SEA Project 7008

OBSERVATION OF PARTICULATE TESTING AND PROCESS OPERATIONS DURING U.S. STEEL SCRUBBER CAR DEMONSTRATION COKE OVEN BATTERY NO. 3

U.S. STEEL CORPORATION, GARY WORKS
GARY, INDIANA

Prepared by

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SEA/HH REPORT FR-82-25

Prepared for

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Air Enforcement Division, Region V
230 South Dearborn Street
Chicago, Illinois 60604

Contract No. 68-01-6318
Task 8

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1.0 INTRODUCTION

The Energy and Environmental Division (EED) of Acurex Corporation was retained by the U.S. Environmental Protection Agency (EPA), Region V Air Enforcement Division, to witness emission testing of a mobile pushing emissions control system at U.S. Steel Corporation, Gary Works, Gary, Indiana. Particulate testing was conducted at the No. 3 coke oven battery scrubber car outlet stack during pushing. Visible emission (VE) determinations and process operation data were also obtained.

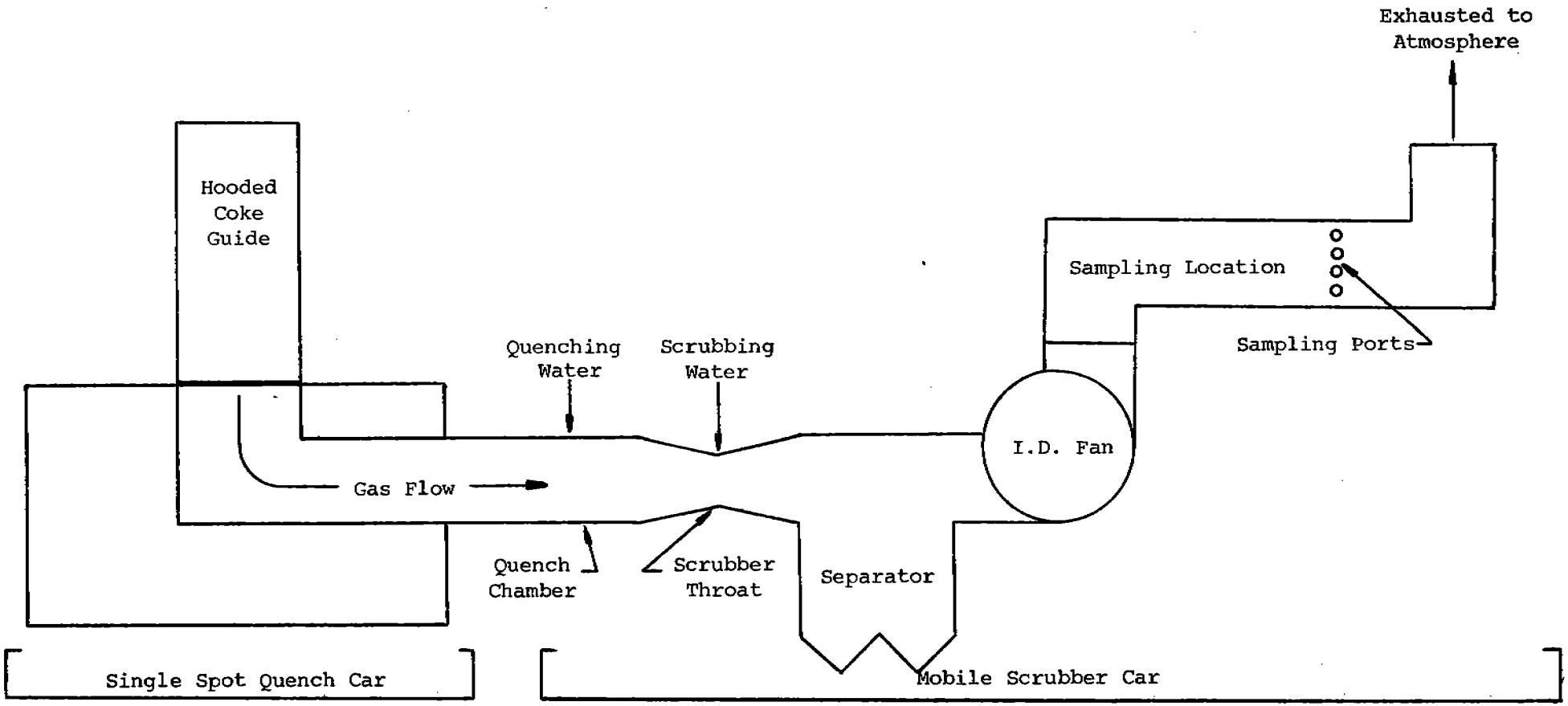
Testing was conducted from September 14 through 16, 1982 by U.S. Steel Environmental Engineering Department personnel. Mr. David R. Pluhar, of EED, observed the particulate testing, conducted VE observations of the hooded coke guide and the scrubber car outlet stack, and recorded process operation data. U.S. Steel personnel performed simultaneous VE observations.

2.0 PROCESS DESCRIPTION

The mobile pushing emissions control system consists of two hooded coke guides, each mounted on a door machine designated as east and west, a single-spot quench car, and a rail car mounted wet scrubber system (No. 9123). The hooded coke guides were constructed by the American Bridge Division of U.S. Steel. The single-spot quench and mobile scrubber cars, which utilize a Ducon scrubbing system, were designed and constructed by U.S. Steel at their Johnstown Works facility. The scrubber system is constructed of Type 316 stainless steel and consists of a quench chamber (equipped with water sprays), Venturi wet scrubber, and a separator. The flowrate through the scrubber is about 40,000 dry standard cubic feet per minute (dscfm), with a pressure drop of 24-inches of water. The water used in the scrubber is received while the quench car is in the quenching tower and is not recirculated, but renewed after each push (Figure 2.0).

2.1. OPERATING PROCEDURES

After the oven door has been removed, the hooded coke guide is aligned with the oven. The single-spot quench car is then positioned under the guide and an articulating elbow-duct from the scrubber inlet is raised, connecting the quench car to the scrubber car. When the quench car operator signals the start of the push, the quench chamber and Venturi sprays are started, and the ID fan damper is opened. Emissions



Parameter	Operating Pressures Design ("wg)	Actual ("wg)
Static Pressure Before Quencher	-4	-4
Venturi Δ Pressure	-24	-24
I.D. Fan Inlet Pressure	-30	-30

Figure 2.0. Mobile pushing emissions control system.

captured within the guide and quench car pass through the quench chamber, the Venturi scrubber, and the separator before exiting through the exhaust stack.

3.0 PARTICULATE SAMPLING PROCEDURES

Particulate testing of the mobile pushing emissions scrubber system was conducted in accordance with the procedures outlined in the EPA Standards of Performance for New Stationary Sources, Methods 1 through 5 (Federal Register, 40CFR60, Appendix A). Additional testing parameters were also tentatively agreed upon by the EPA and U.S. Steel:

(1) One run per day will be conducted during daylight hours only.

(2) The sampling rate will not be less than 0.75 dscf at each sampling point.

(3) Each of the four ports will be traversed, six sampling points per traverse, during each run.

(4) Only one point will be sampled during a push.

(5) Sampling will begin with the movement of the ram and end when the ram is fully extended, plus 10-seconds, or the first movement of the quench car, whichever occurs first.

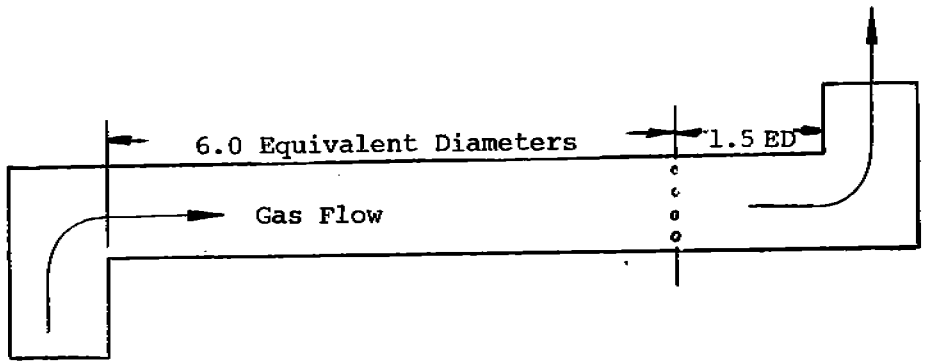
(6) When determining compliance with the Consent Decree, the scrubber car control system tested on battery No. 3 cannot be tested again on another battery.

3.1 SAMPLING LOCATION

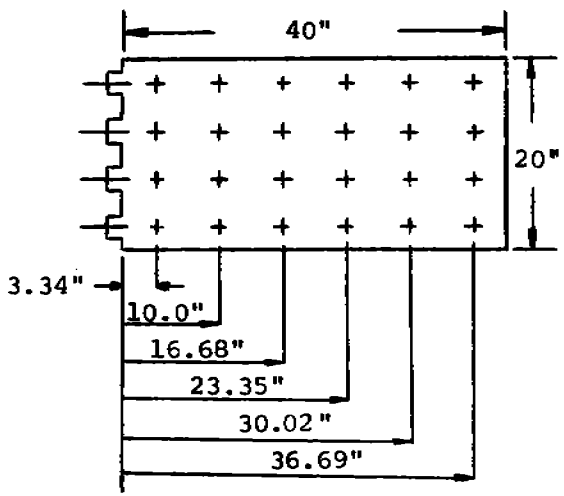
Sampling was conducted in the scrubber exhaust duct, which had been modified with four sampling ports along the vertical face. The duct is 20-inches deep by 40-inches wide.

