Note: This is a reference cited in *AP 42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources.* AP42 is located on the EPA web site at www.epa.gov/ttn/chief/ap42/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

(5)

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

WGG
WUC

RECEIVED

OCT 05 1993

10-6-93

AHF 10/7

Octo

~~AHF~~:
For your review and file.
Please have WUC ~~or WGG~~
see me after reviewing this
report.
CJF

Director
Bureau of Air Quality Control
Department of Environmental Resources
P.O. Box 2063
Harrisburg, PA 17120

Depu
Alleg
Depa
301
Pittsl

U.S. Environmental Protection Agency
Region III
841 Chestnut Building
Philadelphia, PA 19017

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

Gentlemen:

Subject: Compliance Demonstration
Clairton Battery Stack #3

I have enclosed with this letter the mass emission report on #3 Battery Combustion Stack. The compliance demonstration was conducted at USS Clairton Works, Clairton, PA, a division of USX Corporation, on August 4-5, 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

Steel the recycled material

USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA

Report on
COMPLIANCE DEMONSTRATION
NO. 3 BATTERY COMBUSTION STACK
USS CLAIRTON WORKS

SEPTEMBER 1993

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

Project No.: 605041-01

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EXECUTIVE SUMMARY

On August 4 and 5, 1993, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #3 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 0.0099 grains per dry standard cubic feet (gr/dscf) and 3.2 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 #3 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 August 4 and 5, 1993, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #3 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 a representative from the Allegheny County Health Department Bureau of Environmental Quality (BEQ).

The test program required two days to complete the field work activities due to a delay in the operation of the Battery #3. Since no ovens in Battery #3 were pushed or charged from approximately 1400 to 1730 on August 4 1993, no emissions testing was completed during this time period. The third test run was conducted on the following day, August 5, 1993.

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 (CO_2), oxygen (O_2), and nitrogen (N_2, 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 0.0099 grains per dry standard cubic feet (gr/dscf) and 3.2 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 #3 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 (^{o}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 97.6 percent, 104.3 percent, and 104.2 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.

TABLE 1

USS CLAIRTON WORKS
CLAIRTON, PA

#3 BATTERY COMBUSTION STACK
PARTICULATE MATTER EMISSIONS DATA

		Run 1	Run 2	Run 3	Average
Test Number		CLR-BS3-1	CLR-BS3-2	CLR-BS3-3	
Test Date		8-4-93	8-4-93	8-5-93	
Mass Emissions Rate and Concentration					
Particulate Matter	(lb/hr)	10.9	4.1	2.5	5.8
	(gr/dscf)	0.0375	0.0144	0.0089	0.0203
Stack Conditions					
Flow Rate	(acfm)	73800	75100	74500	74467
	(scfm)	38900	38400	38600	38633
	(dscfm)	33960	33101	33466	33509
Temperature	(°F)	522	551	540	538
Moisture Content	(%)	12.7	13.8	13.3	13.3
Sampling Conditions					
Test times		0900 to 0930	1155 to 1225	0720 to 0750	
		0934 to 1004	1228 to 1258	0755 to 0825	
		1007 to 1037	1302 to 1332	0828 to 0858	
		1040 to 1110	1336 to 1406	0901 to 0931	
Sampling Time	(minutes)	120	120	120	
Sample Volume	(dscf)	55.979	58.352	58.951	
Isokinetics	(%)	97.6	104.3	104.2	

COMPLIANCE DEMONSTRATION
NO. 3 BATTERY COMBUSTION STACK
USS CLAIRTON WORKS

USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA

APPENDIX A

TEST PROTOCOL, FIELD DATA SHEETS, CALIBRATION RESULTS

CHESTER
ENVIRONMENTAL

TEST PROTOCOL
COMPLIANCE DEMONSTRATION OF
#3 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 CO_2, O_2, and N_2 (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 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 Pollution Control, field data sheets for the particulate matter sampling and visible emissions determinations, emissions calculations, and gravimetric results for each test.

STACK SAMPLING DATA SHEET

CLIENT USX CLAIRTON WORKS	TEST DATE 08-04-93	ORIFICE CORRECTION 1.572	HOT BOX NO. 2
TEST UNIT BATTERY STACK #3	TEST NO. CLR-BS3-1	METER CORRECTION 1.0151	COLD BOX NO. 2
PROJECT NO. 605041-01	NOZZLE (SIZE,#) 0.428 #56	CALIBRATION DATE 07-02-93	PROBE NO. 105-1
CONTROL BOX OPERATOR KPC	STATIC PRESSURE -1.0 "H2O	PITOT CORRECTION 0.84	FILTER NO. 1039
BAROMETRIC PRESSURE 29.35	PORT DIRECTION PORT A-B	CONTROL BOX NO. THREE	STACK DIA. 114"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Req'd. (in. H2O)	Orifice ΔH Act. (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°C/°F)	Hot Box Temp. (°F)	Comments
40.5	09.00	28.615	.05	.69	.69	73	73	3.5	499	~250°	<68°	~250°	5 min/pt
28.5			.06	.83	.83	86	74	4.0	500				
20.2			.06	.83	.83	90	76	4.0	513				
13.5			.06	.83	.83	94	78	4.0	547				
7.6			.06	.83	.83	95	80	4.0	540				
2.4	09:30	44.400	.05	.69	.69	97	82	3.5	500				
40.5	09:34	44.400	.07	.98	.98	95	95	4.5	509				
28.5			.06	.84	.84	101	86	4.0	524				
20.2			.05	.70	.70	103	88	3.5	500				
13.5			.05	.70	.70	105	89	3.5	523				
7.6			.03	.42	.42	104	91	2.0	496				
2.4	10:04	58.876	.03	.42	.42	104	91	2.0	500				
													Estimates:
													MW= 27.7
													%H2O= 14%

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.0	<0.01 cfm
After	6.5	<0.01 cfm

PITOT LEAK CHECK

	Positive	Negative
Before	OK/1550c	OK/1550c
After	OK/1550c	OK/1550c

	1	2
CO2	13.0	13.0
O2	4.0	4.0
CO	0	0
N2	83.0	83.0

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100 mL D.I. H_2O	716.4	571.3	145.1
2.	100 mL D.I. H_2O	571.8	557.1	14.7
3.	Empty	451.2	449.4	1.8
4.	200g Silica Gel	655.1	643.9	11.2
5.				

