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U. S. Steel
Clairton Works
400 State Street
Clairton, PA 15025-1855

~~U.S. Steel~~
~~AHF~~
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→ WGG/wuc

FEB 21 1993

November 30, 1993

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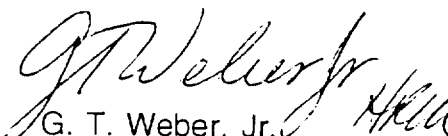
Gentlemen:

Subject: Compliance Demonstration
Clairton Battery Stack #1

I have enclosed with this letter the mass emission report on #1 Battery Combustion Stack. The compliance demonstration was conducted at USS Clairton Works, Clairton, PA, a division of USX Corporation, on September 29-30, 1993.

For questions regarding this report, please contact William C. Graeser at (412) 233-1467.

Very truly yours,


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

GTW/BAC
Enclosure



**USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA**

Report on

**COMPLIANCE DEMONSTRATION
NO. 1 BATTERY COMBUSTION STACK
USS CLAIRTON WORKS**

NOVEMBER 1993

**Prepared By: Chester Environmental
3000 Tech Center Drive
Monroeville, Pennsylvania 15146**

Project No.: 600726-01

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EXECUTIVE SUMMARY

On September 29 and 30, 1993, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #1 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.

The results of the testing showed an average particulate matter concentration and emission rate of 0.0081 grains per dry standard cubic feet (gr/dscf) and 2.6 pounds per hour (lb/hr), respectively. As promulgated by the Amended Mon Valley Consent Decree, Paragraph V.A.(6), the allowable particulate matter concentration for #1 Battery Combustion Stack is 0.030 gr/dscf. Thus, the average particulate matter concentration in the stack gas is less than the allowable concentration.

The opacity of the exhaust gas during any of the three tests was less than or equal to 10 percent. 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."

1.0 INTRODUCTION

On September 29 and 30, 1993, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #1 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 Chester Environmental. All test procedures were witnessed by Phil Lawrence from the Allegheny County Health Department Bureau of Environmental Quality (BEQ).

2.0 METHODOLOGIES

The compliance test program was conducted in accordance with the 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. Three two-hour tests were executed during normal, maximum operation and production of the battery.

The process exhausts through a 114 inch inside 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 traverse point was sampled for 5 minutes, thus bringing the total sampling time to 120 minutes for each test run.

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 carbon dioxide (CO₂), oxygen (O₂), and nitrogen (N₂, by difference) were determined with the use of a Bacharach "Fyrite" apparatus as specified by EPA Method 3. Gas concentrations were used to obtain molecular weight of the process gas on a dry basis.

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 an acetone rinse of the front-half components of the sample train. Front-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 was prepared in the same manner as the test sample rinses. The blank residue weight was subtracted from the test sample residue weights. After blank correction, the acetone rinse residue weights and sample train 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. Copies of the plant 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 BEQ can be found in Appendix A.

Copies of the field data sheets can be found in Appendix A. The gravimetric results and the emissions calculations for each test can be found in Appendix C.

The test results have been summarized in Table 1. The results of the testing showed an average particulate matter concentration and emission rate of 0.0081 grains per dry standard cubic feet (gr/dscf) and 2.6 pounds per hour (lb/hr), respectively. As promulgated by the Amended Mon Valley Consent Decree, Paragraph V.A.(6), the allowable particulate matter concentration for #1 Battery Combustion Stack is 0.030 gr/dscf. Thus, the average particulate matter concentration in the stack gas is less than the allowable concentration.

Table 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 ($^{\circ}$ 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 104.9 percent, 109.2 percent, and 103.4 percent; therefore, all values were within the acceptable range. Actual test sampling times have also been included in Table 1.

Copies of the field data sheets for the visible emissions readings can be found in Appendix A. 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 opacity of the exhaust gas during any of the three tests was less than or equal to 10 percent.

USS CLAIRTON WORKS
CLAIRTON, PA

TABLE 1

#1 BATTERY COMBUSTION STACK
PARTICULATE MATTER EMISSIONS DATA

		Run 1	Run 2	Run 3	Average
Test Number		CLR-1BS-1	CLR-1BS-2	CLR-1BS-3	
Test Date		9-29-93	9-30-93	9-30-93	
<u>Mass Emissions Rate and Concentration</u>					
Particulate Matter	(lb/hr)	2.8	3.5	1.5	2.6
	(gr/dscf)	0.0087	0.0111	0.0046	0.0081
<u>Stack Conditions</u>					
Flow Rate	(acfm)	77900	78000	81400	79100
	(scfm)	41500	41800	43300	42200
	(dscfm)	37100	36600	38800	37500
Temperature	(°F)	515	511	518	515
Moisture Content	(%)	10.5	12.5	10.3	11.1
<u>Sampling Conditions</u>					
Test times		1335	0835	1127	
		to 1405	to 0905	to 1157	
		1410	0913	1226	
		to 1440	to 0943	to 1256	
		1451	0947	1303	
		to 1521	to 1017	to 1333	
		1534	1020	1340	
		to 1604	to 1050	to 1410	
Sampling Time	(minutes)	120	120	120	
Sample Volume	(dscf)	65.869	67.573	67.987	
Isokinetics	(%)	104.9	109.2	103.4	

**COMPLIANCE DEMONSTRATION
NO. 1 BATTERY COMBUSTION STACK
USS CLAIRTON WORKS**

**USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA**

**APPENDIX A
TEST PROTOCOL, FIELD DATA SHEETS, CALIBRATION
RESULTS**

**TEST PROTOCOL
COMPLIANCE DEMONSTRATION
#1 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 (40 CFR, Part 60, Appendix A) 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 114 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. Static pressure of the exhaust gas stream will be measured with the same pitot tube.

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 Bacharach "Fyrite" apparatus as specified by EPA Method 3. Gas concentrations will be used to obtain molecular weight of the process gas on a dry basis.

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 an acetone rinse of the front-half components of the sample train. Front-half acetone rinses will be evaporated to dryness, desiccated, and weighed to a constant weight. Sample train glass fiber 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 milligram. One acetone blank will be prepared in the same manner as the test sample rinses. The blank residue weight will be subtracted from the test sample residue weights. After blank correction, front-half acetone rinse residue weights and sample train filter weights will be used to determine total particulate matter catch. Clean up and analytical procedures will follow the methodology of EPA Method 5.

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 Quality, field data sheets for the particulate matter sampling and visible emissions determinations, emissions calculations, and gravimetric results for each test.

STACK SAMPLING DATA SHEET

Page 1 of 2

CLIENT USS Chester Works TEST DATE 9-29-93 (Wed.) ORIFICE CORRECTION (ΔH) 1.8022 HOT/COLD BOX NO. 37
 TEST UNIT # 1 Battery Stack TEST NO. 622-183-74-1 METER CORRECTION (Y) 0.9619 PROBE NO. 10-1
 PROJECT NO. 600721-01 NOZZLE (SIZE, #) 0.423" CALIBRATION DATE 5-17-93 FILTER NO. 1046
 TEST CREW RPC JC JPS STATIC PRESSURE -1.2" H₂O PITOT CORRECTION 0.877 STACK DIA. 14"
 BAROMETRIC PRESSURE 29.50 PORT DIRECTION A, B CONTROL BOX NO. 7 PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (scf)	Pitot ΔP (in. H ₂ O)	Orifice ΔH		Meter Temperature		Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
				Required (in. H ₂ O)	Actual (in. H ₂ O)	In (°F)	Out (°F)						
40.6	13:35	272.945	.07	1.15	1.15	62	62	4.0	499	250	468	250	5 min./point
28.5			.07	1.15	1.15	81	63	4.0	535				
20.2			.06	.99	.99	88	64	3.0	544	250	38	266	
13.5			.06	.99	.99	90	65	3.0	552				
7.6			.05	.82	.82	92	66	3.0	534	250	39	265	
2.4	14:05	291.035	.04	.66	.66	91	66	3.0	499				
40.6	14:10	291.035	.07	1.15	1.15	78	66	4.0	483	245	39	255	
28.5			.06	.99	.99	84	70	3.5	498				
20.2			.06	.99	.99	92	71	3.5	497	250	40	250	
13.5			.06	.99	.99	98	71	3.5	500				
7.6			.05	.82	.82	100	72	3.5	499	250	40	250	
2.4	14:40	308.915	.05	.82	.82	100	72	3.0	497				Estimates: MW = 28.3 %H ₂ O = 12

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.0	20.01 cfm
After	5.5	20.01 cfm

PITOT LEAK CHECK

	Before	After	Positive	Negative
GAS	0.4/1.5 sec	0.3/1.5 sec	0.4/1.5 sec	0.3/1.5 sec

	CO ₂	O ₂	CO	N ₂
	4.0	13.0	0	83.0

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100 mL D.I. H ₂ O	670.1	543.5	126.6
2.	100 mL D.I. H ₂ O	559.9	538.8	21.1
3.	Empty	442.8	440.1	2.7
4.	5.11 mL GEL	666.6	653.3	13.3
5.				
6.	Actual			
7.	Moisture = 10.5%			
8.				



⇒ MW = 27.99

150.4g

STACK SAMPLING DATA SHEET

CLIENT: USS Clackson Works
TEST DATE: 7-29-93 (10/26/93)
TEST NO.: 02R-185-774-1
NOZZLE (SIZE, #): 0.428"
STATIC PRESSURE: -1.2" H₂O
PORT DIRECTION: C
ORIFICE CORRECTION (ΔH): 1.802-
METER CORRECTION (Y): 0.9619
CALIBRATION DATE: 5-17-93
PITOT CORRECTION: 0.021
CONTROL BOX NO.: 7
IOT/COLD BOX NO.: 3, 7
PROBE NO.: 10-1
FILTER NO.: 1046
STACK DIA.: 11.4"
PORT SIZE: 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dscf)	Pilot A/P (in. H ₂ O)	Orifice ΔH		Meter Temperature		Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
				Required (in. H ₂ O)	Actual (in. H ₂ O)	In (°F)	Out (°F)						
40.6	14:51	308.915	.065	1.07	1.07	90	70	4.0	521	~250	<68	~250	5 min./point
28.5			.07	1.15	1.15	96	72	4.0	565				
20.2			.07	1.15	1.15	98	73	4.0	550	250	43	255	
13.5			.05	.82	.82	100	73	3.0	489				
7.6			.05	.82	.82	100	73	3.0	488	250	44	260	
2.4	15:21	327.135	.05	.82	.82	100	73	3.0	490				
40.6	15:34	327.135	.07	1.15	1.15	80	70	4.5	514	245	45	255	
28.5			.06	.99	.99	99	72	3.5	530				
20.2			.06	.99	.99	100	74	3.5	544	245	44	250	
13.5			.05	.82	.82	101	74	3.0	506				
7.6			.04	.66	.66	101	74	3.0	491	250	44	250	
2.4	16:04	343.910	.04	.66	.66	101	74	3.0	490				
Total		$\Delta =$	(AP) $\Delta =$	(ΔH) $\Delta =$	(ΔH) $\Delta =$	(Temp) $\Delta =$	(Temp) $\Delta =$		(Stack) $\Delta =$				Estimates:
Totals	120 min.	30.995	0.053	0.948	0.948	81.2	81.2		515.8				MW = 28.3
													% H ₂ O = 12-

SYSTEM LEAK CHECK		PITOT LEAK CHECK		Impinger Contents		Impinger Velocity		Difference	
Before	After	Before	After	Positive	Negative	Initial	Final	Initial	Final



STACK SAMPLING DATA SHEET

Page 1 of 2

CLIENT USS Chemicals TEST DATE 02-30-93 ORIFICE CORRECTION (ΔH) @ 1802 HOT/COLD BOX NO. 7-5
 TEST UNIT # 1 TEST NO. 662-185-PP-2 METER CORRECTION (Y) 0.9619 PROBE NO. 10-1
 PROJECT NO. 60726-01 NOZZLE (SIZE, #) 0.428 CALIBRATION DATE 05-17-93 FILTER NO. 1086
 TEST CREW RPK STATIC PRESSURE -12.1420 PITOT CORRECTION 0.24 STACK DIA. 114
 BAROMETRIC PRESSURE 30.60 PORT DIRECTION D.C. CONTROL BOX NO. 3600 PORT SIZE 40