A total of three runs were conducted, one run per day. A total of 24 points were sampled during the first two runs as required by the test protocol agreed to by the EPA and

U.S. Steel. Preliminary calculations of the first run by U.S. Steel indicated that the required sampling rate of 0.75 dscf per sampling point was not attained using a 24-point traverse. In turn, a total sample volume of 18.0 dscf could not be attained. The SEA observer was notified of this halfway through the second run. In an attempt to meet the required flowrate, the SEA observer and Mr. George Czerniak of EPA Region V decided to increase the sampling points to 32 during the third run. The second run was completed using the 24-point traverse. The required sampling rate still could not be attained during the third run. Port locations and sampling point configurations (both 24 and 32 point tests) are presented in Figure 3.1.



Run Nos. 1 & 2
(24 point traverse)



Run No. 3
(32 point traverse)

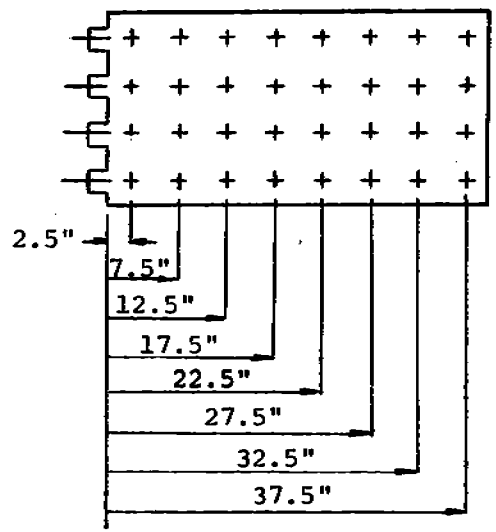


Figure 3.1. Port locations and sampling point configurations.

4.0 VISIBLE EMISSION OBSERVATIONS

Visible emission observations were performed in accordance with EPA Method 9, Visual Determination of the Opacity of Emissions from Stationary Sources.

Visible emission readings of the scrubber outlet duct could only be performed during two pushes because of unfavorable viewing conditions, i.e., overcast, white vapor plume, no contrasting background, during the remaining pushes. The data sheets, which include process information, are presented in Appendix B.

Mr. Bob Trezck of U.S. Steel, Environmental Engineering Department, conducted simultaneous VE readings of the hooded coke guide only. The scrubber outlet duct was not read because of the water vapor plume. The U.S. Steel observers field data are not included in this report.

4.1 OBSERVATION LOCATION

The observer traveled along a service road, about 100-feet south of and parallel to battery No. 3, to maintain a clear viewing position of the control car during pushing (Figure 4.1). Each position took weather, sun angle, and wind direction into account.

Visible emission observations began as the coke exited the oven, continued as the quench car traveled to the quench tower, and ended as the quench car entered the tower or the observers' view was obstructed by steam, building structures, etc.

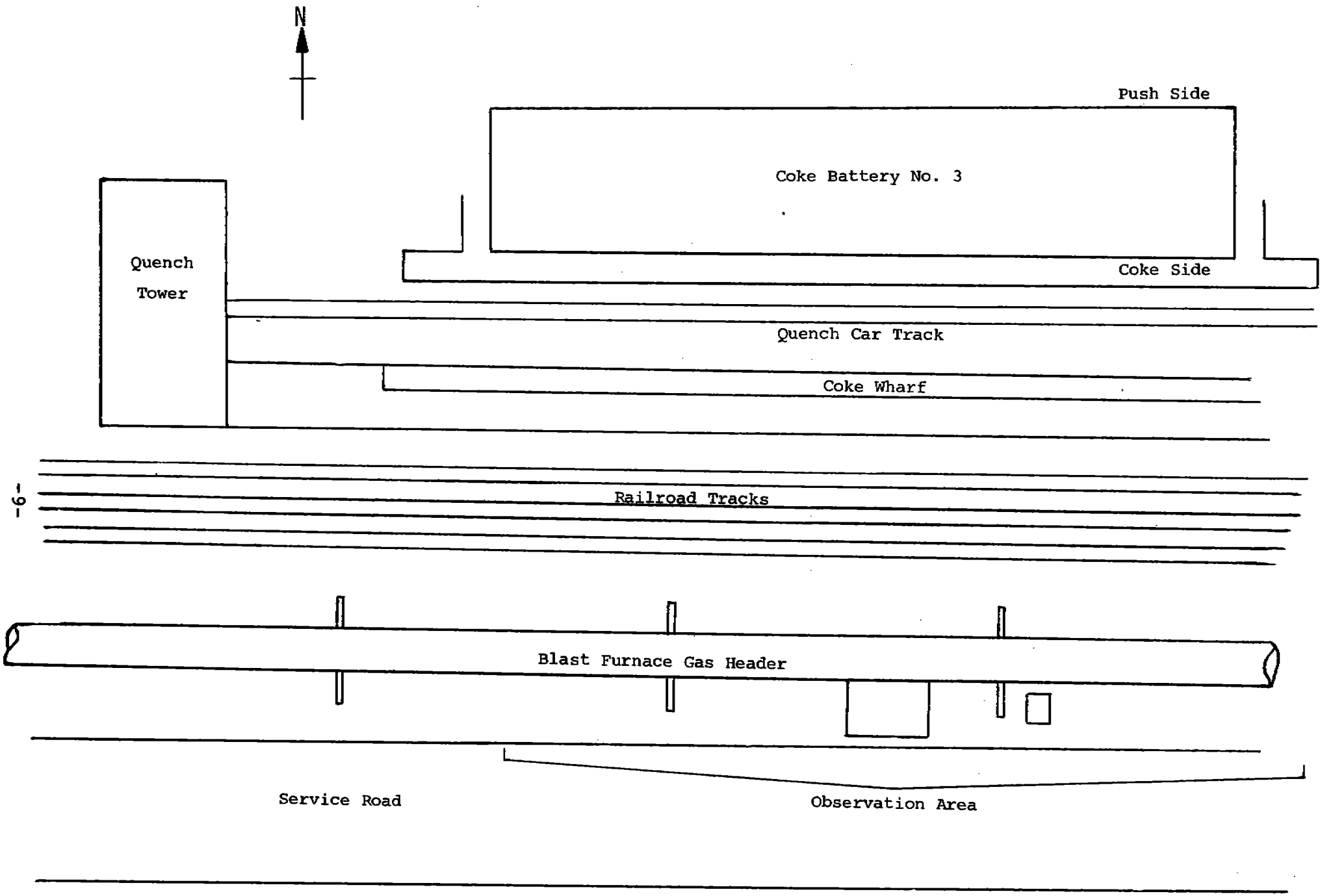


Figure 4.1. Visible Emission Observation Location.

Using the sky as a background, opacities were read about 50-feet above the battery while the scrubber car was in the coke-receiving position. This was due to structures located directly above the battery which obscured the observers' view. When the car was traveling to the quench tower, any contrasting background was used.

4.2 EMISSION POINTS

Emissions were noted escaping from two areas. The primary emission point was a gap between the oven door and the hooded coke guide. Emissions also escaped from an opening where the guide connects to the quench car (Figure 4.2).