161.6g

172.8g - 11g

KEYSTONE ENVIRONMENTAL RESOURCES INC

STACK SAMPLING DATA SHEET

CLIENT USX - CLAIRTON Works	TEST DATE 08-04-93	ORIFICE CORRECTION 1.572	HOT BOX NO. 2
TEST UNIT BATTERY STACK #3	TEST NO. CLR-BS3-1	METER CORRECTION 1.0157	COLD BOX NO. 2
PROJECT NO. 6050411-01	NOZZLE (SIZE,#) 0.428"	CALIBRATION DATE 07-02-93	PROBE NO. 10-1
CONTROL BOX OPERATOR RPC	STATIC PRESSURE -1.0 "H2O	PITOT CORRECTION 0.84	FILTER NO. 1039H
BAROMETRIC PRESSURE 29.35	PORT DIRECTION PORT C, D	CONTROL BOX NO. THREE	STACK DIA. 114

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Req'd. (in. H2O)	Orifice ΔH Act. (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°C/°F)	Hot Box Temp. (°F)	Comments
40.5	10:07	58.876	.06	.84	.84	100	92	3.5	535	~250°F	68° F/A	250°F	Sam. Port
28.5			.05	.70	.70	105	92	3.0	560				
20.2			.05	.70	.70	105	92	3.0	572				
13.5			.05	.70	.70	105	92	3.0	561				
7.6			.04	.56	.56	104	92	2.5	520				
2.4	10:37	73.575	.04	.56	.56	104	92	2.5	500				
40.5	10:40	73.575	.06	.84	.84	98	91	3.5	509				
28.5			.06	.84	.84	105	91	3.5	511				
20.2			.05	.70	.70	105	91	3.0	525				
13.5			.04	.56	.56	103	91	3.0	539				
7.6			.03	.42	.42	104	91	2.5	515				
2.4	11:10	87.500	.03	.42	.42	103	91	2.5	520				
													Estimates:
TEST TOTALS	Δ=120 min	Δ=58.885 dcf	$(\Delta P)_{Avg}$=	$(\Delta H)_{Avg}$=0.69		$(T_{meter})_{Avg}$=94°F			$(T_{stack})_{Avg}$=522°F				MW= 27.7
			0.05										%H2O= 14%

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before		
After		

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				

KEYSTONE ENVIRONMENTAL RESOURCES, INC.

STACK SAMPLING DATA SHEET

CLIENT	USX - CLAIRTON	TEST DATE	08-04-93	ORIFICE CORRECTION	1.572	HOT BOX NO.	7
TEST UNIT	BATTERY STACK #3	TEST NO.	CLR-BS3-2	METER CORRECTION	1.0151	COLD BOX NO.	7
PROJECT NO.	605041-01	NOZZLE (SIZE,#)	0.428 #56	CALIBRATION DATE	07-02-93	PROBE NO.	10-1
CONTROL BOX OPERATOR	RPC	STATIC PRESSURE	-1.0" H_2O	PITOT CORRECTION	0.84	FILTER NO.	~~1039~~ 1038
BAROMETRIC PRESSURE	29.35	PORT DIRECTION	PORT D, C	CONTROL BOX NO.	THREE	STACK DIA.	114"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Req'd. (in. H2O)	Orifice ΔH Act. (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°C/°F)	Hot Box Temp. (°F)	Comments
40.5	11:55	87-815	.06	.83	.83	87	85	1.0	540	~250°F	<68°F ICH	~250°F	5 min/pt
28.5			.05	.69	.69	94	86	1.0	520				
20.2			.04	.55	.55	98	86	1.0	552				
13.5			.05	.69	.69	99	87	1.0	550				
7.6			.05	.69	.69	102	87	1.0	550				
2.4	12:25	103.246	.05	.69	.69	103	87	1.0	551				
40.5	12:28	103.246	.06	.83	.83	103	99	1.5	550				
28.5			.06	.83	.83	103	99	3.0	545				
20.2			.05	.69	.69	105	91	2.5	555				
13.5			.06	.83	.83	104	91	3.0	554				
7.6			.03	.41	.41	105	92	1.0	550				
2.4	12:58	117.392	.03	.41	.41	103	92	1.0	551				
													Estimates:
													MW= 27.7
													%H2O= 14%

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.0	<0.015 cfm
After	6.0	<0.015 cfm

PITOT LEAK CHECK

	Positive	Negative
Before	ok/15 sec	ok/15 sec
After	ok/15 sec	ok/15 sec

	1	2
CO2	13.0	13.0
O2	4.0	4.0
CO	0	0
N2	83.0	83.0

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100mL D.I. H_2O	698.8	538.8	160.0
2.	100mL D.I. H_2O	575.5	553.7	21.8
3.	Empty	467.5	464.7	2.8
4.	200g Silica Gel	670.8	657.3	13.5
5.				

184.6g

198.1g total

AQE 2/92

KEYSTONE ENVIRONMENTAL RESOURCES INC

STACK SAMPLING DATA SHEET

CLIENT USX- CLAIRTON	TEST DATE 08-04-93	ORIFICE CORRECTION 1.572	HOT BOX NO. 7
TEST UNIT BATTERY STACK #3	TEST NO. CLR-BS 3-2	METER CORRECTION 1.0151	COLD BOX NO. 7
PROJECT NO. 605041-01	NOZZLE (SIZE,#) 0.428 #56	CALIBRATION DATE 07-02-93	PROBE NO. 10-1
CONTROL BOX OPERATOR RPC	STATIC PRESSURE -1.0" H_2O	PITOT CORRECTION 0.84	FILTER NO. 1038
BAROMETRIC PRESSURE 29.35	PORT DIRECTION PORTS B, A	CONTROL BOX NO. THREE	STACK DIA. 114'

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Req'd. (in. H2O)	Orifice ΔH Act. (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°C/°F)	Hot Box Temp. (°F)	Comments
405	13:02	117.392	.06	.83	.83	94	88	3.5	520	~250	<68°F ICU	250%	5 min/PT
28.5			.06	.83	.83	103	91	4.0	556				
20.2			.06	.83	.83	105	91	3.5	556				
13.5			.06	.83	.83	105	91	3.0	557				
7.6			.06	.83	.83	106	91	3.0	574				
2.4	13:32	133.492	.04	.55	.55	106	92	1.0	550				
405	13:36	133.492	.06	.83	.83	93	89	3.0	525				
28.5			.06	.83	.83	105	89	3.0	565				
20.2			.06	.83	.83	106	92	2.5	574				
13.5			.06	.83	.83	106	92	2.5	584				
7.6			.05	.69	.69	106	92	2.5	574				
2.4	14:06	149.418	.05	.69	.69	105	93	2.5	505				
													Estimates:
TEST TOTALS	Δ = 120 min	Δ = 61.603 dcf	$(\Delta P)_{AVG}$ = 0.05	$(\Delta H)_{AVG}$ = 0.73		$(T_{meter})_{AVG}$ = 96°F			$(T_{stack})_{AVG}$ = 557°F				MW= 27.7 %H2O= 14