Traverse Point (inches)	Time	Dry Gas Meter Reading (scf)	Pitot ΔP (in. H ₂ O)	Orifice ΔH	Meter Temperature	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
40.6	08:35	344.875	0.7	1.15	48	4.0	489	2350	168	245	5 min./point
28.5			0.7	1.15	68	4.0	535				
20.2			0.7	1.15	74	4.0	543	240	39	245	
13.5			0.6	.99	79	3.5	552				
7.6			0.4	.66	80	3.0	570	245	36	245	
2.4	09:05	363.120	0.4	.66	80	3.0	497				
40.6	09:13	363.120	0.7	1.15	70	4.0	479	245	39	245	
28.5			0.6	.99	82	3.0	483				
20.2			0.6	.99	84	3.0	489	250	39	245	
13.5			0.5	.82	86	3.0	494				
7.6			0.5	.82	86	3.0	489	250	40	250	
2.4	09:43	380.950	0.5	.82	85	3.0	508				

Estimates:

MW = 28.3

%H₂O = 12

PITOT LEAK CHECK

Before	After	Positive	Negative
0.15	0.15	0.15	0.15
0.15	0.15	0.15	0.15

GAS	CO ₂	O ₂	CO	N ₂
1.0	1.0	1.0	1.0	1.0
1.0	1.0	1.0	1.0	1.0

SYSTEM LEAK CHECK

Vacuum (in. Hg)	DCM Rate (cfm)
5.0	5.0
5.0	5.0

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100% H ₂ O	720.6	552.5	158.1
2.	100% H ₂ O	585.0	556.6	28.4
3.	empty	429.7	425.3	4.4
4.	50% H ₂ O	672.7	659.3	13.4
5.				
6.				
7.	Aschel			
8.	Moisture = 12.5%			

⇒ MW = 27.77



CHESTER
ENVIRONMENTAL

STACK SAMPLING DATA SHEET

Page 1 of 2

CLIENT USS CLARKSON Works TEST DATE 09-20-93 (Thu) ORIFICE CORRECTION (ΔH) 1.802 HOT/COLD BOX NO. 1
 TEST UNIT #1 Battery Stack TEST NO. CL2-165-PM-3 METER CORRECTION (Y) 0.9619 PROBE NO. 10-1
 PROJECT NO. 60-726-01 NOZZLE (SIZE) 0.428" CALIBRATION DATE 05-17-92 FILTER NO. 1047
 TEST CREW RPC TM JPS STATIC PRESSURE -12" H₂O PITOT CORRECTION 0.84 STACK DIA. 14"
 BAROMETRIC PRESSURE 29.60 PORT DIRECTION AB CONTROL BOX NO. 5640 PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcl)	Pitot ΔP (in. H ₂ O)	Orifice ΔH		Meter Temperature		Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
				Required (in. H ₂ O)	Actual (in. H ₂ O)	In (°F)	Out (°F)						
40.6	11:27	416.320	0.7	1.15	1.15	62	62	3.5	490	280	68°F	255	5 min./point
28.5			0.7	1.15	1.15	82	63	3.5	489				
20.2			0.6	.99	.99	86	63	3.0	523	245	38	250	
13.5			0.7	1.15	1.15	88	63	3.5	534				
7.6			0.5	.82	.82	90	65	3.0	534	250	38	250	
2.4	11:57	434.800	0.5	.82	.82	90	65	3.0	531				
40.6	12:26	434.800	0.7	1.15	1.15	70	65	3.0	512	255	38	260	1.802 stack
28.5			0.8	1.32	1.32	86	62	4.0	496				Probe to AT 12"
20.2			0.7	1.15	1.15	90	62	3.0	526	250	38	255	Probe to stack
13.5			0.6	.98	.98	90	62	3.0	521				Probe to stack
7.6			0.6	.98	.98	90	63	3.0	537	250	39	255	
2.4	12:56	453.400	0.6	.98	.98	92	63	3.0	546				
													Estimates:
													MW = 28.3
													%H ₂ O = 12.0

SYSTEM LEAK CHECK		PITOT LEAK CHECK	
Vacuum (in. Hg)	DGM Rate (cfm)	Before	After
Before	5.0	0.15 sec	0.15 sec
After	5.0	0.15 sec	0.15 sec
		GAS	2
		CO ₂	40.0
		O ₂	13.0
		CO	0
		N ₂	83.0

Impinger		Impinger		Impinger		Impinger		Impinger	
No.	Contents	Final	Initial	Final	Initial	Final	Initial	Final	Initial
1.	100 mL DI H ₂ O	593.7	478.3	593.7	478.3	593.7	478.3	593.7	478.3
2.	100 mL DI H ₂ O	569.1	539.2	569.1	539.2	569.1	539.2	569.1	539.2
3.	Empty	450.0	414.9	450.0	414.9	450.0	414.9	450.0	414.9
4.	Silicone gel	680.7	666.0	680.7	666.0	680.7	666.0	680.7	666.0
5.									
6.	Actual								
7.	Moisture = 10.370								
8.									



⇒ MW = 28.01

150.4g

13.32
1.802 (MW)
12.005
1.802

VISIBLE EMISSIONS OBSERVATION FORM

*1 Battery Stack Test
Day 1 Page 1

SERVER: Robert Y. Gou
 DATE: 9/29/93 Wednesday
 FACILITY: USX-Clairton Works
 OBSERVATION START TIME: 13:30 pm
 END TIME: 14:30 pm

OBSERVATION POINT:
W. of Air Repair Shop along roadway

SOURCE: # 1 Battery Stack
 DISTANCE: @ 600'
 DIRECTION FROM: NW
 HEIGHT: @ 200'

WIND:
 SPEED: 9 mph
 DIRECTION: NW
 TEMPERATURE: 55°F
 SKY CONDITION: Mostly Cloudy
 BACKGROUND: Sky

READING CONDITIONS: Good
 COLOR OF EMISSIONS: black

TOTAL # OF READINGS: 240
 NO. READINGS 0 - 15%: 240
 NO. READINGS 20%: 0
 NO. READINGS 25 - 50%: 0
 NO. READINGS 60 - 100%: 0
 NO. READINGS > 20%: 0
 GREATEST OPACITY: 10%

COMMENTS:

13:30 pm

	:00	:15	:30	:45
00	0	0	0	0
01	0	0	0	0
02	0	0	0	0
03	0	0	0	0
04	0	5	5	5
05	5	5	5	5
06	0	0	0	0
07	0	0	0	0
08	0	5	5	5
09	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

14:00 pm

14:00 pm

	:00	:15	:30	:45
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	5	5	10
49	10	10	5	5
50	0	5	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

14:20 pm

VISIBLE EMISSIONS OBSERVATION FORM

#1 Battery Stack Test
Day 1 Page 3

OBSERVER: Robert Y. Gou

DATE: 9/29/93 Wednesday

FACILITY: USX-Clayton Works

OBSERVATION START TIME: 15:30 pm

END TIME: 16:05 pm

OBSERVATION POINT:

N.W. of Ali Pipeline Shop along roadway

SOURCE: #1 Battery Stack

DISTANCE: @ 600'

DIRECTION FROM: N.W.

HEIGHT: @ 200'

WIND:

SPEED: 9 mph

DIRECTION: West

TEMPERATURE: 53°F

SKY CONDITION: Mostly Cloudy

BACKGROUND: Sky

READING CONDITIONS: Good

COLOR OF EMISSIONS: NA

TOTAL # OF READINGS: 140

NO. READINGS 0 - 1%: 140

NO. READINGS 20%: 0

NO. READINGS 25 - 50%: 0

NO. READINGS 60 - 100%: 0

NO. READINGS > 20%: 0

GREATEST OPACITY: 0 %

COMMENTS:

End Test 16:05pm

Test 1: 9/29/93 - 13:30 pm - 14:05 pm

15:30 pm

:40

:50

	:00	:15	:30	:45
00	0	0	0	0
01	0	0	0	0
02	0	0	0	0
03	0	0	0	0
04	0	0	0	0
05	0	0	0	0
06	0	0	0	0
07	0	0	0	0
08	0	0	0	0
09	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

16:00

16:05
END

	:00	:15	:30	:45
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				
36				
37				
38				
39				
40				
41				
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57				
58				
59				

VISIBLE EMISSIONS OBSERVATIONS FORM

1 STACK

OBSERVER: Rat Mace

DATE: 9-30-93

FACILITY: USS-Clinton

OBSERVATION: START TIME: 9:35
END TIME: 10:35

OBSERVATION POINT:
Maple Ave Lot

SOURCE: #1 STACK

DISTANCE: ~850 ft.

DIRECTION FROM: SW

HEIGHT: ~200 ft.

WIND:

SPEED: 12 mph

DIRECTION: NW

TEMPERATURE: 45°

SKY CONDITION: Broken Clouds

BACKGROUND: Sky

READING CONDITIONS: Fair

COLOR OF EMISSION: —

TOTAL No. OF READINGS: 240

No. READINGS $\geq$ 20% —

No. READINGS $\geq$ 60% —

GREATEST OPACITY: 0%

CREW: B FOREMAN: ZACUR

COMMENTS: _____

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

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

VISIBLE EMISSIONS OBSERVATIONS FORM

1 STACK

OBSERVER: Pat Macone

DATE: 9-30-93

FACILITY: USS-Clinton

OBSERVATION: START TIME: 10:35
END TIME: 11:09

OBSERVATION POINT:
Maple Ave lot

SOURCE: #1 Stack

DISTANCE: ~850 ft.
DIRECTION FROM: SW
HEIGHT: ~200 ft.

WIND:

SPEED: 9 mph
DIRECTION: North
TEMPERATURE: 46°
SKY CONDITIONS: Scattered Clouds
BACKGROUND: Sky

READING CONDITIONS: Fair
COLOR OF EMISSION: —

TOTAL No. OF READINGS: 136
No. READINGS $\geq$ 20% —
No. READINGS $\geq$ 60% —
GREATEST OPACITY: 0%
CREW: B FOREMAN: ZACUR

COMMENTS: _____

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

30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34				
35				
36				
37				
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58				
59				

VISIBLE EMISSIONS OBSERVATIONS FORM

1 STACK

OBSERVER: Pat Malone

DATE: 9-30-93

FACILITY: USS-Clairton

OBSERVATION: START TIME: 11:25

END TIME: 12:25

OBSERVATION POINT:

Maple Ave lot

SOURCE: #1 STACK

DISTANCE: ~850 ft.

DIRECTION FROM: SW

HEIGHT: ~200 ft.

WIND:

SPEED: 9 mph

DIRECTION: North

TEMPERATURE: 46°

SKY CONDITION: Scattered Clouds

BACKGROUND: Sky

READING CONDITIONS: Fair

COLOR OF EMISSION: —

TOTAL NO. OF READINGS: 240

NO. READINGS $\geq$ 20% —

NO. READINGS $\geq$ 60% —

GREATEST OPACITY: 0%

CREW: B FOREMAN: ZACW

COMMENTS: —

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

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

PRE-TEST MAGNEHELIC CALIBRATION

BOX# 7

DATE 05-17-93

OPERATOR RPC

0 to 10" H2O RANGE

0 to 0.50" H2O RANGE

0 to 3" H2O RANGE

MAGNEHELIC	ΔP	MANOMETER	MAGNEHELIC	ΔP	MANOMETER	MAGNEHELIC	ΔH	MANOMETER
	0.50	0.50		0.50	---		3.00	3.00
	1.00	1.00		0.40	---		2.00	2.00
	2.00	2.00		0.30	---		1.00	1.00
	4.00	4.00		0.20	---		0.50	0.50
	6.00	6.00		0.10	---			
	8.00	8.00						

Calibration not necessary.

Primary standard on control box.

PRE-TEST LEAK CHECK

DATE 05-17-93

OPERATOR RPC

	START CF	STOP CF	VOLUME CF	TIME (min)	LEAK RATE
DRY	38.650	38.878	0.228	10.000	-0.003
WET	0.000	0.202	0.202		

PYROMETER CALIBRATION

DATE 04-28-88

OPERATOR AGL

VOLTAGE INPUT (mV)	ARGE 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

PRE-TEST PYROMETER CHECK

DATE 05-17-93

OPERATOR RPC

VOLTAGE INPUT (mV)	TARGET TEMP (°F)	TEMP READING (°F)
0.18	40	41.0
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	299.0
8.31	400	399.0
10.57	500	498.0

POST-TEST MAGNEHELIC CALIBRATION

BOX# 7

DATE 10-22-93

OPERATOR RPC

0 to 10" H2O RANGE

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

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

0 to 0.50" H2O RANGE

0 to 3" H2O RANGE

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

Calibration not necessary.

Primary standard on control box.