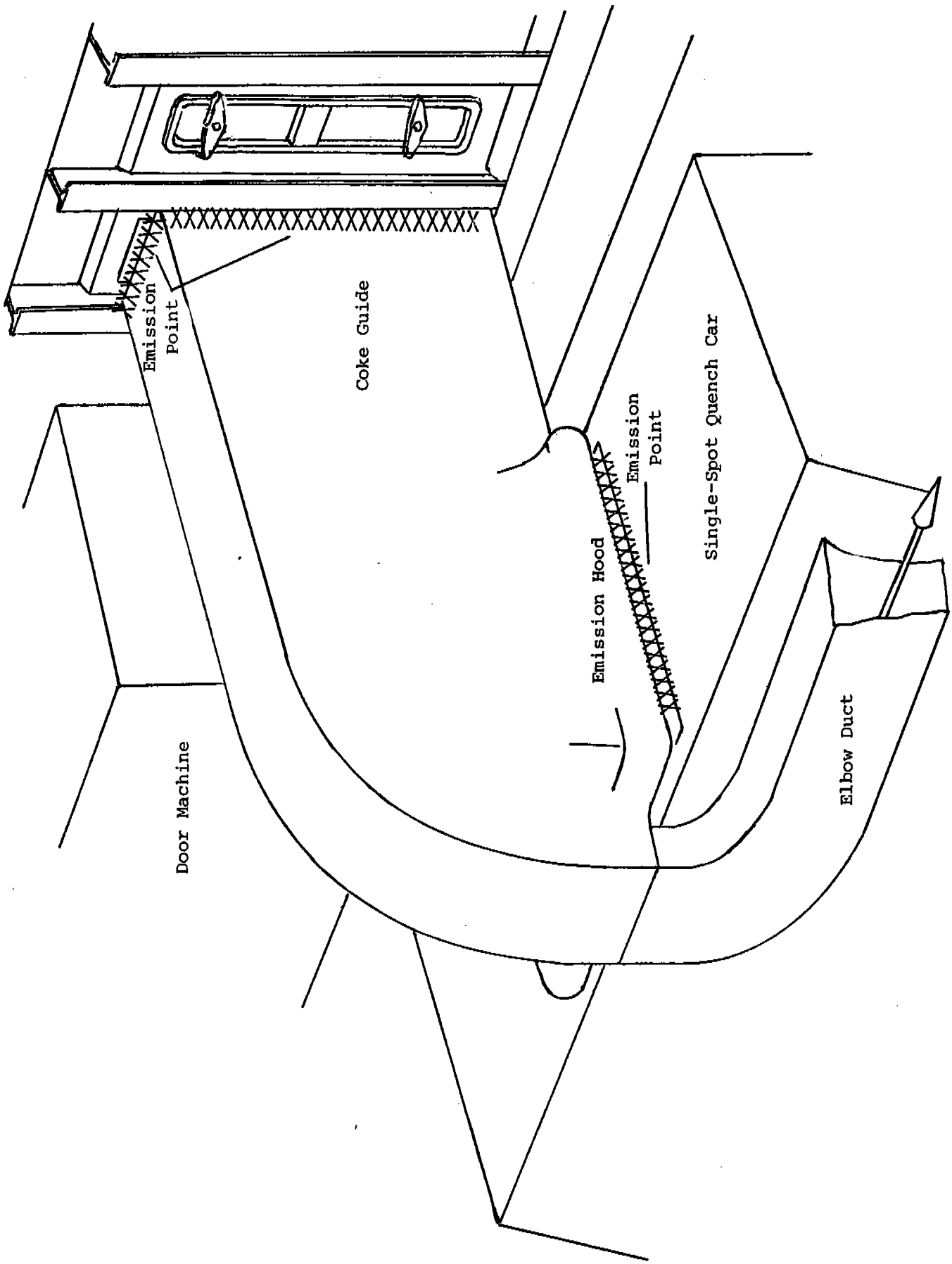


Figure 4.2. Emission Points on Control System.

5.0 VALIDITY OF THE TEST PROGRAM

The EED observer could not view the particulate testing at close range because of limited space on the scrubber car and safety restrictions imposed by U.S. Steel. The observer viewed equipment preparation, sample recovery, questioned the test crew about testing procedures, and reviewed the field data sheets. No process upsets were encountered during the study. The observer also reviewed the final report prepared by U.S. Steel which summarizes the testing program. The results indicated no significant deviation in the emission rate between the two 24-point tests and the 32-point test, although the sample volume from the 32-point test was considerably larger. It is the opinion of the observer that, in this case, increased sample volumes during the 24-point tests would not have significantly increased the accuracy of the results.

The testing procedures employed during the testing program provided representative emission rates of the mobile pushing emissions control system.

APPENDIX A

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

Acurex Corporation

David R. Pluhar	Test Team Leader (EPA Representative)

U.S. Steel Corporation

Pat Murphy	Test Team Leader
William S. Kubiak	Test Engineer
Rick Elkin	Field Technician
Gary Hammar	Field Technician
Robert Trezak	Process Observer
Theo Sandidge	Process Observer

APPENDIX B

VISIBLE EMISSION FIELD DATA SHEETS

B-1. September 14, 1982

B-2. September 15, 1982

B-3. September 16, 1982

B-1. September 14, 1982

Source Evaluation & Analysis

VISIBLE EMISSION OBSERVATION FORM

Date 9-14-82 Company Name U.S. STEEL

Observer D. PLUHAR Location GARY WORKS

U.S. EPA Region 5

Source: COKE BATTERY NO. 3. PUSHING W/ SCRUBBER CAR CONTROLS. CAR NO. 9123

Source Height: 30 ft

Distance from Source: 100 ft

Direction from Source: SOUTH

Wind Direction: SW Speed: 15-20 mph

Background(s) Used: (1) SKY

(2) BATTERY (3)

Colors of Backround(s): (1) BLUE

(2) BLACK (3)

Colors of Emissions: (1) BLACK

(2) BLACK (3)

Ambient Temperature: 75 °F

Relative Humidity: <50% (≥50%)

Reading Conditions: EX☐ GD☒ FR☐ PR☐

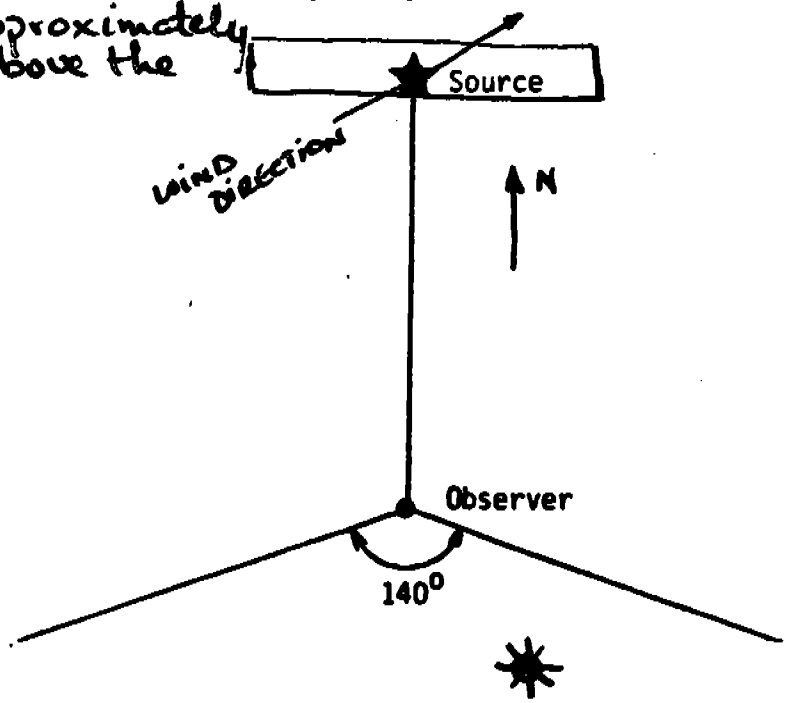
Comments: Due to structure of the battery above the oven doors and the coal handling system which obscure sky above the ovens, readings are made approximately 50 feet above the doors.

Observation Point: SERVICE ROAD SOUTH OF BATTERY NO. 3

Signature: David R Pluhar

Date Last Certified: 4-29-82

Show: Sun, Wind, and North Arrow



Source Evaluation & Analysis

VISIBLE EMISSION OBSERVATION FORM

Date 9-14-82 Company Name U.S. STEEL

Observer D. PLUHAR Location GARY WORKS

U.S. EPA Region 5

Source: COKE BATTERY No. 3
PUSHING W/ SCRUBBER CAR.
CAR No. 9123

Source Height: 30 ft

Distance from Source: 100 ft

Direction from Source: S

Wind Direction: N Speed: 20 mph

Background(s) Used: (1) SKY

(2) BATTERY (3)

Colors of Backround(s): (1) BLUE

(2) BLACK (3)

Colors of Emissions: (1) BLACK

(2) (3)

Ambient Temperature: 75 °F

Relative Humidity: <50% (≥50%)

Reading Conditions: EX☐ GD☐ FR☒ PR☐

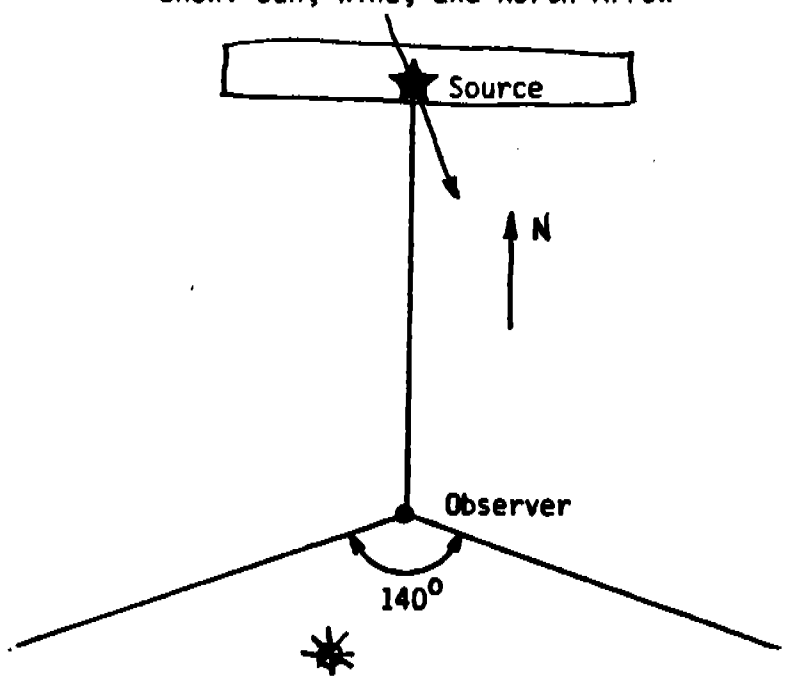
Comments: 12:00 wind switched from SW to N. Accompanied by U.S Steel personnel: Bob Trezak + Theo Sandidge.

Observation Point: Service road south of battery no. 3

Signature: David R. Pluhar

Date Last Certified: 4.29.82

Show: Sun, Wind, and North Arrow



Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R Pluhar

Location COKE BATTERY NO. 3 Date 9-14-82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN NO.	TIME (2400)	MIN	0	15	30	45
	11	0				
		1				
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				

OVEN NO.	Time (2400)	MIN	0	15	30	45
	11	30	First push witnessed,			
		31	was not start of test.			
7	11	32	0	50	20	15
1:16 push		33	0	0*	0T	0T
		34	0T			
		35				
		36				
		37				
		38				
		39				
		40				
		41				
		42				
		43				
		44				
		45				
		46				
		47				
		48				
		49				
		50				
		51				
		52				
9	11	53	15	X	X	X*
0:53 push		54	X	0T	0T	
		55				
		56				
		57				
		58				
		59				

Notes: * - Last reading made during the push.
T - Readings made during coke car travel to quench tower.
X - View obscured by smoke from coke wharf.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R. Pluhar

Location COKE BATTERY NO. 3 Date 9-14-82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN NO.	TIME (2400)	MIN	0	15	30	45
	12	0				
		1				
		2				
11	12	3	X	X	25	15
1:03	push	4	X*	0T	0T	
		5				
		6				
		7				
		8				
		9				
		10				
13	12	11	X	X	X	X*
0:50	push	12	X	0T		
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
15	12	24	0	20	25	15
1:13	push	25	5*	0	0T	0T
		26				
		27				
		28				
		29				

OVEN NO.