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before		
After		

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				

KEYSTONE ENVIRONMENTAL RESOURCES INC

AQE 2/92

STACK SAMPLING DATA SHEET

CLIENT USX CLAIRTON	TEST DATE 08/05/93	ORIFICE CORRECTION 1.572	HOT BOX NO. 5
TEST UNIT BATTERY/STACK #3	TEST NO. CLR-BS3-3	METER CORRECTION 1.0151	COLD BOX NO. 5
PROJECT NO. 605041-01	NOZZLE (SIZE,#) 0.428 #56	CALIBRATION DATE 07/02/93	PROBE NO. 10-1
CONTROL BOX OPERATOR RPC	STATIC PRESSURE -1.1 "H2O	PITOT CORRECTION 0.84	FILTER NO. 1040
BAROMETRIC PRESSURE 29.43	PORT DIRECTION D, C	CONTROL BOX NO. Three	STACK DIA. 114"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Req'd. (in. H2O)	Orifice ΔH Act. (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°C/°F)	Hot Box Temp. (°F)	Comments
40.5	0720	149.835	.05	.65	.65	70	63	1.0	530	250	Iced down/68	250	5 MINS/PT
28.5			.05	.65	.65	75	64	1.0	534				
20.2			.05	.65	.65	80	67	1.0	545				
13.5			.050	.65	.65	84	69	1.5	552				
7.6			.04	.52	.52	85	71	1.0	550				
2.4	0750	164.183	.04	.52	.52	87	73	1.0	556				
40.5	07:55	164.183	.06	.78	.78	87	75	2.5	551				
28.5			.05	.65	.65	90	76	2.0	533				
20.2			.05	.65	.65	91	77	2.0	530				
13.5			.05	.65	.65	93	78	2.0	531				
7.6			.04	.52	.52	93	79	1.0	527				
2.4	08:25	179.475	.04	.52	.52	93	79	1.0	521				
													Estimates:
													MW= 27.7
													%H2O= 14.0

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	8.0	<0.01 CFM
After	8.0	<0.01 cfm

PITOT LEAK CHECK

	Positive	Negative
Before	OK/SEC	OK/SEC
After	OK/SEC	OK/SEC

	1	2
CO2	13.0	
O2	4.0	
CO	0	
N2	83.0	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100 ml H2O	691.1	531.5	159.6
2.	100 ml H2O	562.2	544.3	17.9
3.	Dry	446.8	444.7	2.1
4.	Si Gel	677.2	664.9	12.3
5.				

179.6g

191.9g total

KEYSTONE ENVIRONMENTAL RESOURCES INC

STACK SAMPLING DATA SHEET

CLIENT USX Clairton	TEST DATE 08/05/93	ORIFICE CORRECTION 1.572	HOT BOX NO. 5
TEST UNIT Battery Stack #3	TEST NO. CLR-BS3-3	METER CORRECTION 1.0151	COLD BOX NO. 5
PROJECT NO. 605041-01	NOZZLE (SIZE,#) 0.428	CALIBRATION DATE 07/02/93	PROBE NO. 10-1
CONTROL BOX OPERATOR RPC	STATIC PRESSURE -1.1" H2O	PITOT CORRECTION 0.84	FILTER NO. 1040
BAROMETRIC PRESSURE 29.43	PORT DIRECTION B, A	CONTROL BOX NO. Three	STACK DIA. 114"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Req'd. (in. H20)	Orifice ΔH Act. (in. H20)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°C/°F)	Hot Box Temp. (°F)	Comments
40.5	08:28	179.475	.06	.78	.78	93	81	3.0	550	~250°F	<68°F Ice & Pour	~250°F	5 min/pt
28.5			.06	.78	.78	95	82	3.0	548				
20.2			.07	.91	.91	98	82	3.0	569				
13.5			.07	.91	.91	98	84	3.0	567				
7.6			.06	.78	.78	100	85	2.5	531				
2.4	08:58	195.236	.05	.65	.65	100	85	2.5	530				
40.5	09:01	195.236	.06	.78	.78	96	86	2.5	530				
28.5			.06	.78	.78	101	88	2.5	526				
20.2			.07	.91	.91	101	87	2.5	545				
13.5			.06	.78	.78	102	87	2.5	540				
7.6			.05	.65	.65	102	89	2.5	554				
2.4	09:31	210.786	.05	.65	.65	102	89	2.5	500				
TEST TOTALS	Δ=120 min	Δ=60.951 dcf	$(\Delta P)_{AVG}$ = 0.05	$(\Delta H)_{AVG}$ = 0.70		$(T_{meter})_{AVG}$ = 86°F			$(T_{stack})_{AVG}$ = 540°F				Estimates: MW= 27.7 %H2O= 14.0

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before		
After		

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				

AQE 2/92

KEYSTONE ENVIRONMENTAL RESOURCES INC

TEST

VISIBLE EMISSIONS OBSERVATIONS FORM

#3 STACK TEST

OBSERVER: E. Berg / Dennis

DATE: 8-4-93 START 9:00 AM

FACILITY: USX CLAIRTON

OBSERVATION: START TIME: 9:00 Am

END TIME: 10:00 Am

OBSERVATION POINT:

ETS TRAILER AREA

SOURCE: #3 STACK

DISTANCE: 700'

DIRECTION FROM: NW

HEIGHT: 200'

WIND:

SPEED: 6 MPH

DIRECTION: → SW

TEMPERATURE: 65 °F

SKY CONDITION: CLOUDY

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: —

TOTAL No. OF READINGS: 240

No. READINGS >= 20%: 0

No. READINGS >= 60%: 0

GREATEST OPACITY: 0

CREW: B FOREMAN: ZACUR

COMMENTS: — = 0 %

DAY 1

1ST HR.

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

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

TEST

VISIBLE EMISSIONS OBSERVATIONS FORM

#3 STACK TEST

OBSERVER: E.B. Dense

DATE: 8-4-93

FACILITY: USX CLAIRTON

OBSERVATION: START TIME: 10:00 AM

END TIME: 11:00 AM

OBSERVATION POINT:

EES TRAILER AREA

SOURCE: # 3 STACK

DISTANCE: 700'

DIRECTION FROM: SW

HEIGHT: 200'

WIND:

SPEED: 8 MPH

DIRECTION: → WEST

TEMPERATURE: 66 °F

SKY CONDITION: CLOUDY

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: BLACK

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 10%

CREW: B FOREMAN: ZASUR

COMMENTS: = 0%

DAY 1

2nd HR.

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

	0	15	30	45
30	—	—	—	—
31	—	—	—	—
32	—	—	—	—
33	—	—	—	—
34	—	—	—	—
35	—	—	—	—
36	—	—	—	—
37	—	—	—	—
38	—	—	—	—
39	—	—	—	—
40	—	—	—	—
41	—	—	—	—
42	—	—	—	—
43	—	—	—	—
44	—	—	—	—
45	—	—	—	—
46	—	—	—	—
47	—	—	—	—
48	—	—	—	—
49	—	—	—	—
50	—	—	—	—
51	—	—	—	—
52	—	—	—	—
53	—	—	—	—
54	—	5	10	10
55	10	10	10	10
56	10	10	10	10
57	10	10	10	10
58	10	10	10	10
59	10	10	10	10

TEST

MARK HUGHES

VISIBLE EMISSIONS OBSERVATIONS FORM

#3 STACK TEST

OBSERVER: E.B. Denne

DATE: 8-4-93

FACILITY: USX CLAIRTON

OBSERVATION: START TIME: 11:00 AM

END TIME: 12:00 PM

OBSERVATION POINT:

ETS TRAILER AREA

SOURCE: #3 STACK

DISTANCE: 700'

DIRECTION FROM: NW

HEIGHT: 200'

WIND:

SPEED: 9 MPH

DIRECTION: → SW

TEMPERATURE: 65 °F

SKY CONDITION: CLOUDY

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: BLACK

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 10%

CREW: B FOREMAN: ZACUR

COMMENTS: - = 0%

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

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

DAY 1

3RD HR.