POST-TEST LEAK CHECK

DATE 10-22-93

OPERATOR RPC

START	STOP	VOLUME	TIME	LEAK
CF	CF	CF	(min)	RATE
338.001	338.200	0.199	10.000	-0.0004
DRY				
WET	0.000	0.195		

PYROMETER CALIBRATION

DATE 04-28-88

OPERATOR AGL

POST-TEST PYROMETER CHECK

DATE 10-22-93

OPERATOR RPC

VOLTIAGE	ARGE	TEMP	VOLTIAGE	TARGET	TEMP
INPUT	TEMP	READING	INPUT	TEMP	READING
(mV)	(°F)	(°F)	(mV)	(°F)	(°F)
0.18	40	40.0	0.18	40	40.0
0.40	50	50.0	0.40	50	50.0
0.84	70	70.0	0.84	70	70.0
1.29	90	90.0	1.29	90	90.0
1.74	110	110.0	1.74	110	110.0
2.66	150	150.0	2.66	150	150.0
3.82	200	200.0	3.82	200	200.0
6.09	300	301.0	6.09	300	300.0
8.31	400	400.0	8.31	400	400.0
10.57	500	500.0	10.57	500	502.0

QA ORIFICE AUDIT

ORIFICE BAPC-3
OPERATOR RPCDATE 11-22-93
BOX # 7

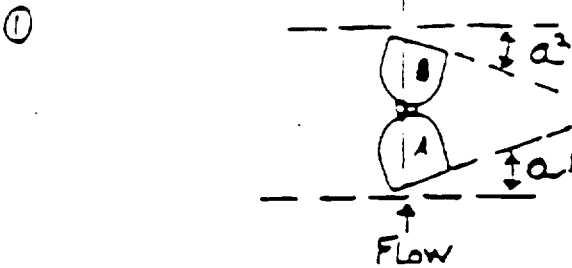
B.P. 29.20

RUN	1		2		3	
INITIAL CF	445.800		453.700		461.600	
FINAL CF	453.420		461.370		469.224	
DIFFERENCE	7.620		7.670		7.624	
TEMP INITIAL	IN 80	OUT 70	IN 81	OUT 71	IN 82	OUT 73
TEMP 5 MIN	80	70	82	73	83	75
TEMP 10 MIN	81	71	82	73	84	75
TEMP 15 MIN	81	71	82	73	84	75
TEMP AVG	75.5	TEMP R 535.5	77.125	TEMP R 537.125	78.875	TEMP R 538.875
TIME (MIN.)	15.00		15.00		15.00	
ORIFICE	IN WATER 0.70	IN HG 0.05	IN WATER 0.70	IN HG 0.05	IN WATER 0.70	IN HG 0.05
METER PRESSURE	29.25		29.25		29.25	
AMBIENT TEMP.	°F 75.0	°C 23.9	°F 75.0	°C 23.9	°F 75.0	°C 23.9
VACUUM IN HG	21.0		21.0		21.0	
DGM CAL Y	0.9619		0.9619		0.9619	
STD CF	7.092		7.117		7.052	
STD CUBIC METERS	0.2009		0.2016		0.1997	

GEOMETRIC PITOT CALIBRATION

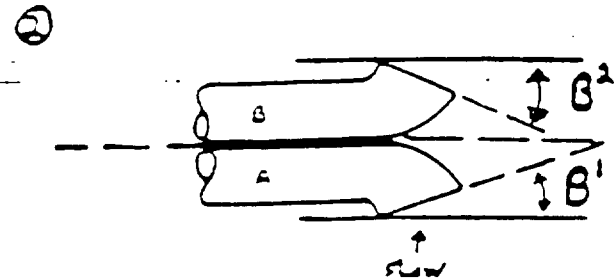
Caliper # XFS-59
 Precheck _____
 Post Check _____

Probe #: 10-1
 Date: 8-18-93
 Initials: [Signature]



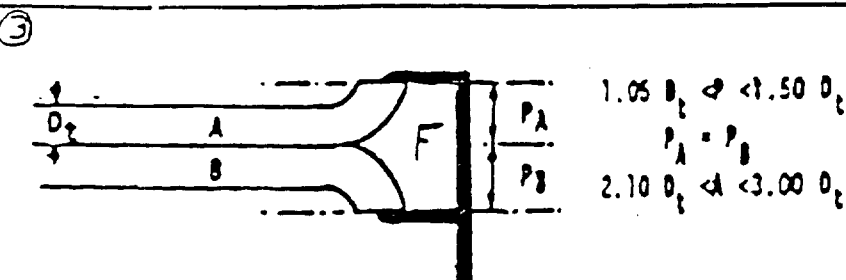
$a^1 = 0^\circ$
 $a^2 = 0.5^\circ$
 $B^1 = 1.5^\circ$
 $B^2 = 1.0^\circ$
 $F = 0.980$

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



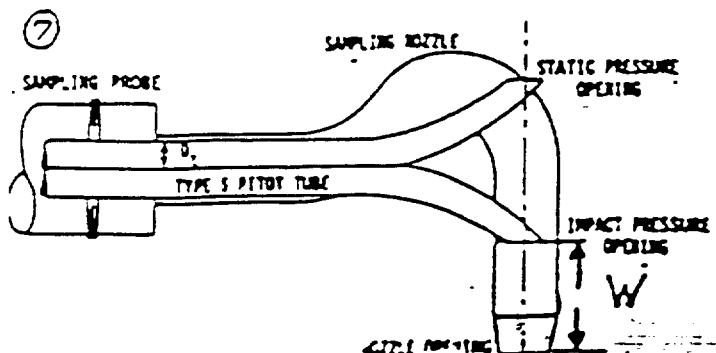
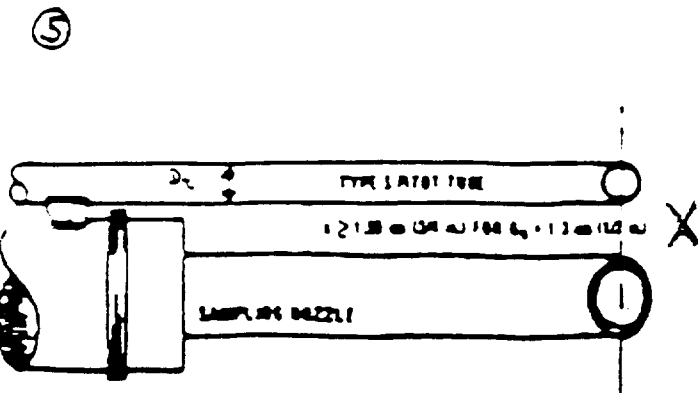
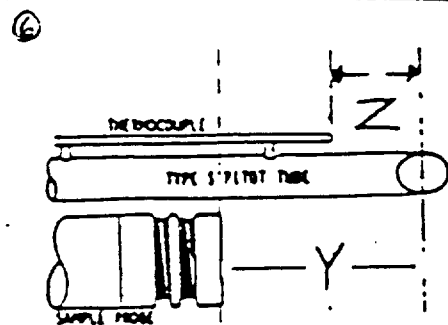
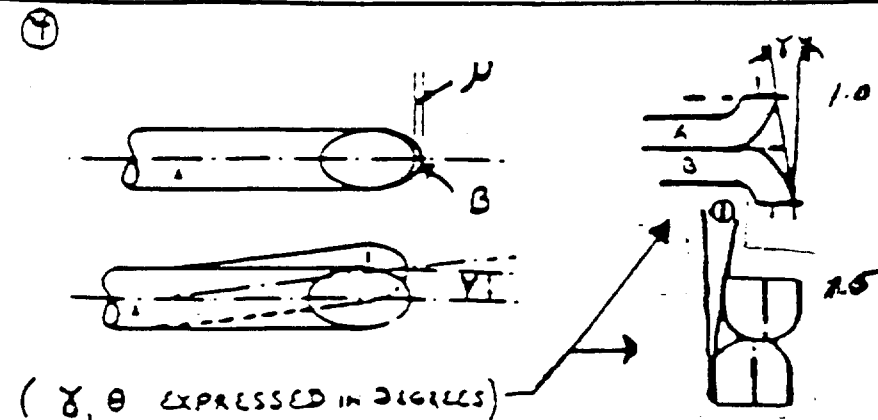
$\mu = 0.0175$
 $V = 0.026$
 $W = 0.237$

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



$Y = 6.000$
 $Z = 2.500$
 $D_t = 0.374$

$Y \geq 3.0$
 $Z > 2.0$
 $D_t > .1875$

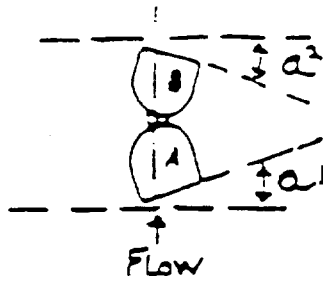


GEOMETRIC PITOT CALIBRATION

Caliper # XEF-59
 Precheck _____
 Post Check _____

Probe #: 10-1
 Date: 10-11-93
 Initials: gm

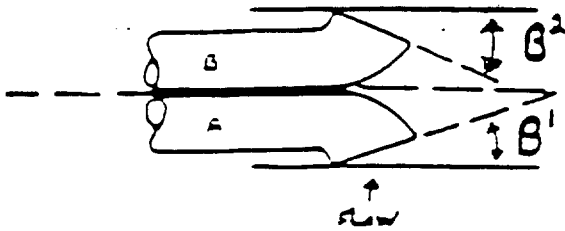
①



$a^1 = 1.0$
 $a^2 = 3.0^\circ$
 $B^1 = 1.0^\circ$
 $B^2 = 2.0^\circ$
 $F = 0.975"$

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

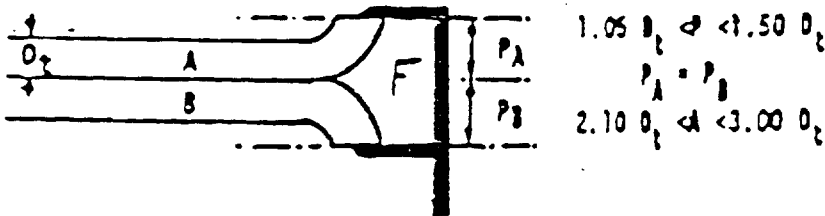
②



$\mu = 0.340$
 $V = 0$
 $W = 0.278$

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

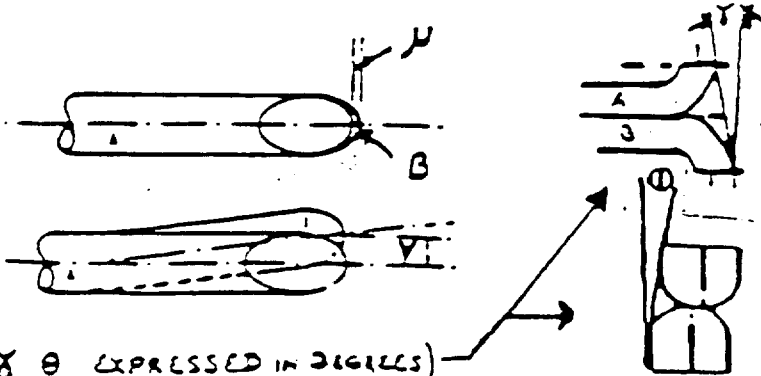
③



$Y = 6.000$
 $Z = 3.264$
 $D_t = 0.374$

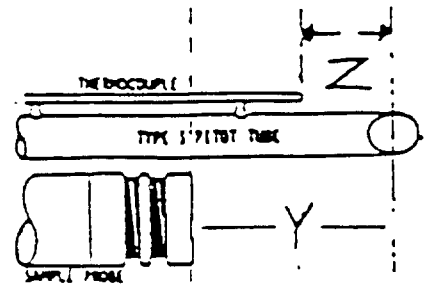
$Y \geq 3.0"$
 $Z \geq 2.0"$
 $D_t \geq .1875"$

④

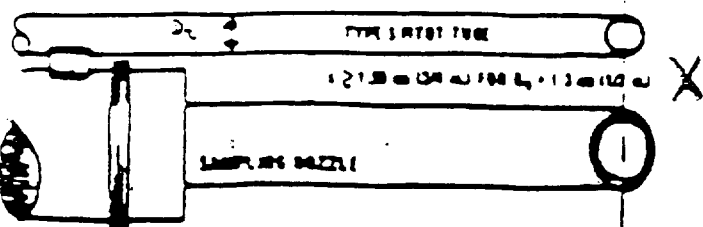


(θ, θ EXPRESSED IN DEGREES)