Time (2400)	MIN	0	15	30	45
	30				
	31				
	32				
	33				
	34				
	35				
	36				
	37				
	38				
	39				
	40				
	41				
	42				
	43				
	44				
	45				
	46				
	47				
	48				
	49				
	50				
	51				
	52				
	53				
	54				
	55				
	56				
	57				
	58				
	59				

Notes: * - Last reading made during the push.
T - Readings made while coke car travels to quench tower.
X - View obscured by smoke from coke wharf.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R. Pluhar

Location COKE BATTERY No. 3 Date 9.14.82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN No.	TIME (2400)	MIN	0	15	30	45
	13	0				
		1				
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
17	13	15	0	10	15	10
1:00 push		16	0*	0T	0T	
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
19	13	25	0	15	20	10
1:05 push		26	5*	0T	0T	
		27				
		28				
		29				

OVEN No.	Time (2400)	MIN	0	15	30	45
	13	30				
		31				
		32				
		33				
		34				
21	13	35	0	15	20	5*
0:55 push		36	0	X	0	
		37				
		38				
		39				
		40				
		41				
		42				
		43				
		44				
		45				
		46				
		47				
		48				
		49				
		50				
		51				
		52				
		53				
		54				
		55				
		56				
23	13	57	0	20	25	0
1:20 push		58	0	0*	0T	0T
		59				

Notes: *- Last reading made during push.
T- Reading made while coke car traveling to quench tower.
X- View obscured by smoke from coke warf.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R. Pluhar

Location COKE BATTERY NO. 3 Date 9.14.82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN NO.	TIME (2400)	MIN	0	15	30	45
	14	0				
		1				
		2				
		3				
		4				
25	14	5	Push not observed, viewed			
		6	the scrubber outlet stack.			
		7				
		8				
		9				
		10				
		11				
		12				
27	14	13	5	20	15	5 *
0:50 push		14	0	X T	X T	
		15				
		16				
		17				
		18				
		19				
		20				
		21				
29	14	22	5	35	15	X *
0:55 push		23	0	X T	X T	
		24				
		25				
		26				
		27				
		28				
		29				

OVEN NO.	Time (2400)	MIN	0	15	30	45
	14	30				
31	14	31	5	25	20	0 *
0:55 push		32	0	X T	0 T	
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				
		41				
33	14	42	5	20	15	10 *
0:53 push		43	0	X T	0 T	
		44	Test completed following			
		45	push of #33.			
		46				
		47				
		48				
		49				
		50				
		51				
		52				
		53				
		54				
		55				
		56				
		57				
		58				
		59				

* - Last reading during push.

Notes: T - Readings made while coke car traveling to quench tower.

X - View obscured by smoke from coke wharf.

B-2. September 15, 1982

Source Evaluation & Analysis

VISIBLE EMISSION OBSERVATION FORM

Date 9.15.82 Company Name U.S. STEEL

Observer D. PLUHAR Location GARY WORKS

U.S. EPA Region 5

Source: COKE BATTERY No. 3 PUSHING - SCRUBBER CAR IN USE.

Source Height: 30 ft

Distance from Source: 100 ft

Direction from Source: S

Wind Direction: NW Speed: 5 mph

Background(s) Used: (1) SKY

(2) BATTERY (3)

Colors of Backround(s): (1) LT. GRAY

(2) BLACK (3)

Colors of Emissions: (1) BLACK

(2) BLACK (3)

Ambient Temperature: 65 °F

Relative Humidity: <50% (≥50%)

Reading Conditions: EX☐ GD☐ FR☒ PR☐

Comments:

WIND CHANGED 09:00 to WEST. RETURNED TO NW @ 9:40. SPEED TO 15-20 MPH @ 11:00.

Observation Point: Service road south of the battery.

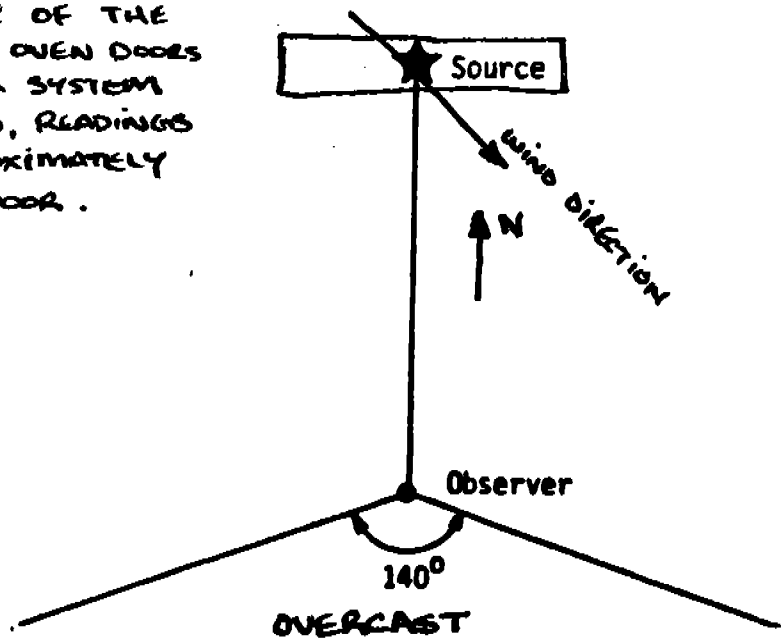
Signature: David R. Pluhar

Date Last Certified: 4-29-82

COMMENTS:

DUE TO STRUCTURE OF THE BATTERY ABOVE THE OVEN DOORS + THE COAL HANDLING SYSTEM WHICH OBSCURE VIEW, READINGS ARE MADE AT APPROXIMATELY 50 FEET ABOVE THE DOOR.

Show: Sun, Wind, and North Arrow



Source Evaluation & Analysis

VISIBLE EMISSION OBSERVATION FORM

Date 9-15-82 Company Name U.S. STEEL

Observer D. PLUHAR Location GARY WORKS

U.S. EPA Region 5

Source: COKE BATTERY NO. 3 PUSHING W/ SCRUBBER CAR IN USE.

Source Height: 30 ft

Distance from Source: 100 ft

Direction from Source: S

Wind Direction: NW Speed: 15-20mph

Background(s) Used: (1) SKY

(2) BATTERY (3)

Colors of Backround(s): (1) LT. GRAY

(2) BLACK (3)

Colors of Emissions: (1) BLACK

(2) BLACK (3)

Ambient Temperature: 60 °F

Relative Humidity: <50% (≥50%)

Reading Conditions: EX☐ GD☐ FR☒ PR☐

Comments: WEATHER CONDITIONS AFTER 11:00.

BOB TREZAK - U.S. STEEL

THEO SANDIDGE - U.S. STEEL

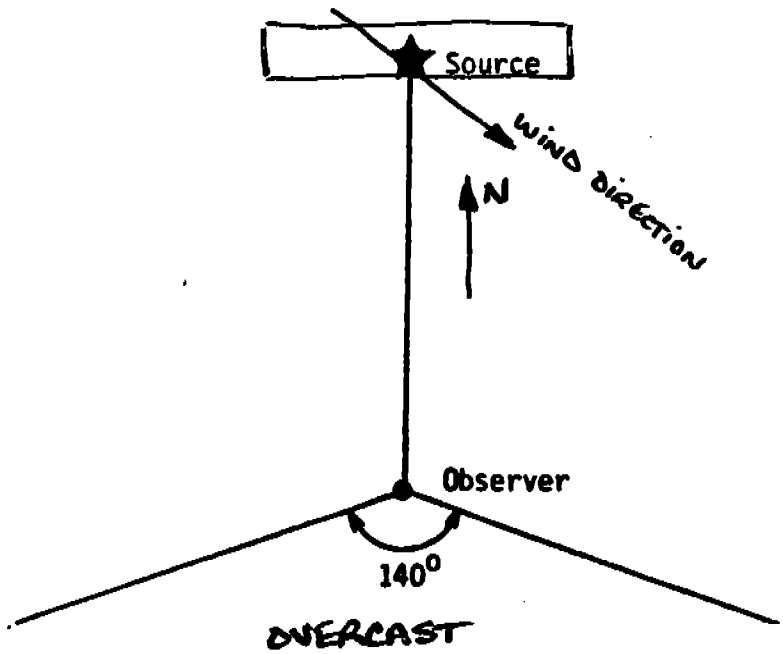
WITNESSED PUSHES ALSO.

Observation Point: Service road south of the battery.

Signature: David R. Pluhar

Date Last Certified: 4-29-82

Show: Sun, Wind, and North Arrow



Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R. Turbar

Location COKE BATTERY NO. 3 Date 9-15-82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN #

TIME (2400)	MIN	0	15	30	45
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				

OVEN #

Time (2400)	MIN	0	15	30	45
	30				
	31				
	32				
	33				
	34				
	35				
	36				
	37				
	38				
	39				
	40				
	41				
	42				
	43	FIRST PUSH INCLUDED IN			
	44	TEST. OVEN 53.			
	45	WEST CAR BEING USED TO			
	46	REMOVE COKE OVEN DOORS.			
	47				
53 07	48	5	10	15	10*
9:52 to push	49	5 T	0 T	0 T	
	50				
	51				
	52				
	53				
	54				
	55				
	56				
	57				
	58				
	59				

Notes: *-Last ~~reading~~ reading made during push.