TEST

VISIBLE EMISSIONS OBSERVATIONS FORM

#3 STACK TEST

MARK HUGHES

OBSERVER: E.B. Deane

DATE: 8-4-93

FACILITY: USX CLAIRTON

OBSERVATION: START TIME: 12:00
END TIME: 13:00

OBSERVATION POINT:
STS TRAILER AREA

SOURCE: #3 STACK

DISTANCE: 700'
DIRECTION FROM: NW
HEIGHT: 200'

WIND:

SPEED: 7 MPH
DIRECTION: → SW
TEMPERATURE: 66°F
SKY CONDITION: CLOUDY
BACKGROUND: SKY

READING CONDITIONS: FAIR
COLOR OF EMISSION: —

TOTAL No. OF READINGS: 240
No. READINGS >= 20%: 0
No. READINGS >= 60%: 0
GREATEST OPACITY: 0
CREW: B FOREMAN: ZACUR

COMMENTS: — = 0%

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

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	—	—	—	—

DAY 1
4TH HR.

TEST

MARK HUGHES

VISIBLE EMISSIONS OBSERVATIONS FORM

#3 STACK TEST

OBSERVER: [signature]

DATE: 8-4-93

FACILITY: USX CLAIRTON

OBSERVATION: START TIME: 13:00

END TIME: 14:00

OBSERVATION POINT:

ETS TRAILER AREA

SOURCE: #3 STACK

DISTANCE: 700'

DIRECTION FROM: NW

HEIGHT: 200'

WIND:

SPEED: 10 MPH

DIRECTION: → SW

TEMPERATURE: 65°F

SKY CONDITION: CLOUDY

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: —

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: B FOREMAN: ZACUR

COMMENTS: - 30%

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

DAY 1

5TH HR.

TEST

VISIBLE EMISSIONS OBSERVATIONS FORM

#3 STACK TEST

OBSERVER: E.B. Demmo

DATE: 8-4-93

FACILITY: USX CLAIRTON

OBSERVATION: START TIME: 14:00

END TIME: ~~15:00~~

OBSERVATION POINT: ETS TRAILER AREA

SOURCE: #3 STACK

DISTANCE: 700'

DIRECTION FROM: NW

HEIGHT: 200'

WIND:

SPEED: 10 MPH

DIRECTION: → SW

TEMPERATURE: 65 °F

SKY CONDITION: CLOUDY

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: —

TOTAL No. OF READINGS: 28

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: B FOREMAN: ZACUR

COMMENTS: — = 0 %

FINISH 2:06 14:06

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

DAY 1 6TH HR.

TEST

VISIBLE EMISSIONS OBSERVATIONS FORM

#3 STACK TEST

OBSERVER: E.B. Deese

DATE: 8-5-93

FACILITY: USX CLAIRTON

OBSERVATION: START TIME: 7:20 am

END TIME: 8:20 am

OBSERVATION POINT: FF TRAILER AREA

SOURCE: #3 STACK

DISTANCE: 200'

DIRECTION FROM: NW

HEIGHT: 200'

WIND:

SPEED: 3 MPH

DIRECTION: → SOUTH

TEMPERATURE: 58°F

SKY CONDITION: CLOUDY

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: —

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: A FOREMAN: WASSIL

COMMENTS: - = 0%

START 7:20

20	0	—	—	—	—	50	30	—	—	—	—				
	1	—	—	—	—		31	—	—	—	—				
	2	—	—	—	—		32	—	—	—	—				
	3	—	—	—	—		33	—	—	—	—				
	4	—	—	—	—		34	—	—	—	—				
25	5	—	—	—	—	55	35	—	—	—	—				
	6	—	—	—	—		36	—	—	—	—				
	7	—	—	—	—		37	—	—	—	—				
	8	—	—	—	—		38	—	—	—	—				
	9	—	—	—	—		39	—	—	—	—				
30	10	—	—	—	—	00	40	—	—	—	—				
	11	—	—	—	—		41	—	—	—	—				
	12	—	—	—	—		42	—	—	—	—				
	13	—	—	—	—		43	—	—	—	—				
	14	—	—	—	—		44	—	—	—	—				
35	15	—	—	—	—	05	45	—	—	—	—				
	16	—	—	—	—		46	—	—	—	—				
	17	—	—	—	—		47	—	—	—	—				
	18	—	—	—	—		48	—	—	—	—				
	19	—	—	—	—		49	—	—	—	—				
40	20	—	—	—	—	10	50	—	—	—	—				
	21	—	—	—	—		51	—	—	—	—				
	22	—	—	—	—		52	—	—	—	—				
	23	—	—	—	—		53	—	—	—	—				
	24	—	—	—	—		54	—	—	—	—				
45	25	—	—	—	—	15	55	—	—	—	—				
	26	—	—	—	—		56	—	—	—	—				
	27	—	—	—	—		57	—	—	—	—				
	28	—	—	—	—		58	—	—	—	—				
	29	—	—	—	—		59	—	—	—	—				

DAY 2

1 1/2 HR.

TEST

VISIBLE EMISSIONS OBSERVATIONS FORM

#3 STACK TEST

OBSERVER: E.B. Davis

DATE: 8-5-93

FACILITY: USX CLAIRTON

OBSERVATION: START TIME: 8:20 AM

END TIME: 9:20 AM

OBSERVATION POINT:

ETS TRAILER AREA

SOURCE: #3 STACK

DISTANCE: 200'

DIRECTION FROM: NW

HEIGHT: 200'

WIND:

SPEED: 6 MPH

DIRECTION: → NW.

