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¹⁹⁹²
USS CLAIRTON WORKS
COMPLIANCE DEMONSTRATION
#14 BATTERY COMBUSTION STACK

Prepared for:

USS CLAIRTON WORKS
A DIVISION OF USX CORPORATION
CLAIRTON, PA

Prepared by:

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
3000 TECH CENTER DRIVE
MONROEVILLE, PA 15146

PROJECT NUMBER: 605039-01

MAY 1992

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ABSTRACT

On March 24, 1992, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #14 Battery Combustion Stack. The purpose of the testing was to determine the (1) concentration and mass emission rates of particulate matter, and (2) presence and extent of visible emissions from the stack as required by the Amended Mon Valley Consent Decree, Paragraph V. A. (6) and Appendix 4. A.

The allowable particulate matter concentration, as required by the Amended Mon Valley Consent Decree, is 0.015 gr/dscf. The results of three test runs produced an average particulate matter concentration and emission rate of 0.010 gr/dscf and 2.67 lb/hr, respectively. Thus, the particulate matter emissions from the stack are in compliance. The Amended Mon Valley Consent Decree requires that visible emissions shall not equal or exceed 20 percent opacity for a period or periods aggregating in excess of 3 minutes in any 60-minute period and shall never equal or exceed 60 percent opacity. The highest three minute average opacity for all tests was 15 percent. The highest opacity reading was 20 percent. Thus, the visible emissions are in compliance.

1.0 INTRODUCTION

On March 24, 1992, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #14 Battery Combustion Stack. The purpose of the testing was to determine the (1) concentration and mass emission rate of particulate matter, and (2) presence and extent of visible emissions from the stack as required by the Amended Mon Valley Consent Decree, Paragraph V. A. (6) and Appendix 4. A.

Testing was performed by the Air Quality Engineering Division of Keystone Environmental Resources, Inc. (Keystone). The test crew was comprised of John Shimshock, Samuel Woodring, and Thomas Morgan.. Visible emissions determinations were performed by Timothy McKee of Environmental Technical Services (ETS). Keystone and ETS are sister companies of the Chester Environmental Group. All test procedures were witnessed by Phil Lawrence of the Allegheny County Health Department Bureau of Air Pollution Control (BAPC).

2.0 METHODOLOGIES

The compliance test program followed the USS-approved emissions measurement test protocol which can be found in Appendix A.

Particulate matter sampling was performed in accordance with EPA Stationary Source Sampling Methods 1 through 5 and Sections 139.11 and 139.12 of the Pennsylvania Department of Environmental Resources (PA DER) Source Testing Manual. Three two-hour tests were executed during normal operating conditions. Greater than 50 dry standard cubic feet of sample gas was collected during each test run.

The process exhausts through a 120 inch diameter stack. A total of 24 traverse points (12 per diameter) were sampled; the traverse points were calculated in accordance with EPA Method 1. Sampling was conducted through four equally spaced ports, with six traverse points sampled per port. Each point was sampled for 5 minutes, thus bringing the total sampling time to 120 minutes. A schematic diagram of the stack and traverse points can be found in Figure 2-1.

In accordance with EPA Method 2, velocities and volumetric flow rates of the exhaust gas were determined using a calibrated S type pitot tube. Positive and negative pitot lines were leak-checked at the beginning and end of each test run. Gas velocity differential pressures along with stack gas temperatures were recorded at each sampling point.

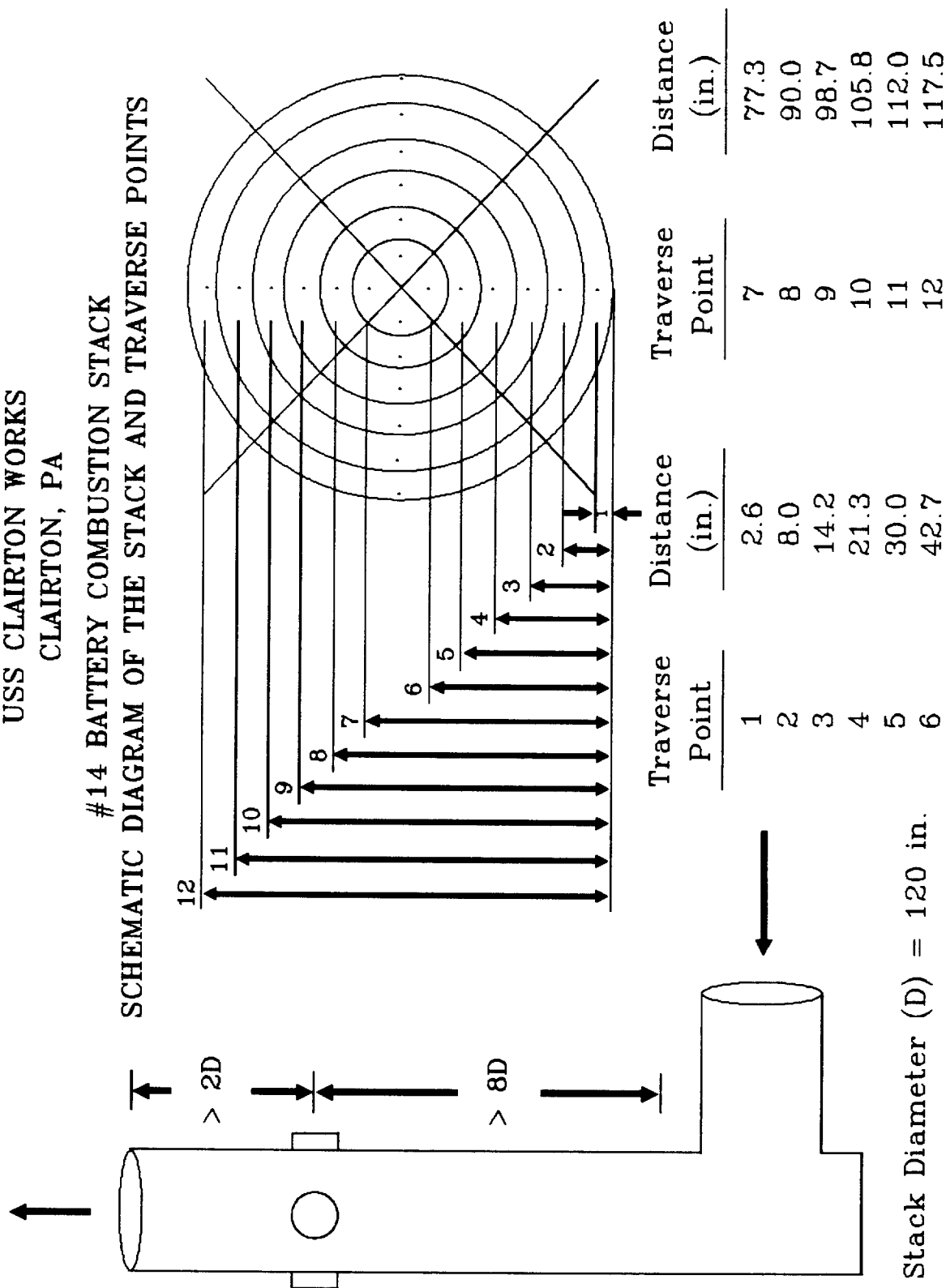
At the beginning and end of each test, gas concentrations of CO₂, O₂, and N₂ (by difference) were determined with the use of a Fyrite apparatus as specified by EPA Method 3. Gas concentrations were used to obtain molecular weight of the process gas.

Percent moisture content, by volume, of the exhaust gas was determined by measuring the weight gain of the four sample train impingers in accordance with EPA Method 4.

As specified by EPA Method 5, each sample train was assembled as required by the method, leak-checked on site at the beginning and end of each test run, and operated such that isokinetic conditions were maintained. Clean up of the sampling train included a water rinse followed by an acetone rinse of both the front-half and back-half components of

FIGURE 2-1
 USS CLAIRTON WORKS
 CLAIRTON, PA

#14 BATTERY COMBUSTION STACK
 SCHEMATIC DIAGRAM OF THE STACK AND TRAVERSE POINTS



Stack Diameter (D) = 120 in.

the sample train, as per Section 139.12 of the PA DER particulate matter test methods. The water soluble and water insoluble portions of the front-half of the sampling train was determined as a total; that is, the water rinse was not filtered to determine soluble and insoluble portions. Front-half acetone and water rinses were evaporated to dryness, desiccated, and weighed to a constant weight. The water soluble and water insoluble portions of the back-half were determined separately in accordance with Section 139.12 of the PA DER Source Testing Manual. The back-half water rinses and first three impinger solutions were combined and then filtered under suction through a preweighed 0.22 micrometer membrane filter. The filter used to capture the insoluble material was dried, desiccated, and weighed to a constant weight. After filtration, the soluble back-half water was extracted with chloroform and ethyl ether. The extracts were evaporated to dryness, desiccated, and weighed to a constant weight. The filtrate, or remaining water from the extraction process, was then submitted for sulfate analysis via ion chromatography. Back-half acetone rinses were evaporated to dryness, desiccated, and weighed to a constant weight. Sample train filters were desiccated for 24 hours, and particulate matter weight was determined gravimetrically. Rinse residue weights and filter weights were measured to the nearest 0.1 mg. One acetone blank and one deionized distilled water blank was prepared in the same manner as the test sample rinses. The blank residue weights were subtracted from the test sample residue weights. After blank correction, front-half water and acetone rinse residue weights, sample train filter weights, and back-half water insoluble filter weights were used to determine total particulate matter catch.

All visible emissions determinations were performed in accordance with EPA Stationary Source Sampling Method 9. Visible emission readings were recorded for the duration of each particulate matter test.

3.0 RESULTS

All testing was performed during periods of normal plant operation. To validate this, copies of the operational data can be found in Appendix B.

All sampling equipment was calibrated and operated in accordance with EPA Stationary Source Sampling Methods 1 through 5. Copies of the pre-test calibration results, post-test calibration results, and the results of an audit conducted with a critical orifice provided by the Allegheny County Health Department BAPC can be found in Appendix C.

Copies of the field data sheets for the particulate matter sampling can be found in Appendix D. The emissions calculations for each test can be found in Appendix E.

The test results have been summarized in Table 3-1. As promulgated by the Amended Mon Valley Consent Decree, Paragraph V.A.(6), the allowable particulate matter concentration for #14 Battery Combustion Stack is 0.015 gr/dscf (a Lowest Achievable Emission Rate (LAER) standard). The results of the testing showed an average particulate matter concentration and emission rate of 0.010 grains per dry standard cubic feet (gr/dscf) and 2.67 pounds per hour (lb/hr), respectively. Thus, the particulate matter emissions from the stack are in compliance.

Tables 3-1 also lists other pertinent stack and sampling parameters which include stack gas flow rate in units of actual cubic feet per minute (acfm) and standard cubic feet per minute (scfm), moisture content of the stack gas (percent by volume), stack gas temperature (°F), gas volume sampled for each test in units of dry standard cubic feet (dscf), and the isokinetics value for each test. The gas volume sampled for each 120 minute test was greater than 50 dry standard cubic feet. The isokinetics value is equal to the ratio of the average linear gas velocity sampled through the probe nozzle to the average stack gas velocity. An isokinetics value between 90 percent and 110 percent is considered acceptable. Isokinetic values for the three test runs were 94.5 percent, 96.8 percent, and 94.6 percent; therefore, all values were within the acceptable range. Actual test sampling times have also been included in Table 3-1.

TABLE 3-1

USS CLAIRTON WORKS
CLAIRTON, PA

#14 BATTERY COMBUSTION STACK
PARTICULATE MATTER EMISSIONS DATA

Test Number		Run 1	Run 2	Run 3	Average
Test Date		CLR-14CS-1	CLR-14CS-2	CLR-14CS-3	
		3/24/92	3/24/92	3/24/92	
<u>Mass Emission Rate and Concentration</u>					
Particulate Matter	(lb/hr)	2.84	3.05	2.11	2.67
	(gr/DSCF)	0.010	0.010	0.009	0.010
<u>Stack Conditions</u>					
Average Flow Rate	(ACFM)	66447	73245	59273	66322
Standard Flow Rate	(SCFM)	37171	40187	32981	36780
Temperature	(°F)	432.5	450.0	437.3	439.9
Moisture Content	(%) vol.	13.1	14.1	12.6	13.3
<u>Sampling Conditions</u>					
Test times		8:52	11:45	14:32	
		to 9:22	to 12:15	to 15:02	
		9:25	12:20	15:05	
		to 9:55	to 12:50	to 15:35	
		9:58	12:55	15:38	
		to 10:28	to 13:25	to 16:08	
		10:31	13:28	16:19	
		to 11:01	to 13:58	to 16:49	
Sampling Time	(minutes)	120	120	120	
Sample Volume	(DSCF)	64.621	70.734	57.691	
Isokinetics	(%)	94.5	96.8	94.6	

Copies of the field data sheets for the visible emissions readings can be found in Appendix F. As promulgated by the Amended Mon Valley Consent Decree, Paragraph V. A. (6), the "visible emissions shall not equal or exceed 20 percent opacity for a period or periods aggregating in excess of 3 minutes in any 60-minute period and shall never equal or exceed 60 percent opacity." The highest three minute average opacity for all tests was 15 percent. The highest opacity reading was 20 percent. Thus, the visible emissions are in compliance.

A summary table of the analytical results for sulfate analysis on the soluble back-half water can be found in Table 3-2. A copy of the analytical report for sulfate analysis can be found in Appendix G.

TABLE 3-2
USS CLAIRTON WORKS
CLAIRTON, PA
#14 BATTERY COMBUSTION STACK
SULFATE ANALYSIS OF BACK-HALF WATER

Test Number	Sulfate Concentration (mg/L)	Sample Volume (L)	Total Sulfate (mg)
CLR-14CS-1	64.93	800	51.9
CLR-14CS-1	76.65	720	55.2
CLR-14CS-1	63.73	780	49.7

**COMPLIANCE DEMONSTRATION
#14 BATTERY COMBUSTION STACK**

**USS CLAIRTON WORKS
CLAIRTON, PA**

APPENDIX A

TEST PROTOCOL



USS
Clairton Works
400 State Street
Clairton, PA 15025

February 27, 1992

U. S. Environmental Protection Agency
Region III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

Department of Environmental Resources
Bureau of Air Quality Control
Executive House -2nd & Chestnut
P.O. Box 2357
Harrisburg, PA 17105-2357

Bureau of Air Pollution Control
Allegheny County Health Department
301 Thirty-Ninth Street
Pittsburgh, Pennsylvania 15201
ATTN: A. H. Fieser Ph.D., P.E.

Office of Chief Council
Western Region
Department of Environmental Resources
400 Waterfront Drive
Pittsburgh, Pennsylvania 15222-4745

Gentlemen:

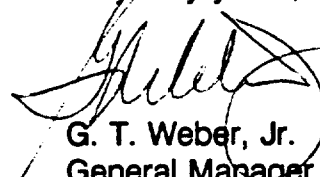
RE: 14 Battery Combustion Stack

This letter should serve as a formal notification of our intention to initiate a compliance demonstration program on #14 Battery Combustion Stack on March 24, 1992. Three particulate emission concentration tests will be conducted. Each run will be of two hours duration. Each test will be complemented by simultaneous V. E. readings. This tentative schedule is contingent upon normal operations of the #14 Battery Combustion Stack and acceptable weather.

The sampling methods and equipment employed will be those referenced in 40 C.F.R. Part 60, Appendix A, most recent revision. A proposed test protocol is included as an attachment.