T - Readings made while coke car traveling to quench tower.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS
Location COKE BATTERY NO. 3
Signature David R. Ruhar
Date 9-15-82

PUSHING - SCRUBBER CAR DEMONSTRATION
CAR NO. 9123

OVEN #55 — 0:55 push

TIME (2400)	MIN	0	15	30	45
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
08	8	5	20	25	20*
	9	5	0T	0T	
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
08	23	0	15	15*	5
	24	0T	0T	0T	
	25				
	26				
	27				
	28				
	29				

OVEN #42 — 0:42 push

Time (2400)	MIN	0	15	30	45
	30				
	31				
	32				
08	33	5	20	20	15*
	34	0T	0T		
	35				
	36				
	37				
	38				
	39				
	40				
	41				
	42				
	43				
08	44	X	20	15*	15
	45	0T	0T		
	46				
	47				
	48				
	49				
	50				
	51				
	52				
	53				
	54				
	55				
	56				
08	57	X	X	15	10*
	58	5T	0T		
	59				

OVEN #2 — 0:42 push
OVEN #4 — 0:42 push
OVEN #6 — 0:52 push

Notes: * Last reading made during push.
T Reading made during travel to quench tower.
X View obscured by smoke from coke warf.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R. Plukas

Location COKE BATTERY NO. 3 Date 9.15.82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN #	TIME (2400)	MIN	0	15	30	45
	09	0				
		1				
		2				
		3				
		4				
		5				
#8	09	6	0	10	20*	15
0:40 push		7	0T	0T		
		8				
		9				
		10				
		11				
		12				
		13				
#10	09	14	0	10	20	15*
0:44 push		15	0T	0T		
		16				
		17	BATTERY OPERATION			
		18	CEASED FOLLOWING PUSH			
		19	OF OVEN NO. 10 UNTIL			
		20	09:40			
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				

OVEN #	Time (2400)	MIN	0	15	30	45
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				
		41				
#12	09	42	20	25	20	15*
0:40 push		43	0T			
		44				
		45				
		46				
		47				
		48				
		49				
		50				
		51				
		52				
		53				
#14	09	54	10	20	20	15*
0:45 push		55	0T	0T		
		56	DOOR	RECEIVING CARS		
		57	CHANGED AFTER THIS			
		58	PUSH - NOW USING THE			
		59	EAST EAR.			

Notes: *- Last reading made during push.
T- Reading made during coke car travel to quench tower.
X- View obscured by smoke from coke wharf.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS
Location COKE BATTERY NO. 3
Signature David R. Pluhar
Date 9-15-82

PUSHING - SCRUBBER CAR DEMONSTRATION
CAR # 9123

OVEN #	TIME (2400)	MIN	0	15	30	45
	10	0				
		1				
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
#16	10	13	0	10	25	20*
0:45 push		14	10 T	10 T		
		15				
		16	DOOR CARS SWITCHED			
		17	NOW USING WEST CAR			
		18	AGAIN.			
		19				
		20				
		21				
		22				
		23				
#18	10	24	0	20	X	X *
0:45 push		25	5 T	X T		
		26				
		27				
		28				
		29				

OVEN #	Time (2400)	MIN	0	15	30	45
		30				
		31				
		32				
		33				
		34				
#20	10	35	0	10	15*	0
0:40 push		36	0 T			
		37				
		38				
		39	PUSHES ON OVENS NO.			
		40	22+24 NOT WITNESSED			
		41	DUE TO DISCUSSION WITH			
		42	BILL KUBIAK CONCERNING			
		43	DEVIATION FROM TEST			
		44	PROTOCOL.			
		45				
		46				
		47				
		48				
		49				
		50				
		51				
		52				
		53				
		54				
		55				
		56				
		57				
		58				
		59				

Notes: * Last reading made during push.
T Reading during travel to quench tower.
X View obscured by smoke from coke wharf.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R. Pluhar

Location COKE BATTERY NO. 3 Date 9.15.82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN NO.	TIME (2400)	MIN	0	15	30	45
	11	0				
		1				
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
26	11	11	0	5	10	10*
	0:43 push	12	X T	X T		
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
28	11	22	0	X	X*	X
	0:38 push	23	0 T	0 T		
		24				
		25				
		26				
		27				
		28				
		29				

OVEN NO.	Time (2400)	MIN	0	15	30	45
30	11	30	0	20	30	25*
	0:47 push	31	0 T	0 T	X T	
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				
		41				
		42				
		43				
32	11	44	0	25	40*	25
	0:40 push	45	10 T	5 T		
		46				
		47				
		48				
		49				
		50				
		51				
		52				
34	11	53	0	20	30*	25
	0:40 push	54	X T	0 T		
		55				
		56				
		57				
		58				
		59				

Notes: * - Last reading made during push.
T - Reading made while coke car traveling to quench tower.
X - View obscured by smoke from coke wharf.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS
Location COKE BATTERY NO. 3
Signature David R Pluhar
Date 9.15.82

PUSHING - SCRUBBER CAR DEMONSTRATION
CAR NO. 9123

OVEN NO.

TIME (2400)	MIN	0	15	30	45
12	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				

OVEN NO.

Time (2400)	MIN	0	15	30	45
12	30				
	31				
	32				
	33				
	34				
	35				
	36				
	37				
	38				
	39				
	40				
	41				
	42				
12	43	0	10	20*	20
0:35 push	44	0 T	0 T		
	45				
	46				
	47				
	48				
	49				
	50				
	51				
12	52	0	25	25	15*
0:45 push	53	5 T			
	54				
	55				
	56				
	57				
	58				
	59				

#36

#38

Notes: * - Last reading made during push.
T - Readings made while coke car traveling to quench tower

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R. Pluhar

Location COKE BATTERY NO. 3 Date 9.15.82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN NO.	TIME (2400)	MIN	0	15	30	45
	13	0				
		1				
40	13	2	0	10	20	15*
	0:43 push	3	5T	XT		
		4				
		5				
		6				
		7				
		8				
		9				
42	13	10	0	X	10	10*
	0:45 push	11	0T	XT		
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
	13 0:45 push	0	6	15	25	15*

OVEN NO.	Time (2400)	MIN	0	15	30	45
	13	30	0T	0T		
		31	TEST	COMPLETED	AFTER	
		32	THIS	PUSH.		
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				
		41				
		42				
		43				
		44				
		45				
		46				
		47				
		48				
		49				
		50				
		51				
		52				
		53				
		54				
		55				
		56				
		57				
		58				
		59				

Notes: * - Last reading made during push.

T - Readings made while coke car traveling to quench tower.

X - View obscured by smoke from coke wharf.

B-3. September 16, 1982

Source Evaluation & Analysis

VISIBLE EMISSION OBSERVATION FORM

Date 9.16.82 Company Name U.S. STEEL

Observer D. PLUHAR Location GARY WORKS

U.S. EPA Region 5

Source: COKE BATTERY NO. 3 PUSHING / SCRUBBER CAR CAR NO. 9123

Source Height: 30 ft

Distance from Source: 100 ft

Direction from Source: S

Wind Direction: NW Speed: 15 mph

Background(s) Used: (1) SKY (2) BATTERY (3)

Colors of Backround(s): (1) LT. GRAY (2) BLACK (3)

Colors of Emissions: (1) BLACK (2) BLACK (3)

Ambient Temperature: 50 °F

Relative Humidity: (<50%) ≥50%

Reading Conditions: EX☐ GD☒ FR☐ PR☐

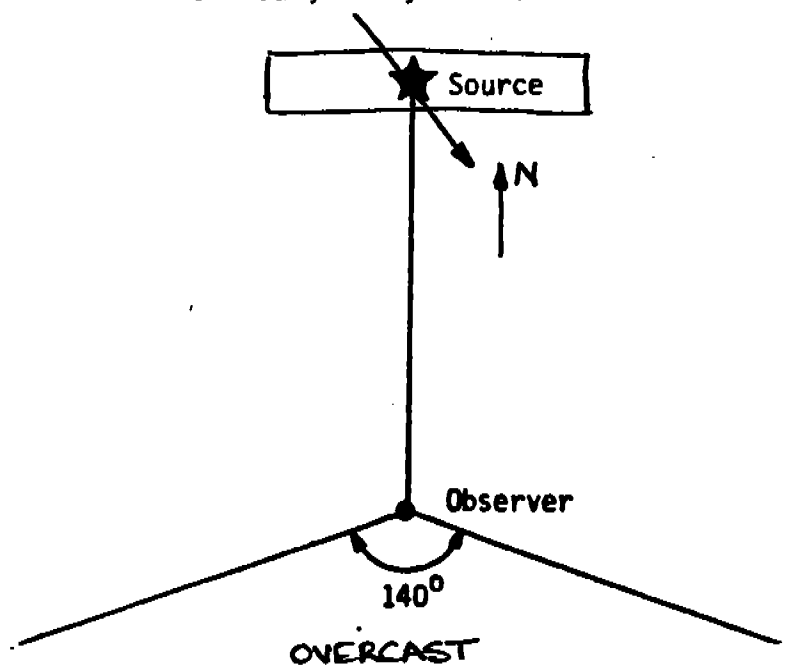
Comments: Due to structures above the battery ovens, readings are made at approximately 50 feet above the oven door.