TEMPERATURE: 60 °F

SKY CONDITION: Partly cloudy

BACKGROUND: Sky

READING CONDITIONS: Fair

COLOR OF EMISSION: —

TOTAL No. OF READINGS: 240

No. READINGS >= 20%: 0

No. READINGS >= 60%: 0

GREATEST OPACITY: 0

CREW: C FOREMAN: HARRIS

COMMENTS: — = 0%

START 8:20

20	0	—	—	—	—
	1	—	—	—	—
	2	—	—	—	—
	3	—	—	—	—
	4	—	—	—	—
25	5	—	—	—	—
	6	—	—	—	—
	7	—	—	—	—
	8	—	—	—	—
	9	—	—	—	—
30	10	—	—	—	—
	11	—	—	—	—
	12	—	—	—	—
	13	—	—	—	—
	14	—	—	—	—
35	15	—	—	—	—
	16	—	—	—	—
	17	—	—	—	—
	18	—	—	—	—
	19	—	—	—	—
40	20	—	—	—	—
	21	—	—	—	—
	22	—	—	—	—
	23	—	—	—	—
	24	—	—	—	—
45	25	—	—	—	—
	26	—	—	—	—
	27	—	—	—	—
	28	—	—	—	—
	29	—	—	—	—
50	30	—	—	—	—
	31	—	—	—	—
	32	—	—	—	—
	33	—	—	—	—
	34	—	—	—	—
55	35	—	—	—	—
	36	—	—	—	—
	37	—	—	—	—
	38	—	—	—	—
	39				
00	40	—	—	—	—
	41	—	—	—	—
	42	—	—	—	—
	43	—	—	—	—
	44	—	—	—	—
05	45	—	—	—	—
	46	—	—	—	—
	47	—	—	—	—
	48	—	—	—	—
	49	—	—	—	—
10	50	—	—	—	—
	51	—	—	—	—
	52	—	—	—	—
	53	—	—	—	—
	54	—	—	—	—
15	55	—	—	—	—
	56	—	—	—	—
	57	—	—	—	—
	58	—	—	—	—
	59	—	—	—	—

DAY 2 2ND HR.

TEST

VISIBLE EMISSIONS OBSERVATIONS FORM

#3 STACK TEST

OBSERVER: E.B. Lewis

DATE: 8-5-93

FACILITY: USX CLAIRTON

OBSERVATION: START TIME: 9:20

END TIME: 9:31

OBSERVATION POINT:

EES TRAILER AREA

SOURCE: #3 STACK

DISTANCE: 200'

DIRECTION FROM: NW

HEIGHT: 200'

WIND:

SPEED: 5 MPH

DIRECTION: → NW

TEMPERATURE: 66 °F

SKY CONDITION: Prcy Cldy

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: —

TOTAL No. OF READINGS: 48

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: HARRIS

COMMENTS: — = 0%

START 9:20

FINISH 9:31

20	0	—	—	—	—	
	1	—	—	—	—	
	2	—	—	—	—	
	3	—	—	—	—	
	4	—	—	—	—	
25	5	—	—	—	—	
	6	—	—	—	—	
	7	—	—	—	—	
	8	—	—	—	—	
	9	—	—	—	—	
30	10	—	—	—	—	
	11	—	—	—	—	
	12					
	13					
	14					
35	15					
	16					
	17					
	18					
	19					
40	20					
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DAY 2

3RD HR

CONTROL BOX CALIBRATION
THREE POINT CALIBRATION

BOX # 3 BP 28.90 in. Hg
DATE 07-02-93 OPERATOR RPC

	WET TEST METER				DRY TEST METER					METER COEFFICIENT Y	ORIFICE COEFFICIENT ▲H@
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD		
START			0.000	28.90				0.50	74.200		
HALF		78.0			104.0	92.0	98.0				
STOP	11.48		5.000						79.348		
CALCULATION	11.48	538.0	5.013	28.90			558.0	28.94	5.148	1.0086	1.492
START			0.000	28.90				1.00	79.700		
HALF		78.0			108.0	94.0	101.0				
STOP	8.43		5.000						84.836		
CALCULATION	8.43	538.0	5.013	28.90			561.0	28.97	5.136	1.0151	1.601
START			0.000	28.90				2.00	96.600		
HALF		79.0			117.0	98.0	107.5				
STOP	12.05		10.000						106.880		
CALCULATION	12.05	539.0	10.025	28.90			567.5	29.05	10.280	1.0216	1.623
AVERAGE										1.0151	1.572

POST TEST

BOX # 3 BP 28.95 In. Hg
DATE 08-16-93 OPERATOR RPC

	WET TEST METER				DRY TEST METER					METER	ORIFICE
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD	COEFFICIENT Y	COEFFICIENT ΔH@
START			0.000	28.95				1.10	554.700		
HALF		81.0			115.0	96.0	105.5				
STOP	7.33		5.000						559.721		
CALCULATION	7.33	541.0	5.013	28.95			565.5	29.03	5.021	1.0406	1.333
START			0.000	28.95				1.10	559.900		
HALF		82.0			116.0	100.0	108.0				
STOP	7.38		5.000						564.906		
CALCULATION	7.38	542.0	5.013	28.95			568.0	29.03	5.006	1.0464	1.350
START			0.000	28.95				1.10	565.200		
HALF		82.0			122.0	103.0	112.5				
STOP	7.67		5.000						570.211		
CALCULATION	7.67	542.0	5.013	28.95			572.5	29.03	5.011	1.0536	1.447
AVERAGE										1.0469	1.377
DIFFERENCE										-3.0%	14.2%

PRE-TEST MAGNEHELIC CALIBRATION
BOX # 3
DATE 07-02-93
OPERATOR RPC

0 to 10" H2O RANGE

MAGNEHELIC Δ P	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 Δ P	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 Δ 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 07-02-93
OPERATOR RPC

	START CF	STOP CF	VOLUME CF	TIME (min)	LEAK RATE
DRY	73.610	73.795	0.185	10.000	0.004
WET	0.000	0.230	0.230		

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 07-02-93
OPERATOR RPC

VOLTAGE INPUT (mV)	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	201.0
6.09	300	300.0
8.31	400	402.0
10.57	500	502.0

POST-TEST MAGNEHELIC CALIBRATION
BOX # 3
DATE 08-16-93
OPERATOR RPC

0 to 10" H2O RANGE

MAGNEHELIC Δ P	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 Δ P	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 Δ H	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 08-16-93
OPERATOR RPC

	START CF	STOP CF	VOLUME CF	TIME (min)	LEAK RATE
DRY	653.500	653.740	0.240	10.000	0.0006
WET	0.000	0.246	0.246		

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

POST-TEST PYROMETER CHECK
DATE 08-16-93
OPERATOR RPC

VOLTAGE INPUT (mV)	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	303.0
8.31	400	403.0
10.57	500	503.0

Name: Richard L Cassidy Sr Phone: 825-1843

Date 10-01-93 Train ID Box #3 DGM Cal. Factor, Y 1.015 Orifice No. BAPC #3

Type of Meter Box NAPP Inc Type of Pump Diaphragm

			Run Number		
		Example	1	2	3
DGM					
Final reading	ft^3	966.461	19.580	27.040	34.580
Initial reading	ft^3	946.602	12.400	19.800	27.200
Difference, V_m	ft^3	9.859	7.180	7.240	7.380
Percent Accuracy, %A					
Inlet/Outlet temperatures					
Initial	°F.	108/88	58/58	72/62	80/70
After 5 minutes		110/88	64/58	74/64	80/70
After 10 minutes		111/88	68/60	78/68	81/71
Final		112/89	69/60	80/70	83/73
Avg. temperature, t_d	°F/°R	99.3/559.3	65/159 (62)	76/166 (71)	81/171 (76)
Time, θ	min	15.0	15.0	15.0	15.0
Orifice man. rdg., delta H		1.35	0.65	0.65	0.65
Bar. pressure, P_{bar}		29.75	29.05	29.05	29.05
Ambient temperature, t_i	°F/°C	74/23.3	60/1	60/1	60/1
Pump vacuum	in. Hg	18.8	20.0	2.0	20.0
$V_{m(std)}$'	ft^3	9.2815	7.051	6.990	7.058
DGM cal. factor, Y_c		1.0593	1.0151	1.0151	1.0151
*Vm(std)(M)	m^3	0.2629	0.1997	0.1980	0.1999