Questions regarding this program should be referred to Mr. W. C. Graeser at 233-1467.

Very truly yours,



G. T. Weber, Jr.
General Manager
USS Clairton Works

GTW/BAC
Attachment

**TEST PROTOCOL
#14 BATTERY COMBUSTION STACK**

**USS CLAIRTON WORKS
CLAIRTON, PA**

Particulate matter sampling will be performed in accordance with EPA Stationary Source Sampling Methods 1 through 5 and Sections 139.11 and 139.12 of the Pennsylvania Department of Environmental Resources (PA DER) Source Testing Manual. Three two-hour tests will be executed during normal operating conditions. Greater than 50 dry standard cubic feet of sample gas will be collected during each test run.

The process exhausts through a 120 inch diameter stack. A total of 24 traverse points (12 per diameter) will be sampled; the traverse points will be calculated in accordance with EPA Method 1. Sampling will be conducted through four equally spaced ports, with six traverse points sampled per port. Each point will be sampled for 5 minutes, thus bringing the total sampling time to 120 minutes.

In accordance with EPA Method 2, velocities and volumetric flow rates of the exhaust gas will be determined using a calibrated S type pitot tube. Positive and negative pitot lines will be leak-checked at the beginning and end of each test run. Gas velocity differential pressures along with stack gas temperatures will be recorded at each sampling point.

At the beginning and end of each test, gas concentrations of CO₂, O₂, and N₂ (by difference) will be determined with the use of a Fyrite apparatus as specified by EPA Method 3. Gas concentrations will be used to obtain molecular weight of the process gas.

Percent moisture content, by volume, of the exhaust gas will be determined by measuring the weight gain of the four sample train impingers in accordance with EPA Method 4.

As specified by EPA Method 5, each sample train will be assembled as required by the method, leak-checked on site at the beginning and end of each test run, and operated such that isokinetic conditions are maintained. Clean up of the sampling train will include a water rinse followed by an acetone rinse of both the front-half and back-half components of the sample train, as per PA DER particulate matter test methods. The water soluble and water insoluble portions of the front-half of the sampling train will be determined as a total; that is, the water rinse will not be filtered to determine soluble and insoluble portions. Front-half acetone and water rinses will be evaporated to dryness, desiccated, and weighed to a constant weight. The water soluble and water insoluble portions of the back-half will be determined separately in accordance with Section 139.12 of the PA DER Source Testing Manual. The back-half water rinses and first three impinger solutions will be combined and then filtered under suction through a preweighed 0.22 micrometer membrane filter. The filter used to capture the insoluble material will be dried, desiccated, and weighed to a constant weight. After filtration, the soluble back-half water will be extracted with chloroform and ethyl ether. The extracts will be evaporated to dryness, desiccated, and weighed to a constant weight. The filtrate, or remaining water from the extraction process, will then be submitted for sulfate analysis via ion chromatography. Back-half acetone rinses will be evaporated to dryness, desiccated, and weighed to a constant weight. Sample train filters will be desiccated for 24 hours, and particulate matter weight will be determined gravimetrically. Rinse residue weights and filter weights will be measured to the nearest 0.1 mg. One acetone blank and one deionized distilled water blank will be prepared in the same manner as the test sample rinses. The blank residue weights will be subtracted from the test sample residue weights. After blank correction, front-half water and acetone rinse residue weights, sample train filter weights, and back-half water insoluble filter weights will be used to determine total particulate matter catch.

All visible emissions determinations will be performed in accordance with EPA Stationary Source Sampling Method 9. Visible emission readings will be recorded for the duration of each particulate matter test.

A report summarizing the compliance test program will be submitted within 60 days following completion of field work. The report will describe test methodologies utilized and present a textual and tabular summary of the emissions results and related sampling

information. Copies of operational data will be included in the report to verify that all testing was performed during periods of normal plant operation. Also incorporated into the report will be copies of the pre-test calibration results, post-test calibration results, the results of an audit conducted with a critical orifice provided by the Allegheny County Health Department Bureau of Air Pollution Control, field data sheets for the particulate matter sampling and visible emissions determinations, computer-generated emissions calculations, and analytical results for each test.

**COMPLIANCE DEMONSTRATION
#14 BATTERY COMBUSTION STACK**

**USS CLAIRTON WORKS
CLAIRTON, PA**

APPENDIX B

OPERATIONAL DATA

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 5

12 Hrs. Beginning 12:00 A M

Date 8-24-92

BATTERY NO. <u>14</u> <u>A</u>				BATTERY NO. <u>14</u> <u>B</u>				BATTERY NO. _____			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1				1	7 26	7 35		1			
3				3	7 37	7 45		3			
5				5	7 47	7 54		5			
7				7	8 33	8 56		7			
9				9	8 58	9 11		9			
11				11	9 13	9 26		11			
13				13				13			
15				15				15			
17				17				17			
19				19				19			
21				21				21			
23				23				23			
25				25				25			
27				27				27			
29				29				29			
31				31				31			
2	1 48	2 00		2				2			
4	2 02	2 09		4				4			
6	2 11	2 19		6				6			
8	2 28	3 00		8				8			
10	3 02	3 10		10				10			
12	3 12	4 11		12				12			
14	4 13	4 17		14				14			
16	4 19	4 24		16				16			
18	4 26	5 09		18		11 39		18			
20	5 11	5 18		20	11 41	11 46		20			
22	5 20	5 29		22	11 48	12 00		22			
24	5 31	6 10		24	12 02	12 38		24			
26	6 12	6 20		26	12 45	12 49		26			
28	6 22	6 30		28	12 51	1 00		28			
30	6 32	6 35		30	1 02	1 46		30			
1				1				1			
2				2				2			

REMARKS: 15 15

17 13
15 15
27 28

Condition of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	
11-12	2	2		5-6	3	3		
12-1	3	3		6-7	3	4		Total Ovens Pushed 27
1-2	2	2		7-8	3	3		Total Ovens Charged 28
2-3	3	3		8-9	2	1		
3-4	2	2		9-10	1	2		Pusherman <u>J. L. Mc. Keith</u>
4-5	3	3		10-11	0	0		Battery Foreman
	15	15			12	13		

PUSHING AND CHARGING REPORT

UNIT NO. 5

12 Mrs. Beginning 12:00 PM

Date 3.24.92

BATTERY NO. 14-A				BATTERY NO. 14-B				BATTERY NO.			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	3 42	3 53		1				1			
3	3 57	4 06		3				3			
5	4 11	4 21		5				5			
7	4 48	4 59		7				7			
9	4 56	5 35		9				9			
11	5 02	5 40		11				11			
13	5 37	5 49		13	11 38	11 56		13			
15	5 42	6 20		15	11 58	12 10		15			
17	5 51	6 29		17	12 12	12 20		17			
19	6 22	6 35		19	12 53	1 03		19			
21	6 31	7 48		21	1 05	1 15		21			
23	6 37	7 55		23	1 17	1 23		23			
25	7 49	8 00		25	2 06	2 14		25			
27	7 57	8 07		27	2 17	2 38		27			
29	8 02	8 41		29	2 39	2 39		29			
31	8 09	8 51		31				31			
2				2	8 43	9 00		2			
4				4	8 53	9 38		4			
6				6	9 02	10 00		6			
8				8	9 40	10 11		8			
10				10	10 02			10			
12				12	10 13			12			
14				14				14			
16				16				16			
18				18				18			
20				20				20			
22				22				22			
24				24				24			
26				26				26			
28				28				28			
30				30				30			
1				1				1			
2				2				2			

REMARKS: 16 16 15 13

Condition of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
11 12	2	1		56	4	3	
12 1	2	2		67	3	3	
12	2	3		78	2	2	
23	3	3		89	4	4	
34	2	1		910	2	2	
45	3	3		1011	2	2	
14	14	13		17	16		

Total Ovens Pushed 31

Total Ovens Charged 29

Pusherman 7 (L. L. D. D.) L. L. D.

Battery Foreman

OVCNS 43 Date 5/24/92 TURN 1

#13 & #14 Battery Pushing Schedule

B 1 /14	_____	A 1 /14	_____	B 2 /14	_____	A 2 /14	_____
B 3 /14	_____	A 3 /14	_____	B 4 /14	_____	A 4 /14	_____
B 5 /14	_____	A 5 /14	_____	B 6 /14	_____	A 6 /14	_____
A 1 /13	_____	B 2 /13	_____	A 2 /13	_____	B 1 /13	_____
A 3 /13	_____	B 4 /13	_____	A 4 /13	_____	B 3 /13	_____
A 5 /13	_____	B 6 /13	_____	A 6 /13	_____	B 5 /13	_____
B 7 /14	_____	A 7 /14	_____	B 8 /14	_____	A 8 /14	_____
B 9 /14	_____	A 9 /14	_____	B10 /14	_____	A10 /14	_____
B11 /14	_____	A11 /14	_____	B12 /14	_____	A12 /14	_____
A 7 /13	_____	B 8 /13	_____	A 8 /13	_____	B 7 /13	_____
A 9 /13	_____	B10 /13	_____	A10 /13	_____	B 9 /13	_____
A11 /13	_____	B12 /13	_____	A12 /13	_____	B11 /13	_____
B13 /14	_____	A13 /14	_____	B14 /14	_____	A14 /14	_____
B15 /14	_____	A15 /14	_____	B16 /14	_____	A16 /14	_____
B17 /14	_____	A17 /14	_____	B18 /14	_____	A18 /14	_____
A13 /13	_____	B14 /13	_____	A14 /13	_____	B13 /13	_____
A15 /13	_____	B16 /13	_____	A16 /13	_____	B15 /13	_____
A17 /13	_____	B18 /13	_____	A18 /13	_____	B17 /13	_____
B19 /14	_____	A19 /14	_____	B20 /14	_____	A20 /14	_____
B21 /14	_____	A21 /14	_____	B22 /14	_____	A22 /14	_____
B23 /14	_____	A23 /14	_____	B24 /14	_____	A24 /14	_____
A19 /13	_____	B20 /13	_____	A20 /13	_____	B19 /13	_____
A21 /13	_____	B22 /13	_____	A22 /13	_____	B21 /13	_____
A23 /13	_____	B24 /13	_____	A24 /13	_____	B23 /13	_____
B25 /14	_____	A25 /14	_____	B26 /14	_____	A26 /14	_____
B27 /14	_____	A27 /14	_____	B28 /14	_____	A28 /14	_____
B29 /14	_____	A29 /14	_____	B30 /14	_____	A30 /14	_____
A25 /13	_____	A31 /14	_____	A26 /13	_____	B25 /13	<u>43</u>
A27 /13	_____	B26 /13	_____	A28 /13	_____	B27 /13	_____
A29 /13	_____	B28 /13	_____	A30 /13	_____	B29 /13	_____
A31 /13	_____	B30 /13	_____				

START A14/13
FINISH B25/13

Pass up _____

Pick up _____

Ovens 43 Date 3-14-96 Turn 2

#13 & #14 Battery Pushing Schedule

B 1 /14	A 1 /14	B 2 /14	A 2 /14
B 3 /14	A 3 /14	B 4 /14	A 4 /14
B 5 /14	A 5 /14	B 6 /14	A 6 /14
A 1 /13	B 2 /13	A 2 /13	B 1 /13
A 3 /13	B 4 /13	A 4 /13	B 3 /13
A 5 /13	B 6 /13	A 6 /13	B 5 /13
B 7 /14	A 7 /14	B 8 /14	A 8 /14
B 9 /14	A 9 /14	B10 /14	A10 /14
B11 /14	A11 /14	B12 /14	A12 /14
A 7 /13	B 8 /13	A 8 /13	B 7 /13
A 9 /13	B10 /13	A10 /13	B 9 /13
A11 /13	B12 /13	A12 /13	B11 /13
B13 /14	A13 /14	B14 /14	A14 /14
B15 /14	A15 /14	B16 /14	A16 /14
B17 /14	A17 /14	B18 /14	A18 /14
A13 /13	B14 /13	A14 /13	B13 /13
A15 /13	B16 /13	A16 /13	B15 /13
A17 /13	B18 /13	A18 /13	B17 /13
B19 /14	A19 /14	B20 /14	A20 /14
B21 /14	A21 /14	B22 /14	A22 /14
B23 /14	A23 /14	B24 /14	A24 /14
A19 /13	B20 /13	A20 /13	B19 /13
A21 /13	B22 /13	A22 /13	B21 /13
A23 /13	B24 /13	A24 /13	B23 /13
B25 /14	A25 /14	B26 /14	A26 /14
B27 /14	A27 /14	B28 /14	A28 /14
B29 /14	A29 /14	B30 /14	A30 /14
A25 /13	A31 /14	A26 /13	B25 /13
A27 /13	B26 /13	A28 /13	B27 /13
A29 /13	B28 /13	A30 /13	B29 /13
A31 /13	B30 /13		

