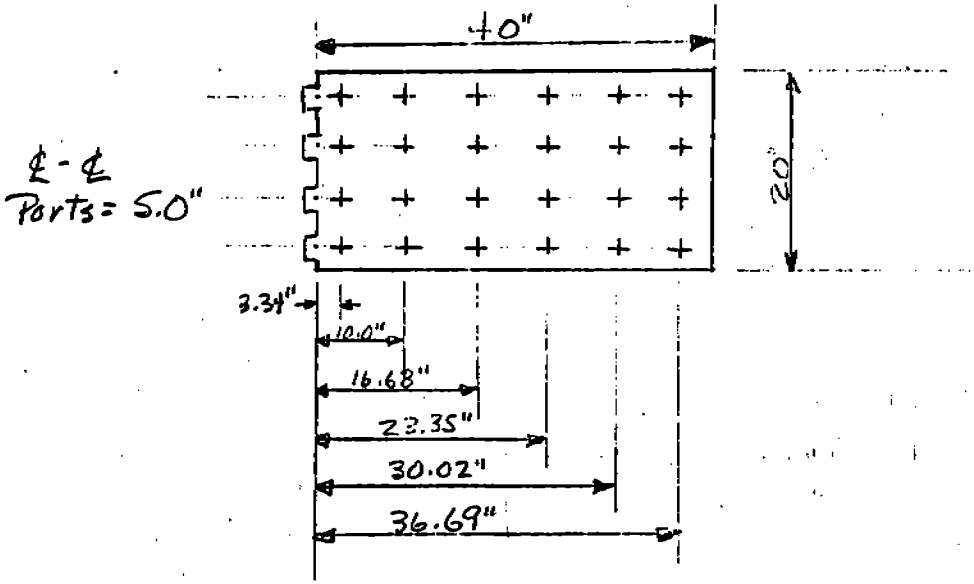
Test Duct Dimensions
20" x 40"

Equivalent Diameter = $\frac{2LW}{L+W}$

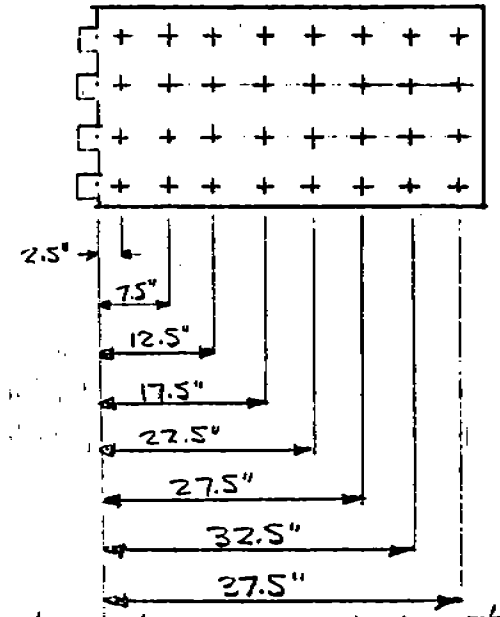
$$\frac{2 \times 20'' \times 40''}{20'' + 40''} = \underline{26.67''}$$



Test Duct Configuration



4 port X 6 points/port as used for runs #1 and #2



4 port X 8 points/port as used for run #3

Figure 4-1 (APPENDIX A)

W.S. Kubiak 9-16-02

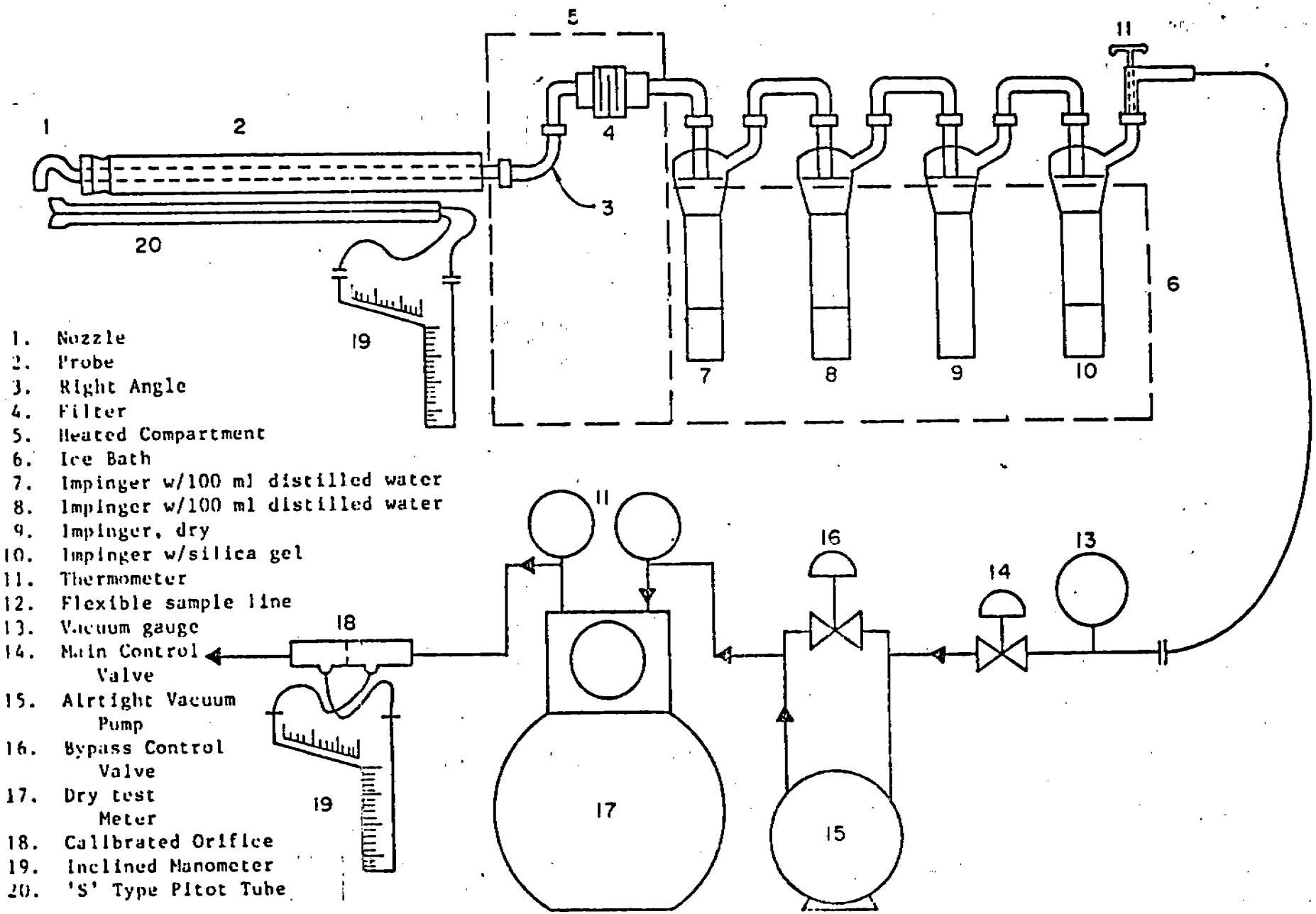


FIGURE 4-1 PARTICULATE SAMPLING TRAIN

UNITED STATES STEEL CORPORATION
ENGINEERING-STEEL

PLANT ENGINEERING
GARY WORKS

LABORATORY DATA

DIVISION Coke and Chemicals

SOURCE No. 3 Battery mobile pushing emission scrubber car #9123

PARTICULATE SOURCE	RUN NO. 1 DATE: 9-14-82			RUN NO. 2 DATE: 9-15-82			RUN NO. 3 DATE: 9-16-82			BLANKS None DATE:		
	FINAL Wt. (g)	INITIAL Wt. (g)	DIFF. (g)	FINAL Wt. (g)	INITIAL Wt. (g)	DIFF. (g)	FINAL Wt. (g)	INITIAL Wt. (g)	DIFF. (g)	FINAL Wt. (g)	INITIAL Wt. (g)	DIFF. (g)
(1) FILTER	0.4102	0.4011	0.0091	0.4073	0.3998	0.0075	0.4043	0.3937	0.0106			
(2) ACETONE RINSE	126. 6878	126. 6787 g	0.0091	126. 9341	126. 9266 g	0.0075	128. 9373	128. 9335 g	0.0038		___ g ml	
(3)												
(4)												
(5)												
		GROSS WT.	0.0182		GROSS WT.	0.0150		GROSS WT.	0.0144			
		LESS BLANK WT.	–		LESS BLANK WT.	–		LESS BLANK WT.	–			
		NET WEIGHT	0.0182		NET WEIGHT	0.0150		NET WEIGHT	0.0144			