Observation Point: SERVICE ROAD SOUTH OF THE BATTERY.

Signature: David R. Pluhar

Date Last Certified: 4-29-82

Show: Sun, Wind, and North Arrow



Source Evaluation & Analysis

VISIBLE EMISSION OBSERVATION FORM

Date 9-16-82 Company Name U.S. STEEL

Observer D. PLUHAR Location GARY WORKS

U.S. EPA Region 5

Source: COKE BATTERY NO.3 PUSHING W/ SCRUBBER CAR

Source Height: 30 ft

Distance from Source: 100 ft

Direction from Source: S

Wind Direction: NNE Speed: 20 mph

Background(s) Used: (1) SKY

(2) BATTERY (3)

Colors of Backround(s): (1) BLUE

(2) BLACK (3)

Colors of Emissions: (1) BLACK

(2) BLACK (3)

Ambient Temperature: 55 °F

Relative Humidity: (≤50%) ≥50%

Reading Conditions: EX☐ GD☒ FR☐ PR☐

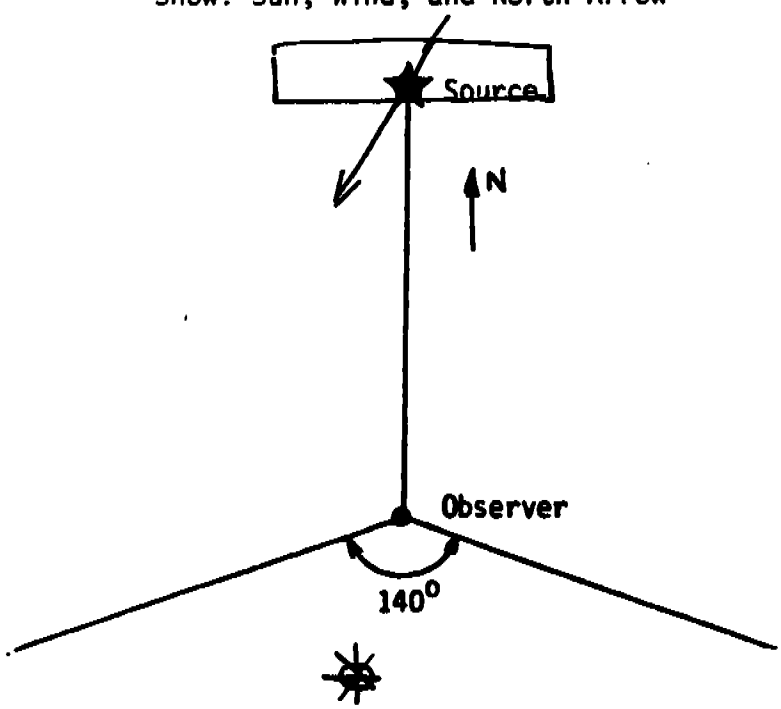
Comments: READINGS AFTER 13:00

Observation Point: SERVICE ROAD SOUTH OF THE BATTERY

Signature: David R. Pluhar

Date Last Certified: 4-29-82

Show: Sun, Wind, and North Arrow



Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David F. Rubay

Location COKE BATTERY NO.3 Date 9.16.82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR No. 9123

OVEN NO.	TIME (2400)	MIN	0	15	30	45
	07	0				
		1				
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14	NOTE: THE SCRUBBER CAR			
		15	IS REMAINING UNDER THE			
		16	COKE GUIDE AND HOOD			
		17	FOR 30 TO 45 SECONDS.			
		18	THIS PRACTICE IS DIFFERENT			
		19	THAN PREVIOUS TWO DAYS			
		20	WHEN THE SCRUBBER CAR			
		21	BEGAN TRAVELING QUICKLY			
		22	FOLLOWING END OF PUSH.			
		23				
		24				
		25				
		26				
		27				
		28				
		29				

OVEN NO.	Time (2400)	MIN	0	15	30	45
	07	30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40	START OF TEST.			
		41	EAST DOOR CAR IN USE			
11	07	42	10	25	15	10*
at 50 push		43	0	0	0T	0T
		44				
		45				
		46				
		47				
		48				
		49				
		50				
		51				
		52				
13	07	53	0	20	10	5*
at 44 push		54	0	0	0	XT
		55	0T			
		56				
		57				
		58				
		59				

Notes: * Last reading made during push.
T Reading made while car is traveling to quench tower.
X Views obscured by smoke from coke wart.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R. Pluda

Location COKE BATTERY NO. 3 Date 9.16.82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN NO.	TIME (2400)	MIN	0	15	30	45
	08	0				
		1				
15	08	2	0	X	X	X *
	0:47 push	3	X	X	X *	X T
		4	0 T			
		5				
		6				
		7				
		8				
		9				
17	08	10	X	X	X	X *
	0:43 push	11	X *	X T	0 T	
		12				
		13				
		14				
		15				
		16				
		17				
		18				
19	08	19	0	30	20	5 *
	0:43 push	20	X	X T	0 T	
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				

OVEN NO.	Time (2400)	MIN	0	15	30	45
	08	30				
		31				
		32				
		33				
		34				
		35				
21	08	36	0	10	20	10 *
	0:43 push	37	0	0	X T	X T
		38				
		39				
		40				
		41				
		42				
		43				
		44				
23	08	45	0	X	20	10 *
	0:47 push	46	0	X T	X T	X T
		47				
		48				
		49				
		50				
		51				
		52				
		53				
		54				
		55				
		56				
		57				
		58				
		59				

Notes: * Last reading made during push.
T scrubber car + coke car traveling to quench tower.
X Steam from coke wharf obscuring view.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R. Rubal

Location COKE BATTERY NO. 3 Date 9.16.82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN No.	TIME (2400)	MIN	0	15	30	45
	09	0				
		1				
		2				
		3				
		4				
		5				
		6				
25	09	7	0	20	25	10*
	0:45 push	8	0	X T	0 T	
		9				
		10				
		11				
		12				
		13				
		14				
27	09	15	0	X	X	X*
	0:47 push	16	0	X T	0 T	0 T
		17				
		18				
		19	DOOR CARS SWITCHED AFTER			
		20	THIS PUSH. WEST CAR NOW			
		21	IN USE ↓			
		22				
		23				
		24				
		25				
		26				
29	09	27	0	20	30	15*
	0:45 push	28	0	0	0 T	0 T
		29				

OVEN No.	Time (2400)	MIN	0	15	30	45
	09	30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				
		41				
31	09	42	0	25	30	15*
	0:42 push	43	5	5 T	X T	X T
		44				
		45				
		46				
		47				
		48				
		49				
		50				
		51				
		52				
33	09	53	0	20	25	20*
	0:47 push	54	5	5 T	X T	X T
		55				
		56				
		57				
		58				
		59				

Notes: * Last reading made during push.
T Reading made while car traveling to quench tower.
X View obscured by smoke from coke wharf.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS
Location COKE BATTERY NO. 3
PUSHING - SCRUBBER CAR DEMONSTRATION
CAR NO. 9123

Signature David R. Ruhar
Date 9-16-82

OVEN NO.

TIME (2400)	MIN	0	15	30	45
10	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				

OVEN NO.

Time (2400)	MIN	0	15	30	45
10	30				
	31				
	32				
	33				
	34				
	35				
	36				
	37				
	38				
	39				
	40				
	41				
	42				
	43				
	44				
	45				
	46				
	47				
	48				
	49				
	50				
35 10	51	0	20	25	10*
10:45 push	52	5	5	5T	5T
	53				
	54				
	55				
	56				
	57				
	58				
	59				

Notes: * Last reading made during push.
T Readings made while coke car is traveling to the quench tower.

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R. Pluhar

Location COKE BATTERY NO. 3 Date 9-16-82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN NO.	TIME (2400)	MIN	0	15	30	45
37	11	0	0	15	25*	10
	0:40 push	1	0	XT	XT	XT
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
39	11	14	0	20	30	20*
	0:45 push	15	5	5	XT	XT
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
41	11	28	0	25	35	20*
	0:48	29	10	10	0T	0T

OVEN NO.	Time (2400)	MIN	0	15	30	45
		30	PUSHES ON OVENS NOS.			
		31	43+45 WERE NOT			
		32	READ AT SCRUBBER CAR			
		33	INLET. THE SCRUBBER			
		34	OUTLET STACK WAS READ.			
		35	SEE SEPERATE DATA.			
		36				
		37				
		38				
		39				
		40				
		41				
		42				
		43				
		44				
		45				
		46				
		47				
		48				
		49				
		50				
		51				
		52				
		53				
		54				
		55				
		56				
		57				
47	11	58	0	20	35	15*
		59	10	5T	XT	XT

Notes:

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS
Location COKE BATTERY NO. 3
Signature David R. Pluhar
Date 9.16.82

PUSHING - SCRUBBER CAR DEMONSTRATION
CAR NO. 9123

OVEN NO.	TIME (2400)	MIN	0	15	30	45
	12	0	Z			
		1				
		2				
		3				
		4				
		5				
		6				
49	12	7	5	20	25	25*
	0:49 push	8	10	5	0 T	5 T
		9	X T	5 T		
		10	THE SCRUBBER INLET			
		11	ELBOW DROPPED DOWN			
		12	OUT OF POSITION 30 SEC.			
		13	INTO THE PUSH. OVEN #49			
		14				
51	12	15	0	15	X	X*
	0:51 push	16	X	X T	X T	X T
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				