Pass up

Pick up

START B-27-13

FINISH B-2-13

Ovens 43 Date 3/24/92 Turn 3

#13 & #14 Battery Pushing Schedule

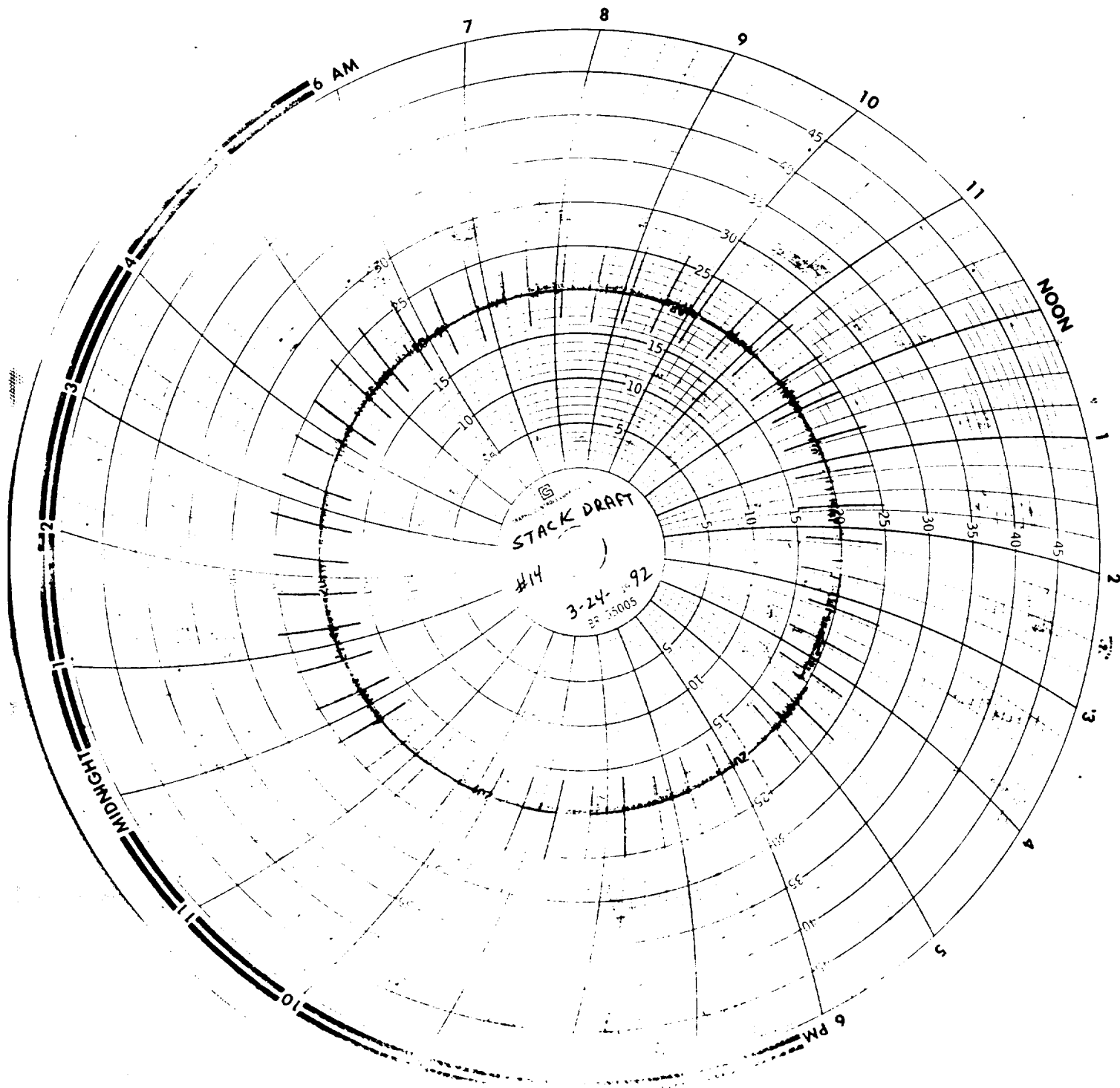
B 1 /14		A 1 /14		B 2 /14		A 2 /14	
B 3 /14		A 3 /14		B 4 /14		A 4 /14	
B 5 /14		A 5 /14		B 6 /14		A 6 /14	
A 1 /13		B 2 /13		A 2 /13		B 1 /13	
A 3 /13		B 4 /13		A 4 /13		B 3 /13	
A 5 /13		B 6 /13		A 6 /13		B 5 /13	
B 7 /14		A 7 /14		B 8 /14		A 8 /14	
B 9 /14		A 9 /14		B10 /14		A10 /14	
B11 /14		A11 /14		B12 /14		A12 /14	
A 7 /13		B 8 /13		A 8 /13	43	B 7 /13	
A 9 /13		B10 /13		A10 /13		B 9 /13	
A11 /13		B12 /13		A12 /13		B11 /13	
B13 /14		A13 /14		B14 /14		A14 /14	
B15 /14		A15 /14		B16 /14		A16 /14	
B17 /14		A17 /14		B18 /14		A18 /14	
A13 /13		B14 /13		A14 /13		B13 /13	
A15 /13		B16 /13		A16 /13		B15 /13	
A17 /13		B18 /13		A18 /13		B17 /13	
B19 /14		A19 /14		B20 /14		A20 /14	
B21 /14		A21 /14		B22 /14		A22 /14	
B23 /14		A23 /14		B24 /14		A24 /14	
A19 /13		B20 /13		A20 /13		B19 /13	
A21 /13		B22 /13		A22 /13		B21 /13	
A23 /13		B24 /13		A24 /13		B23 /13	
B25 /14		A25 /14		B26 /14		A26 /14	
B27 /14		A27 /14		B28 /14		A28 /14	
B29 /14		A29 /14		B30 /14		A30 /14	
A25 /13		A31 /14		A26 /13		B25 /13	
A27 /13		B26 /13		A28 /13		B27 /13	
A29 /13		B28 /13		A30 /13		B29 /13	
A31 /13		B30 /13					

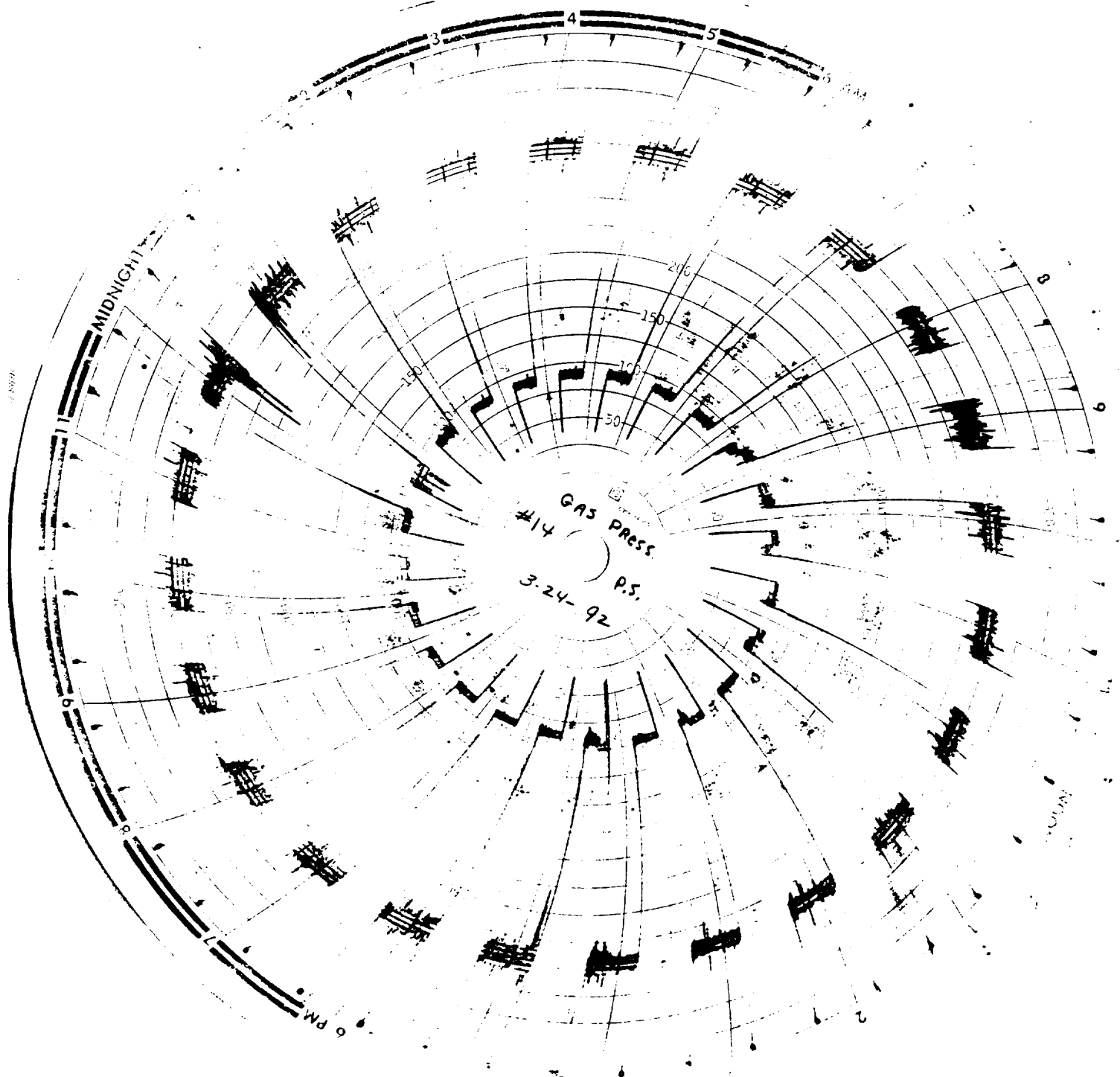
Pass up

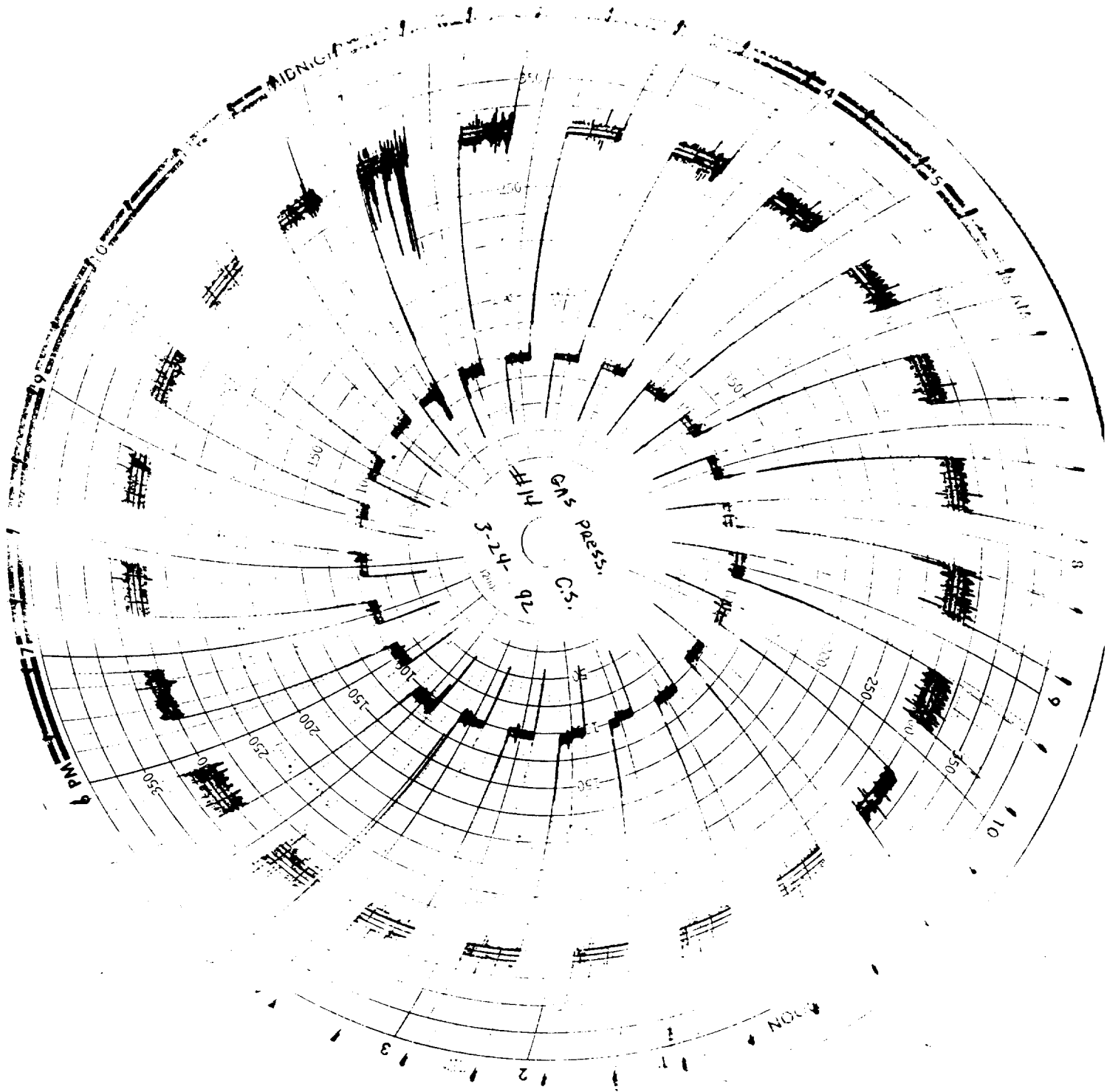
START A-29-13

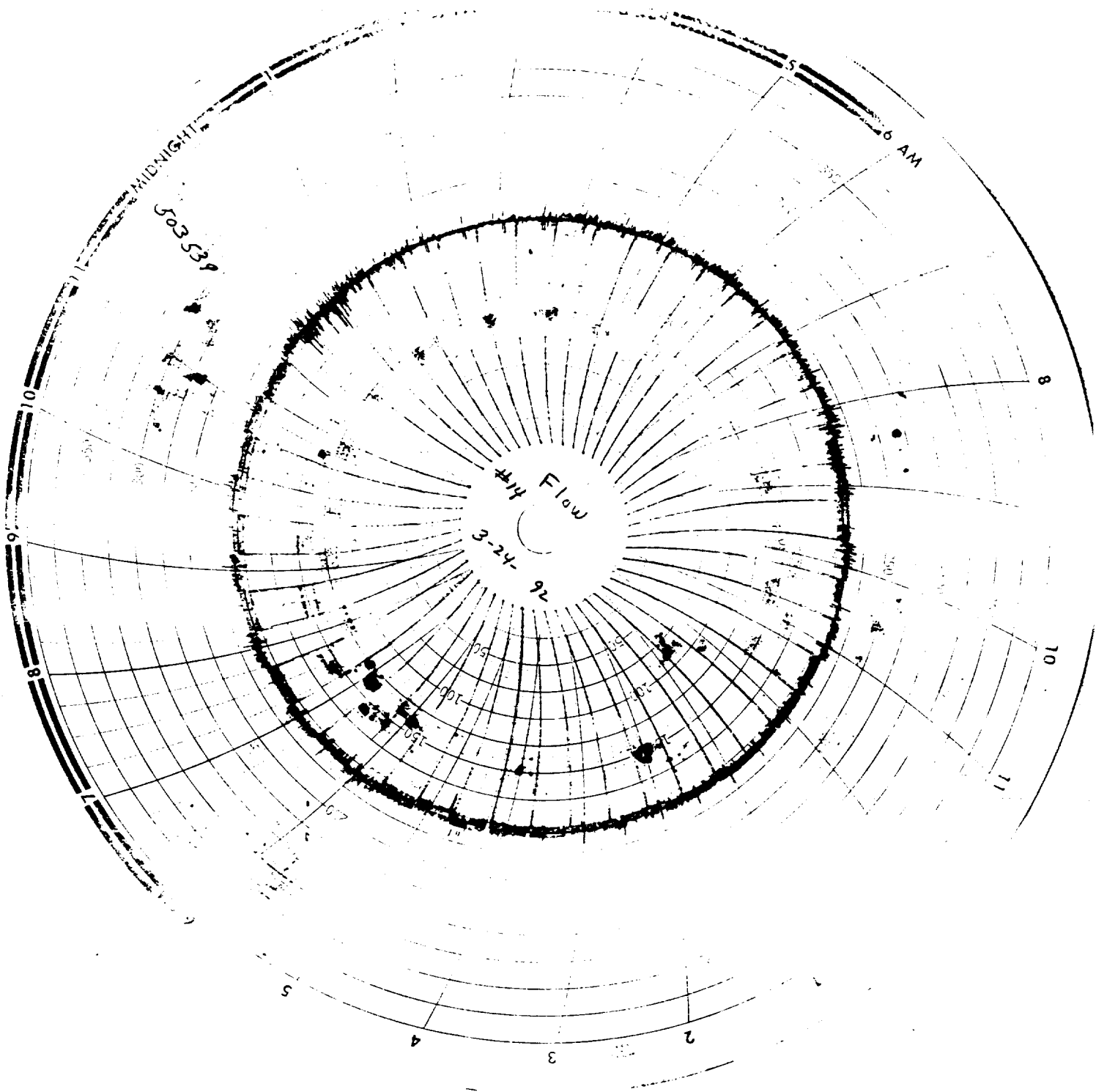
FINISH A-8-13

Pick up









**COMPLIANCE DEMONSTRATION
#14 BATTERY COMBUSTION STACK**

**USS CLAIRTON WORKS
CLAIRTON, PA**

APPENDIX C

CALIBRATION RESULTS

CONTROL BOX CALIBRATION

THREE POINT CALIBRATION

BOX # 1 BP 29.00
DATE 02-11-92 OPERATOR RPC

	WET TEST METER				DRY TEST METER						METER CORRECT Y	ORIFICE COEFFICIENT ΔH@
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD			
START			0.000	29.00				0.50	463.100			
HALF		70.0			90.0	83.0	86.5					
STOP	12.57		5.000						468.381			
CALCULATION	12.57	530.0	5.013	29.00			546.5	29.04	5.281	0.9775	1.767	
START			0.000	29.00				1.00	468.800			
HALF		70.0			94.0	85.0	89.5					
STOP	8.87		5.000						474.081			
CALCULATION	8.87	530.0	5.013	29.00			549.5	29.07	5.281	0.9816	1.750	
START			0.000	29.00				2.00	474.800			
HALF		70.0			97.0	88.0	92.5					
STOP	6.30		5.000						480.078			
CALCULATION	6.30	530.0	5.013	29.00			552.5	29.15	5.278	0.9850	1.756	
AVERAGE										0.9814	1.757	