COMMENTS:

UNITED STATES STEEL CORPORATION
ENGINEERING — STEEL

PLANT ENGINEERING
GARY WORKS

ORIFICE AND DRY GAS METER
CALIBRATION FORM

CONSOLE NO. 801-8 DATE 8-24-82

CALIBRATED BY Murphy / Elkins P_{bar} 29.40

ORIFICE MANOMETER SETTING (ΔH) INCHES OF H_2O	GAS VOLUME TEST METER (V_t) ft^3	GAS VOLUME DRY GAS METER (V_d) ft^3	TEMPERATURE TEST METER (t_t) °F	TEMPERATURE DRY GAS METER (t_d) °F	TIME (θ) MIN.	Y	$\Delta H@$
0.5	2.065	2.050	81	71	5	[illegible]	1.716
1.0	3.000	2.970	79	74	5	[illegible]	1.614
2.0	4.050	4.025	77	78	5	[illegible]	1.755
4.0	5.655	5.635	76	83	5	1.010	1.774
6.0	6.790	6.780	76	88	5	1.010	1.838
8.0	7.787	7.790	75	93	5	1.011	1.841
					AVERAGE	1.004	1.757

CALCULATIONS

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_t P_{bar}(t_d+460)}{V_d\left(P_{bar}+\frac{\Delta H}{13.6}\right)(t_t+460)}$	$\Delta H@$: $\frac{0.0317(\Delta H)}{P_{bar}(t_d+460)}\left(\frac{(t_t+460)\theta}{V_t}\right)^2$
0.5	0.0368		
1.0	0.0737		
2.0	0.1470		
4.0	0.2940		
6.0	0.4310		
8.0	0.5880		

APPENDIX
I

UNITED STATES STEEL CORPORATION
ENGINEERING - STEEL

PLANT ENGINEERING
GARY WORKS

NOZZEL CALIBRATION FORM

DATE 9-13-82

CALIBRATED BY W.S. Kubiak

NOZZEL IDENTIFICATION NUMBER	NOZZEL DIAMETER[a]			ΔD[b] (IN.)	D_{avg}[c]
	D_1 (IN.)	D_2 (IN.)	D_3 (IN.)		
.125 I	*	*	*	*	0.1250*
* An inside micrometer of this range was not available to calibrate this nozzel. A ¼" drill rod was ground with an outside micrometer at four diameters and was found to be exactly 0.1250" for all diameters. This drill rod was then inserted into the tip of the nozzel and the tip of the nozzel was then reamed around its circumference untill its inside diameter exactly matched the outside diameter of the drill rod.					

WHERE:

a - $D_{1,2,3}$ = THREE DIFFERENT NOZZEL DIAMETERS; EACH DIAMETER MEASURED TO CLOSEST 0.001 IN.

b - ΔD = MAXIMUM DIFFERENCE BETWEEN ANY TWO DIAMETERS; $\Delta D \leq 0.004$ IN.

c - D_{avg} = AVERAGE OF D_1, D_2, AND D_3

APPENDIX D

UNITED STATES STEEL CORPORATION
ENGINEERING-STEEL

PLANT ENGINEERING
GARY WORKS

USEPA RM 5 NOMENCLATURE

An	CROSS-SECTION AREA OF NOZZEL (FT.^{2})
As	CROSS-SECTION AREA OF STACK (FT.^{2})
Bws	PERCENT WATER VAPOR IN GAS STEAM (BY VOLUME)
I	PERCENT OF ISOKINETIC SAMPLING
Pbar	BAROMETRIC PRESSURE AT SAMPLING SITE (INCHES OF Hg)
Ps	ABSOLUTE STACK GAS PRESSURE (INCHES OF Hg)
Pstd	STANDARD ABSOLUTE PRESSURE (29.92 INCHES Hg)
R	IDEAL GAS CONSTANT (21.85 INCHES Hg - FT.^{3}/^{o}R - LB MOLE)
Tm	AVERAGE ABSOLUTE DGM TEMPERATURE (^{o}R)
Ts	AVERAGE ABSOLUTE STACK GAS TEMPERATURE (^{o}R)
Tstd	STANDARD ABSOLUTE TEMPERATURE (530°R)
Vi	VOLUME OF LIQUID COLLECTED IN IMPINGER TRAIN (ml)
Vm	VOLUME OF GAS SAMPLED AT METER CONDITIONS (Ft.^{3})
Vmstd	Vm CORRECTED TO STANDARD CONDITIONS (Ft.^{3})
Vwstd	VOLUME OF WATER VAPOR IN GAS SAMPLE AT STANDARD CONDITIONS (Ft.^{3})
Vs	STACK GAS VELOCITY (Ft./SEC)
Y	DGM CALIBRATION FACTOR
ΔH	AVERAGE PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (Inches of H_2O)
Md	MOLECULAR WEIGHT OF STACK GAS, DRY BASIS (Lb./Lb. Mole)
Ms	MOLECULAR WEIGHT OF STACK GAS, WET BASIS (Lb./Lb. Mole)
Qs	DRY VOLUMETRIC STACK GAS FLOW RATE AT STANDARD CONDITION (dscf/Min.)
ΔP	STACK GAS VELOCITY HEAD (Inches of H_2O)
O	TOTAL SAMPLING TIME (Minutes)
PMR	MASS EMISSION RATE (Lb./Hr.)
Cp	PITOT TUBE COEFFICIENT (0.84)
^{o}R	= ^{o}F + 460
Qm	= .75

UNITED STATES STEEL CORPORATION
ENGINEERING-STEEL

PLANT ENGINEERING
GARY WORKS

USEPA RM 5 FORMULAE

CALCULATE REQUIRED NOZZEL DIAMETER (INCHES)

$$D_n = \sqrt{\left(\frac{.0358\ C_p\ P_m}{T_m\ C_1\ (1-B_{ws})}\right)\sqrt{\frac{T_s\ M_s}{P_s\ (\Delta P)}}}$$

CALCULATE K FACTOR

$$K = 846.72\ D_n^4\ \Delta H_@\ C_p^2\ (1-B_{ws})^2\ \frac{M_d}{M_s}\ \frac{T_m}{T_s}\ \frac{P_s}{P_m}$$

CALCULATE ΔH

$$\Delta H = K(\Delta P)$$

CALCULATE ISOKINETIC SAMPLING RATE

$$I = \frac{T_s\ (1.667)\left[(0.00267)\ V_i + \frac{V_m}{T_m}\left(P_{bar} + \frac{\Delta H}{13.6}\right)\right]}{\theta\ V_s\ P_s\ A_n}$$

CALCULATE MOLECULAR WEIGHT OF GAS (DRY BASIS)

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

CALCULATE MOLECULAR WEIGHT OF GAS (WET BASIS)

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

CALCULATE STACK GAS VELOCITY (Ft./Sec)

$$V_s = 85.49\ C_p\ (\sqrt{\Delta P})_{AVG}\sqrt{\frac{T_s}{P_s\ M_s}}$$

CALCULATE VOLUME OF WATER VAPOR IN GAS SAMPLED AT STANDARD CONDITIONS (Cu. Ft.)