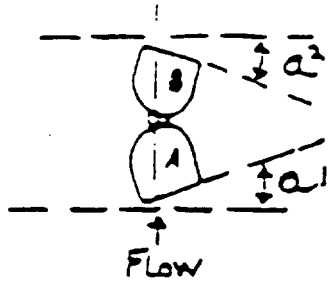
*If you calculate dry gas volume in English Units, use the conversion factor of 0.02832 m^3/ft^3 to obtain the volume in metric units.

$$V_{m(std)} = V_m \left[\frac{P_{bar}}{29.92}\right]\left[\frac{528}{t_d + 460}\right]$$ Data Sheet

GEOMETRIC PITOT CALIBRATION

Caliper # XE F - 59
Precheck
Post Check

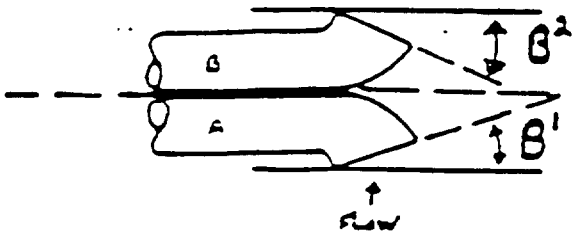
Probe #: 10-1
Date: 07-13-95
Initials: RPC

① 

a^1 = 1.0
a^2 = 0
$a^1, a^2 = <10°$

B^1 = 1°
B^2 = 1°
$B^1, B^2 = <5°$

F = .965"

② 

μ = .0506 — μ = ≤ 0.1250" ($\mu = F \tan \beta$)

V = 0 — V = ≤0.03125" ($V = F \tan \theta$)

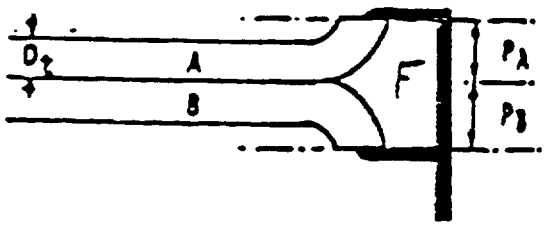
W = .60 — W ≥ 0"

X = .79 — X ≥ 0.750" (3/4" using 1/2" nozzle)

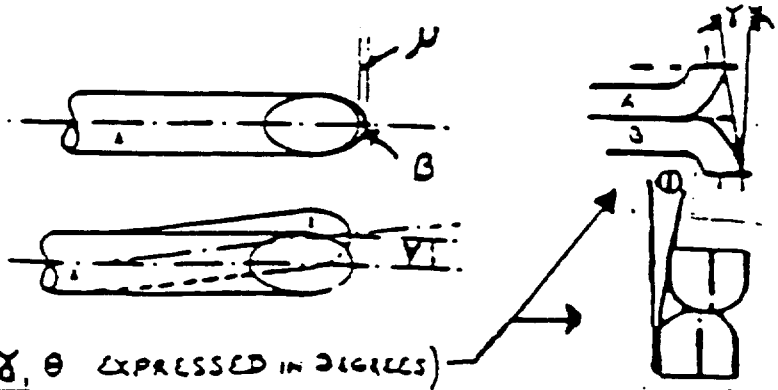
Y = 7.00 — Y ≥ 3.0"

Z = 3.9 — Z > 2.0"

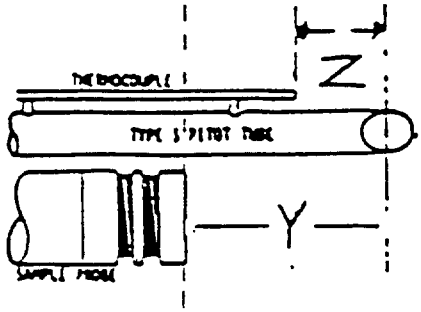
D_t = .380 — D_t > .1875"

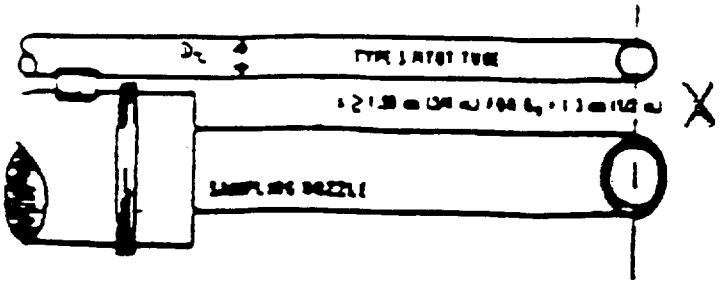
③ 

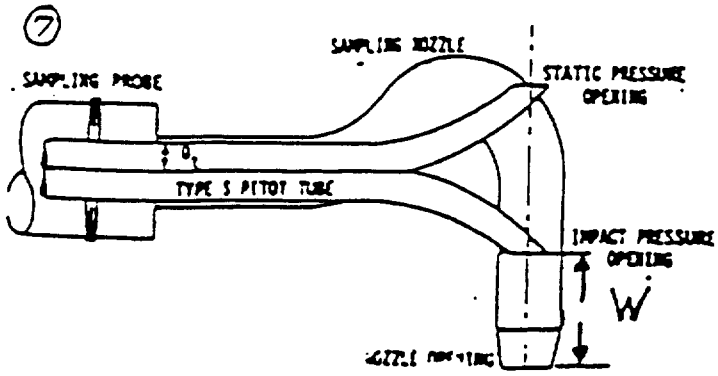
$1.05\ D_t < A < 1.50\ D_t$
$P_A = P_B$
$2.10\ D_t < A < 3.00\ D_t$

④ 

(γ, θ EXPRESSED IN DEGREES)

⑥ 

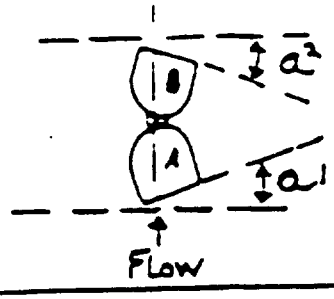
⑤ 

⑦ 

GEOMETRIC PITOT CALIBRATION

Caliper # XES-59
Precheck
Post Check

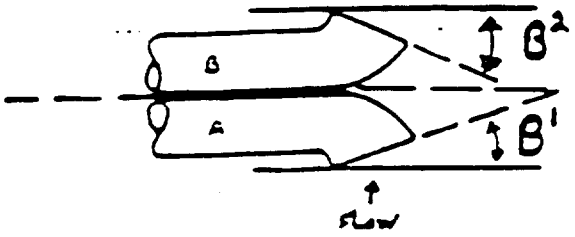
Probe #: 10-1
Date: 8-12-93
Initials: KM