POST TEST

BOX # 1 BP 28.75
 DATE 3-30-92 OPERATOR RPC

	WET TEST METER				DRY TEST METER						METER CORRECT Y	ORIFICE COEFFICIENT ΔH@
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD			
START			0.000	28.75	121.0	108.0	114.5	1.80	270.400			
HALF												
STOP	6.73	72.0	5.000						275.895			
CALCULATION	6.73	532.0	5.013	28.75			574.5	28.88	5.495	0.9806		1.763
START			0.000	28.75	123.0	112.0	117.5	1.80	276.100			
HALF												
STOP	6.73	72.0	5.000						281.624			
CALCULATION	6.73	532.0	5.013	28.75			577.5	28.88	5.524	0.9805		1.753
START			0.000	28.75	129.0	114.0	121.5	1.80	281.900			
HALF												
STOP	6.75	72.0	5.000						287.441			
CALCULATION	6.75	532.0	5.013	28.75			581.5	28.88	5.541	0.9843		1.752
AVERAGE										0.9818		1.756
DIFFERENCE										-0.04%		0.09%

PRE-TEST MAGNEHELIC CALIBRATION

BOX# 1
DATE 01-14-92
OPERATOR RPC

0 to 10" H2O RANGE

MAGNEHELIC	ΔP	MANOMETER
	0.50	0.50
	1.00	1.05
	2.00	2.00
	4.00	4.00
	6.00	6.00
	8.00	8.00

0 to 0.50" H2O RANGE

MAGNEHELIC	ΔP	MANOMETER
	0.50	0.50
	0.40	0.40
	0.30	0.30
	0.20	0.20
	0.10	0.10

0 to 5" H2O RANGE

MAGNEHELIC	DELTA H	MANOMETER
	4.00	4.00
	3.00	3.00
	2.00	2.00
	1.00	1.00
	0.50	0.50

PRE-TEST LEAK CHECK

DATE 02-11-92
OPERATOR RPC

START	STOP	VOLUME	TIME	LEAK
CF	CF	CF	(min)	RATE
461.970	462.152	0.182	10.000	-0.002
0.000	0.161	0.161		

PYROMETER CALIBRATION

DATE 04-28-88
OPERATOR AGL

TEMP	TARGET	TEMP
READING	TEMP	READING
°F	°F	°F
40	40.0	40.0
50	50.0	50.0
70	70.0	69.0
90	90.0	89.0
110	110.0	109.0
150	150.0	149.0
200	200.0	200.0
300	301.0	300.0
400	400.0	400.0
500	500.0	500.0

PRE-TEST PYROMETER CHECK

DATE 01-14-92
OPERATOR RPC

TEMP	TARGET	TEMP
READING	TEMP	READING
°F	°F	°F
40	40	40.0
50	50	50.0
70	70	69.0
90	90	89.0
110	110	109.0
150	150	149.0
200	200	200.0
300	300	300.0
400	400	400.0
500	500	500.0

POST-TEST MAGNEHELIC CALIBRATION

BOX# 1
DATE 3-30-92
OPERATOR RPC

0 to 10" H2O RANGE

MAGNEHELIC ΔP	MANOMETER
0.50	0.50
1.00	1.00
2.00	2.00
4.00	4.00
6.00	6.00
8.00	8.00

0 to 0.50" H2O RANGE

MAGNEHELIC ΔP	MANOMETER
0.50	0.50
0.40	0.40
0.30	0.30
0.20	0.20
0.10	0.10

0 to 5" H2O RANGE

MAGNEHELIC ΔH	MANOMETER
4.00	4.00
3.00	3.00
2.00	2.00
1.00	1.00
0.50	0.50

POST-TEST LEAK CHECK

DATE 3-30-92
OPERATOR RPC

START CF	STOP CF	VOLUME CF	TIME (min)	LEAK RATE
268.945	269.161	0.216	10.000	-0.004
0.000	0.190	0.180		

PYROMETER CALIBRATION

DATE 04-28-88
OPERATOR AGL

mV input	TARGET TEMP °F	TEMP READING °F
0.18	40	40.0
0.40	50	50.0
0.84	70	70.0
1.29	90	90.0
1.74	110	110.0
2.66	150	150.0
3.82	200	200.0
6.09	300	301.0
8.31	400	400.0
10.57	500	500.0

POST-TEST PYROMETER CHECK

DATE	OPERATOR	TARGET TEMP °F	TEMP READING °F
3-30-92	RPC	40	40.0
		50	50.0
		70	70.0
		90	89.0
		110	109.0
		150	150.0
		200	200.0
		300	301.0
		400	400.0
		500	499.0

QA ORIFICE AUDIT

AGENCY BAPC
DATE 10-28-91
OPERATOR RPC

RUN	1		2		3	
INITIAL CF	341.500		348.775		356.050	
FINAL CF	348.746		356.026		363.314	
DIFFERENCE	7.246		7.251		7.264	
TEMP INITIAL	IN	OUT	IN	OUT	IN	OUT
TEMP 5 MIN	80	78	80	80	81	80
TEMP 10 MIN	79	79	81	80	81	80
TEMP 15 MIN	80	79	81	80	81	80
TEMP AVG	79.25	539.25	80.375	540.375	80.5	540.5
TIME MINUTES	15		15		15	
ORIFICE	IN WATE	IN HG	IN WATER	IN HG	IN WATER	IN HG
	0.70	0.05	0.70	0.05	0.70	0.05
BARA PRESSURE	29.11	29.16	29.11	29.16	29.11	29.16
AMBIENT TEMP.	F	C	F	C	F	C
	75.0	23.9	75.0	23.9	75.0	23.9
VACUUM IN HG	23		23		23	
STD CF	6.941		6.931		6.942	
DGM CAL Y	1.0033		1.0033		1.0033	
VOL SCF	0.1972		0.1969		0.1973	

KEYSTONE ENVIRONMENTAL RESOURCES

QA ORIFICE AUDIT

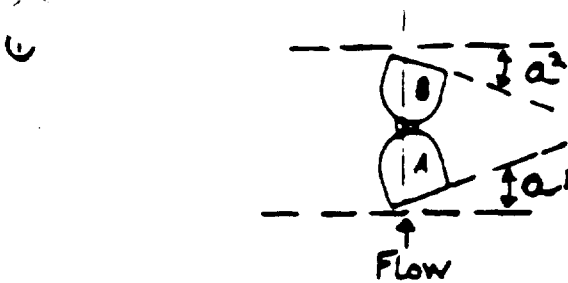
AGENCY BAPC DATE 4-7-92 B.P. 28.85
 OPERATOR KS BOX # 1

RUN	1	2	3
INITIAL CF	705.035	712.272	719.628
FINAL CF	712.272	719.628	727.118
DIFFERENCE	7.237	7.356	7.490
TEMP INITIAL	IN 76 OUT 72	IN 83 OUT 79	IN 93 OUT 87
TEMP 5 MIN	77 74	86 82	95 88
TEMP 10 MIN	79 75	88 84	96 89
TEMP 15 MIN	81 77	92 86	99 91
TEMP AVG	TEMP R 76.375 536.375	TEMP R 85 545	TEMP R 92.25 552.25
TIME MINUTES	15.00	15.00	15.00
ORIFICE P	IN WATER 0.67 IN HG 0.05	IN WATER 0.67 IN HG 0.05	IN WATER 0.67 IN HG 0.05
METER PRESSURE	28.90	28.90	28.90
AMBIENT TEMP.	F 70.0 C 21.1	F 70.0 C 21.1	F 70.0 C 21.1
VACUUM IN HG	19.0	19.0	19.0
DGM CAL Y	0.9814	0.9814	0.9814
STD CF	6.779	6.781	6.814
STD CUBIC METERS	0.1920	0.1920	0.1930

GEOMETRIC PITOT CALIBRATION

Caliper # YCF59
 Precheck ✓
 Post Check _____

Probe #: 10-2
 Date: 2-27-72
 Initials: [Signature]



$a^1 = 5^\circ$
 $a^2 = 2^\circ$
 $B^1 = 1^\circ$
 $B^2 = 1^\circ$

$a^1, a^2 = < 10^\circ$
 $B^1, B^2 = < 5^\circ$

$F = 0.905$

$\mu = 0.0078$

$\mu \leq 0.1250^\circ (\mu = F \tan \gamma)$

$V = 0.0078$

$V \leq 0.03125^\circ (V = F \tan \theta)$

$W = 0.256$

$W \geq 0$

$X = 0.926$

$X \geq 0.750$
 (3/4" using 1/2" nozzle)

$Y = 5.770$

$Y \geq 3.0$

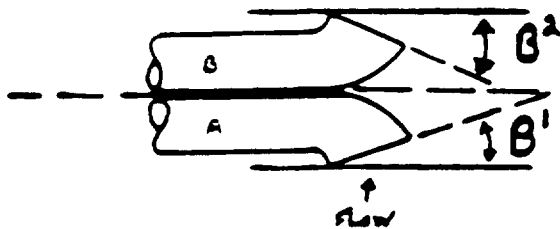
$Z = 3.724$

$Z \geq 2.0$

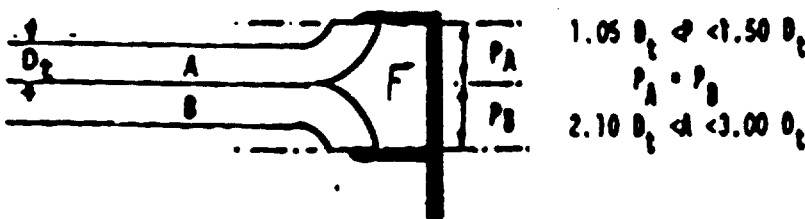
$D_t = 0.378$

$D_t > .1875 \text{ to } .375$
 (3/16" to 3/8")

②

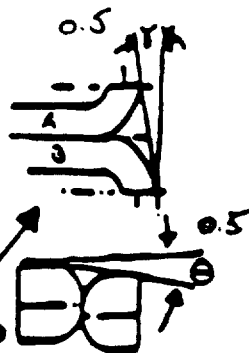
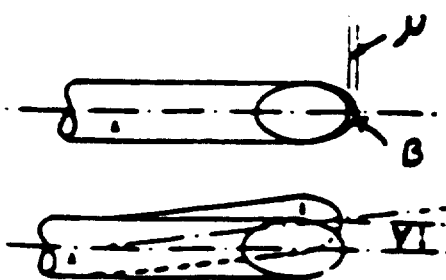


③



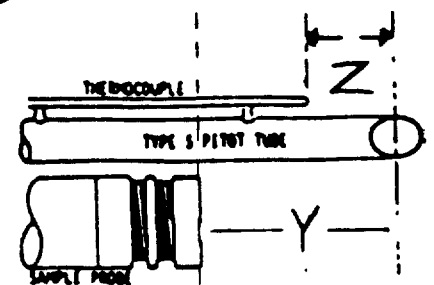
$1.05 D_t \leq \phi < 1.50 D_t$
 $P_A = P_B$
 $2.10 D_t \leq \phi < 3.00 D_t$

④

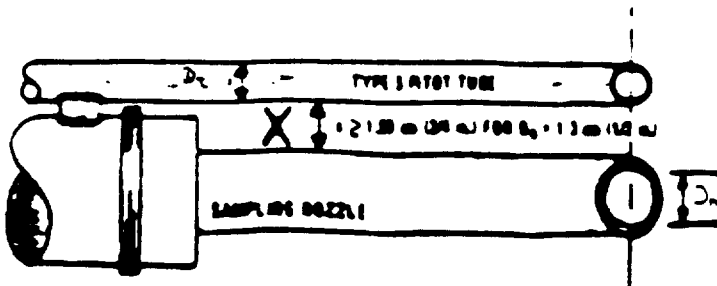


(γ, θ EXPRESSED IN DEGREES)

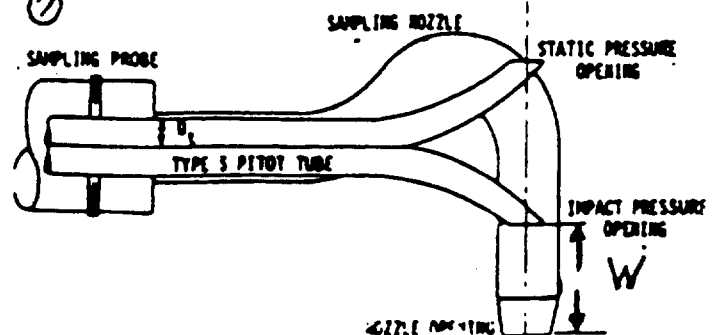
⑥



⑤



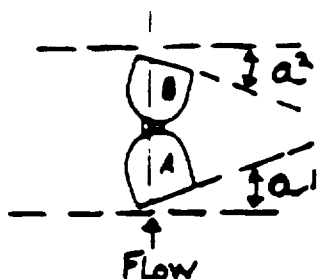
⑦



GEOMETRIC PITOT CALIBRATION

Caliper # X2F59
 Precheck ✓
 Post Check _____

Probe #: 10.3
 Date: 2-27-92
 Initials: PH



$$\begin{aligned} a^1 &= 5^\circ \\ a^2 &= 1^\circ \\ B^1 &= 2^\circ \\ B^2 &= 2^\circ \end{aligned} \quad \begin{aligned} &> a^1, a^2 < 10^\circ \\ &> B^1, B^2 < 5^\circ \end{aligned}$$

$$F = 0.996''$$

$$\mu = 0.0174$$

$$\mu \leq 0.1250'' (\mu = F \tan \theta)$$

$$V = 0.0174$$

$$V \leq 0.03125'' (V = F \tan \theta)$$

$$W = 0.180$$

$$W \geq 0''$$

$$X = 0.834$$

$$X \geq 0.750''$$

 (3/4" using 1/2" nozzle)

$$Y = 5.816$$

$$Y \geq 3.0''$$

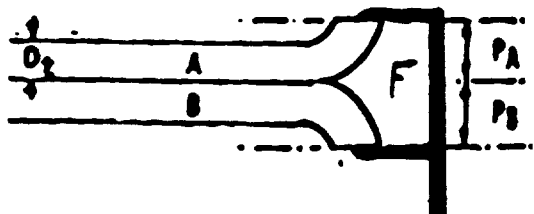
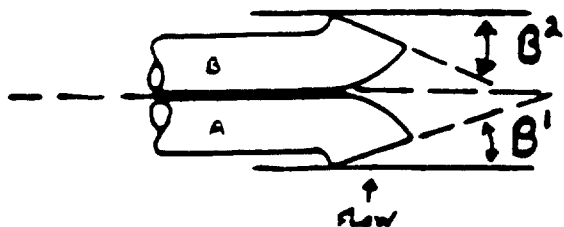
$$Z = 2.540$$