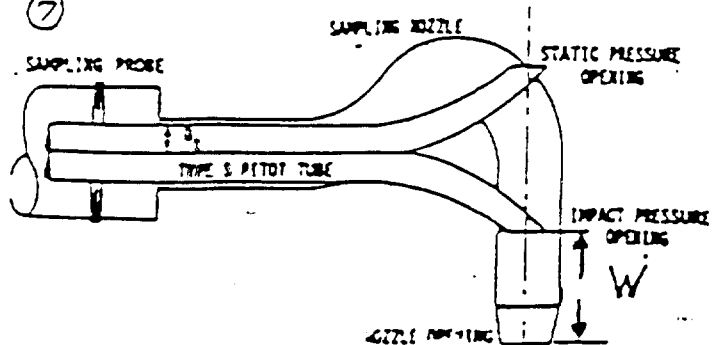
⑤



⑥



⑦



**COMPLIANCE DEMONSTRATION
NO. 1 BATTERY COMBUSTION STACK
USS CLAIRTON WORKS**

**USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA**

**APPENDIX B
PLANT OPERATIONAL DATA**

CC-10275 Rev. 1161
33 201 0010

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1

12 Hrs. Beginning 12:00 PM

Date 9-29-72

BATTERY NO. <u>B-2</u>				BATTERY NO. <u>A-1</u>				BATTERY NO. <u>C-1</u>			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	7:10	7:39		1	1:30	1:33		1			
3	7:20	7:50		3	1:43	1:46		3			
5	7:30	8:29		5	1:54	1:59		5			
7	7:41	8:39		7	2:04	2:07		7			
9	7:52	8:50		9	2:15	2:18		9			
11	8:31	9:—		11	2:26	2:30		11			
13	8:41	9:11		13	2:37	2:41		13			
15	8:52	9:22		15	2:42	2:50		15			
17	9:02	9:33		17	2:57	2:59		17			
19	9:13	9:43		19	3:10	3:13		19			
21	9:24	9:53		21	3:20	3:23		21			
23	9:35	10:04		23	3:30	3:33		23			
25	9:45	10:15		25	3:40	3:43		25			
27	9:55	10:20		27	3:50	3:53		27			
29	10:06	10:35		29	4:04	4:12		29			
(31)	10:17	X X	PURGE	31	4:14	4:28		31			
2				2	10:37	11:06		2	4:30	4:38	
4				4	10:48	11:11		4	4:40	4:48	
6				6	10:58	11:23		6	4:50	4:57	
8				8	11:08	11:11		8	5:—	5:03	
10				10	11:13	11:23		10	5:10	5:18	
12				12	11:25	11:28		12	5:20	5:28	
14				14				14	5:30	5:38	
16				16				16	5:40	5:48	
18				18				18	5:50	5:59	
20				20				20	6:01	6:09	
22				22				22	6:11	6:19	
24				24				24	6:21	6:29	
26	12:55	1:33		26				26	6:31	6:39	
28				28				28	6:41	6:49	
30	12:48	1:46		30				30	6:51	6:55	
31	12:55	1:50						31	6:57	7:08	
32	10:22	10:51						2			

REMARKS:

Condition of Signals 42 44
50 60

Condition of Pusher

HOURLY REPORT OF OPERATION							
TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
12-1	3	3		5-7	7	6	
1-2	3	6		7-8	5	3	
2-3	6	6		8-9	3	3	
3-4	5	5		9-10	6	6	
4-5	5	5		10-11	6	5	
5-6	6	6		11-12	3	6	
	28	31			30	29	

Total Ovens Pushed 58
Total Ovens Charged 60
Pusherman
Battery Foreman JAW

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1

12 Hrs. Beginning 12:00 AM

Date 9-29-63

BATTERY NO. 4-3				BATTERY NO. 4-2				BATTERY NO. 4-1			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	11:48			1	11:55			1			
3	11:57			3	12:05			3			
5	12:08			5	12:15			5			
7	12:17			7	12:25			7			
9	12:25			9	12:35			9			
11	12:34			11	12:45			11			
13	12:41			13	12:55			13			
15	12:50			15	1:05			15			
17	1:00			17	1:15			17			
19	1:08			19	1:25			19			
21	1:17			21	1:35			21			
23	1:25			23	1:45			23			
25	1:34			25	1:55			25			
27	1:41			27	2:05			27			
29	1:50			29	2:15			29			
31	1:58			31	2:35			31			
2				2	2:45			2			
4				4	2:55			4			
6				6	3:05			6			
8				8	3:15			8			
10				10	3:25			10			
12				12	3:35			12			
14				14	3:45			14			
16				16	3:55			16			
18				18	4:05			18			
20				20	4:15			20			
22				22	4:25			22			
24				24	4:35			24			
26				26	4:45			26			
28				28	4:55			28			
30				30	5:05			30			
1				1				1			
2				2				2			

REMARKS:

11/22	22/20	11/16	41 46
Condition of Signals	Condition of Pusher	11/16	15 15
		11/16	56 57

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	
12-1	5	5		8-9	5	5		
1-2	6	6		7-8	5	5		Total Ovens Pushed 56
2-3	6	6		8-9	5	5		Total Ovens Charged 57
3-4	6	6		9-10	5	5		
4-5	6	5		10-11	5	5		Pusherman
5-6	6	6		11-12	2	4		Battery Foreman
	30	29			26	28		

JAW

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1

12 Hrs. Beginning 12:00 PM

Date 12/10/77

BATTERY NO. 1				BATTERY NO. 2				BATTERY NO. 3			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1				1				1			
3				3				3			
5				5				5			
7				7				7			
9	12:00	12:30		9				9			
11	12:00	12:40		11				11			
13	12:00	12:40		13				13			
15	12:00	12:40		15				15			
17	12:00	12:40		17				17			
19	12:00	12:40		19				19			
21	12:00	12:40		21				21			
23	12:00	12:40		23				23			
25	12:00	12:40		25				25	8:00	8:38	
27	12:00	12:40		27				27	10:00	10:44	
29	12:00	12:40		29				29	10:00	10:53	
31	12:00	12:40		31				31	10:00	10:58	
2	9:55	10:15		2	10:00	10:40		2			
4	10:03	10:31		4	10:00	10:40		4			
6	10:12	10:41		6	10:35	11:02		6			
8	10:18	10:53		8	10:45	11:12		8			
10	10:38	11:13		10	10:50	11:21		10			
12	10:50	11:15		12	11:00	11:30		12			
14	11:00	11:30		14	11:18	11:48		14			
16	11:10	11:35		16	11:24	11:54		16			
18	11:45	11:57		18	11:28	11:58		18			
20	11:50			20	11:40	12:10		20			
22	11:55			22	11:48	12:18		22			
24	11:59			24	11:52	12:22		24			
26				26	12:00	12:30		26			
28				28	12:00	12:30		28			
30				30	12:00	12:30		30			
1				1				1			
2				2				2	12:00	12:06	

REMARKS:

25/26 15/15 17/17 40/41

Condition of Signals Condition of Pusher 17/17 17/17

DAILY REPORT OF OPERATION							
TIME	Ovens Pushed	Ovens Charged	Ovens Scheduled	TIME	Ovens Pushed	Ovens Charged	Ovens Scheduled
12-1	1	1		6-7	5	6	
1-2	1	1		7-8	3	5	
2-3	1	1		8-9	4	4	
3-4	1	1		9-10	2	2	
4-5	1	1		10-11	5	4	
5-6	1	1		11-12	6	4	
	32	35			25	23	

Total Ovens Pushed 57

Total Ovens Charged 58

Pusherman

Battery Foreman JAH

UNITED STATES STEEL CORPORATION
CLAIRTON CORE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1

12 Hrs. Beginning 12:00 A.M.

Date 9-29-93

BATTERY NO. <u>A-3</u>				BATTERY NO. <u>B-3</u>				BATTERY NO. <u>A-2</u>			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1				1				1	5 12	5 49	
3				3				3	5 31	6 01	
5		5 09		5				5	5 41	6 11	
7		12 20		7				7	5 51	6 21	
9		12 30		9				9	6 03	6 31	
11	12 07	12 40		11				11	6 13	6 41	
13	12 18	12 50		13				13	6 30	7 -	
15	12 28	1 -		15				15	6 40	7 10	
17	12 38	1 10		17				17	6 50	7 20	
19	12 48	1 20		19				19	7 03	7 30	
21	12 58	1 30		21				21	7 13	8 10	
23	1 08	1 40		23				23	7 23	8 12	
25	1 18	1 50		25				(25)	7 33	8 13	
27	1 28	2 -		27				(27)	8 -5	8 55	
29	1 38	2 10		29				29	8 10	9 50	
31	1 48	2 20		31				31	8 15	9 55	
2	1 30	2 40		(3)	2 03	2 42		2			
4	1 40	10 28		4	2 13	2 52		4			
6	2 40	10 32		6	2 30	3 02 AB		6			
8	2 48	10 41		8	2 40	3 12		8			
10	10 10	11 00		10	2 50	3 32		10			
12	10 40	11 17		12	3 -	3 32		12			
14	10 55	11 27		14	3 10	3 42		14			
16	11 25	11 28		16	3 20	3 52		16			
18	11 45	11 55		18	3 30	4 33		18			
20	11 55			20	3 40	4 43		20			
22	12 10			22	3 50	4 53		22			
24	12 25			24	4 35	5 03		24			
26				26	4 45	5 12		26			
28				28	4 55	5 19		28			
30				30	5 05	5 29		30			
1				C1	5 10	5 39		1			
2				2				2			

REMARKS:

Condition of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	
12-1	6	6		6-7	5	5		
1-2	5	5		7-8	4	4		Total Ovens Pushed 55
2-3	5	5		8-9	3	4		Total Ovens Charged 55
3-4	6	6		9-10	4	3		
4-5	3	3		10-11	3	3		Pusherman
5-6	6	6		11-12	5	5		Battery Foreman <u>JAN</u>
	31	31			24	24		

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1

12 Hrs. Beginning 12:00 AM

Date 9-30-93

BATTERY NO. <u>B-2</u>				BATTERY NO. <u>A-1</u>				BATTERY NO. <u>B-1</u>			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1				1	8 40	8 43	✓	1	57	1 59	✓
3				3	8 50	8 54	✓	3	2 08	2 10	✓
5				5	9 04	9 07		5	2 18	2 20	✓
7				7	9 15	9 18		7	2 35	2 37	✓
9				9	9 20	9 23		9	10 35	10 38	✓
11				11	9 47	9 51		11	2 56	2 58	✓
13				13	10 10	10 13		13	3 10	3 12	✓
15				15	10 20	10 23		15	3 20	3 22	✓
17				17	10 45	10 48		17	3 30	3 32	✓
19				19	10 53	10 58		19	3 42	3 44	✓
21				21	11 10	11 13		21	3 50	3 54	✓
23				23	11 22	11 25		23	4 32	4 34	✓
25				25	11 35	11 38		25	4 44	4 46	✓
27				27	11 48	11 51		27	4 55	4 57	✓
29				29	11 56	11 59		29	5 06	5 08	✓
31		2 05	✓	31				31	5 16	5 18	✓
2	5 35	6 07	✓	2				2			
4	5 45	6 23	✓	4				4			
6	5 55	6 34	✓	6				6			
8	6 09	6 44	✓	8				8			
10	6 55	6 56	✓	10				10			
12	6 36	7 08	✓	12				12			
14	6 46	7 18	✓	14	12 10	12 12	✓	14			
16	6 58	7 28	✓	16	12 22	12 24	✓	16			
18	7 10	7 38	✓	18	12 32	12 34	✓	18			
20	7 20	7 48	✓	20	12 45	12 44	✓	20			
22	7 30	8 02	✓	22	12 50	12 54	✓	22			
24	7 40	8 08	✓	24	1 04	1 06	✓	24			
26	7 50	8 10	✓	26	1 18	1 20	✓	26			
28	8 46	6 50	✓	28	1 30	1 32	✓	28			
30	8 14	8 17	✓	30	1 48	1 50	✓	30			
01	8 25	8 28	✓	01				01			
2				2				02	5 01	5 03	✓

REMARKS: 16/ 24/ 17/ 57
17 24 17 58

Condition of Signals _____ Condition of Pusner _____

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
1-1	5	5		5-7	5	6	
1-2	5	5		7-8	5	5	
2-3	5	5		8-9	4	7	
3-4	5	5		9-10	4	4	
4-5	3	3		10-11	5	5	
5-5	6	3		11-12	5	5	
	29	26			28	32	