$$V_{wstd} = 0.0474\ V_{lc}$$

CALCULATE VOLUME OF GAS SAMPLED AT STANDARD CONDITIONS (SCF)

$$V_{mstd} = (17.64)\ (V_m)\ \left(\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right) Y$$

CALCULATE PERCENT WATER VAPOR IN GAS STREAM (By Volume)

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

CALCULATE VOLUMETRIC FLOW RATE (dscf/Min.)

$$Q_s = 60\,(1 - B_{ws})\,V_s\,A_s \left(\frac{528}{T_s}\right)\left(\frac{P_s}{29.92}\right)$$

CALCULATE PARTICULATE CONCENTRATION (gr./dscf)

$$C_s \quad \frac{15.43 \times \text{grams of particulate collected}}{V_{mstd}}$$

CALCULATE MASS EMISSION RATE (Lb./Hr.)

$$PMR = C_s\ C_s\ (6.58 \times 10^{-3})$$

CALCULATE POUNDS OF PARTICULATE PER TON OF COKE PUSHED

$$\frac{C_s \times Q_s \times 0.9\ \text{min/push}}{22\ \text{tons of coke/push} \times 7000\ \text{gr./lb.}}$$

PARTICULATE FIELD DATA

SHEET 1 OF 1

U.S. ST. CORPORATION
USS ENGINEERING

DIVISION: Coke Div
Dunbar

SOURCE: [illegible]
Surge [illegible]

TEST ENGINEER: W.S. Kubiak

OPERATOR: F.K. Murphy

TECHNICIANS: R. Elkins
G. Hammar

RUN NO.: 1

DATE: [illegible]

AMBIENT TEMP = [illegible] °F.
BAROMETRIC PRS. = [illegible] In. Hg.

METER BOX:
ID No. = [illegible]
H @ = 1.75
Y = [illegible]
PITOT TUBE Cp = [illegible]
NOZZLE:
ID No. = .125 I
DIAMETER = [illegible] In.

PROBE:
LENGTH = 4 Ft
LINER MATERIAL = [illegible]

DUCT:
DIAMETER = 20X40 In.
STATIC PRS = [illegible] In. H2O
ASSUMED MOISTURE [illegible] %
REF. Δ P = [illegible] In. H2O

FINAL LEAK CHECK:
0 CF/M @ 15 In. Hg.

K FACTOR = [illegible]

FLUE GAS ANALYSIS

O2	CO2	CO
15.[illegible]	1.6	

FILTER NO.: 11 INIT. WT: [illegible]

IMPINGER NO.	INITIAL WEIGHT (GRAMS)	FINAL WEIGHT (GRAMS)
1	455.5	[illegible]
2	436.0	437.5
3	320.0	321.5
4	[illegible]	[illegible]

POINT NO.	PORT	SAMPLING TIME (MIN.)	CLOCK TIME (24 Hr.)	VACUUM (In. Hg)	Δ P (In. H2O)	√Δ P	Δ H (In. H2O)	DGM READING (Cu. Ft.)	STACK TEMP. (°F.)	FILTER TEMP. (°F.)	DGM TEMP. (°F.)	IMPINGER TEMP. (°F.)
1-1	[illegible]	3.4	[illegible]	[illegible]	[illegible]	2.15	[illegible]	[illegible]	[illegible]	[illegible]	77	[illegible]
1-2	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	110	[illegible]	[illegible]	[illegible]
1-3	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	1.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1-4	[illegible]		[illegible]	[illegible]	[illegible]	2.35	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1-5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1-6	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2-1	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	147	[illegible]	[illegible]	[illegible]
2-2	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2-3	[illegible]		[illegible]	[illegible]	[illegible]	2.24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
2-4	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2-5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2-6	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3-1	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3-2	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3-3	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3-4	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3-5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3-6	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4-1	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4-2	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4-3	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4-4	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4-5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4-6	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		TOTAL		MAXIMUM		AVERAGE	AVERAGE	TOTAL	AVERAGE		AVERAGE	MAXIMUM
				5		2.427	1.0887	[illegible]	[illegible]		85.12	80

PARTICULATE FIELD DATA

SHEET 1 OF 1

U.S. STEEL CORPORATION
USS ENGINEERING

DIVISION: Coke Plant
Duquesne

SOURCE: [illegible]
Sample Point

TEST ENGINEER: W.S. Kubiak

OPERATOR: M. Murphy

TECHNICIANS: R. Elkins
G. Hammer

RUN NO.: 1-2

DATE: 9/15/84

AMBIENT TEMP = [illegible] °F.
BAROMETRIC PRS. = [illegible] In Hg.

METER BOX:
ID No. = 801-8
H @ = 1.757
Y = 1.004
PITOT TUBE Cp = .841
NOZZLE:
ID No. = .125 I
DIAMETER = .125 In

PT E:
LENGTH = 4 Ft
LINER MATERIAL = [illegible]

DUCT:
DIAMETER = 40 In.
STATIC PRS = [illegible] In. H2O
ASSUMED MOISTURE [illegible] %
REF. Δ P = [illegible] In H2O

FINAL LEAK CHECK:
0 CF/M @ 5 In. Hg.

K FACTOR = .109

FLUE GAS ANALYSIS

O_2	CO_2	CO
[illegible]	1%	
[illegible]	1.5	
[illegible]	1.7	

FILTER NO.: 12 ANTI WT: .3498

IMPINGER NO.	INITIAL WEIGHT (GRAMS)	FINAL WEIGHT (GRAMS)
1	436.5	514.5
2	443.0	494.5
3	331.0	331.0
4	521.0	533.

POINT NO.	PORT	SAMPLING TIME (MIN.)	CLOCK TIME (24 Hr.)	VACUUM (In. Hg)	Δ P (In. H2O)	√Δ P	Δ H (In. H2O)	DGM READING (Cu. Ft.)	STACK TEMP. (°F.)	FILTER TEMP. (°F.)	DGM TEMP. (°F.)	IMPINGER TEMP. (°F.)
1-1	2	5	7:50	3	6.5	[illegible]	1.5	[illegible]	[illegible]	249	70	62
1-2	[illegible]			3	7.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	60
1-3	3		8:06	3	6.5	[illegible]	1.3	[illegible]	[illegible]	[illegible]	73	60
1-4	4		:35	3	[illegible]	[illegible]	1.1	[illegible]	[illegible]	[illegible]	73	59
1-5	1		:40	[illegible]	[illegible]	[illegible]	1.1	[illegible]	[illegible]	[illegible]	75	57
1-6	2		:45	[illegible]	6.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	76	57
2-1	3		9:07	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	76	55
2-2	4		:11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	247	77	54
2-3	14		:15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78	56
2-4	16		10:19	[illegible]	5.0	[illegible]	[illegible]	[illegible]	[illegible]	246	78	56
2-5	1		:25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	79	54
2-6	2		1:37	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	81	61
3-1	3		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78	59
3-2	4		:50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78	57
3-3	1		11:17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	63
3-4	2		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78	63
3-5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78	67
3-6	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78	[illegible]
4-1	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78	70
4-2	[illegible]		12:15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78	77
4-3	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	78	72
4-4	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	70
4-5	[illegible]		[illegible]	3	5.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	71
4-6	[illegible]		[illegible]	3	[illegible]	[illegible]	1.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
							[illegible]	[illegible]	[illegible]		76.9	
		TOTAL		MAXIMUM		AVERAGE	AVERAGE	TOTAL	AVERAGE		AVERAGE	MAXIMUM

PARTICULATE FIELD DATA

SHEET 1 OF 2

U.S. STEEL CORPORATION
USS ENGINEERING

DIVISION: [illegible]

SOURCE: [illegible]

TEST ENGINEER: [illegible]

OPERATOR: [illegible]

TECHNICIANS: [illegible]

RUN NO.: [illegible]

DATE: [illegible]

AMBIENT TEMP = [illegible] °F.
BAROMETRIC PRS. = [illegible] In. Hg.