$$Z \geq 2.0''$$

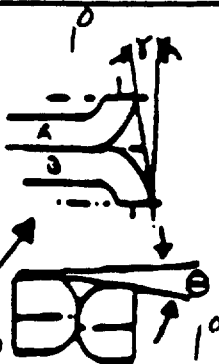
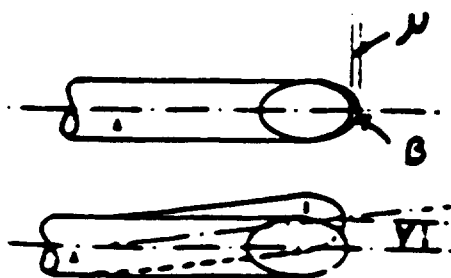
$$D_t = 0.377$$

$$D_t > .1875'' \text{ to } .375''$$

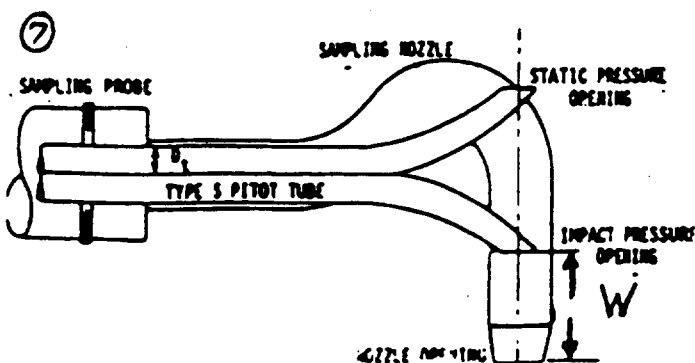
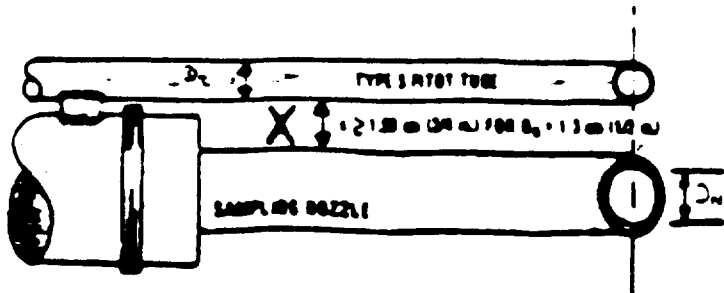
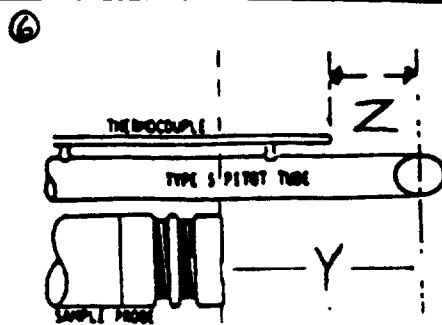
 (3/16" to 3/8")



$$\begin{aligned} 1.05 \theta_t &\leq \theta < 1.50 \theta_t \\ P_A &= P_B \\ 2.10 \theta_t &\leq \theta < 3.00 \theta_t \end{aligned}$$



(θ, θ EXPRESSED IN DEGREES)

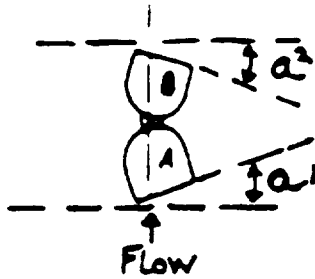


GEOMETRIC PITOT CALIBRATION

Caliper # XEF 59
 Precheck _____
 Post Check ✓

Probe #: 10-2
 Date: 3/31/92
 Initials: SW

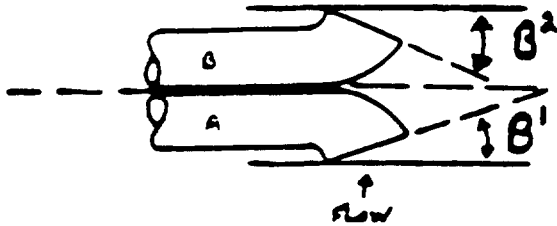
①



$a^1 = 2.0$
 $a^2 = 1.5$
 $B^1 = 1.0$
 $B^2 = 1.0$
 $F = .914$ "

$a^1, a^2 = < 10^\circ$
 $B^1, B^2 = < 5^\circ$

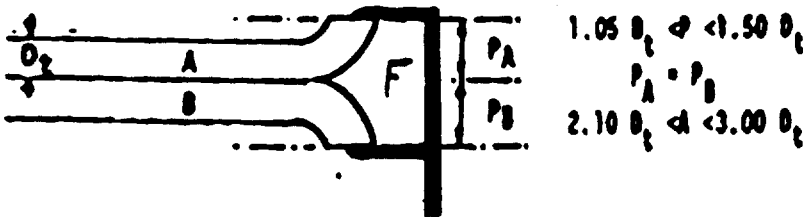
②



$\mu = .008$
 $V = .0115$
 $W = .245$

$\mu \leq 0.1250" (\mu = F \tan \gamma)$
 $V \leq 0.03125" (V = F \tan \theta)$
 $W \geq 0"$

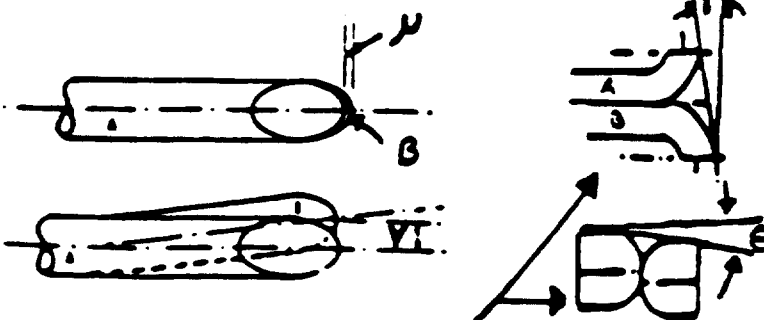
③



$X = .945$
 $Y = 6.0$
 $Z = 2.15$
 $D_t = .256$

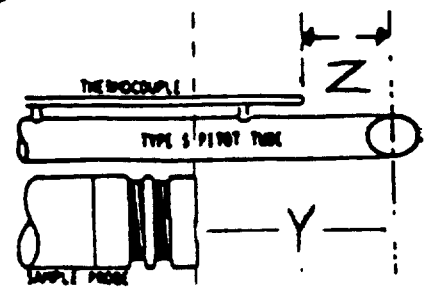
$X \geq 0.750"$
 (3/4" using 1/2" nozzle)
 $Y \geq 3.0"$
 $Z > 2.0"$
 $D_t > .1875" \text{ to } .375"$
 (3/16" to 3/8")

④

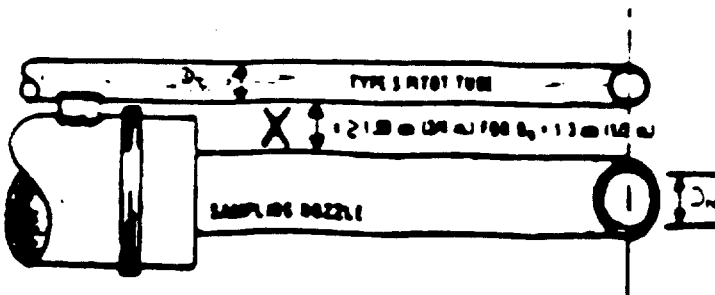


(γ, θ EXPRESSED IN DEGREES)

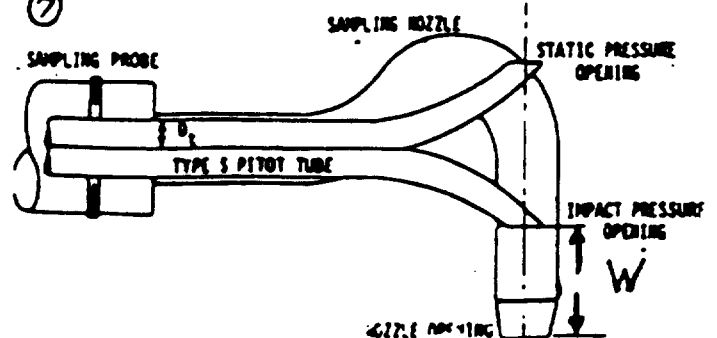
⑥



⑤



⑦



Caliper # XZF 59
Precheck _____
Post Check ✓

Probe #: 10-3
Date: 3/31/92
Initials: STW

The diagram illustrates a vertical pipe with two distinct regions. The upper region is labeled a_2 and contains a gas phase. The lower region is labeled a_1 and contains a liquid phase. A vertical arrow labeled "Flow" points upwards from the bottom of the pipe, indicating the direction of flow.

$a^1 = \underline{3.0}$
 $a^2 = \underline{4.0}$
 $B^1 = \underline{1.5}$
 $B^2 = \underline{2.5}$
 $F = \underline{1.023}''$

$$\begin{array}{ll} \mu = \frac{0.0268}{} & \mu = \leq 0.1250^\circ (\mu = F \tan \theta) \\ v = \frac{00805}{} & v = \leq 0.03125^\circ (v = F \tan \theta) \\ w = \frac{.158}{} & w \geq 0'' \end{array}$$

Diagram of a nozzle with two parallel tubes A and B merging into a single tube F. The inlet diameters are D_A and D_B . The outlet pressure is $P_A = P_B$. The flow rates are given as $1.05 D_A < Q < 1.50 D_B$ and $2.10 D_B < Q < 3.00 D_A$.

$X = \underline{1.025}$ $X \geq 0.750''$
 (3/4" using 1/2" nozzle)
 $Y = \underline{6.0}$ $Y \geq 3.0''$
 $Z = \underline{2.75}$ $Z \geq 2.0''$
 $D_t = \underline{.287}$ $D_t \geq .1875'' \text{ to } .375''$
 (3/16" to 3/8")

(γ, θ EXPRESSED IN DIGITS)

Diagram illustrating the Type S Pilot Tube assembly. The tube is labeled "TYPE S PILOT TUBE". A thermocouple is attached to one end, labeled "THERMOCOUPLE". A dimension line labeled "Z" indicates the distance from the thermocouple to the right end of the tube. A cross-section view labeled "Y" shows the internal structure of the tube.

Diagram of a Type S Pitot Tube. The diagram shows a horizontal tube labeled "TYPE S PITOT TUBE" with a "SAMPLING PROBE" at its left end. The right end of the tube is a "SAMPLING NOZZLE". The nozzle has two openings: a "STATIC PRESSURE OPENING" at the top and an "IMPACT PRESSURE OPENING" at the bottom. A vertical arrow labeled "W" indicates the flow direction towards the nozzle. Below the nozzle, the text "627.1 mm (24.7 in.)" is visible.

**COMPLIANCE DEMONSTRATION
#14 BATTERY COMBUSTION STACK**

**USS CLAIRTON WORKS
CLAIRTON, PA**

APPENDIX D

FIELD DATA SHEETS



STACK SAMPLING DATA SHEET

PLANT: USS Clanton Coke Works DATE: 3-24-92 Tuesday ΔH@: 1.757 (2-11-92) HOT BOX NO.: 8
LOCATION: Clanton, PA TEST NO.: CLR-14CS-1 METER CORRECTION: 0.9814 COLD BOX NO.: 0
ACTIVITY NO.: 005039-01 NOZZLE: #55 0.504 PITOT CORRECTION: 0.84 PROBE NO.: 10-3
CONTROL BOX OPERATOR: STATIC PRESSURE Ps: -1.2 CONTROL BOX NO.: 1 FILTER NO.: 702
PROBE HANDLER: PORT DIRECTION: A, B NOMOGRAPH SET POINT: STACK DIA.: 120' = 10'
CLEAN UP: BAROMETRIC PRESSURE: 28.38 LENGTHS OF UMBILICAL 25' x 50'

Point	Time	Meter Reading (dry) CF	Velocity HD in. H ₂ O	Orifice ΔH in. H ₂ O	Meter Temp In Out °F	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
42.7	0852	003.130	0.025	0.69	47 44	3.0	422	260	468°F	250	5 min/pt
30.0			0.025	0.74	52 46	3.0	439				
21.3			0.025	0.74	54 47	3.0	441	295			
14.2			0.025	0.74	55 47	3.0	433	350			
8.0	0922		0.015	0.44	55 48	2.0	427	365			
2.6	0928	015.827	0.005	0.15	54 48	1.0	421				
42.7	0925	015.827	0.030	0.89	56 50	3.5	427	385			
30.0			0.030	0.89	59 51	3.5	450	365			
21.3			0.030	0.88	60 52	3.5	448	352			
14.2			0.025	0.73	61 52	3.0	430	345			
8.0			0.025	0.73	61 53	3.0	421	351			
2.6	0955	030.578	0.015	0.44	63 54	2.0	420				

O₂ ≈ 10.5%
O₂ ≈ 4%
MW ≈ 27.5
moisture ≈ 15%

LEAK CHECK

	in. Hg.	Rate
Before	5.0	40.02 gpm
After	6.0	0.005 gpm

PITOT LEAK CHECK	
POS.	NEG.
15.44	15.44
15.44	15.44

Impinger No.

Final Initial Difference

1	727.9	569.2	158.7
2	587.7	536.0	31.7
3	453.3	451.5	1.8
4	583.9	569.9	14.0
5			

100ml H₂O
100ml H₂O
empty
5.11 ml Gas



STACK SAMPLING DATA SHEET

PLANT USS Clanton Works DATE: 3-24-92 Tuesday ΔH@: 1.757 (2-11-92) HOT BOX NO.: 8
LOCATION: Clanton, PA TEST NO.: C2-14CS-1 METER CORRECTION: 0.9814 COLD BOX NO.: 8
ACTIVITY NO.: 455 0.504 NOZZLE: 455 0.504 PITOT CORRECTION: 0.94 PROBE NO.: 10-3
CONTROL BOX OPERATOR: CLD STATIC PRESSURE PS: -1.2 CONTROL BOX NO.: 1 FILTER NO.: 782
PROBE HANDLER: CLD PORT DIRECTION: C, D NOMOGRAPH SET POINT: 12.0" ± 10'
CLEAN UP: CLD BAROMETRIC PRESSURE: 28.38 LENGTHS OF UMBILICAL x 25' x 50'

Point	Time	Meter Reading (dry) CF	Velocity HD in. H ₂ O	Orifice All in. H ₂ O		Meter Temp		Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
				Reg.	Act.	In	Out						
42.7	0958	030.578	0.040	1.17	1.17	65	57	4.0	435	375	46.87	250	5 min/pt
30.0			0.050	1.46	1.46	75	61	5.0	440	385			
21.3			0.050	1.52	1.52	77	64	5.5	440				
14.2			0.040	1.21	1.21	79	66	4.5	429				
8.0			0.050	1.34	1.34	81	69	5.5	426				
2.6	1028	050.295	0.045	1.39	1.39	85	70	5.0	421	405			
42.7	1031	050.295	0.045	1.56	1.56	81	74	5.5	421				
30.0		0.050	0.055	1.72	1.72	87	75	6.0	434	406			
21.3			0.050	1.55	1.55	89	77	5.5	442	387	45		
14.2			0.050	1.55	1.55	92	78	5.5	436	402			
8.0			0.055	1.71	1.71	94	81	6.0	431	417			
2.6	1101	071.923	0.050	1.55	1.55	96	81	5.5	426	412			

LEAK CHECK

	in. Hg.	Rate
Before		
After		

Impinger No.