Total Ovens Pushed 57
Total Ovens Charged 58

Pusherman _____
Battery Foreman Blair

UNITED STATES STEEL CORPORATION
 CLAIRTON CORE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1

12 Hrs Beginning 12:00 A.M.

Date 12/15/55

BATTERY NO. 1				BATTERY NO. 2				BATTERY NO. 3			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1				1	7 30	7 27		1	1 52	2 31	
3				3	7 45	7 32		3	2 -	2 38	
5				5	7 55	7 42		5	2 12	2 45	
7				7	7 15	10 15		7	2 27	3 -	
9				9	-	-		9	2 42	3 10	
11				11	-	-		11	2 52	3 20	
13				13	7 25	10 25		13	3 02	3 30	
15				15	7 30	10 52		15	3 12	3 40	
17				17	10 25	11 12		17	3 22	3 50	
19				19	10 50	11 12		19	3 32	4 34	
21				21	11 25	11 22		21	3 42	4 44	
23				23	11 15	11 21		23	3 52	4 54	
25				25	11 30	11 55		25	4 36	5 08	
27				27	11 40			27	4 46	5 30	
29				29	11 50			29	4 56	5 43	
31				31				31	5 10	5 53	
2	5 27	6 04		2				2			
4	5 40	6 15		4				4			
6	5 50	6 28		6				6			
8	6 02	6 38		8		12 06		8			
10	6 13	6 48		10	6 19			10			
12	6 30	6 54		12		12 27		12			
14	6 40	7 14		14	12 04	12 38		14			
16	6 50	7 24		16	12 16	12 59		16			
18	7 02	7 34		18	12 25	1 07		18			
20	7 12	7 44		20	12 36	1 14		20			
22	7 22	7 55		22	12 45	1 32		22			
24	7 32	8 05		24	12 57	1 40		24			
26	7 42	8 15		26	1 09	1 49		26			
28	8 05	8 38		28	1 24	1 58		28			
30	8 15	8 48		30	1 34	2 10		30			
1				1	1 42	2 22		1			
2				2				2			

REMARKS: 15/15 24/23 16/16 55/54

Condition of Signals Condition of Pusner

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
12-1	6	4		8-7	6	6	
1-2	5	6		7-8	5	4	
2-3	5	5		8-9	5	4	
3-4	6	6		9-10	3	4	
4-5	3	3		10-11	2	3	
5-6	4	4		11-12	5	5	
	29	28			26	26	

Total Ovens Pushed 55
 Total Ovens Charged 54
 Pusherman
 Battery Foreman

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1

12 Hrs. Beginning 12:00 ^{PM}

Date 9-20-73

BATTERY NO. <u>15-2</u>				BATTERY NO. <u>17-1</u>				BATTERY NO. <u>19-1</u>			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	4:25	4:35	1					1	10:04	10:32	63
3	4:15	4:45	3					3	10:19	10:47	65
5	4:22	4:56	5					5	10:24	10:57	67
7	4:37	5:06	7					7	10:34	11	69
9	4:47	5:16	9					9	X	X	71.5-71.5
11	4:58	5:27	11					11	10:49	11:17	
13	5:08	5:37	13					13	10:59	11:18	
15	5:18	5:48	15					15	11:09		
17	5:29	5:58	17					17	11:20		
19	5:39	6:09	19					19			
21	5:50	6:19	21					21			
23	6	6:29	23					23			
25	6:11	6:40	25					25			
27	6:21	6:50	27					27			
29	6:31	7:01	29					29			
31	9:43	X	X	31	12:45	12:48		31			
2				2	6:52	7:22	33	2	1:05	1:08	
4				4	7:03	7:31	35	4	1:16	1:19	
6				6	7:14	7:37	37	6	1:22	1:30	
8				8	7:24	7:48	39	8	1:40	1:43	
10				10	7:29	8:28	40	10	1:50	1:53	
12				12	7:39	8:38	42	12	2	2:05	
14				14	7:50	8:48	44	14	2:11	2:14	
16				16	8:30	8:58	46	16	2:24	2:28	
18				18	8:40	9:08	48	18	2:35	2:39	
20				20	8:50	9:21	50	20	2:48	2:51	
22				22	9	9:31	52	22	2:57	2:59	
24				24	9:10	9:52	54	24	3:10	3:15	
26				26	9:23	10:04	56	26	3:20	3:23	
28				28	9:33	10:12	58	28	3:30	3:34	
30				30	9:54	10:22	61	30	3:40	4:19	
5/7	6:42	7:12	31					5/7	3:45	4:31	

REMARKS:

Condition of Signals Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
12-1	1	1		6-7	6	5	
1-2	5	5		7-8	6	6	
2-3	6	6		8-9	3	4	
3-4	5	3		9-10	6	4	
4-5	6	5		10-11	6	6	
5-6	5	6		11-12	2	2	
28	26				29	27	

Total Ovens Pushed 57

Total Ovens Charged 59

Pusherman J. J. W.

Battery Foreman J. J. W.

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1

12 Hrs. Beginning 12:00 -- 4

Date 2-2-57

BATTERY NO. 1				BATTERY NO. 2				BATTERY NO. 3			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	4 15	4 34		1				1	9 56	10 32	
3	4 10	4 44		3				3	10 08	10 40	
5	4 21	4 56		5				5	10 18	10 48	
7	4 32	5 06		7				7	10 30	10 54	
9	4 42	5 16		9				9	10 38	11 07	
11	4 53	5 26		11				11	10 46	11 17	
13	5 04	5 37		13				13	10 52	11 27	
15	5 14	5 47		15				15	11 05		
17	5 24	5 57		17				17	11 15		
19	5 35	6 07		19				19	11 25		
21	5 45	6 17		21				21			
23	5 55	6 27		23				23			
25	6 05	6 38		25				25			
27	6 15	6 48		27		12 47		27			
29	6 25	6 58		29		12 52		29			
31	6 36	7 10		31	12 40	1 05		31			
2				2	6 46	7 22		2	1 30	1 52	
4				4	6 56	7 37		4	1 10	1 47	
6				6	7 08	7 47		6	1 20	1 57	
8				8	7 20	7 57		8	1 30	2 07	
10				10	=	=		10	1 45	2 10	
12				12	7 35	8 37		12	1 55	2 12	
14				14	7 45	8 47		14	2 05	2 32	
16				16	7 55	8 57		16	2 15	2 42	
18				18	8 35	9 07		18	2 25	2 52	
20				20	8 45	9 18		20	2 35	3 02	
22				22	8 55	9 30		22	2 45	3 12	
24				24	9 05	9 40		24	2 55	3 22	
26				26	9 16	9 50		26	3 05	3 32	
28				28	9 28	9 58		28	3 15	3 42	
30				30	9 38	10 10		30	3 25	3 52	
1				1	9 48	10 20		1			
2				2	12 50	1 12		2			

REMARKS: 16/116 17/118 25/22 58 57

Condition of Signals _____ Condition of Pusher _____

HOURLY REPORT OF OPERATION

TIME	Ovens Pushed	Ovens Charged	Ovens Scheduled	TIME	Ovens Pushed	Ovens Charged	Ovens Scheduled
12-1	2	2		8-7	6	6	
1-2	2	5		7-8	5	5	
2-3	5	6		9-9	3	3	
3-4	5	4		9-10	6	6	
4-5	5	5		10-11	6	6	
5-6	6	6		11-12	3	3	
	29	28			29	29	

Total Ovens Pushed 58
Total Ovens Charged 57

Pusherman _____
Battery Foreman *[Signature]*

+ BZE/2 after A4/1

Wednesday, September 27, 1990
Batteries: 1-1-1

Sec	Over	Last Pushed	Earliest	Desired	Latest
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
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					
60					
61					
62					
63					
64					
65					
66					
67					
68					
69					
70					
71					
72					
73					
74					
75					
76					
77					
78					
79					
80					
81					
82					
83					
84					
85					
86					
87					
88					
89					
90					
91					
92					
93					
94					
95					
96					
97					
98					
99					
100					

- B $\frac{10}{3}$ BAKED

Thursday, September 20, 1945 11:00

Batteries: 1-1-1

Sec #	Area	Lat. Fixed	Lat. East	Lat. West	Lat. East
66					
67					
68					
69					
70					
71					
72					
73					
74					
75					
76					
77					
78					
79					