① 

a^1 = 0°
a^2 = 0.5°
a^1, a^2 = <10°

B^1 = 1.5°
B^2 = 1.0°
B^1, B^2, = <5°

F = 0.980"

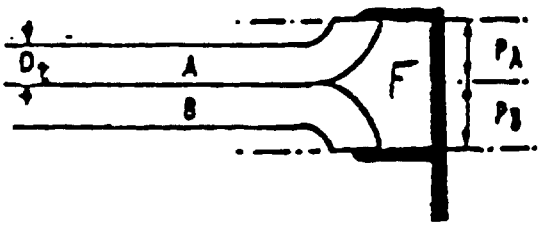
② 

μ = 0.0175 — μ = ≤ 0.1250" ($\mu = F \tan\gamma$)

V = 0.026 — V = ≤0.03125" ($V = F \tan\theta$)

W = 0.237 — W ≥ 0"

X = 0.779 — X ≥ 0.750" (3/4" using 1/2" nozzle)

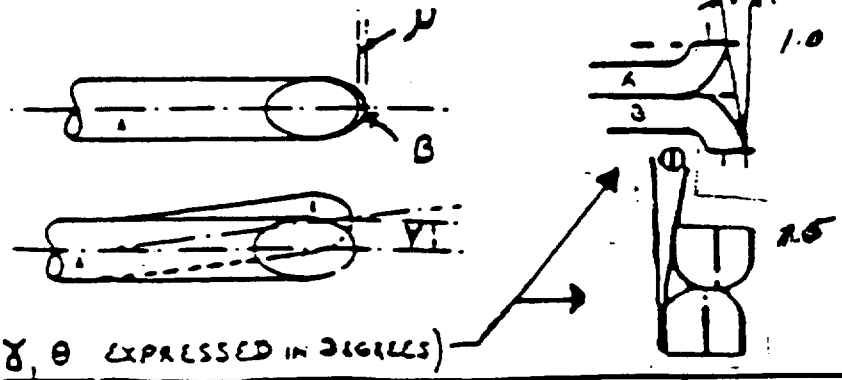
③ 

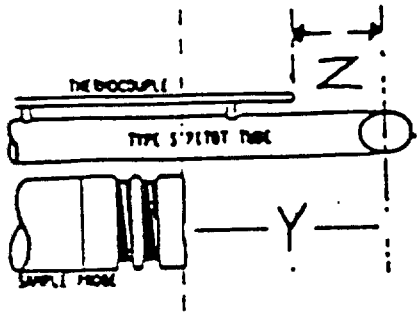
1.05 D_t < d < 1.50 D_t
P_A = P_B
2.10 D_t < d < 3.00 D_t

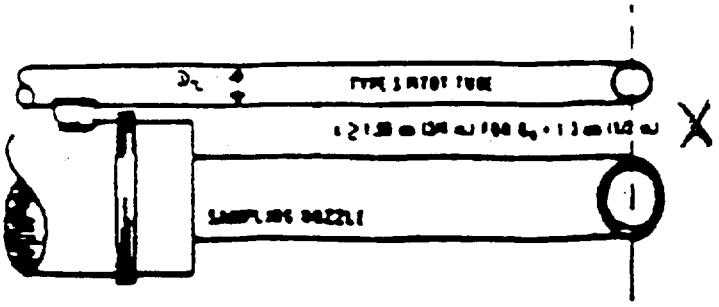
Y = 6.000 — Y ≥ 3.0"

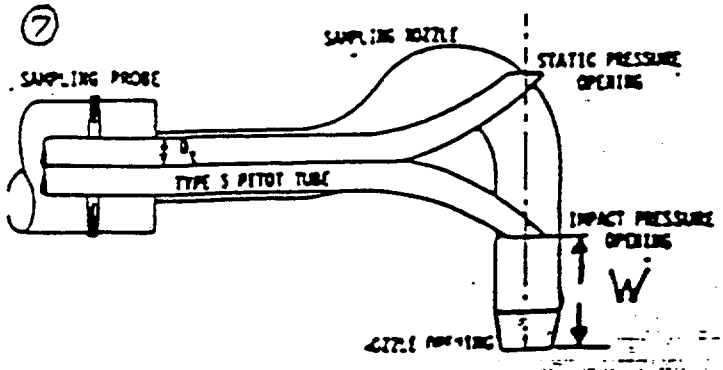
Z = 2.500 — Z > 2.0"

D_t = 0.374 — D_t > .1875"