OVEN NO.	Time (2400)	MIN	0	15	30	45
	12	30				
		31				
53	12	32	5	20	25*	15
	0:41 push	33	0	0 T	X T	X T
		34				
		35				
		36				
		37				
		38				
		39				
		40				
		41				
55	12	42	0	20	20*	10
	0:42 push	43	5	0	0 T	0 T
		44				
		45				
		46				
		47				
		48				
		49				
		50				
		51				
		52				
		53				
		54				
		55				
57	12	56	0	25	35*	20
	0:42 push	57	5	0 T	0 T	X T
		58				
		59				

Notes:

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S.STEEL - GARY WORKS Signature David R. Dubar

Location COKE BATTERY NO. 3 Date 9.16.82

PUSHING - SCRUBBER CAR DEMONSTRATION

CAR NO. 9123

OVEN NO.	TIME (2400)	MIN	0	15	30	45
	13	0				
		1				
		2				
		3				
		4				
		5				
2	13	6	0	15	15	10*
	0:45 push	7	X	X^{T}	0^{T}	
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
4	13	16	0	10	10	5*
	0:47 push	17	0	0^{T}	0^{T}	
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				

OVEN No.	Time (2400)	MIN	0	15	30	45
	13	30				
		31				
		32				
		33				
		34				
6	13	35	0	10	15	5*
	0:48 push	36	0	0^{T}	0^{T}	
		37				
		38				
		39				
		40				
		41				
		42				
8	13	43	0	10	X*	X
	0:38 push	44	X	X^{T}	X^{T}	
		45				
		46				
		47				
		48				
		49				
		50	c			
10	13	51	0	X	X	X
	0:39 push	52	X	X^{T}	0^{T}	
		53				
		54				
		55				
		56				
		57				
		58				
		59				

Notes:

Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S.STEEL - GARY WORKS
Location COKE BATTERY NO.3
PUSHING - SCRUBBER CAR DEMONSTRATION
CAR NO. 9123

Signature David R. Ruhar
Date 9.16.82

OVEN NO.	TIME (2400)	MIN	0	15	30	45
	14	0				
		1				
		2				
		3				
		4				
		5				
		6				
		7				
		8				
12	14	9	0	10	15	10*
	0:46 push	10	5	0T	0T	
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
14	14	25	0	20	25	15*
	0:52 push	26	5	0T	10T	5T
		27				
		28				
		29				

OVEN NO.	Time (2400)	MIN	0	15	30	45
	14	30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
16	14	39	0	10	10	5*
	0:47 push	40	5	5T	XT	
		41	Last push during test.			
		42				
		43				
		44				
		45				
		46				
18	14	47	0	10	15*	XT
	0:35 push	48	0T			
		49				
		50				
		51				
		52				
		53				
		54				
		55				
		56				
		57				
		58				
		59				

Notes:

Source Evaluation & Analysis

VISIBLE EMISSION OBSERVATION FORM

Date 9-16-82 Company Name U.S.STEEL

Observer D.PLUHAR Location GARY WORKS

U.S. EPA Region 5

Source: Scrubber car controlling emissions from coke oven pushing. Outlet stack

Source Height: 30 ft

Distance from Source: 100 ft

Direction from Source: S

Wind Direction: NW Speed: 15-20mph

Background(s) Used: (1) Coal handling building (2) sky (3)

Colors of Backround(s): (1) green (2) blue (3)

Colors of Emissions: (1) white (2) white (3)

Ambient Temperature: 55 °F

Relative Humidity: (<50%) ≥50%

Reading Conditions: EX☐ GD☒ FR☐ PR☐

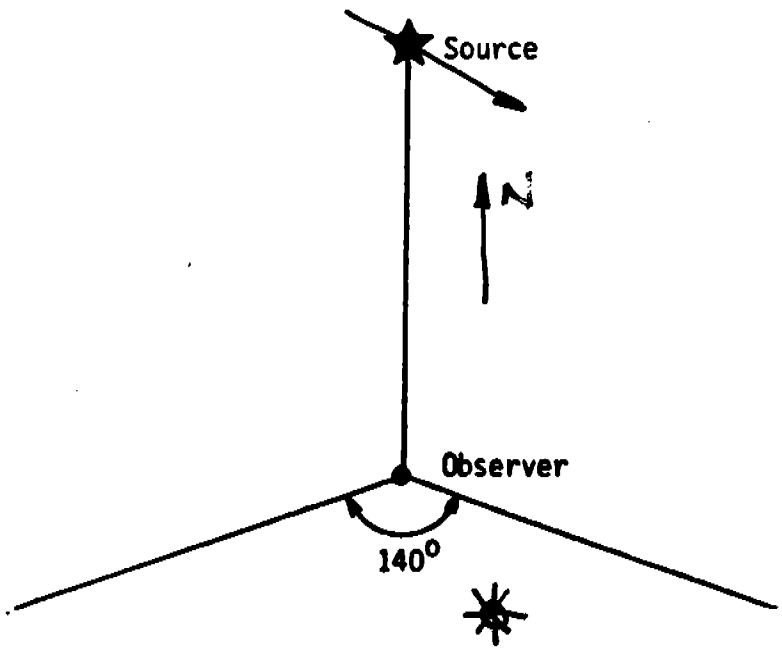
Comments: plume read after dispersion of steam 50-70' above stack.

Observation Point: Service road south of battery no. 3

Signature: David R. Pluhar

Date Last Certified: 4-29-82

Show: Sun, Wind, and North Arrow



Source Evaluation & Analysis

VISIBLE EMISSIONS OBSERVATION FORM

Company U.S. STEEL - GARY WORKS Signature David R. Pluhar

Location Scrubber car outlet stack Date 9.16.82

TIME (2400)	MIN	0	15	30	45
	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
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	23				
	24				
	25				
	26				
	27				
	28				
	29				

Time (2400)	MIN	0	15	30	45
	30				
	31				
	32				
	33				
	34				
	35				
	36				
	37				
	38				
	39				
	40				
11	41	0	10	10	10
	42				
	43				
	44				
	45				
	46				
	47				
	48				
11	49	0	5	10	10
	50	15			
	51				
	52				
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	57				
	58				
	59				

Notes:

APPENDIX C

OBSERVER'S FIELD NOTES: PARTICULATE TESTING

APPENDIX B

SOURCE TEST OBSERVATION

Company name U.S. STEEL CORPORATION

Source tested SCRUBBER CAR SERVICING NO. 3 BATTERY PUSHING.

Address of source COKE BATTERY NO. 3, GARY WORKS, U.S. STEEL.

Name and title of principle contact BILL KUBIAK

Telephone number of principle contact 219-944-3385

Other company personnel contacted:

Name	Title
BOB TREZAK	ENVIRONMENTAL ENGINEERING
THED SANDIDGE	"

Test Team Information

Name of firm U.S. STEEL ENVIRONMENTAL ENGINEERING

Test team leader PAT MURPHY

Address _____ Telephone Number 219-944-3385

Other team members:

Name	Title
RICK ELKINS	ENVIRONMENTAL ENGINEER
GARY HAMMAR	"

Date(s) of observation SEPTEMBER 14, 15 + 16, 1982

Has EPA observer reviewed test protocol? YES

Has EPA observer reviewed pretest meeting material? NO

Other enforcement agency observers present during tests:

Name	Title	Agency
NO AGENCY PERSONNEL PRESENT.		

Sampling Location

Location of sampling ports 4 PORTS IN THE VERTICAL PLANE

Stack/duct cross section dimensions 20" x 40"

Material of construction 316 STAINLESS Corroded? NO Leaks? NO

Internal appearance:

Corroded? NO Caked particulate? NO If yes, indicate thickness ____

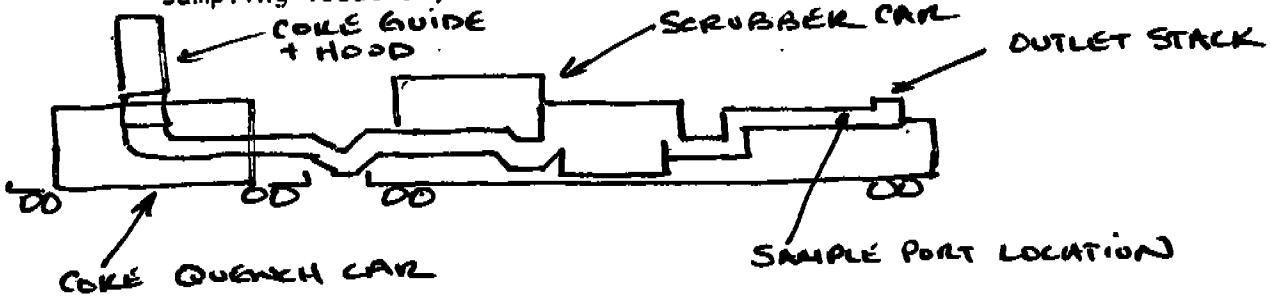
Insulation or lining type ____ Thickness ____