1/-B9

B2 1/2 after A9 1/2

B10 1/3 after B10 1/2

Batteries: 1-00

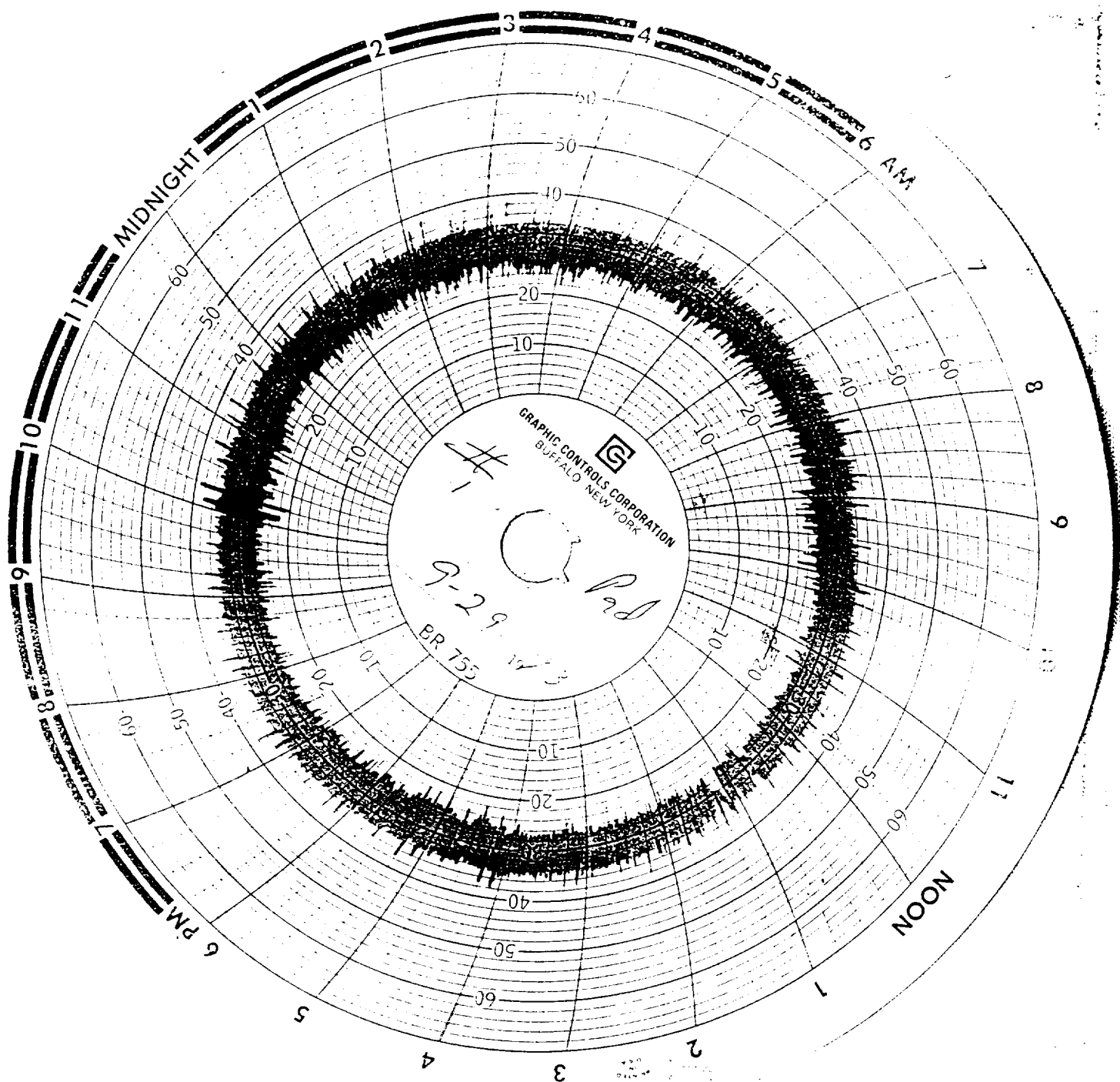
- B28/2 - B9/3 - B11/3
+ B9/1 " A7/1

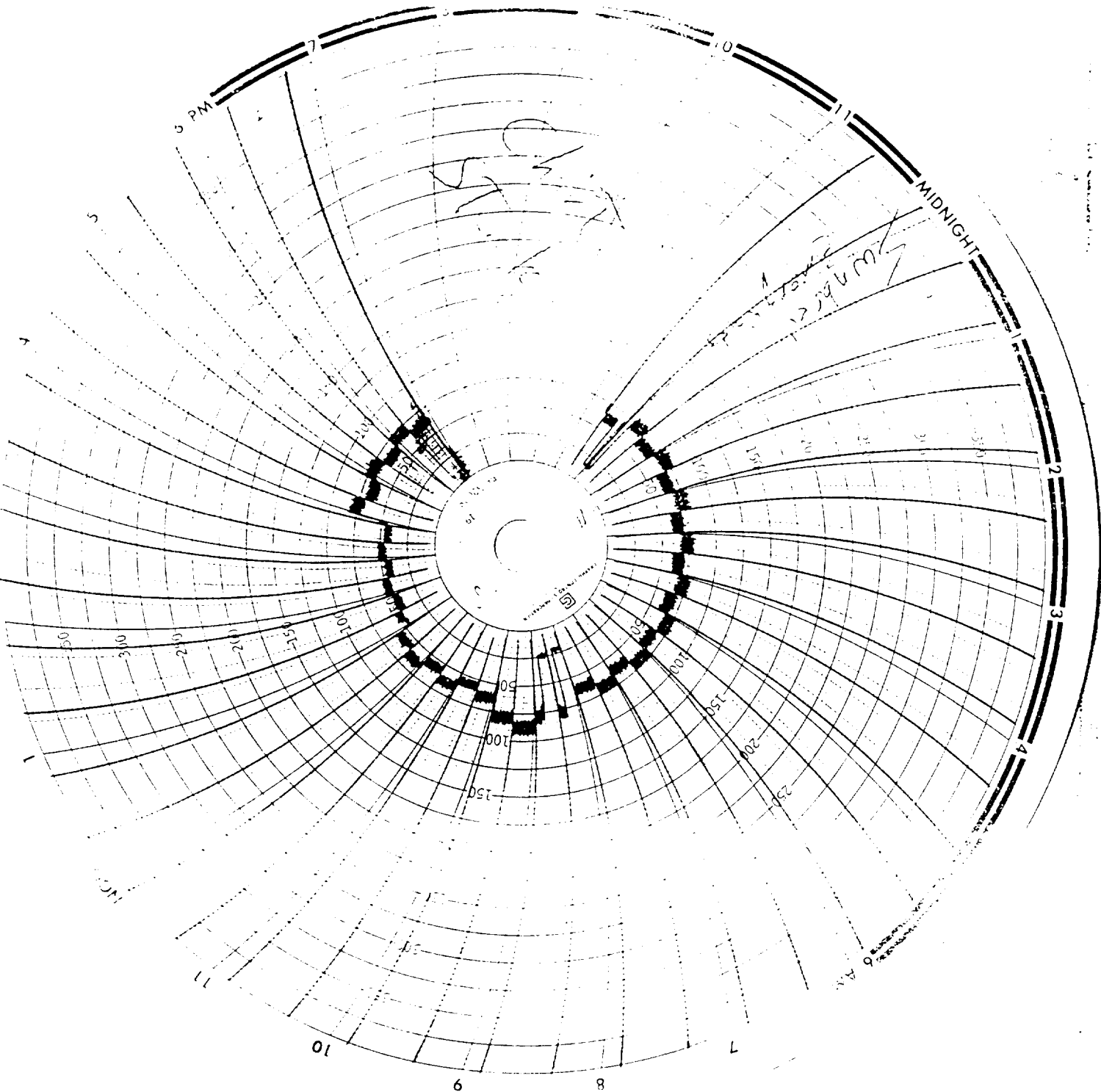
Thursday, September 30, 1992
 Batteries: 1-3

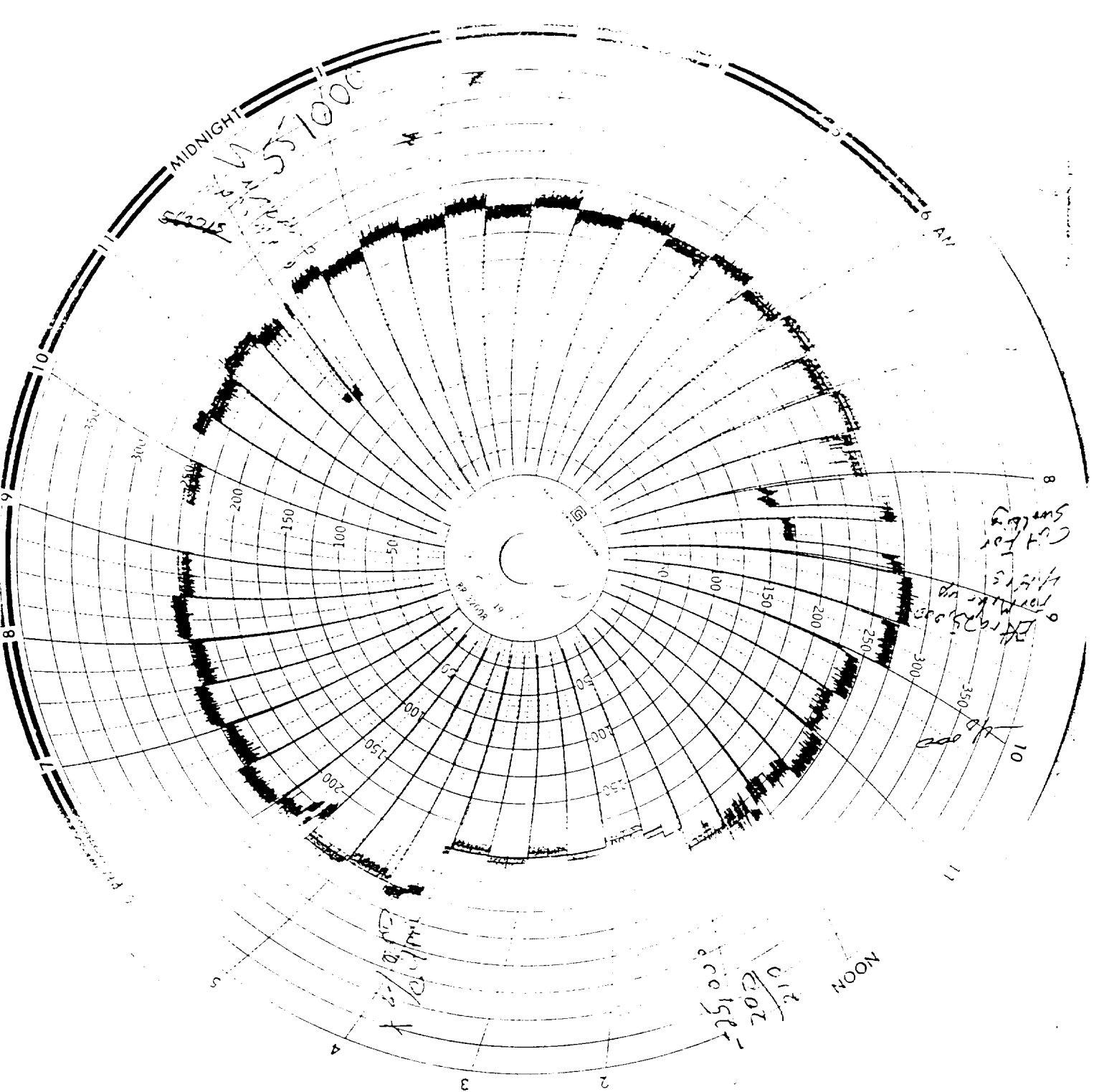
Sec	Over	Last Pushed	Earliest	Desired	Latest
60					
61					
62					
63					
64					
65					
66					
67					
68					
69					
70					
71					
72					
73					
74					
75					
76					
77					
78					
79					
80					

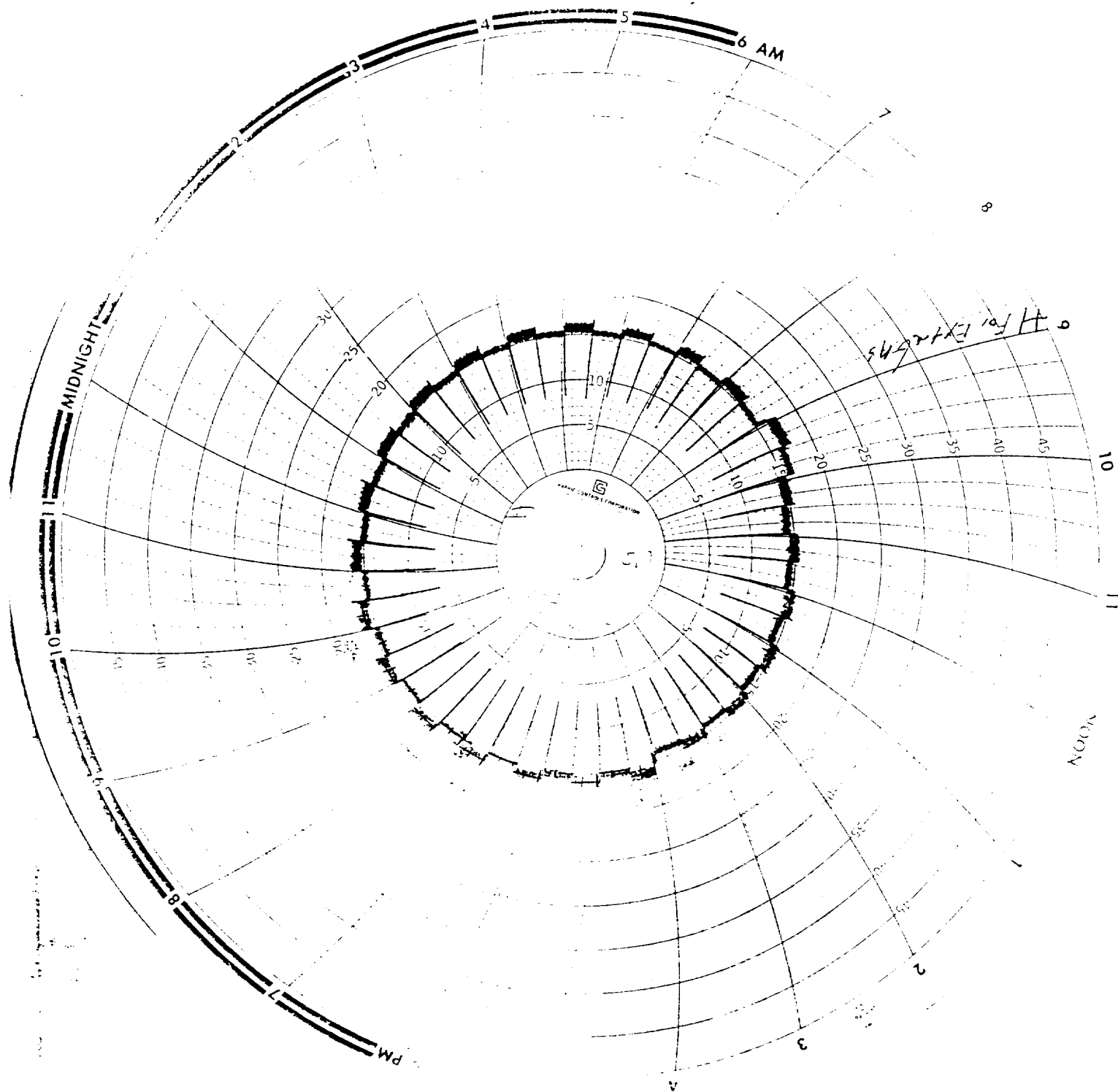
$$-B \frac{31}{2} - B \frac{10}{3} - C \frac{9}{1}$$