	1		2		PITOT LEAK CHECK
	POS.	NEG.	POS.	NEG.	
1					
2					
3					
4					
5					

Initial

Final

Difference



STACK SAMPLING DATA SHEET

PLANT US3 Clanton Lake Hydro
LOCATION: Clanton PTA
ACTIVITY NO.:
CONTROL BOX OPERATOR:
PROBE HANDLER:
CLEAN UP:

DATE: 3-24-92 Tuesday
TEST NO.: 042-14CS-2
NOZZLE: #55 0.504
STATIC PRESSURE PSI: -1.2
PORT DIRECTION: D, C
BAROMETRIC PRESSURE: 22.32

ALL @: 1.757 (2-1-92)
METER CORRECTION: 0.924
PITOT CORRECTION: 0.34
CONTROL BOX NO.: 1
NOMOGRAPH SET POINT:
LENGTHS OF UMBILICAL x 25' x 50'

HOT BOX NO.: 4
COLD BOX NO.: 4
PROBE NO.: 10-2
FILTER NO.: 774
STACK DIA.: 120" = 10'

Point	Time	Meter Reading (dry) CF	Velocity HD in. H ₂ O	Orifice Δ H in. H ₂ O		Meter Temp °F In Out		Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
				Reg.	Act.	In	Out						
42.7	1145	072.119	0.035	1.05	1.05	72	71	6.0	424	260	468°F	250	Sampling pt
30.0			0.040	1.26	1.26	83	72	7.5	451				
21.3			0.040	1.24	1.24	86	75	8.0	452				
14.2			0.040	1.24	1.24	89	76	8.0	451				
8.0			0.045	1.41	1.41	93	81	9.0	433				
2.6	1215	091.620	0.045	1.41	1.41	97	82	9.0	424				
42.7	1220	091.620	0.040	1.27	1.27	92	87	7.5	453				
30.0			0.045	1.42	1.42	96	86	8.5	468				
21.3			0.045	1.42	1.42	97	86	9.0	470				
14.2			0.045	1.42	1.42	99	87	9.0	471				
8.0			0.035	1.11	1.11	102	92	7.0	458				
2.6	1250	111.670	0.040	1.27	1.27	103	91	7.5	422				

LEAK CHECK

	in. Hg.	Rate
Before	5.0	2007 CFM
After	9.0	0.005 CFM

Impinger No.

	1		2		3		4		5	
	POS.	NEG.	POS.	NEG.	POS.	NEG.	POS.	NEG.	POS.	NEG.
PITOT LEAK CHECK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Difference

Final	Initial	Difference
629.9	495.0	134.9
618.9	583.7	35.2
428.7	423.3	5.4
671.4	651.4	20.0



STACK SAMPLING DATA SHEET

PLANT VSS Clinton Coke Works DATE: 3-24-92 Tuesday ΔH@: 1.757 (2-11-92) HOT BOX NO.: 4
LOCATION: Clinton, PA TEST NO.: 22-146-2 METER CORRECTION: 0.9814 COLD BOX NO.: 4
ACTIVITY NO.: NOZZLE: #55 0.504 PITOT CORRECTION: 0.84 PROBE NO.: 10-2
CONTROL BOX OPERATOR: STATIC PRESSURE Ps: -1.2 CONTROL BOX NO.: 1 FILTER NO.: 774
PROBE HANDLER: PORT DIRECTION: B, A NOMOGRAPH SET POINT: STACK DIA: 120" = 10'
CLEAN UP: BAROMETRIC PRESSURE: 28.38 LENGTHS OF UMBILICAL x 25' x 50'

Point	Time	Meter Reading (dry) CF	Velocity HD in. H ₂ O	Orifice a H in. H ₂ O	Reg.	Act.	Meter Temp °F In Out	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
42.7	1255	111.670	0.040	1.27	1.27	1.27	96 93	7.5	437	260	487	250	5 min / st
30.0			0.035	1.12	1.12	1.12	100 91	7.0	457				
21.3			0.040	1.28	1.28	1.28	101 93	8.0	462				
14.2			0.040	1.28	1.28	1.28	102 91	8.0	454				
8.0			0.040	1.28	1.28	1.28	102 93	8.0	440				
2.6	1325	131.471	0.040	1.28	1.28	1.28	105 92	8.0	423				
42.7	1328	131.471	0.035	1.12	1.12	1.12	98 94	6.5	436				
30.0			0.045	1.44	1.44	1.44	100 91	8.5	476				
21.3			0.040	1.25	1.25	1.25	101 92	8.0	477				
14.2			0.040	1.25	1.25	1.25	101 92	8.0	483				
9.0			0.040	1.25	1.25	1.25	101 92	8.0	457				
2.6	1358	151.214	0.040	1.25	1.25	1.25	100 90	8.0	420				

LEAK CHECK

	in. Hg.	Rate
Before		
After		

Impinger No.

PITOT LEAK CHECK	
1	2
POS.	NEG.

Final Initial Difference



STACK SAMPLING DATA SHEET

PLANT VSS Charleston Works DATE: 3-24-92 Tuesday ΔH@: 1.757 (2-11-92) HOT BOX NO.: 7
LOCATION: Charleston, PA TEST NO.: CLP-145-3 METER CORRECTION: 0.9214 COLD BOX NO.: 7
ACTIVITY NO.: #55 0504 NOZZLE: #55 0504 PITOT CORRECTION: 0.04 PROBE NO.: 10-3
CONTROL BOX OPERATOR: STATIC PRESSURE PS: -1.2 CONTROL BOX NO.: 781 FILTER NO.:
PROBE HANDLER: PORT DIRECTION: A, B NOMOGRAPH SET POINT: STACK DIA.: 120" = 10'
CLEAN UP: BAROMETRIC PRESSURE: 28.38 LENGTHS OF UMBILICAL 25' x 50'

Point	Time	Meter Reading (dry) CF	Velocity HD in. H ₂ O	Orifice a H ₂ O		Meter Temp		Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
				Reg.	Act.	In	Out						
42.7	1432	157.510	0.030	0.91	0.91	72	71	3.5	453	260	48°F	250	5 min / ft
30.0			0.030	0.91	0.91	81	73	3.5	456				
21.3			0.030	0.92	0.92	85	75	3.5	460	366			
14.2			0.035	1.07	1.07	88	77	4.0	454				
9.0			0.035	1.07	1.07	90	78	4.0	439	355			
2.6	1502	169.145	0.035	1.07	1.07	92	81	4.0	423	361			
42.7	1505	169.145	0.020	0.62	0.62	88	84	3.0	441	401			
30.0			0.025	0.77	0.77	94	85	3.5	447	403			
21.3			0.025	0.79	0.79	96	86	3.5	440	409			
14.2			0.025	0.79	0.79	98	88	3.5	425	376			
9.0			0.025	0.79	0.79	101	92	3.5	421	376			
2.6	1535	183.677	0.015	0.47	0.47	103	93	2.5	418	378			

LEAK CHECK

	in. Hg.	Rate
Before	5.0	10.07 CFM
After	5.0	0.012 CFM

PITOT LEAK CHECK	
CO ₂	4.0
O ₂	16.0
CO	0.0
N	85.0

Impinger No.

Final	Initial	Difference
692.5	555.8	136.7
586.8	562.5	24.3
431.0	428.3	2.7
659.2	646.0	13.2

100 ml H₂O
100 ml H₂O
empty
Silica Gel



P. 2 of 2

6

STACK SAMPLING DATA SHEET

PLANT USS Clanton Gate Works DATE: 3-24-92 Tuesday ΔH@: 1.757 (2-11-92) HOT BOX NO.: 7
LOCATION: Clanton, PA TEST NO.: C42-1465-3 METER CORRECTION: 0.9214 COLD BOX NO.: 7
ACTIVITY NO.: #53 0.504 NOZZLE: #53 0.504 PITOT CORRECTION: 0.24 PROBE NO.: 10-3
CONTROL BOX OPERATOR: STATIC PRESSURE Ps: -1.2 CONTROL BOX NO.: 1 FILTER NO.: 781
PROBE HANDLER: PORT DIRECTION: C, D NOMOGRAPH SET POINT: STACK DIA: 12" = 10'
CLEAN UP: BAROMETRIC PRESSURE: 28.78 LENGTHS OF UMBILICAL 25' x 50'

Point	Time	Meter Reading (dry) CF	Velocity HD in. H ₂ O	Orifice aH in. H ₂ O	Reg.	Act.	Meter Temp In	Out	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/F	Hot Box °F	Comments
42.7	1538	183.677	0.035	1.11	1.11	1.11	101	98	4.0	437	260	48°F	250	5 min/pt
30.0			0.035	1.12	1.12	1.12	105	97	4.0	459	389	57		
21.3			0.035	1.12	1.12	1.12	106	98	4.0	443	377			
14.2			0.020	0.64	0.64	0.64	106	98	3.0	438	370			
8.0			0.035	1.12	1.12	1.12	108	100	4.0	426	378			
2.6	1608	201.125	0.020	0.97	0.97	0.97	112	101	3.5	417	389			
42.7	1611	201.125	0.020	0.65	0.65	0.65	95	98	3.0	424	384			
30.0			0.025	0.81	0.81	0.81	101	95	3.0	443	386			
21.3			0.020	0.64	0.64	0.64	100	94	3.0	446	377			
14.2			0.020	0.64	0.64	0.64	101	93	3.0	439	387			
8.0			0.030	0.96	0.96	0.96	104	97	3.5	428	385			
2.6	1649	216.278	0.020	0.64	0.64	0.64	107	97	3.0	416	386			

LEAK CHECK

	in. Hg.	Rate
Before		
After		

1 2

PITOT LEAK CHECK

POS.	NEG.

Impinger No.

Final

Initial

Difference

216.278

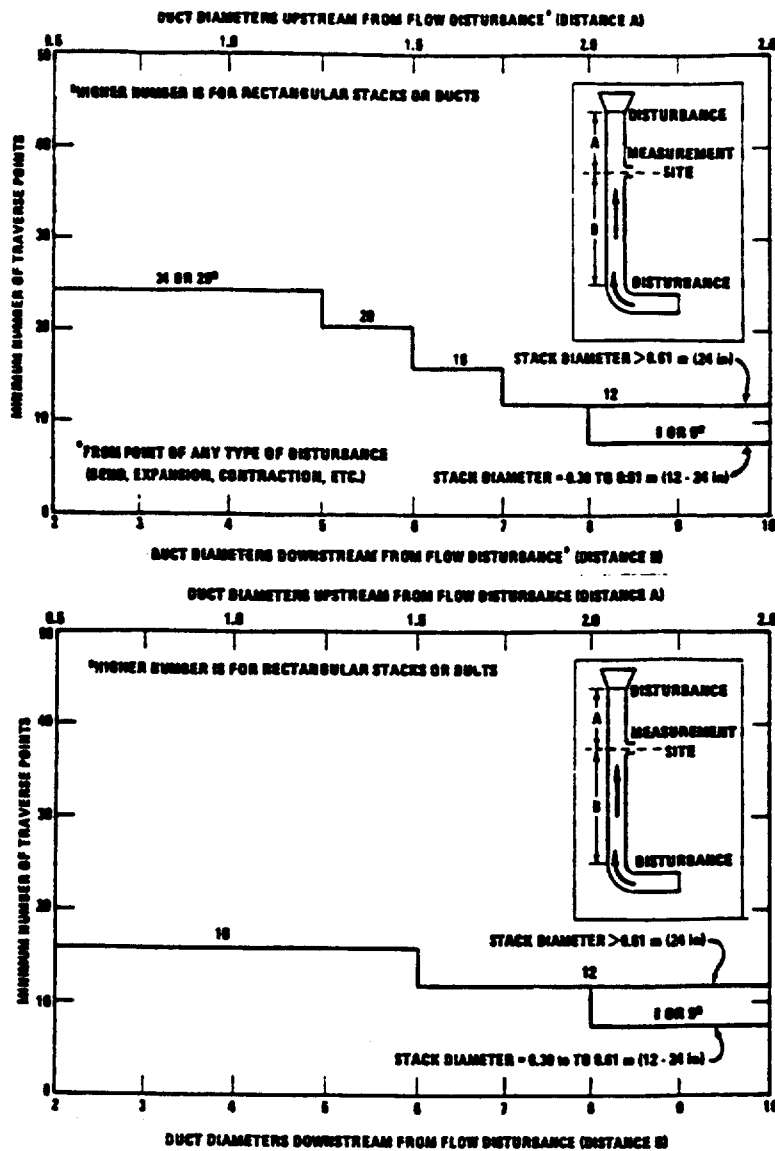


TABLE 1-2. LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

[Percent of stack diameter from inside wall to traverse point]

Traverse point number on a diameter	Number of traverse points on a diameter—											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.8	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.6	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.6	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.6	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	68.4	60.7	39.8
13							94.3	87.5	81.2	75.0	66.6	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.6
16								98.4	92.5	87.1	82.0	77.0
17									95.8	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.6
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.6
24												98.9

TABLE 1-1. CROSS-SECTION LAYOUT FOR RECTANGULAR STACKS

Number of traverse points	Matrix layout
9	3x3
12	4x3
16	4x4
20	5x4
25	5x5
30	6x5
36	6x6
42	7x6
49	7x7

**COMPLIANCE DEMONSTRATION
#14 BATTERY COMBUSTION STACK**

**USS CLAIRTON WORKS
CLAIRTON, PA**

**APPENDIX E
EMISSIONS CALCULATIONS**

KEYSTONE ENVIRONMENTAL RESOURCES
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA
BATTERY STACK 14

DATE:03/24/92
CHARGE #: ...150-605039
TEST #:CLR-14CS-1

1. EMISSION RESULTS

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01025	2.83795

2. STACK CONDITIONS

FLOW (ACFM)	66447.
(SCFM)	37171.
MOISTURE CONTENT (%)	13.08
STACK TEMPERATURE (F)	432.5

3. SAMPLING CONDITIONS

SAMPLE TIME (MIN.)	120.0
SCFD GAS SAMPLED	64.621
PERCENT ISOKINETIC	94.48

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA BATTERY STACK 14
CLR-14CS-1 03/24/92

FIELD DATA AND VELOCITY CALCULATIONS

POINT	TIME	METER	DELTA P IN.H2O	ORIFICE		METER		VACUUM IN.HG.	STACK	CORRECTED
		READING		DELTA H	TEMP	TEMP	VELOCITY			
		(DRY) CF		REQ	ACT	DEG F	DEG		FFT/SEC	
						IN	OUT			
42.7H	852.0	3.130	.025	.69	.69	47.	44.	3.0	422.	12.0
30.0			.025	.74	.74	52.	46.	3.0	439.	12.1
21.3			.025	.74	.74	54.	47.	3.0	441.	12.1
14.2			.025	.74	.74	55.	47.	3.0	433.	12.1
8.0			.015	.44	.44	55.	48.	2.0	427.	9.3
2.6	922.0	15.827	.005	.15	.15	54.	48.	1.0	421.	5.4
42.7H	925.0	15.827	.030	.89	.89	56.	50.	3.5	427.	13.2
30.0			.030	.89	.89	59.	51.	3.5	450.	13.4
21.3			.030	.88	.88	60.	52.	3.5	448.	13.3
14.2			.025	.73	.73	61.	52.	3.0	430.	12.1
8.0			.025	.73	.73	61.	53.	3.0	421.	12.0
2.6H	955.0	30.578	.015	.44	.44	63.	54.	2.0	420.	9.3
42.7H	958.0	30.578	.040	1.17	1.17	65.	57.	4.0	435.	15.3
30.0			.050	1.46	1.46	75.	61.	5.0	440.	17.1
21.3			.050	1.52	1.52	77.	64.	5.5	440.	17.1
14.2			.040	1.21	1.21	79.	66.	4.5	429.	15.2
8.0			.050	1.54	1.54	81.	69.	5.5	426.	17.0
2.6	1028.0	50.295	.045	1.39	1.39	85.	70.	5.0	421.	16.1
42.7H	1031.0	50.295	.050	1.56	1.56	81.	74.	5.5	421.	17.0
30.0			.055	1.72	1.72	87.	75.	6.0	454.	18.1
21.3			.050	1.55	1.55	89.	77.	5.5	442.	17.2
14.2			.050	1.55	1.55	92.	78.	5.5	436.	17.1
8.0			.055	1.71	1.71	94.	81.	6.0	431.	17.9
2.6	1101.0	71.923	.050	1.55	1.55	96.	81.	5.5	426.	17.0