METER BOX:
ID No. = [illegible]
H @ = 1.757
Y = [illegible]
PITOT TUBE Cp = [illegible]
NOZZLE:
ID No. = [illegible]
DIAMETER = [illegible] In.

PITOT:
LENGTH = [illegible] Ft.
LINER MATERIAL = [illegible]

DUCT:
DIAMETER = [illegible] In.
STATIC PRS = [illegible] In. H2O
ASSUMED MOISTURE [illegible] %
REF. Δ P = [illegible] In. H2O

FINAL LEAK CHECK:
0 CF/M @ [illegible] In. Hg.

K FACTOR = [illegible]

FLUE GAS ANALYSIS

O2	CO2	CO
[illegible]	[illegible]	

FILTER NO.: [illegible] INIT. WT.: [illegible]

IMPINGER NO.	INITIAL WEIGHT (GRAMS)	FINAL WEIGHT (GRAMS)
1	[illegible]	491.0
2	[illegible]	443.0
3	[illegible]	329.0
4	[illegible]	512.0

POINT NO.	PORT	SAMPLING TIME (MIN.)	CLOCK TIME (24 Hr.)	VACUUM (In. Hg)	Δ P (In. H2O)	√Δ P	Δ H (In. H2O)	DGM READING (Cu. Ft.)	STACK TEMP. (°F.)	FILTER TEMP. (°F.)	DGM TEMP. (°F.)	IMPINGER TEMP. (°F.)
1-1	11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	60	56
1-2	13		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	62	56
1-3	15		8[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	137	260	64	55
1-4	17		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	65	55
1-5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	66	54
1-6	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	68	54
1-7	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	69	54
1-8	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	74	52
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	75	52
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	74	52
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	74	55
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	73	56
[illegible]	[illegible]		10[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	62
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	64
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	65
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	65
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	65
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	66
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	66
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	66
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	67
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	66
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72	68
		TOTAL		MAXIMUM		AVERAGE	AVERAGE	TOTAL	AVERAGE		AVERAGE	MAXIMUM

PARTICULATE FIELD DATA

SHEET ___ OF ___

U.S. ST CORPORATION
USS ENGINEERING

DIVISION: _____

SOURCE: _____

TEST ENGINEER: _____

OPERATOR: _____

TECHNICIANS: _____

RUN NO.: 3

DATE: [illegible]

AMBIENT TEMP = _____ °F.
BAROMETRIC PRS. = _____ In. Hg.

METER BOX:
ID No. = _____
H @ = _____
Y = _____
PITOT TUBE Cp= _____
NOZZLE:
ID No. = _____
DIAMETER = _____ In.

STACK:
LENGTH = _____ Ft.
LINER MATERIAL = _____

DUCT:
DIAMETER = _____ In.
STATIC PRS = _____ In. H2O
ASSUMED MOISTURE _____ %
REF. Δ P = _____ In. H2O

FINAL LEAK CHECK:
_____ CF/M @ _____ In. Hg.

K FACTOR = _____

FLUE GAS ANALYSIS

O2	CO2	CO

FILTER NO.: _____ INIT. WT: _____

IMPINGER NO.	INITIAL WEIGHT (GRAMS)	FINAL WEIGHT (GRAMS)
1	[illegible]	
2	941.0	
3	328.5	
4	5[illegible]	

POINT NO.	PORT	SAMPLING TIME (MIN.)	CLOCK TIME (24 Hr.)	VACUUM (In. Hg)	Δ P (In. H2O)	$\sqrt{\Delta P}$	Δ H (In. H2O)	DGM READING (Cu. Ft.)	STACK TEMP. (°F.)	FILTER TEMP. (°F.)	DGM TEMP. (°F.)	IMPINGER TEMP. (°F.)
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	72	66
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	74	[illegible]
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	74	[illegible]
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	76	[illegible]
								[illegible]				

PUSHING INSPECTION

DATE 9/14/82 BATTERY # #3

PROCESS OBSERVER Theo Sanders
U.S. Steel Corp., Gary, Works

START TIME 7:30
FINISH TIME 9:50

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	15	30	45	TRAVEL OPACITY 0	15	30	45
42	8:59	9:03	+61	61	+19	+95	13 HRS 31 MIN	5 5	10	15	10	5	5		
44	9:08	9:06	+59	59	+20	+405	SPRAYED OVEN 13 HRS 25 MIN	10	15	20	15	10	5		
46	9:22	9:24	+60	60	+28	+90	13 HRS 32 MIN	5 5	15	15	10	5	10		
48	9:30	9:33	+58	58	+24	+416	SPRAYED OVEN 13 HRS 30 MIN	5	5	10	5	5	5		
50	9:44	9:45	+59	59	+25	+92	13 HRS 42 MIN	15	25	20	15	10	20		

* USING ONE SPOT CAR (9103)

SUMMARY:

NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 5

NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/14/82 BATTERY # 3

PROCESS OBSERVER THEE SANDIDGE
U.S. Steel Corp., Gary, Works

START TIME 9:50
FINISH TIME 11:19

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	PUSH OPACITY 15	PUSH OPACITY 30	PUSH OPACITY 45	TRAVEL OPACITY 0	TRAVEL OPACITY 15	TRAVEL OPACITY 30	TRAVEL OPACITY 45
52	9:51	9:53	+ 52	58	+ 21	+ 98	13 HRS 30 MIN	10	30	15	15	10	10		
54	9:59	10:02	+ 180	10:15	+ 18	FROM TIME TRAVEL STARTED + 247	13 HRS 29 MIN	5 0 0	5 0 0	0 0 0	0 0 0	5	5		
56	10:34	10:35	+ 61	61	+ 26	+ 96	13 HRS 53 MIN	15 5	25	30	20	5	5		
1	10:42	10:50	+ 58	58	+ 21	SPRAYED OVER + 504	13 HRS 51 MIN	10	40	35	20	5	5		
3	NOT 11:02	IN 11:06	COM + 67	PLIA 67	NCE + 20	+ 97	13 HRS 57 MIN	20 5	50	45	20	5	5		
5	11:12	11:14	+ 53	53	+ 24	+ 180	13 HRS 51 MIN	15	40	20	15	5	5		

* USING ONE SPOT (9123)
MOBILE SCRUBBER OPERATING
– FAN RUNNING

SUMMARY:
NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 8
NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/14/82 BATTERY # 3

PROCESS OBSERVER Thee Candidge
U.S. Steel Corp., Gary, Works

START TIME 11:19
FINISH TIME 1:20

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	15	30	45	TRAVEL OPACITY 0	15	30	45
7	11:26	11:30	+76	76	+21	+206	13 HRS 58 MIN	5 0	20 0	25	25	5	0		
9	11:38	11:53	+53	53	+20	+114	13 HRS 59 MIN	5	20	25	20	5	5	0	
11	12:00	12:03	+59	59	+26	+82	14 HRS 1 MIN	15	35	50	40	0	0		
13	12:09	12:11	+49	49	+22	SPRAYED OVEN +450	14 HRS 0 MIN	25	30	15	5	0	0		
15	12:20	12:24	+65	65	+26	+94	14 HRS 5 MIN	5 10	30	35	15	0	0		
17	1:11	1:15	+54	54	+24	SPRAYED OVEN +313	14 HRS 47 MIN	5	25	20	15	0	0		

* USING ONE SPOT CAR (9123)
* MOBILE SCRUBBER OPERATING
* FAN RUNNING

SUMMARY:
NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 11
NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/4/99 BATTERY # 3