$$+ B \frac{31}{1} \cup C \frac{1}{3}$$









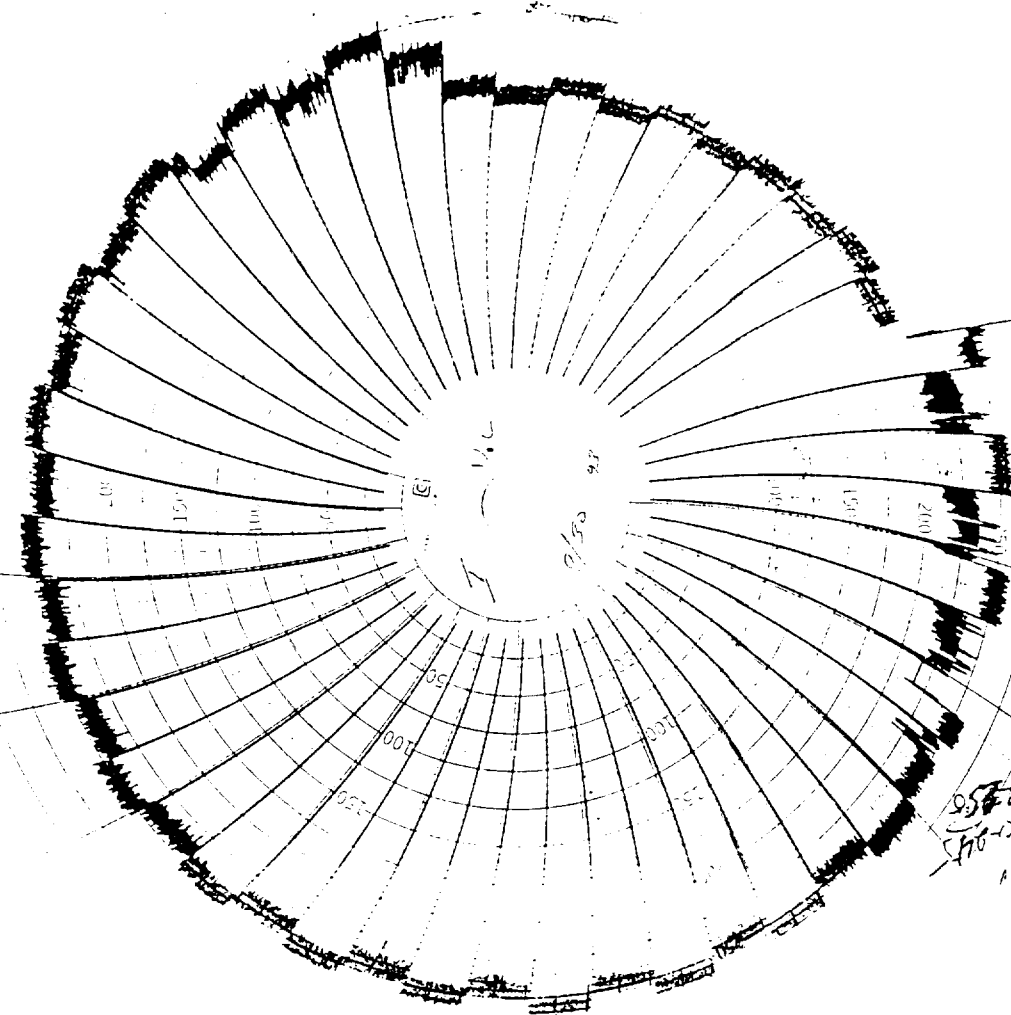
200-000
200-000
200-000

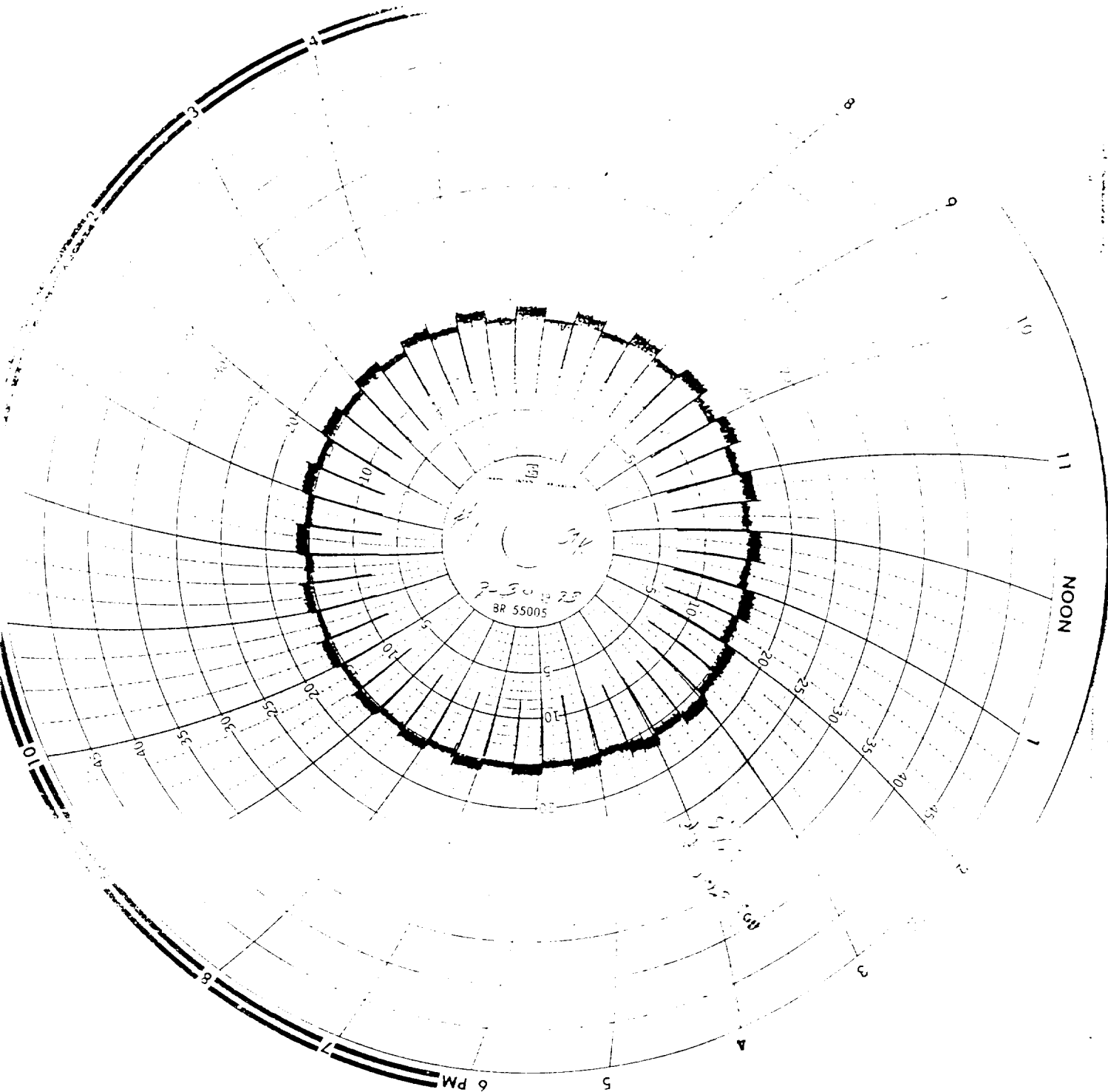
200-000

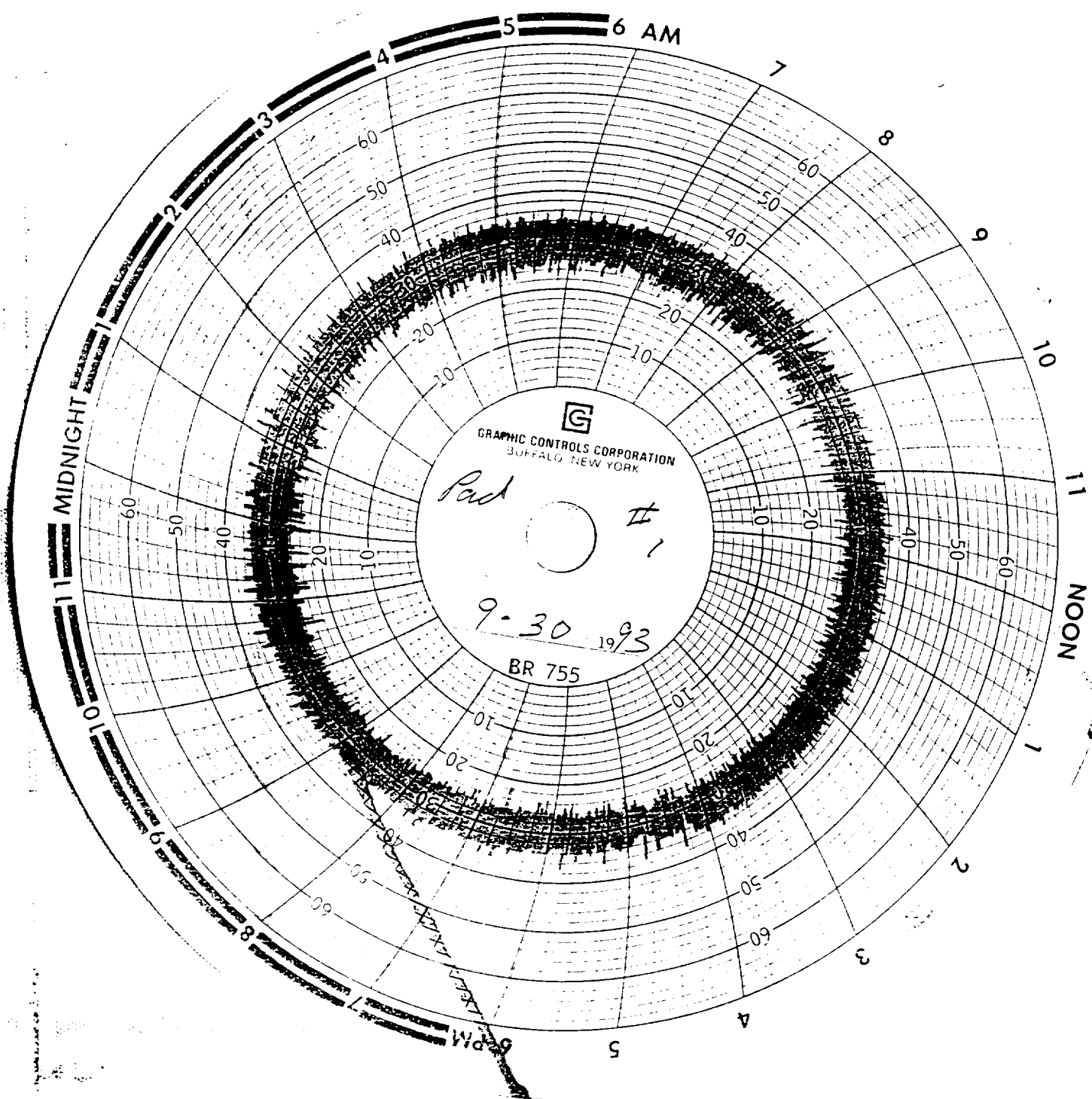
6 PM

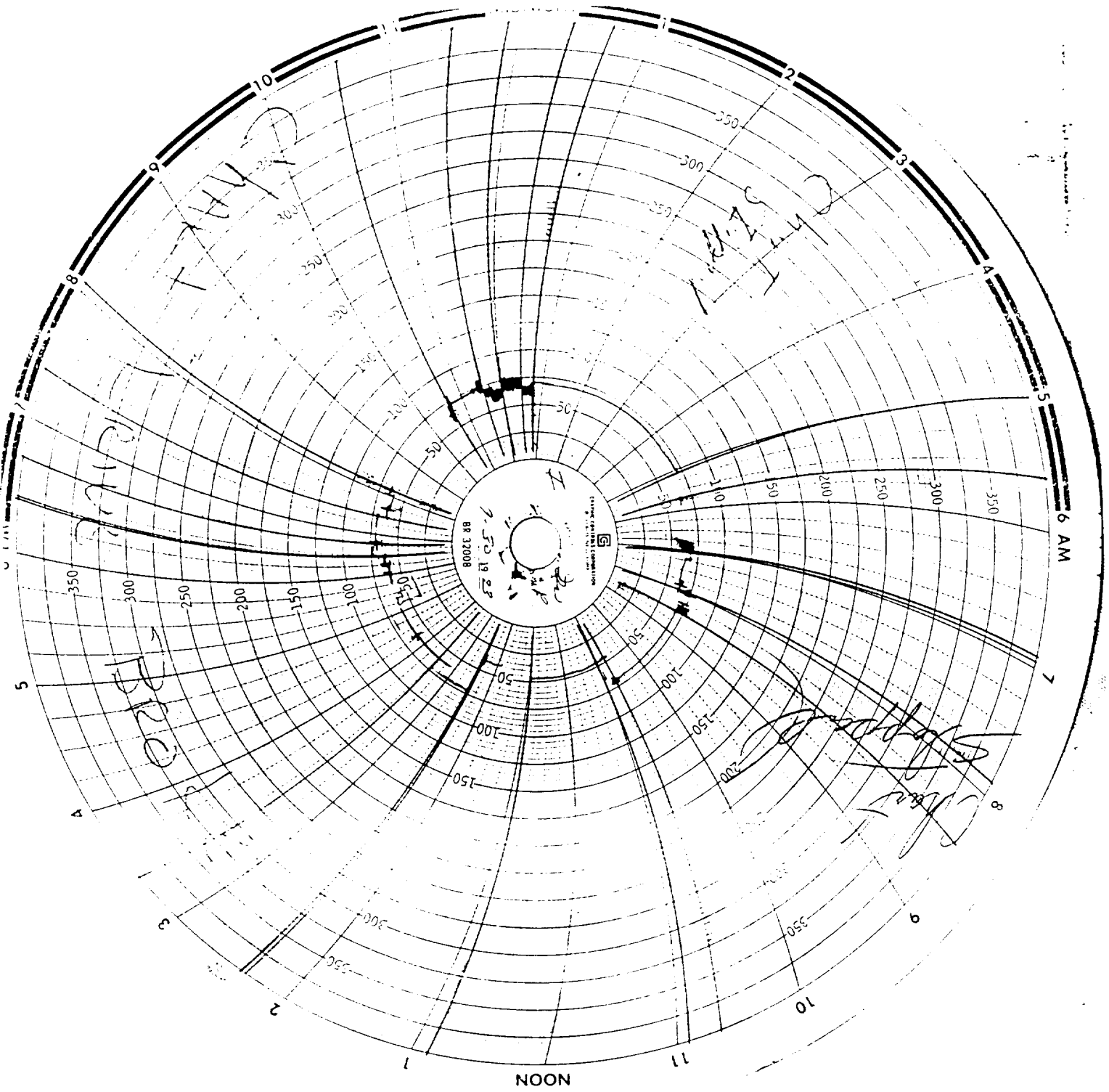
151001
RASCAL-045
T-44-050

200-000









**COMPLIANCE DEMONSTRATION
NO. 1 BATTERY COMBUSTION STACK
USS CLAIRTON WORKS**

**USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA**

**APPENDIX C
GRAVIMETRIC RESULTS, EMISSIONS CALCULATIONS**

**KEYSTONE ENVIRONMENTAL RESOURCES
AIR QUALITY ENGINEERING
ANALYTICAL REPORTING FORM**

CLIENT	USS - Clinton Steel	TEST DATE	9/29 + 9/30/93
PLANT LOCATION	#1 BATTERY STACK	DATE RECEIVED	9/30/93
PROJECT NUMBER	600726-01	DATE ANALYZED	10/4/93
UNIT TESTED	265	ANALYTICAL METHOD	
			0.22µm Filter

[illegible]

Analyst's Signature P. C. G. Heston
Date 10/6/83

Comments

STACK SAMPLING CALCULATIONS

CLIENT UES Clinton Works

TEST DATE 9-29-93

TEST SITE #1 Battery Stack

TEST NUMBER CLR-135-PM-1

A. Barometric Pressure	<u>29.50</u>	in. Hg	
B. Static Pressure	<u>-1.2</u>	in. H2O	
C. Stack Pressure	<u>29.41</u>	in. Hg	[A+(B/13.6)]
D. Average ΔH	<u>0.94</u>	in. H2O	
E. Meter Pressure	<u>29.57</u>	in. Hg	[A+(D/13.6)]
F. Average ΔP	<u>0.055</u>	in. H2O	
G. Pitot Coefficient	<u>0.84</u>		
H. Gas Meter Coefficient	<u>0.9619</u>		
I. Stack Diameter	<u>11.4</u>	in.	
J. Stack Area	<u>70.88</u>	ft ²	(0.00545*I ²)
K. Nozzle Diameter	<u>0.428</u>	in.	
L. Nozzle Area	<u>9.99 x 10⁻⁴</u>	ft ²	(0.00545*K ²)
M. Average Stack Temperature	<u>515</u>	°F	
N. Average Stack Temperature	<u>975</u>	°R	(460+M)
O. Average Meter Temperature	<u>81</u>	°F	
P. Average Meter Temperature	<u>541</u>	°R	(460+O)
Q. Condensate Volume	<u>150.4</u>	mL	
R. Absorbed H2O	<u>13.3</u>	mL	
S. Total H2O	<u>163.7</u>	mL	(Q+R)
T. Filter Weight	<u>0.0089</u>	g	
U. Probe Weight	<u>0.0281</u>	g	
V. Impinger Weight		g	
W. Total Weight	<u>0.0370</u>	g	(T+U+V)
X. Metered Gas Volume	<u>70.995</u>	dcf	
Y. Corrected Metered Gas Volume	<u>68.290</u>	dcf	(X*H)
Z. H2O Gas Volume	<u>8.016</u>	cf	(0.00267*S*P/A)
AA. Total Sample Volume	<u>76.306</u>	cf	(Y+Z)
BB. Percent H2O	<u>10.5</u>	%	(100*Z/AA)
CC. Gas Volume Sampled	<u>65.869</u>	dscf	[Y*(528/P)*(E/29.92)]
DD. Grain Loading	<u>0.0087</u>	gr/dscf	(15.43*W/CC)
EE. Average Molecular Weight:			

Component	% Volume ÷100	*(1-BB/100)	* Molecular Weight	= Weight/Mol
H2O	<u>0.105</u>		18	<u>1.890</u>
CO2	<u>0.04</u>	<u>0.895</u>	44	<u>1.575</u>
CO	<u>0</u>	<u>1</u>	28	<u>0</u>
O2	<u>0.13</u>	<u>1</u>	32	<u>3.723</u>
N2	<u>0.83</u>	<u>↓</u>	28	<u>20.800</u>

Average Molecular Weight 27.99 lb./lb. mol

FF. Average Stack Velocity	<u>18.3</u>	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG. Average Flow Rate	<u>77900</u>	acfm	(60*FF*J)
HH. Standard Flow Rate	<u>41500</u>	scfm	[GG*(528/N)*(C/29.92)]
II. Sample Time	<u>7200</u>	sec	
JJ. Percent Isokinetic	<u>104.9</u>	%	{[100*CC*60*J] / [HH*L*II*(1-BB/100)]}
KK. Mass Flow Rate	<u>2.8</u>	lb/hr	[DD*HH*(1-BB/100)*60/7000]



CHESTER
ENVIRONMENTAL

STACK SAMPLING CALCULATIONS

CLIENT USS Clayton Works
TEST SITE #1 Battery Stack

TEST DATE 9-30-93
TEST NUMBER CLR-1BS-PM-2

A. Barometric Pressure	<u>29.60</u>	in. Hg	
B. Static Pressure	<u>-1.2</u>	in. H2O	
C. Stack Pressure	<u>29.51</u>	in. Hg	[A+(B/13.6)]
D. Average ΔH	<u>0.93</u>	in. H2O	
E. Meter Pressure	<u>29.67</u>	in. Hg	[A+(D/13.6)]
F. Average ΔP	<u>0.055</u>	in. H2O	
G. Pitot Coefficient	<u>0.84</u>		
H. Gas Meter Coefficient	<u>0.9619</u>		
I. Stack Diameter	<u>114</u>	in.	