O R S A T

CO2 4.5 IMPINGER NO. 1 158.7
O2 12.5 2 31.7
CO .0 3 1.8
N 83.0 4 .0
ABSORBED H2O 14.0

CONTROL BOX CALIBRATIONS

	FACTOR	DATE
ORIFICE	1.757	02/11/92
METER	0.9814	2/11/92
PITOT	0.84	2/27/92

LEAK CHECK

	RATE	IN.HG
INITIAL LT	0.02CFM	5.0
FINAL	0.005 CFM	6.0

CONTROL BOX NO. 1

PROBE NO. 10-3

NOZZLE NO. 55

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA BATTERY STACK 14
CLR-14CS-1 03/24/92

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG.....	28.38
B.	AVG. DELTA H (IN H2O).....	1.08
C.	METER PRESSURE (IN. HG.).....	28.46
D.	STATIC PRESSURE (IN. H2O).....	-1.20
E.	STATIC PRESSURE (IN. HG.).....	-.088
F.	STACK PRESSURE (IN. HG.) (A+E).....	28.29
G.	STACK DIAMETER (IN.).....	120.00
H.	STACK AREA (SQ. FT.).....	78.54
	NOZZLE DIAMETER.....	.5040
I.	NOZZLE AREA (SQ. FT.).....	.001385
J.	AVG. STACK TEMP (DEG. R.).....	892.5
K.	AVG. METER TEMP (DEG. R.).....	525.1
L.	CONDENSATE VOL. (ML).....	192.2
M.	ABSORBED H2O (ML).....	14.0
N.	TOTAL H2O (ML).....	206.2
O.	METERED GAS (CF).....	68.793
P.	GAS METER CORRECTION.....	.9814
Q.	CORRECTED METERED GAS (CF).....	67.513
R.	H2O GAS VOLUME (CF) (0.00267N(K/C).....	10.157
S.	TOTAL SAMPLED VOLUME (CF) (Q+R).....	77.671
T.	PERCENT H2O (100R/S).....	13.08
	THEORETICAL MAXIMUM.....	100.00
	PERCENT WATER USED.....	13.08
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K)).....	64.621

V. MOLECULAR WEIGHT OF STACK GAS

COMPONENT	ORSAT-DRY VOL.PCT./100	X	MOISTURE CORRECTION (1-T/100)	X	MOLECULAR WEIGHT	=	WEIGHT PER MOLE
CO2	.045	X	.8692	X	44.0	=	1.72
CO	.000	X	.8692	X	28.0	=	.00
O2	.125	X	.8692	X	32.0	=	3.48
N2	.830	X	.8692	X	28.2	=	20.35
H2O		X	T/100= .1308	X	18.0	=	2.35
MOLECULAR WEIGHT OF STACK GAS							= 27.90

W.	PITOT CORRECTION.....	.840
X.	AVERAGE CORRECTED VELOCITY (FPS).....	14.10
	[85.49*W*SQRT{(J*DELTA P)/(V*F)}]	
Y.	AVG. FLOW RATE (CFM) (X*H*60).....	66447.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92).....	37171.
	STACK FLOW RATE (DRY).....	32310.
AA.	SAMPLE TIME (SEC).....	7200.
BB.	PERCENT ISOKINETIC.....	94.48
	(J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA BATTERY STACK 14
CLR-14CS-1 03/24/92

6 - 6 hours

PARAMETER	CYCLONE WT. (G)	MATL.ON FILTER(G)	INSOL.MATL. IN PROBE(G)	SOL.MATL. IN PROBE(G)
PARTICULATE	.00000	.01230	.00000	.02910

PARAMETER	INSOL.MATL. IN IMP. (G)	SOLUBLE MATL. IN IMP. (G)
PARTICULATE	.00160	.00300

PARTICULATE	.04600
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ALL MATLS.	.04600
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PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01025	2.83795

Emission rates are based on the PA method.
The soluble impinger weight is excluded from the calculations

KEYSTONE ENVIRONMENTAL RESOURCES
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA
BATTERY STACK 14

DATE:03/24/92
CHARGE #: ...150-605039
TEST #:CLR-14CS-2

1. EMISSION RESULTS

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01030	3.04842

2. STACK CONDITIONS

FLOW (ACFM)	73245.
(SCFM)	40187.
MOISTURE CONTENT (%)	14.06
STACK TEMPERATURE (F)	450.0

3. SAMPLING CONDITIONS

SAMPLE TIME (MIN.)	120.0
SCFD GAS SAMPLED	70.734
PERCENT ISOKINETIC	96.76

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA BATTERY STACK 14
CLR-14CS-2 03/24/92

FIELD DATA AND VELOCITY CALCULATIONS

POINT	TIME	METER	DELTA P IN.H2O	ORIFICE		METER		VACUUM IN.HG.	STACK	CORRECTED
		READING		DELTA H	TEMP	TEMP	VELOCITY			
		(DRY) CF		REQ	ACT	DEG F	IN OUT		DEG FTT/SEC	
42.7H	1145.0	72.119	.035	1.05	1.05	72.	71.	6.0	424.	14.3
30.0			.040	1.26	1.26	83.	72.	7.5	451.	15.5
21.3			.040	1.24	1.24	86.	75.	8.0	452.	15.5
14.2			.040	1.24	1.24	89.	76.	8.0	451.	15.5
8.0			.045	1.41	1.41	93.	81.	9.0	433.	16.3
2.6	1215.0	91.620	.045	1.41	1.41	97.	82.	9.0	424.	16.2
42.7H	1220.0	91.620	.040	1.27	1.27	92.	87.	7.5	453.	15.5
30.0			.045	1.42	1.42	96.	86.	8.5	468.	16.6
21.3			.045	1.42	1.42	97.	86.	9.0	470.	16.6
14.2			.045	1.42	1.42	99.	87.	9.0	471.	16.6
8.0			.035	1.11	1.11	102.	92.	7.0	458.	14.5
2.6	1250.0	111.670	.040	1.27	1.27	103.	91.	7.5	422.	15.2
42.7H	1255.0	111.670	.040	1.27	1.27	96.	93.	7.5	437.	15.4
30.0			.035	1.12	1.12	100.	91.	7.0	457.	14.5
21.3			.040	1.28	1.28	101.	93.	8.0	462.	15.6
14.2			.040	1.28	1.28	102.	91.	8.0	454.	15.5
8.0			.040	1.28	1.28	102.	93.	8.0	440.	15.4
2.6	1325.0	131.471	.040	1.28	1.28	105.	92.	8.0	423.	15.2
42.7H	1328.0	131.471	.035	1.12	1.12	98.	94.	6.5	436.	14.4
30.0			.045	1.44	1.44	100.	91.	8.5	476.	16.6
21.3			.040	1.25	1.25	101.	92.	8.0	477.	15.7
14.2			.040	1.25	1.25	101.	92.	8.0	483.	15.8
8.0			.040	1.25	1.25	101.	92.	8.0	457.	15.5
2.6	1358.0	151.214	.040	1.25	1.25	100.	90.	8.0	420.	15.2

O R S A T

CO2	4.0	IMPINGER NO. 1	184.9
O2	12.0	2	35.2
CO	.0	3	5.4
N	84.0	4	.0
		ABSORBED H2O	20.0

CONTROL BOX CALIBRATIONS

	FACTOR	DATE
ORIFICE	1.757	02/11/92
METER	0.9814	2/11/92
PITOT	0.84	2/27/92

LEAK CHECK

	RATE	IN.HG
INITIAL LT	0.02CFM	5.0
FINAL	0.005 CFM	9.0

CONTROL BOX NO. 1

PROBE NO. 10-2

NOZZLE NO. 55

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA BATTERY STACK 14
CLR-14CS-2 03/24/92

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG.....	28.38
B.	AVG. DELTA H (IN H2O).....	1.27
C.	METER PRESSURE (IN. HG.).....	28.47
D.	STATIC PRESSURE (IN. H2O).....	-1.20
E.	STATIC PRESSURE (IN. HG.).....	-.088
F.	STACK PRESSURE (IN. HG.) (A+E).....	28.29
G.	STACK DIAMETER (IN.).....	120.00
H.	STACK AREA (SQ. FT.).....	78.54
	NOZZLE DIAMETER.....	.5040
I.	NOZZLE AREA (SQ. FT.).....	.001385
J.	AVG. STACK TEMP (DEG. R.).....	910.0
K.	AVG. METER TEMP (DEG. R.).....	551.8
L.	CONDENSATE VOL. (ML).....	225.5
M.	ABSORBED H2O (ML).....	20.0
N.	TOTAL H2O (ML).....	245.5
O.	METERED GAS (CF).....	79.095
P.	GAS METER CORRECTION.....	.9814
Q.	CORRECTED METERED GAS (CF).....	77.624
R.	H2O GAS VOLUME (CF) (0.00267N(K/C)).....	12.703
S.	TOTAL SAMPLED VOLUME (CF) (Q+R).....	90.326
T.	PERCENT H2O (100R/S).....	14.06
	THEORETICAL MAXIMUM.....	100.00
	PERCENT WATER USED.....	14.06
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K)).....	70.734

V. MOLECULAR WEIGHT OF STACK GAS

COMPONENT	ORSAT-DRY VOL.PCT./100	X	MOISTURE CORRECTION (1-T/100)	X	MOLECULAR WEIGHT	=	WEIGHT PER MOLE
CO2	.040	X	.8594	X	44.0	=	1.51
CO	.000	X	.8594	X	28.0	=	.00
O2	.120	X	.8594	X	32.0	=	3.30
N2	.840	X	.8594	X	28.2	=	20.36
H2O		X	T/100= .1406	X	18.0	=	2.53
MOLECULAR WEIGHT OF STACK GAS							= 27.70

W.	PITOT CORRECTION.....	.840
X.	AVERAGE CORRECTED VELOCITY (FPS).....	15.54
	[85.49*W*SQRT((J*DELTA P)/(V*F))]	
Y.	AVG. FLOW RATE (CFM) (X*H*60).....	73245.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92).....	40187.
	STACK FLOW RATE (DRY).....	34536.
AA.	SAMPLE TIME (SEC).....	7200.
BB.	PERCENT ISOKINETIC.....	96.76
	(J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA BATTERY STACK 14
CLR-14CS-2 03/24/92

PARAMETER	CYCLONE WT. (G)	MATL.ON FILTER(G)	INSOL.MATL. IN PROBE(G)	SOL.MATL. IN PROBE(G)
PARTICULATE	.00000	.01400	.00000	.03120

PARAMETER	INSOL.MATL. IN IMP.(G)	SOLUBLE MATL. IN IMP.(G)
PARTICULATE	.00210	.00130

PARTICULATE .04860

ALL MATLS. .04860

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01030	3.04842

Emission rates are based on the PA method.
The soluble impinger weight is excluded from the calculations

KEYSTONE ENVIRONMENTAL RESOURCES
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA
BATTERY STACK 14

DATE:03/24/92
CHARGE #: ...150-605039
TEST #:CLR-14CS-3

1. EMISSION RESULTS

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.00854	2.10974

2. STACK CONDITIONS

FLOW (ACFM)	59273.
(SCFM)	32981.
MOISTURE CONTENT (%)	12.63
STACK TEMPERATURE (F)	437.3

3. SAMPLING CONDITIONS

SAMPLE TIME (MIN.)	120.0
SCFD GAS SAMPLED	57.691
PERCENT ISOKINETIC	94.58

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA BATTERY STACK 14
CLR-14CS-3 03/24/92

FIELD DATA AND VELOCITY CALCULATIONS

POINT	TIME	METER READING (DRY) CF	DELTA P IN. H ₂ O	ORIFICE		METER TEMP DEG F		VACUUM IN. HG.	STACK TEMP DEG	CORRECTED VELOCITY FFT/SEC
				REQ	ACT	IN	OUT			
42.7H	1432.0	151.510	.030	.91	.91	72.	71.	3.5	455.	13.4
30.0			.030	.91	.91	81.	73.	3.5	456.	13.4
21.3			.030	.92	.92	85.	75.	3.5	460.	13.4
14.2			.035	1.07	1.07	88.	77.	4.0	454.	14.5
8.0			.035	1.07	1.07	90.	78.	4.0	439.	14.4
2.6	1502.0	169.145	.035	1.07	1.07	92.	81.	4.0	423.	14.2
42.7H	1505.0	169.145	.020	.62	.62	88.	84.	3.0	441.	10.9
30.0			.025	.77	.77	94.	85.	3.5	447.	12.2
21.3			.025	.77	.77	96.	86.	3.5	440.	12.1
14.2			.025	.79	.79	98.	88.	3.5	425.	12.0
8.0			.025	.79	.79	101.	92.	3.5	421.	12.0
2.6	1535.0	183.677	.015	.47	.47	103.	93.	2.5	418.	9.3
42.7H	1538.0	183.677	.035	1.11	1.11	101.	98.	4.0	437.	14.3
30.0			.035	1.12	1.12	105.	97.	4.0	459.	14.5
21.3			.035	1.12	1.12	106.	98.	4.0	443.	14.4
14.2			.020	.64	.64	106.	98.	3.0	438.	10.8
8.0			.035	1.12	1.12	108.	100.	4.0	426.	14.3
2.6	1608.0	201.125	.030	.97	.97	112.	101.	3.5	417.	13.1
42.7H	1619.0	201.125	.020	.65	.65	95.	98.	3.0	424.	10.8
30.0			.025	.81	.81	101.	95.	3.0	443.	12.2
21.3			.020	.64	.64	100.	94.	3.0	446.	10.9
14.2			.020	.64	.64	101.	93.	3.0	439.	10.9
8.0			.030	.96	.96	104.	97.	3.5	428.	13.2
2.6	1649.0	216.278	.020	.64	.64	107.	97.	3.0	416.	10.7

O R S A T

CO ₂	4.0	IMPINGER NO. 1	136.7
O ₂	11.0	2	24.3
CO	.0	3	2.7
N	85.0	4	.0
		ABSORBED H ₂ O	13.2

CONTROL BOX CALIBRATIONS

	FACTOR	DATE
ORIFICE	1.757	02/11/92
METER	0.9814	2/11/92
PITOT	0.84	2/27/92

LEAK CHECK

	RATE	IN. HG
INITIAL LT	0.02 CFM	5.0
FINAL	0.010 CFM	5.0

CONTROL BOX NO. 1

PROBE NO. 10-3

NOZZLE NO. 55

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA BATTERY STACK 14
CLR-14CS-3 03/24/92