PROCESS OBSERVER Thee Sponge
U.S. Steel Corp., Gary, Works

START TIME 1:20
FINISH TIME 2:25

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	PUSH OPACITY 15	PUSH OPACITY 30	PUSH OPACITY 45	TRAVEL OPACITY 0	TRAVEL OPACITY 15	TRAVEL OPACITY 30	TRAVEL OPACITY 45
19	1:00	1:05	+61	61	+21	+87	14 HRS 49 MIN	5 0	30	25	10	0	0	0	
21	1:31	1:35	+56	56	+30	+515	STRAYED OVEN 14 HRS 51 MIN	0	15	15	5	5	0	0	
23	1:55	1:57	+81	81	+31	+70	15 HRS 4 MIN	5 0	25 0	20	5	0	0	0	
25	2:03	2:05	+50	50	+27	+71	14 HRS 40 MIN	5	10	15	15	0	0		
27	2:11	2:13	+51	51	+28	+78	14 HRS 48 MIN	5	[illegible]	25	5	0	5	5	
29	2:19	2:22	+56	56	+30	+99	14 HRS 49 MIN	10	30	20	10	0	0	0	

*USING ONE SPOT (9123)
MOBILE SCRUBBER OPERATING
FAN RUNNING

SUMMARY:
NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 6
NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/14/82 BATTERY # 3

PROCESS OBSERVER Thee Saldinge
U.S. Steel Corp., Gary, Works

START TIME 2:25
FINISH TIME 2:50

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	PUSH OPACITY 15	PUSH OPACITY 30	PUSH OPACITY 45	TRAVEL OPACITY 0	TRAVEL OPACITY 15	TRAVEL OPACITY 30	TRAVEL OPACITY 45
							14 HRS	5	25	25	5	0	0	0	
31	2:28	2:31	+52	53	+35	+92	41 MIN								
							14 HRS	0	10	20	0	0	5	5	
33	2:36	2:42	+50	50	+32	+100	46 MIN								

* USING ONE SPOT CAR (9123)
MOBILE SCRUBBER OPERATING
FAN RUNNING

SUMMARY:

NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 2

NUMBER OF PUSHES OBSERVED 2

PUSHING INSPECTION

DATE 9/15/82 BATTERY # 3

PROCESS OBSERVER THE SANDIDGE
U.S. Steel Corp., Gary, Works

START TIME 7:00
FINISH TIME 9:00

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	PUSH OPACITY 15	PUSH OPACITY 30	PUSH OPACITY 45	TRAVEL OPACITY 0	TRAVEL OPACITY 15	TRAVEL OPACITY 30	TRAVEL OPACITY 45
53	7:55	7:43	+50	50	+31	+107	14 HRS 3 MIN	0	15	20	25	0	0	0	
55	7:54	8:08	+54	54	+35	+91	14 HRS 5 MIN	5	20	30	5	0	0	0	
57	8:20	8:23	+29	29	+34	+108	14 HRS 5 MIN	5	15	15		0	0	0	
2	8:29	8:33	+42	42	+30	+107	13 HRS 5 MIN	20	25	30		0	0		
4	8:37	8:44	+45	45	+27	+112	14 HRS 1 MIN	5	25	20	10	0	0		
6	8:49	8:57	+52	52	+25	+104	14 HRS 6 MIN	5	15	20	5	0	0		

* USING ONE SRT CAR (9123)
MOBILE SCRUBBER OPERATING
N RUNNING

SUMMARY:
NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 7
NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/15/82 BATTERY # 3

PROCESS OBSERVER Tim Sandoe
U.S. Steel Corp., Gary, Works

START TIME 9:00
FINISH TIME 10:28

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	15	30	45	TRAVEL OPACITY 0	15	30	45
8	9:02	9:06	+44	44	+25	+148	14 HRS 7 MIN	0	5	10		0	0		
10	9:10	9:14	+44	44	+26	+124	14 HRS 8 MIN	0	15	20		0	0		
12	9:39	9:42	+41	41	+27	+120	13 HRS 38 MIN	0	10	10		0	0		
14	9:47	9:54	+42	42	+21	+124	13 HRS 50 MIN	5	15	25		0	0	0	
16	10:10	10:13	+48	48	+21	+109	13 HRS 44 MIN	0	5	20	15	0	5	0	
18	10:21	10:24	+45	45	+27	+160	13 HRS 47 MIN	0	15	20	5	0	5		

*USING ONE SPOT CAR (9123)
MOBILE SCRUBBER OPERATING
FAN RUNNING

SUMMARY:
NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 2
NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/15/82 BATTERY # 3

PROCESS OBSERVER Tim Savage
U.S. Steel Corp., Gary, Works

START TIME 10:28
FINISH TIME 11:34

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	PUSH OPACITY 15	PUSH OPACITY 30	PUSH OPACITY 45	TRAVEL OPACITY 0	TRAVEL OPACITY 15	TRAVEL OPACITY 30	TRAVEL OPACITY 45
20	10:29	10:35	+39	39	+31	+144	13 HRS 50 MIN	0	10	10		0	0	0	
22	10:39	10:44	+41	41	+30	+146	13 HRS 51 MIN	0	5	15		0	0	0	
24	10:49	10:50	+43	43	+25	+149	13 HRS 44 MIN	0	0	10		0	0	0	
26	11:01	11:11	+43	43	+29	+150	13 HRS 49 MIN	0	5	15		0	0	0	
28	11:15	11:22	+40	40	+37	+149	13 HRS 50 MIN	0	0	10		0	0	0	
30	11:25	11:30	+40	48	+40	+137	13 HRS 41 MIN	0	25	30	10	0	0	0	

*USING ONE SPOT CAR (9103)
MOBILE SCRUBBER OPERATING
FAN PLANNING

SUMMARY:
NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 2
NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/15/82 BATTERY # 3

PROCESS OBSERVER Thos Sandidge
U.S. Steel Corp., Gary, Works

START TIME 11:34
FINISH TIME 1:15

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	15	30	45	TRAVEL OPACITY 0	15	30	45
32	11:37	11:44	+46	46	+37	+159	13 HRS 46 MIN	0	30	30	25	5	5	5	
34	11:49	11:53	+41	41	+40	+153	13 HRS 47 MIN	0	20	15		0	0	0	
36	12:40	12:43	+39	39	+34	+128	14 HRS 3 MIN	0	10	5		5	0	0	
38	12:46	12:50	+45	45	+31	+177	14 HRS 5 MIN	0	10	10	5	0	0	0	
40	12:54	1:02	+43	43	+32	+167	13 HRS 37 MIN	0	5	15		0	0	0	
42	1:05	1:10	+45	45	+33	+162	13 HRS 37 MIN	0	0	5	10	0	0	0	

* USING ONE SPOT CAR (9123)
MOBILE SCRUBBER OPERATING
FAN RUNNING

SUMMARY:
NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 3
NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/15/82 BATTERY # 3

PROCESS OBSERVER THE SCHMOEE
U.S. Steel Corp., Gary, Works

START TIME 1:15
FINISH TIME 1:33

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	PUSH OPACITY 15	PUSH OPACITY 30	PUSH OPACITY 45	TRAVEL OPACITY 0	TRAVEL OPACITY 15	TRAVEL OPACITY 30	TRAVEL OPACITY 45
							13 HRS	5	15	15	10	0	0	0	0
44	1:15	1:24	+ 45	45	+ 45	+ 124	49 MIN								

* USING ONE SPOT CAR (9123)
MOBILE SCRUBBER OPERATING
FAN RUNNING

SUMMARY:

NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 0

NUMBER OF PUSHES OBSERVED 1

PUSHING INSPECTION

DATE 9/16/82 BATTERY # 3

PROCESS OBSERVER Tim Sandridge
U.S. Steel Corp , Gary, Works

START TIME 7:00
FINISH TIME 8:40

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	PUSH OPACITY 15	PUSH OPACITY 30	PUSH OPACITY 45	TRAVEL OPACITY 0	TRAVEL OPACITY 15	TRAVEL OPACITY 30	TRAVEL OPACITY 45
11	7:22	7:42	+52	52	+30	+117	14 HRS 0 MIN	0	20	25	15	0	0	0	
13	7:51	7:53	+44	44	+27	+178	14 HRS 0 MIN	0	10	15		0	0		
15	8:00	8:02	+49	49	+38	+167	13 HRS 50 MIN	0	5	15	10	0	0	0	
17	8:08	8:10	+43	43	+40	+149	13 HRS 50 MIN	5	10	5		0	0	0	
19	8:17	8:19	+42	42	+46	+156	13 HRS 44 MIN	0	15	10		0	0	0	0
21	8:26	8:36	+43	43	+65	+165	13 HRS 46 MIN	5	15	25		0 0	0	0	0

* USING ONE SPOT CAR (9123)
MOBILE SCRUBBER OPERATING
AN RUNNING

SUMMARY:
NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 2
NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/16/82 BATTERY # 3

PROCESS OBSERVER Tim Savage
U.S. Steel Corp., Gary, Works

START TIME 8:41
FINISH TIME 9:58

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	PUSH OPACITY 15	PUSH OPACITY 30	PUSH OPACITY 45	TRAVEL OPACITY 0	TRAVEL OPACITY 15	TRAVEL OPACITY 30	TRAVEL OPACITY 45
							13 HRS	0	30	25	10	0	0	0	
23	[illegible]	[illegible]	+47	47	+40	+144	45 MIN								
							13 HRS	0	20	25	15	0	0	0	
25	9:06	9:07	+45	45	+37	+143	30 MIN								
							13 HRS	0	15	20	5	0	0	0	0
27	9:13	9:15	+47	47	+52	+154	25 MIN								
							13 HRS	10	20	25	10	0	0	0	0
29	9:25	9:27	+45	45	+56	+229	20 MIN								
							13 HRS	0	[illegible]	[illegible]		0	0	0	0
31	9:36	9:40	+42	42	+60	+169	27 MIN					0			
							13 HRS	0	15	20	5	0	0	0	0
33	9:49	9:53	+47	47	+63	+157	23 MIN					0			

* USING ONE SPOT CAR (9103)
MOBILE SCRUBBER OPERATING
FAN RUNNING

SUMMARY:

NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 6

NUMBER OF PUSHES OBSERVED 6

ENVIROTECH CHEMICO AIR POLLUTION CONTROL One Penn Plaza
New York, N.Y. 10001
(212) 239-6300

September 27, 1979

U. S. Steel Corporation
600 Grant Street
Pittsburgh, Pennsylvania 15230

Attention: Mr. L. Malin

Subject: EDV Pilot Plant Test Results as they apply to Gary and South Works Installations

Gentlemen:

The purposes of this letter are threefold:

1) To present test data which we consider meaningful at Gary Works.

2) To demonstrate how that data was used to modify our original design for both the Gary and South Works installations.

3) To utilize pilot data generated at Gary and stack test data at South Works in order to calculate the expected performance at South Works.

There are eight figures attached to this letter which detail results obtained at Gary Works No. 3 Sinter Strand under various conditions, as well as inlet test results from the South Works installation. These figures are labelled as follows, and shall be discussed individually below:

Figure 1 is a bar graph showing the frequency distribution of outlet grain loadings for valid tests at Gary. The mean result is 0.0284 and the standard deviation is 0.006. We have included this figure to show the range of results obtained under a wide variety of process variation.

In the subsequent figures we will detail the effect of inlet loading and fractional efficiencies for salt (KCl and NaCl) and non-salt (as particulate) species in terms of an overall performance calculation, which is necessary because of differences in operation and burden at the two installations.

(cont'd.)

PUSHING INSPECTION

DATE 9/16/82 BATTERY # 3

PROCESS OBSERVER Thos Sandidge
U.S. Steel Corp., Gary, Works

START TIME 9:50
FINISH TIME 11:53

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	15	30	45	TRAVEL OPACITY 0	15	30	45
							13 HRS	0	15	20		0	0	5	5
												5			
35	10:50	10:51	+45	45	+63	+163	41 MIN								
							13 HRS	0	20	30		0	0	5	5
37	10:57	11:00	+44	44	+54	+151	38 MIN								
							13 HRS	5	20	30	15	0	0	0	0
39	11:04	11:14	+45	45	+53	+187	43 MIN								
							13 HRS	0	25	25	5	0	0	0	0
												0			
41	11:19	11:28	+48	48	+63	+145	38 MIN								
							13 HRS	0	15	25	15	0	0	0	5
								5							
43	11:32	11:41	+49	49	+60	+148	41 MIN								
							13 HRS	0	20	30	20	0	0	5	0
												0			
45	11:46	11:49	+47	47	+62	+132	39 MIN								

* USING ONE SPOT CAR (9123)
MOBILE SCRUBBER OPERATING
FAN RUNNING

SUMMARY:
NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 30% = 6
NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/16/82 BATTERY # 3

PROCESS OBSERV. Thee Sandidge
U.S. Steel Corp.. Gary, Works

START TIME 11:53
FINISH TIME 1:01

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	15	30	45	TRAVEL OPACITY 0	15	30	45
							13 HRS	0	25	30	15	0	0	0	0
47	11:54	11:58	+47	47	+51	+147	38 MIN								
							13 HRS	0	30	35	25	0	0	5	0
49	12:03	12:07	+49	49	+63	+152	47 MIN					0			
							13 HRS	0	20	25	15	0	0		
51	12:12	12:15	+51	51	+50	+150	35 MIN								
							13 HRS	5	20	30		0	0	0	0
53	12:20	12:32	+41	41	+53	+172	42 MIN								
							13 HRS	0	25	20		0	0	0	0
55	12:36	12:42	+42	42	+58	+158	43 MIN								
							13 HRS	5	25	20		0	0	0	0
57	12:51	12:56	+42	42	+53	+168	31 MIN								

* USING ONE SPOT CAR (9:23)
MOBILE SCRUBBER OPERATING
FAN RUNNING

SUMMARY:
NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 10
NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/16/82 BATTERY # 3

PROCESS OBSERVER Thee Sandage
U.S. Steel Corp., Cary, Works

START TIME 1:03
FINISH TIME 2:22

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	15	30	45	TRAVEL OPACITY 0	15	30	45
							13 HRS	0	15	25	5	0	0	0	
2	1:04	1:06	+45	45	+42	+154	21 MIN								
						Sprayed oven	13 HRS	0	10	15	5	0	0	0	
4	1:10	1:16	+47	47	+44	+845	23 MIN								
							13 HRS	0	10	30	5	0	0	0	0
6	1:33	1:35	+48	48	+45	+167	35 MIN								
							13 HRS	0	10	15		5	0	0	0
8	1:39	1:43	+38	38	+45	+154	36 MIN								
							13 HRS	0	10	15		0	0	0	0
10	1:47	1:51	+39	39	+48	+164	21 MIN								
						Sprayed oven	13 HRS	0	5	10	5	0	0	0	0
12	2:00	2:09	+46	46	+50	+714	39 MIN								

* USING ONE SPOT CAR (9123)
MOBILE SCRUBBER OPERATING
FAN RUNNING

SUMMARY:
NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 30% = 1
NUMBER OF PUSHES OBSERVED 6

PUSHING INSPECTION

DATE 9/16/82 BATTERY # 3

PROCESS OBSERVER Thee Savage
U.S. Steel Corp., Gary, Works

START TIME 2:22
FINISH TIME 2:53

OVEN NO.	DOOR REMOVED	PUSH BEGAN	PUSH ENDED	TRAVEL BEGAN	TRAVEL ENDED	DOOR REPLACED	COKING TIME	PUSH OPACITY 0	PUSH OPACITY 15	PUSH OPACITY 30	PUSH OPACITY 45	TRAVEL OPACITY 0	TRAVEL OPACITY 15	TRAVEL OPACITY 30	TRAVEL OPACITY 45
							13 HRS	0	5	20	15	0	5	5	5
14	2:23	2:25	+ 52	53	+ 47	+ 142	45 MIN								
							13 HRS	0	10	15	10	0	0	0	
16	2:30	2:34	+ 47	47	+ 41	+ 147	39 MIN								
							13 HRS	10	20	15		0	0	0	
18	2:43	2:47	+ 35	35	+ 30	+ 101	24 MIN								