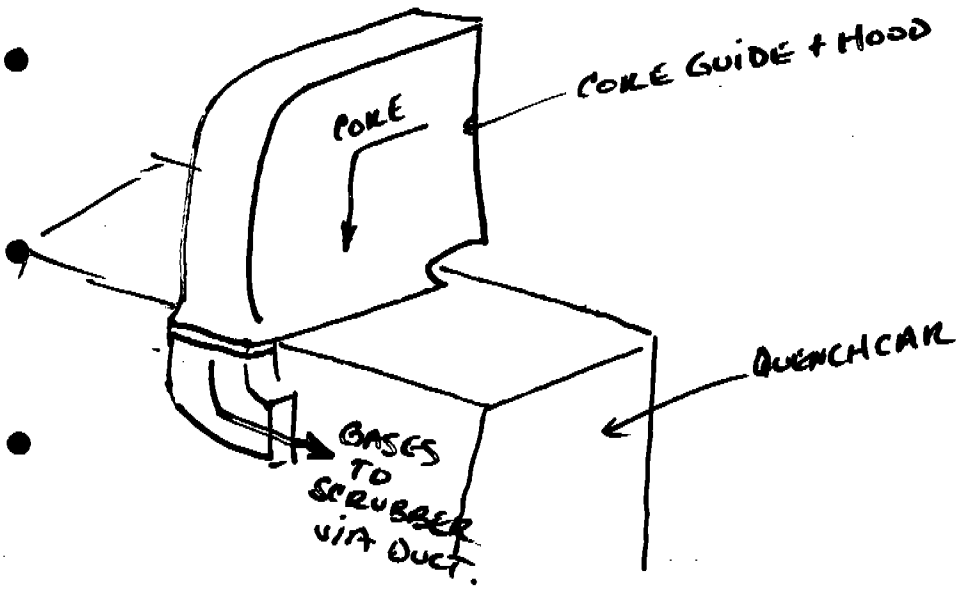
Pipe nipple I.D. 3" Length ____ Flush with inside wall? ____

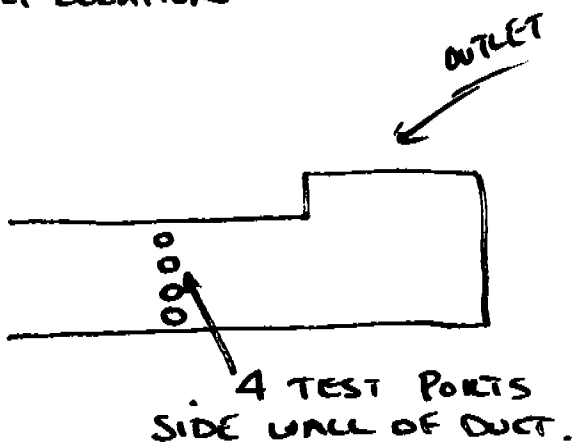
Straight run upstream of ports YES Number of diameters 6.0

Straight run downstream of ports YES Number of diameters 1.5

Sketch of sampling location (Show sampling ports, control equipment, and all disturbances to flow. Also include a cross sectional drawing of the sampling location):







Sampling Equipment

Sampling method(s) employed 1-5

Modifications to reference method(s) NONE

Pump type:
Fiber vanes w/in-line oiler ✓ Carbon vanes _____ Diaphragm _____

Probe:
Liner material 316 Heated? YES Entire length YES
Effective length 4 FEET

Pitot tube:
Type S ✓ Other (Specify type) _____
Connected to: Inclined manometer ✓ Magnehelic gauge _____
Range _____ Divisions _____

Orifice meter:
Connected to: Inclined manometer ✓ Magnehelic gauge _____
Range _____ Divisions _____

Control box manufacturer and Model Number NUTECH

Sample collection box manufacturer and Model Number NUTECH

Dry gas meter:
Manufacturer and Model Number NUTECH
Cu. ft./revolution _____ Divisions _____

Temperature gauge (for stack gas temperature determination):
Thermocouple (Specify type) _____ Other _____

Filter heating system:
Type of temperature guage used _____
Range _____ Divisions _____

Condenser system:
Impingers ✓ 4 GLASS Condenser _____
Silica gel used? YES If not, describe means for monitoring exit temperature and pressure _____

Free space between nozzle and pitot tube (0.75 in.) ✓

Free space between temperature probe and both pitot tube and probe nozzle (0.75 to 1 in.) ✓

Equipment calibrations:

	Date	Acceptability
Orifice and dry gas meters	8-24-82	ACCEPTABLE
Pitot tube(s)	INFO NOT PROVIDED	
Nozzle(s)	PRIOR TO TEST	ACCEPTABLE
Temperature gauge(s) (stack)	INFO NOT PROVIDED	
Magnehelic gauge(s)	INFO NOT PROVIDED	

Were calibration records presented to the observer prior to the test? NO

Schematic drawing of sampling train (show only if the sampling train used differs significantly from that specified by the reference method):

Run Number 1

Date 9-14-82

Recorded by PLUHAR

Sampling Equipment Preparation

Filter manufacturer and type GLASS FIBER Filter diameter 70 CM

Filter or filter container clearly identified? YES

Filter holder clean before test? YES Filter holder assembled correctly? YES Type of filter holder gasket ?

Probe liner clean before test? YES Nozzle clean? YES Nozzle undamaged? YES

Impingers clean before test? NOT REQ. Initial volume of water in impingers

Type of connectors: Ball ____ Screw ✓ Grease used? ____ Type ____

Pitot tube tips undamaged? YES Pitot tube lines checked for leaks? YES

Pitot tube lines checked for plugging? YES

Control box leveled? NOT WITNESSED Pitot tube differential pressure gauge zeroed NOT WITNESSED

Orifice gauge zeroed? NOT WITNESSED

Probe markings correct? YES Probe hot along entire length? YES, PER DATA SHEETS

Filter compartment hot? YES, PER DATA SHEETS Temperature indicator used? YES

Ice bath properly filled? YES Exit gas temperature indicator reading properly? OPERATOR STATED HE HAD DIFFICULTIES DURING FIRST RUN, THERMOCOUPLE WAS CHANGED.

Barometric pressure measured? YES Type of barometer ?

If not measured, what is source of data?

Run Number 1

Date 9.14.82

Recorded by PLUHAR

Sampling Procedures

Is leak test performed before start of run? YES

Leakage rate = 0 cfm @ 15 in. Hg.

Number of sampling points 24 Sampling time/point determined by length of push. min.

Probe and sample collection box movement:

Is nozzle sealed when probe is in the stack with the pump turned off? NO

Is care taken to prevent nozzle from scraping nipple or stack inside wall? YES

Is an effective seal made around probe at port opening? YES

Is probe seal made without disturbing flow inside stack? YES

Is probe moved to each point at the proper time? YES

Is probe marking system adequate to properly locate each point? YES

Is nozzle and pitot tube properly aligned at each point? NOT VIEWED

If probe was disconnected from filter holder with probe in the stack on a negative pressure source, how is particulate matter in the probe prevented from being drawn back into the stack? NA

If filters are changed during a run, was any particulate lost? NA

If any part of the train is disconnected in changing ports, was a leak test performed after reassembly? NA

Leakage rate = _____ cfm @ _____ in. Hg.

Control box operation:

Is data recorded on data sheets in ink? NO — pencil Are data sheets complete? YES

Average time to reach isokinetic rate at each point NOT VIEWED

Is nomograph setting changed when stack gas temperature changes significantly? NOT VIEWED

Are velocity pressures (Δp's) read and recorded accurately? NOT VIEWED.

Is leak test performed at completion of run? Yes

Leakage rate = 0 cfm @ 15 in. Hg.

Probe, filter holder, and impingers sealed adequately after test? Yes

Stack gas analysis:

Type of sample: Grab (from stack) ✓ Integrated bag _____

Type of analyzer: Orsat _____ Fyrite ✓ Other _____

For grab samples: Number obtained during run 3 Was analyzer leak tested? No Checked with air? _____

For bag samples: Was bag sampling system leak tested before run? _____

Was analyzer leak tested? _____ Checked with air? _____

If copies of field data sheets are not obtained, record the following:

Approximate average stack temperature 140 °F

Nozzle diameter .125 in. Volume of gas metered _____ dcf

Minimum Δp 5.0 "H_2O Approximate average Δp 5.5 "H_2O

Maximum Δp 6.5 "H_2O

Were field data sheets initialed by observer? NO

Comments on sampling procedures:

ACTUAL SAMPLING WAS NOT WITNESSED MANY POINTS OF THIS QUESTIONAIRE WERE DETERMINED BY QUESTIONING SAMPLING CREW, AND BY PRE + POST TEST OBSERVATIONS. OBSERVER WAS PROVIDED WITH COPIES OF SAMPLING DATA SHEETS FOLLOWING TEST.

Run Number 1

Date 9-14-82

Recorded by PLUHAR

Sample Recovery

Location of sample recovery area ENVIRONMENTAL ENGINEERING TRAILER

Description of sample recovery area environment ADEQUATELY CLEAN

Type of wash bottle(s)? NALGENE Wash bottle(s) clean? YES

Probe brushed and rinsed thoroughly? YES Probe brush clean? YES

Type of sample containers NALGENE

Sample bottles clean? YES Nozzle brush clean? YES

Acetone grade — Acetone blank value — percent

Filter handled properly? YES Filter removed from filter holder gasket? —

Description of filter container GLASS

Impingers handled properly? YES Impinger water measured by: Graduated Cylinder _____ Balance ✓

After sample recovery:

Filter holder clean? YES Probe liner clean? YES
Nozzle clean? YES

Acetone blank obtained? NOT SEEN Type of container? _____

Description of collected particulate appearance DARK GRAY, SAMPLE PARTICULATES

Color of silica gel BLUE

Sample containers clearly identified? YES Tightly sealed? YES

Liquid level marked on sample bottles? NO Samples placed in locked container? NO

Comments on sample recovery:

ACETONE BLANK NOT TAKEN.
DID NOT WITNESS RINSING OF FRONT PORTION OF FILTER HOLDER. WHEN TEST LEADER WAS ASKED, HE SAID THAT IT HAD BEEN DONE, HOWEVER.