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG.....	28.38
B.	AVG. DELTA H (IN H2O).....	.86
C.	METER PRESSURE (IN. HG.).....	28.44
D.	STATIC PRESSURE (IN. H2O).....	-1.20
E.	STATIC PRESSURE (IN. HG.).....	-.088
F.	STACK PRESSURE (IN. HG.) (A+E).....	28.29
G.	STACK DIAMETER (IN.).....	120.00
H.	STACK AREA (SQ. FT.).....	78.54
	NOZZLE DIAMETER.....	.5040
I.	NOZZLE AREA (SQ. FT.).....	.001385
J.	AVG. STACK TEMP (DEG. R.).....	897.3
K.	AVG. METER TEMP (DEG. R.).....	553.4
L.	CONDENSATE VOL. (ML).....	163.7
M.	ABSORBED H2O (ML).....	13.2
N.	TOTAL H2O (ML).....	176.9
O.	METERED GAS (CF).....	64.768
P.	GAS METER CORRECTION.....	.9814
Q.	CORRECTED METERED GAS (CF).....	63.563
R.	H2O GAS VOLUME (CF) (0.00267N(K/C).....	9.190
S.	TOTAL SAMPLED VOLUME (CF) (Q+R).....	72.753
T.	PERCENT H2O (100R/S).....	12.63
	THEORETICAL MAXIMUM.....	100.00
	PERCENT WATER USED.....	12.63
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K)).....	57.691

V. MOLECULAR WEIGHT OF STACK GAS

COMPONENT	ORSAT-DRY VOL.PCT./100	X	MOISTURE CORRECTION (1-T/100)	X	MOLECULAR WEIGHT	=	WEIGHT PER MOLE
CO2	.040	X	.8737	X	44.0	=	1.54
CO	.000	X	.8737	X	28.0	=	.00
O2	.110	X	.8737	X	32.0	=	3.08
N2	.850	X	.8737	X	28.2	=	20.94
H2O		X	T/100= .1263	X	18.0	=	2.27
					MOLECULAR WEIGHT OF STACK GAS	=	27.83

W.	PITOT CORRECTION.....	.840
X.	AVERAGE CORRECTED VELOCITY (FPS).....	12.58
	[85.49*W*SQRT{(J*DELTA P)/(V*F)}]	
Y.	AVG. FLOW RATE (CFM) (X*H*60).....	59273.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92).....	32981.
	STACK FLOW RATE (DRY).....	28815.
AA.	SAMPLE TIME (SEC).....	7200.
BB.	PERCENT ISOKINETIC.....	94.58
	(J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON COKE WORKS
CLAIRTON, PA BATTERY STACK 14
CLR-14CS-3 03/24/92

PARAMETER	CYCLONE WT. (G)	MATL.ON FILTER(G)	INSOL.MATL. IN PROBE(G)	SOL.MATL. IN PROBE(G)
PARTICULATE	.00000	.01100	.00000	.02040

PARAMETER	INSOL.MATL. IN IMP. (G)	SOLUBLE MATL. IN IMP. (G)
PARTICULATE	.00060	.00210

PARTICULATE	.03410
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ALL MATLS.	.03410
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PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.00854	2.10974

Emission rates are based on the PA method.
The soluble impinger weight is excluded from the calculations

Date: 3/26/92

Activity No. 605039-01

PARTICULATE REPORTING FORM

PARTICULARS

27.11.2022

ACETONE

WATER
ACTION

[illegible]

1/6/92

Activity No. 605039-01

PARTICULATE REPORTING FORM

EXTRACTS:
CHLOROPHYLL
STARCH

[illegible]

**COMPLIANCE DEMONSTRATION
#14 BATTERY COMBUSTION STACK**

**USS CLAIRTON WORKS
CLAIRTON, PA**

APPENDIX F

VISIBLE EMISSIONS DATA

lot 6

1.8m River
A
up River
B
E15 C

VISIBLE EMISSIONS OBSERVATIONS FORM

14 STACK

OBSERVER: Tim McKeeDATE: 3-24-92FACILITY: USX - CLARKSONOBSERVATION: START TIME: 8:52END TIME: 9:54

OBSERVATION POINT:

WABASH PARKING LOT

SOURCE: #14 STACK

DISTANCE: 150 YARDSDIRECTION FROM: SWHEIGHT: 200 feet

WIND:

SPEED: 5DIRECTION: WTEMPERATURE: 23°FSKY CONDITION: CLEARBACKGROUND: SKYREADING CONDITIONS: GOODCOLOR OF EMISSION: BROWNTOTAL No. OF READINGS: 240No. READINGS $\geq$ 20% 0No. READINGS $\geq$ 60% 0GREATEST OPACITY: 5

CREW: _____ FOREMAN: _____

COMMENTS: _____

PORT A

8:52	0	0	0	0	0
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0
	5	0	0	0	0
	6	0	0	0	0
	7	0	0	0	0
9:00	8	0	0	0	0
	9	0	0	0	0
	10	0	0	0	0
	11	0	0	0	0
	12	0	0	0	0
	13	0	0	0	0
	14	0	0	0	0
	15	0	0	0	0
	16	0	0	0	0
	17	0	0	0	0
	18	0	0	0	0
	19	0	0	0	0
	20	0	0	0	0
	21	0	0	0	0
	22	0	0	0	0
9:15	23	0	0	0	0
	24	0	0	0	0
	25	0	0	0	0
	26	0	0	0	0
	27	0	0	0	0
	28	0	0	0	0
9:21	29	0	0	0	0

PORT B

9:25	30	0	0	0	0
	31	0	0	0	0
	32	0	0	0	0
	33	0	0	0	0
	34	0	0	0	0
9:30	35	0	0	0	0
	36	0	0	0	0
	37	0	0	0	0
	38	0	0	0	0
	39	0	0	0	0
	40	0	0	0	0
	41	0	0	0	0
	42	0	5	5	5
	43	0	0	0	0
	44	0	0	0	0
9:40	45	0	0	0	0
	46	0	0	0	0
	47	0	0	0	0
	48	0	0	0	0
	49	0	0	0	0
	50	0	0	0	0
	51	0	0	0	0
	52	0	0	0	0
	53	0	0	0	0
	54	0	0	0	0
9:50	55	0	0	0	0
	56	0	0	0	0
	57	0	0	0	0
	58	0	0	0	0
	59	0	0	0	0

VISIBLE EMISSIONS OBSERVATIONS FORM

14 STACK

OBSERVER: Tim McKeeDATE: 3-24-92FACILITY: USX-CLARKTONOBSERVATION: START TIME: 9:58END TIME: 11:00

OBSERVATION POINT:

WABASH PARKING LOTSOURCE: STACK #14DISTANCE: 150 YARDSDIRECTION FROM: SWHEIGHT: 200 feet

WIND:

SPEED: 13DIRECTION: SWTEMPERATURE: 36° FSKY CONDITION: CLEARBACKGROUND: SKYREADING CONDITIONS: GOOD

COLOR OF EMISSION: _____

TOTAL No. OF READINGS: 240No. READINGS $\geq$ 20% 0No. READINGS $\geq$ 60% 0GREATEST OPACITY: 0

CREW: _____ FOREMAN: _____

COMMENTS: _____

PORT C 9:58					
9:58	0	0	0	0	0
	1	0	0	0	0
10:00	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0
	5	0	0	0	0
	6	0	0	0	0
	7	0	0	0	0
	8	0	0	0	0
	9	0	0	0	0
	10	0	0	0	0
	11	0	0	0	0
10:10	12	0	0	0	0
	13	0	0	0	0
	14	0	0	0	0
	15	0	0	0	0
	16	0	0	0	0
	17	0	0	0	0
	18	0	0	0	0
	19	0	0	0	0
	20	0	0	0	0
	21	0	0	0	0
10:20	22	0	0	0	0
	23	0	0	0	0
	24	0	0	0	0
	25	0	0	0	0
	26	0	0	0	0
	27	0	0	0	0
	28	0	0	0	0
	29	0	0	0	0

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

3 of 6

VISIBLE EMISSIONS OBSERVATIONS FORM

14 STACK

OBSERVER: TIM MCKEEDATE: 3-24-92FACILITY: USX-CLARETOWNOBSERVATION: START TIME: 11:42END TIME: 12:50

OBSERVATION POINT:

WABASH PARKING LOTSOURCE: STACK #14DISTANCE: 150 YDSDIRECTION FROM: SWHEIGHT: 200 Feet

WIND:

SPEED: 5-7DIRECTION: SWTEMPERATURE: 38°FSKY CONDITION: CLEARBACKGROUND: SKYREADING CONDITIONS: GOOD

COLOR OF EMISSION: _____

TOTAL No. OF READINGS: 240No. READINGS $\geq$ 20% 0No. READINGS $\geq$ 60% 0GREATEST OPACITY: 0

CREW: _____ FOREMAN: _____

COMMENTS: _____

PORT D: 11:42				
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0

PORT C: 12:20				
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0

12:00

12:11

4 & 6

VISIBLE EMISSIONS OBSERVATIONS FORM

14 STACK

OBSERVER: Tim McKeeDATE: 3-24-92FACILITY: VSX-CLAIRTONOBSERVATION: START TIME: 12:55

END TIME: _____

OBSERVATION POINT: _____

WABASH PARKING LOT

SOURCE: STACK #14

DISTANCE: 150 ydsDIRECTION FROM: SWHEIGHT: 200 ft.

WIND: _____

SPEED: 10 mphDIRECTION: STEMPERATURE: 43°FSKY CONDITION: CLEARBACKGROUND: SKYREADING CONDITIONS: GOOD

COLOR OF EMISSION: _____

TOTAL No. OF READINGS: 240No. READINGS $\geq$ 20% 0No. READINGS $\geq$ 60% 0GREATEST OPACITY: 0

CREW: _____ FOREMAN: _____

COMMENTS: _____

PORT B: 12:55

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

PORT A: 12:28

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

5 & 6

VISIBLE EMISSIONS OBSERVATIONS FORM

14 STACKOBSERVER: Tim McKeeDATE: 3-24-92FACILITY: USX-CLAIRTONOBSERVATION: START TIME: 2:32END TIME: 3:32

OBSERVATION POINT:

WABASH PARKING LOTSOURCE: STACK #14 2:40DISTANCE: 150 YDSDIRECTION FROM: SWHEIGHT: 200 ft

WIND:

SPEED: 14DIRECTION: WTEMPERATURE: 46°FSKY CONDITION: CLEARBACKGROUND: SKYREADING CONDITIONS: GoodCOLOR OF EMISSION: BLACKTOTAL No. OF READINGS: 240No. READINGS $\geq$ 20% 3No. READINGS $\geq$ 60% 0GREATEST OPACITY: 20

CREW: _____ FOREMAN: _____

COMMENTS: _____

_____PORT A: 2:32

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

PORT B: 3:03

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

3:10

AUG

15%

3:20

6 & 6

VISIBLE EMISSIONS OBSERVATIONS FORM

14 STACK

OBSERVER: TIM MCKEEDATE: 3-24-92FACILITY: CLAIRTON
USX-IRVINOBSERVATION: START TIME: 3:36

END TIME: _____

OBSERVATION POINT:

WABASH PARKING LOTSOURCE: STACK # 14DISTANCE: 150 YDSDIRECTION FROM: SWHEIGHT: 200 Feet

WIND:

SPEED: 10-12DIRECTION: WTEMPERATURE: 46°FSKY CONDITION: ClearBACKGROUND: SKYREADING CONDITIONS: GOOD

COLOR OF EMISSION: _____

TOTAL No. OF READINGS: 240No. READINGS $\geq$ 20% 2No. READINGS $\geq$ 60% 0GREATEST OPACITY: 20

CREW: _____ FOREMAN: _____

COMMENTS: _____

PORT C: 3:36				
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	10	10	20	20
18	10	10	5	5
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0

Port D: 4:17				
30	0	0	0	0
31	0	0	0	0
32	5	5	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0

3:40

4:20

3:50

4:30

AVG = 7.5

4:00

4:40

**COMPLIANCE DEMONSTRATION
#14 BATTERY COMBUSTION STACK**

**USS CLAIRTON WORKS
CLAIRTON, PA**

APPENDIX G

SULFATE ANALYSIS

RJ LeeGroup, Inc.

350 Hochberg Road • Monroeville, PA 15146
412/325-1776 • FAX 412/733-1799

May 8, 1992

Mr. David Beranek
Keystone Environmental Resources, Inc.
3000 Tech Center Drive
Monroeville, PA 15146

RE: Sulfate Analysis of Four Back-Half Washes
RJ Lee Group Project No. ESH203085
Keystone Purchase Order No. B-7185

Dear Mr. Beranek:

This letter report summarizes the analytical results for the seven samples that we received from you on March 31, 1992. The samples were identified as follows:

<u>Keystone Sample ID</u>	<u>RJ Lee Group Sample ID</u>	<u>Description</u>
CLR-14BS-1	601759	Back-half H ₂ O, Chloroform & Ethyl Extracted 3/24/92
CLR-14BS-2	601760	Back-half H ₂ O, Chloroform & Ethyl Extracted 3/24/92
CLR-14BS-3	601761	Back-half H ₂ O, Chloroform & Ethyl Extracted 3/24/92
CLR-14CS	601762	Back-half H ₂ O, Chloroform & Ethyl Extracted 3/24/92

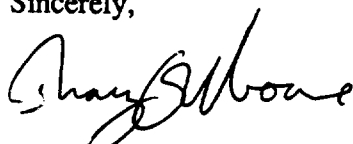
The four back-half washes were analyzed for total sulfate (SO₄⁻²) content. The solutions contained a mixture of chloroform and ethyl ether and were prepared for analysis by evaporating a 100 ml aliquot to 10 ml and rediluting back to the original volume of 100 ml with deionized water. This removed the chloroform and ethyl ether. The samples were then analyzed along with standard sulfate solutions on a Dionex 2120i ion chromatograph.

Results are calculated as milligrams per liter and then converted to total milligrams using the volumes of the solutions that you provided. These results are reported in the enclosed Table I. The precision of this analysis is $\pm 5\%$ of the value reported.

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of sixty (60) days before discarding.

If you have any questions about the analysis, please feel free to call.

Sincerely,



Tracy A. Moore
Meteorologist

TAM:cil
Attachments

Table I
Sulfate Analysis

<u>Keystone Sample ID</u>	<u>RJ Lee Group Sample ID</u>	<u>Sulfate Concentration (mg/l)</u>	<u>Volume (ml)</u>	<u>Total Weight (mg)</u>
CLR-14BS-1	601759	64.93	800	51.9
CLR-14BS-2	601760	76.65	720	55.2
CLR-14BS-3	601761	63.73	780	49.7
CLR-14-CS	601762	0.285	800	0.228

CHAIN OF CUSTODY RECORD

PLANT CODE 605039	PROJECT NAME	NUMBER OF CONTAINERS
SAMPLERS (Signature)		

STA NO.	DATE	TIME	STATION LOCATION	NUMBER OF CONTAINERS
	3/24/92		CLR-14 BS-1	1
	3/24/92		CLR-14 BS-2	1
	3/24/92		CLR-14 BS-3	1
	3/24/92		CLR-14 BS-BLANK	1

CONDUCTIVITY

BH

REMARKS OR OBSERVATIONS

800 ml
720 ml
780 ml
800 ml

50 LTR (50) by J.C.

Received by: (Signature)

Date

Relinquished by: (Signature)

Date

Received by: (Signature)

Date

Relinquished by: (Signature)

Date

Received by: (Signature)

Date

Relinquished by: (Signature)

Date

Received by: (Signature)

Date

Relinquished by: (Signature)

Date

Chain of Custody

Tag #

Ice Chest

#

Ice Chest Temp

°C

Date

Time

Received for Laboratory by: (Signature)

Date

Time

Relinquished by: (Signature)

Date

DISTRIBUTION: Original accompanies shipment; Copy to Coordinator Field Files.