* USING ONE SPOT CAR (9123)
MOBILE SCRUBBER OPERATING
AND RUNNING

SUMMARY:

NUMBER OF 15-SECOND OPACITY READINGS GREATER THAN 20% = 0

NUMBER OF PUSHES OBSERVED 3

GW 20799 REV 1269

COKE WORKS

RECORD OF OVENS PUSHED & CHARGED

9.14.82

TURN No 3

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	[illegible]	355	9[illegible]		1				
2	[illegible]	[illegible]	23		2				
3	[illegible]	10	[illegible]		3				
4	[illegible]	25	[illegible]		4				
5	[illegible]	33	52		5				
6	[illegible]	45	[illegible]		6				
7	[illegible]	55	22		7				
8	[illegible]	1015	51	Hand Push	8	(57)			
9	[illegible]	35	1100		9				
10		52	25		10				
11	3	1107	40		11				
12	5	15	53		12				
13	7	32	1204		13				
14	9	53	13		14				
15	11	1203	21		15				
16	13	10	29		16				
17	15	23	124		17				
18	17	115	33		18				
19	19	25	41		19				
20	21	33	203		20			27	HEATS SCHED.
21	23	55	17		21				
22	25	204	26		22			27	HEATS Push.
23	27	12	37		23				
24	29	20	48		24			57	OVENS IN USE
25	31	30	58		25				
26	33	40			26				
27	5	55			27				
28					28				
29					29				
30					30				
31					31				
32					32				

L. Rains Jr.

SW 52799 REV. 1269

COKE WORKS

RECORD OF OVENS PUSHED & CHARGED

TURN 7-3
9-15-83

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

	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS
1	[illegible]	[illegible]	[illegible]	
2	[illegible]	[illegible]	[illegible]	
3	[illegible]	[illegible]	[illegible]	
4	[illegible]	[illegible]	[illegible]	
5	[illegible]	[illegible]	[illegible]	
6	[illegible]	[illegible]	[illegible]	
7	[illegible]	[illegible]	[illegible]	
8	[illegible]	[illegible]	[illegible]	
9	[illegible]	[illegible]	[illegible]	
10	[illegible]	[illegible]	[illegible]	
11	[illegible]	[illegible]	[illegible]	
12	[illegible]	[illegible]	[illegible]	
13	[illegible]	[illegible]	[illegible]	
14	[illegible]	[illegible]	[illegible]	
15	[illegible]	[illegible]	[illegible]	
16	[illegible]	[illegible]	[illegible]	
17	[illegible]	[illegible]	[illegible]	
18	[illegible]	[illegible]	[illegible]	
19	[illegible]	[illegible]	[illegible]	
20	[illegible]	[illegible]	[illegible]	
21	[illegible]	[illegible]	[illegible]	
22	[illegible]	[illegible]	[illegible]	
23	[illegible]	[illegible]	[illegible]	
24	[illegible]	55	14	
25	40	105	22	
26	[illegible]	12	35	
27	[illegible]	30	44	
28	[illegible]	40	207	
29	48	52	22	
30	50	520	31	
31	52	30	39	
32	54	40		

	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				

REV. 1269

COKE WORKS

RECORD OF OVENS PUSHED & CHARGED

9-16-82

TURN 7-3

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	7		[illegible]		1				
2	[illegible]		[illegible]		2				
3	11	[illegible]	[illegible]		3				
4	13	[illegible]	[illegible]		4				
5	15	[illegible]	16		5				
6	17	19	[illegible]		6				
7	19	20	35		7				
8	21	22	50		8				
9	23	47	[illegible]		9				
10	25	[illegible]	21		10				
11	27	00	38		11				
12	29	30	47		12				
13	31	45	58		13				
14	33	55	[illegible]		14				
15	35	[illegible]	[illegible]		15				
16	37	[illegible]	21		16				
17	39	15	41		17				
18	41	30	51		18				
19	43	42	59		19				
20	45	50	[illegible]		20				
21	47	[illegible]	23	✓	21				
22	49	08	38	✓	22				
23	51	16	49	✓	23				
24	53	32	1:03	✓	24				
25	55	45	13	✓	25				
26	57	1:[illegible]	25	✓	26				
27	2	10	45	✓	27				
28	4	20	54	✓	28				
29	6	35	2:02	✓	29				
30	8	45	14	✓	30				
31	10	52	29	✓	31				
32	12	2:[illegible]	44	✓	32				

GARY COKE AND CHEMICALS DIVISION

9-12-82

DAILY COAL AND COKE
QUALITY REPORT

DATE SAMPLED: 9-13-82
DATE REPORT ISSUED: 9-14-82

INCOMING COALS	3-11-8 TURN PIN ~~Alpheus~~	Corbin	GLA	11-7-8 TURN PIN ~~Alpheus~~	Corbin	GLA / Hi Vol	DAILY AVERAGE PIN ~~Alpheus~~	Corbin	GLA	Hi Vol
% Moisture	4.98	4.19	4.94	4.87	5.50	4.99 / 5.30	4.93	4.85	4.97	5.30
% Ash	5.19	5.88	5.49	5.21	5.83	4.69 / 5.97	5.20	5.86	5.09	5.97
% Volatile Matter	17.41	35.76	31.74	17.16	35.84	31.65 / 30.93	17.29	35.80	31.70	30.93
% Sulfur	.63	.97	.96	.66	.97	.78 / .87	.65	.97	.87	.87

BLENDED COAL	1	3	13-15	A		2-H	2-H				
Bulk Density	N		43.6	43.6		45.7	45.6				
% Moisture	O		4.12	4.12							
% Ash	S	5.75	5.64	5.65							
% Volatile Matter	A M	30.97	29.72	30.07							
% Sulfur	P	.90	.88	.89							
Calc. B.F. Coke Ash	L										
Pulverization % +1"	E										
" % +1/2"											
" % +1/4"			3.6	3.6							
" % -1/8"			83.4	83.4							
" % -100 Mesh											
~~PRODUCTION % -100 Mesh~~	~~.21~~	~~.45~~	~~.31~~	~~1.00~~							

PULVERIZERS	U1 ~~X-1~~	U3 ~~X-3~~	U5 ~~X-5~~	~~Ag 2~~	~~Ag 1~~	3Ca ~~Ab 5~~	3D ~~Ab 3~~	3B ~~Ab 1~~
% MOISTURE	6.03	5.46	6.45					
Pulverization % +1"						D		
" % +1/2"	.2		.1			O		
" % +1/4"	3.6	3.5	3.7			W	1.1	1.2
" % -1/8"	82.1	83.4	81.5			N	88.0	89.6
" % -100 Mesh								

Coal as received		

BLAST FURNACE COKE SCREENING STATION

STATION	+4	+3"	+2½"	+2"	+1½"	+1"	+3/4"	-3/4"	Stab.	Hard.	Moist	Ash	V.M.	Sul.
1	0	9	18	32	59	90	95	5	60	70	7.6	8.02	0.69	0.73
3	0	10	21	35	68	91	94	6	61	72	3.6	8.03	1.05	0.69
8	0	7	27	55	83	95	99	1	61	71	.5	7.82	0.57	0.72