J. Stack Area	<u>70.88</u>	ft ²	(0.00545*I ²)
K. Nozzle Diameter	<u>0.428</u>	in.	
L. Nozzle Area	<u>9.99 x 10⁻⁴</u>	ft ²	(0.00545*K ²)
M. Average Stack Temperature	<u>511</u>	°F	
N. Average Stack Temperature	<u>971</u>	°R	(460+M)
O. Average Meter Temperature	<u>69</u>	°F	
P. Average Meter Temperature	<u>529</u>	°R	(460+O)
Q. Condensate Volume	<u>190.9</u>	mL	
R. Absorbed H2O	<u>13.4</u>	mL	
S. Total H2O	<u>204.3</u>	mL	(Q+R)
T. Filter Weight	<u>0.0110</u>	g	
U. Probe Weight	<u>0.0377</u>	g	
V. Impinger Weight		g	
W. Total Weight	<u>0.0487</u>	g	(T+U+V)
X. Metered Gas Volume	<u>70.975</u>	dcf	
Y. Corrected Metered Gas Volume	<u>68.271</u>	dcf	(X*H)
Z. H2O Gas Volume	<u>9.749</u>	cf	(0.00267*S*P/A)
AA. Total Sample Volume	<u>78.020</u>	cf	(Y+Z)
BB. Percent H2O	<u>12.5</u>	%	(100*Z/AA)
CC. Gas Volume Sampled	<u>67.573</u>	dscf	[Y*(528/P)*(E/29.92)]
DD. Grain Loading	<u>0.0111</u>	gr/dscf	(15.43*W/CC)
EE. Average Molecular Weight:			

Component	% Volume ÷100	* (1-BB/100)	* Molecular Weight	= Weight/Mol
H2O	0.125		18	2.250
CO2	0.04	0.875	44	1.540
CO	0		28	0
O2	0.13		32	3.640
N2	0.83		28	20.335

Average Molecular Weight 27.77 lb./lb. mol

FF. Average Stack Velocity	<u>18.3</u>	ips	{85.49*G*[(F*N)/(C*EE)]*0.5}
GG. Average Flow Rate	<u>78000</u>	acfm	(60*FF*J)
HH. Standard Flow Rate	<u>41800</u>	scfm	[GG*(528/N)*(C/29.92)]
II. Sample Time	<u>7200</u>	sec	
JJ. Percent Isokinetic	<u>109.2</u>	%	{[100*CC*60*J] / [HH*L*II*(1-BB/100)]}
KK. Mass Flow Rate	<u>35</u>	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT JSS Clinton Works

TEST DATE 9-30-93

TEST SITE #1 Battery Stack

TEST NUMBER CLR-185-PM-3

A. Barometric Pressure	<u>29.60</u>	in. Hg	
B. Static Pressure	<u>-1.2</u>	in. H2O	
C. Stack Pressure	<u>29.51</u>	in. Hg	[A+(B/13.6)]
D. Average ΔH	<u>1.00</u>	in. H2O	
E. Meter Pressure	<u>29.67</u>	in. Hg	[A+(D/13.6)]
F. Average ΔP	<u>0.060</u>	in. H2O	
G. Pitot Coefficient	<u>0.84</u>		
H. Gas Meter Coefficient	<u>0.969</u>		
I. Stack Diameter	<u>11.4</u>	in.	
J. Stack Area	<u>70.88</u>	ft ²	(0.00545*I ²)
K. Nozzle Diameter	<u>0.428</u>	in.	
L. Nozzle Area	<u>9.99 x 10⁻⁴</u>	ft ²	(0.00545*K ²)
M. Average Stack Temperature	<u>51.8</u>	°F	
N. Average Stack Temperature	<u>97.8</u>	°R	(460+M)
O. Average Meter Temperature	<u>75</u>	°F	
P. Average Meter Temperature	<u>53.5</u>	°R	(460+O)
Q. Condensate Volume	<u>150.4</u>	mL	
R. Absorbed H2O	<u>14.7</u>	mL	
S. Total H2O	<u>165.1</u>	mL	(Q+R)
T. Filter Weight	<u>0.0057</u>	g	
U. Probe Weight	<u>0.0147</u>	g	
V. Impinger Weight	<u>—</u>	g	
W. Total Weight	<u>0.0204</u>	g	(T+U+V)
X. Metered Gas Volume	<u>72.221</u>	dcf	
Y. Corrected Metered Gas Volume	<u>69.469</u>	dcf	(X*H)
Z. H2O Gas Volume	<u>7.967</u>	cf	(0.00267*S*P/A)
AA. Total Sample Volume	<u>77.436</u>	cf	(Y+Z)
BB. Percent H2O	<u>10.3</u>	%	(100*Z/AA)
CC. Gas Volume Sampled	<u>67.987</u>	dscf	[Y*(528/P)*(E/29.92)]
DD. Grain Loading	<u>0.0046</u>	gr/dscf	(15.43*W/CC)
EE. Average Molecular Weight:			

Component	% Volume ÷100	* (1-BB/100)	* Molecular Weight	= Weight/Mol
H2O	0.103		18	1.854
CO2	0.04	0.897	44	1.579
CO	0	1	28	0
O2	0.13	1	32	3.732
N2	0.83	1	28	20.846

Average Molecular Weight 28.01 lb./lb. mol

FF. Average Stack Velocity	<u>9.1</u>	fps	{85.49*G*[(F*N)/(C*EE)]*0.5}
GG. Average Flow Rate	<u>81400</u>	acfm	(60*FF*J)
HH. Standard Flow Rate	<u>43300</u>	scfm	[GG*(528/N)*(C/29.92)]
II. Sample Time	<u>7200</u>	sec	
JJ. Percent Isokinetic	<u>103.4</u>	%	{[100*CC*60*J] / [HH*L* π *(1-BB/100)]}
KK. Mass Flow Rate	<u>1.5</u>	lb/hr	[DD*HH*(1-BB/100)*60/7000]



CHESTER
ENVIRONMENTAL