GARY COKE AND CHEMICALS DIVI ON

DAILY COAL AND COKE
QUALITY REPORT

DATE SAMPLED: 9-1

DATE REPORT ISSUED: 4-15

INCOMING COALS	3-11-8 TURN PIN ~~Alpheus~~	Corbin	GLA	11-7-8 TURN PIN ~~Alpheus~~	Corbin	GA / RA	DAILY AVERAGE PIN ~~Alpheus~~	Corbin	GA / RA
% Moisture	4.99	3.51	4.81	5.39	6.15	4.70 / 7.52	5.19	4.63	4.7[illegible] / [illegible]
% Ash	5.66	5.63	4.57	5.45	5.62	7.21 / 6.06	5.56	5.63	5.9[illegible] / [illegible]
% Volatile Matter	17.42	36.17	32.17	17.79	36.55	31.49 / 31.48	17.61	36.36	31.[illegible] / [illegible]
% Sulfur	.72	.95	.84	.68	.89	1.01 / .91	.70	.92	.9[illegible] / [illegible]

BLENDED COAL	1	3	13-15	A		13-1-14 4:30 PM	13-2-14 4:00 P	1H 12:00 A 2:00 A	2H 12:00 A 2:00 A		
Bulk Density	45.9		44.9	45.4		46.4	46.0	46.2	46.1		
% Moisture	5.39		4.97	5.18							
% Ash	6.17		5.30	5.[illegible]							
% Volatile Matter	29.35		28.00	28.[illegible]							
% Sulfur	.88		.83	.8[illegible]							
Calc. B.F. Coke Ash											
Pulverization % +1"											
" % +1/2"	.1			.1							
" % +1/4"	4.0		3.9	4.0							
" % -1/8"	82.2		81.4	81.8							
" % -100 Mesh											
PRODUCTION % -200 Mesh	.24	.45	.31	1.00							

PULVERIZERS	01 ~~X-1~~	03 ~~X-3~~	05 ~~X-5~~	~~Ab-1~~	~~Ab-2~~	3A ~~Ab-5~~	3B ~~Ab-3~~	3C ~~Ab-2~~	Coal as received		
% MOISTURE	5.70	5.40	5.45								
Pulverization % +1"											
" % +1/2"		.1									
" % +1/4"	3.6	3.7	3.4			1.5	.9	.6			
" % -1/8"	80.6	82.7	81.9			89.9	91.3	95.2			
" % -100 Mesh											

BLAST FURNACE COKE SCREENING

STATION	+4"	+3"	+2½"	+2"	+1½"	+1"	+3/4"	-3/4"	Stab.	Hard.	Moist	Ash	V.M.	Su
1	0	15	28	44	70	92	97	3	56	70	6.9	5.15	0.80	.7
3	0	10	18	31	62	90	93	7	61	71	4.1	7.59	0.87	.7
8	0	10	28	46	79	96	98	2	58	70	3.1	6.92	0.90	.6

GARY COKE AND CHEMICALS DIVISION

DAILY COAL AND COKE QUALITY REPORT

* FROM STOCK

DATE SAMPLED: 9-1

DATE REPORT ISSUED: 9-16

INCOMING COALS	3-11-7 TURN Alpheus	Corbin	RA	11-7-7 TURN * PIN [illegible]	Corbin	RA	DAILY AVERAGE * PIN [illegible]	Corbin	RA
% Moisture		6.53	7.48	5.27	6.73	7.17	5.27	6.63	7.33
% Ash		6.00	6.67	5.63	6.44	7.00	5.63	6.22	6.84
% Volatile Matter		36.40	31.47	17.68	35.03	31.34	17.68	35.72	31.41
% Sulfur		0.92	0.95	0.67	0.99	0.95	0.67	0.96	0.95

BLENDED COAL	1	3	13-15	AVG		2H 1[illegible]	2H 2[illegible]				
Bulk Density	45.2	—	45.0	45.1		45.7	45.4				
% Moisture	6.33	—	6.62	6.48							
% Ash	6.32	6.01	6.24	6.16							
% Volatile Matter	28.08	32.03	27.86	29.79							
% Sulfur	0.87	0.86	0.88	0.87							
Calc. R.F. Coke Ash											
Pulverization % +1"	0.0	—	0.0	0.0							
" % +1/2"	0.0	—	0.0	0.0							
" % +1/4"	4.1	—	3.5	3.8							
" % -1/8"	81.3	—	82.5	81.9							
" % -100 Mesh											
Production % -200 Mesh	.24	.45	.31	1.00							

PULVERIZERS	U-1	U-3	U-5		PC →	3A	3B	3C	Coal as received		
% MOISTURE	5.58	7.19	5.74								
Pulverization % +1"	0.0	0.0	0.0			0.0	0.0	0.0			
" % +1/2"	0.0	0.0	0.0			0.0	0.0	0.0			
" % +1/4"	4.0	3.5	2.8			1.0	0.8	0.9			
" % -1/8"	[illegible]	[illegible]	83.1			90.0	90.0	91.9			
" % -100 Mesh											

BLAST FURNACE COKE

SCREENING STATION	+4"	+3"	+2½"	+2"	+1½"	+1"	+3/4"	-3/4"	Stab.	Hard.	Moist	Ash	V.M.	Sul
1	0	15	30	47	77	95	98	2	57	70	3.3	8.19	0.46	0.7
3	0	3	10	25	62	87	92	8	61	72	7.1	8.17	0.64	0.7
8	0	13	31	51	80	91	95	5	58	71	2.3	8.22	0.13	0.7

GARY COKE AND CHEMICALS DIVISI...

DAILY COAL AND COKE
QUALITY REPORT

DATE SAMPLED: 9-16-8

DATE REPORT ISSUED: 9-17-8

INCOMING COALS	3-11-8 TURN ~~Alpheus~~	Corbin	GLA	11-7-8 TURN PIN ~~Alpheus~~	Corbin	GLA / PA	DAILY AVERAGE PIN ~~Alpheus~~	Corbin	GLA
% Moisture		5.14	4.92	4.46	5.62	4.71 / 7.03	4.46	5.38	4.82
% Ash		6.10	5.75	4.84	6.14	6.46 / 6.19	4.84	6.12	6.11
% Volatile Matter		35.48	31.49	18.02	33.28	31.50 / 32.82	18.02	34.35	31.50
% Sulfur		.93	.91	.67	.87	.97 / .89	.67	.90	.94

BLENDED COAL	1	3	13-15	A		3-11	2H	2H			
Bulk Density	44.6		44.3	44.5		44.1	46.5	46.5			
% Moisture	5.29		5.33	5.31							
% Ash	5.95	5.86	6.09	5.95							
% Volatile Matter	30.78	31.54	29.40	30.69							
% Sulfur	.89	.85	.93	.88							
Calc. B.F. Coke Ash											
Pulverization % +1"											
" % +1/2"											
" % +1/4"	3.6		11.4	7.5							
" % -1/8"	82.7		77.6	79.9							
" % -100 Mesh											
PRODUCTION % -[illegible]	.24	.45	.31	1.00							

PULVERIZERS	01 X-1	03 X-3	05 X-5	Ab 2	Ab 1	3A Ab 5	3B Ab 3	3C Ab 1	Coal as received		
% Moisture	6.17	6.58	5.88								
Pulverization % +1"											
" % +1/2"	11.9							14.3			
" % +1/4"	13.9	13.9	14.6			16.8	14.3	15.4			
" % -1/8"	76.0	77.2	73.8			78.2	78.8	77.4			
" % -100 Mesh											

BLAST FURNACE COKE

SCREENING STATION	+4"	+3"	+2½"	+2"	+1½"	+1"	+3/4"	-3/4"	Stab.	Hard.	Moist	Ash	V.M.	Sul.
1	0	12	20	43	76	92	96	4	55	67	8.0	8.01	1.06	.73
3	0	8	17	33	67	90	94	6	62	72	4.6	7.82	.95	.68
5	0	19	39	54	82	95	97	3	57	69	6.9	7.75	.88	.65