④ 

⑥ 

⑤ 

⑦ 

COMPLIANCE DEMONSTRATION
NO. 3 BATTERY COMBUSTION STACK
USS CLAIRTON WORKS

USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA

APPENDIX B

PLANT OPERATIONAL DATA

CHESTER
ENVIRONMENTAL

Wednesday, August 4, 1993 Turn 2
Batteries: 1-3_2

Seq #	Oven	Last Pushed	Earliest	Desired	Latest
1	A11/3	######	7:50am	8:00am	8:25am
2	B11/2	######	7:57am	8:06am	8:31am
3	B31/1	0:06	8:02am	8:12am	8:37am
4	A13/3	######	8:08am	8:18am	8:43am
5	B13/2	######	8:14am	8:24am	8:49am
6	A15/3	######	8:20am	8:30am	8:55am
7	B15/2	######	8:26am	8:36am	9:01am
8	A17/3	######	8:33am	8:43am	9:08am
9	B17/2	######	8:39am	8:49am	9:14am
10	A19/3	######	8:45am	8:55am	9:20am
11	B19/2	######	8:51am	9:01am	9:26am
12	A21/3	######	8:57am	9:07am	9:32am
13	B21/2	######	9:03am	9:13am	9:38am
14	A23/3	######	9:10am	9:20am	9:45am
15	B23/2	######	9:16am	9:26am	9:51am
16	B24/1	0:06	9:22am	9:32am	9:57am
17	A25/3	######	9:28am	9:38am	10:03am
18	B25/2	######	9:34am	9:44am	10:09am
19	A27/3	######	9:40am	9:50am	10:15am
20	B27/2	######	9:46am	9:56am	10:21am
21	A29/3	######	9:53am	10:03am	10:28am
22	B29/2	######	9:59am	10:09am	10:34am
23	A31/3	######	10:05am	10:15am	10:40am
24	B26/1	0:00	10:11am	10:21am	10:46am
25	B31/2	######	10:17am	10:27am	10:52am
26	C2 /2	######	10:23am	10:33am	10:58am
27	B2 /3	######	10:30am	10:40am	11:05am
28	A2 /1	######	10:36am	10:46am	11:11am
29	B4 /3	######	10:42am	10:52am	11:17am
30	A4 /1	######	10:48am	10:58am	11:23am
31	B6 /3	######	10:54am	11:04am	11:29am
32	A6 /1	######	11:00am	11:10am	11:35am
33	B8 /3	######	11:06am	11:16am	11:41am
34	A8 /1	######	11:13am	11:23am	11:48am
35	B10/3	######	11:19am	11:29am	11:54am
36	A10/1	######	11:25am	11:35am	12:00pm
37	B12/3	######	11:31am	11:41am	12:06pm
38	A12/1	######	11:37am	11:47am	12:12pm
39	B14/3	######	11:43am	11:53am	12:18pm
40	A14/1	######	11:50am	12:00pm	12:25pm
41	B16/3	######	11:56am	12:06pm	12:31pm
42	A16/1	######	12:02pm	12:12pm	12:37pm
43	B18/3	######	12:08pm	12:18pm	12:43pm
44	A18/1	######	12:14pm	12:24pm	12:49pm
45	B20/3	######	12:20pm	12:30pm	12:55pm
46	A20/1	######	12:26pm	12:36pm	1:01pm
47	B22/3	######	12:33pm	12:43pm	1:08pm
48	A22/1	######	12:39pm	12:49pm	1:14pm
49	B24/3	######	12:45pm	12:55pm	1:20pm
50	A24/1	######	12:51pm	1:01pm	1:26pm
51	B26/3	######	12:57pm	1:07pm	1:32pm
52	A26/1	######	1:03pm	1:13pm	1:38pm
53	B28/3	######	1:09pm	1:19pm	1:44pm
54	A28/1	######	1:16pm	1:26pm	1:51pm
55	B30/3	######	1:22pm	1:32pm	1:57pm
56	C1 /3	######	1:28pm	1:38pm	2:03pm
57	A30/1	######	1:34pm	1:44pm	2:09pm
58	A1 /2	######	1:40pm	1:50pm	2:15pm
59	B1 /1	######	1:46pm	1:56pm	2:21pm
60	A3 /2	######	1:53pm	2:03pm	2:28pm
61	B3 /1	######	1:59pm	2:09pm	2:34pm
62	A5 /2	######	2:05pm	2:15pm	2:40pm
63	B5 /1	######	2:11pm	2:21pm	2:46pm
64	A7 /2	######	2:17pm	2:27pm	2:52pm
65	B7 /1	######	2:23pm	2:33pm	2:58pm
66	A9 /2	######	2:29pm	2:39pm	3:04pm
67	B9 /1	######	2:36pm	2:46pm	3:11pm
68	A11/2	######	2:42pm	2:52pm	3:17pm
69	B11/1	######	2:48pm	2:58pm	3:23pm
70	A13/2	######	2:54pm	3:04pm	3:29pm
71	B13/1	######	3:00pm	3:10pm	3:35pm
72	A15/2	######	3:06pm	3:16pm	3:41pm
73	B15/1	######	3:13pm	3:23pm	3:48pm
74	A17/2	######	3:19pm	3:29pm	3:54pm
75	B17/1	######	3:25pm	3:35pm	4:00pm
76	A19/2	######	3:31pm	3:41pm	4:06pm
77	B19/1	######	3:37pm	3:47pm	4:12pm
78	A21/2	######	3:43pm	3:53pm	4:18pm

B31/1 after B11/2

B24/1 after B23/2

B26/1 after A31/3

Wednesday, August 4, 1993 Turn 3
Batteries: 1-3_2

Seq #	Oven	Last Pushed	Earliest	Desired	Latest
1	B21/1	######	3:50pm	4:00pm	4:10pm
2	A23/2	######	3:57pm	4:06pm	4:16pm
3	B23/1	######	4:02pm	4:12pm	4:22pm
4	A25/2	######	4:08pm	4:18pm	4:28pm
5	B25/1	######	4:14pm	4:24pm	4:34pm
6	A27/2	######	4:20pm	4:30pm	4:40pm
7	B27/1	######	4:26pm	4:36pm	4:46pm
8	A29/2	######	4:32pm	4:42pm	4:52pm
9	B29/1	######	4:38pm	4:48pm	4:58pm
10	A31/2	######	4:44pm	4:54pm	5:04pm
11	C2 /1	######	4:50pm	5:00pm	5:10pm
12	A2 /3	######	4:56pm	5:06pm	5:16pm
13	B2 /2	######	5:02pm	5:12pm	5:22pm
14	A4 /3	######	5:08pm	5:18pm	5:28pm
15	B4 /2	######	5:15pm	5:25pm	5:35pm
16	A6 /3	######	5:21pm	5:31pm	5:41pm
17	B6 /2	######	5:27pm	5:37pm	5:47pm
18	A8 /3	######	5:33pm	5:43pm	5:53pm
19	B8 /2	######	5:39pm	5:49pm	5:59pm
20	A10/3	######	5:45pm	5:55pm	6:05pm
21	B10/2	######	5:51pm	6:01pm	6:11pm
22	A12/3	######	5:57pm	6:07pm	6:17pm
23	B12/2	######	6:03pm	6:13pm	6:23pm
24	A14/3	######	6:09pm	6:19pm	6:29pm
25	B14/2	######	6:15pm	6:25pm	6:35pm
26	A16/3	######	6:21pm	6:31pm	6:41pm
27	B16/2	######	6:27pm	6:37pm	6:47pm
28	A18/3	######	6:34pm	6:44pm	6:54pm
29	B18/2	######	6:40pm	6:50pm	7:00pm
30	A20/3	######	6:46pm	6:56pm	7:06pm
31	B20/2	######	6:52pm	7:02pm	7:12pm
32	A22/3	######	6:58pm	7:08pm	7:18pm
33	B22/2	######	7:04pm	7:14pm	7:24pm
34	A24/3	######	7:10pm	7:20pm	7:30pm
35	B24/2	######	7:16pm	7:26pm	7:36pm
36	A26/3	######	7:22pm	7:32pm	7:42pm
37	B26/2	######	7:28pm	7:38pm	7:48pm
38	A28/3	######	7:34pm	7:44pm	7:54pm
39	B28/2	######	7:40pm	7:50pm	8:00pm
40	A30/3	######	7:46pm	7:56pm	8:06pm
41	B30/2	######	7:53pm	8:03pm	8:13pm
42	C1 /2	######	7:59pm	8:09pm	8:19pm
43	B1 /3	######	8:05pm	8:15pm	8:25pm
44	A1 /1	######	8:11pm	8:21pm	8:31pm
45	B3 /3	######	8:17pm	8:27pm	8:37pm
46	A3 /1	######	8:23pm	8:33pm	8:43pm
47	B5 /3	######	8:29pm	8:39pm	8:49pm
48	A5 /1	######	8:35pm	8:45pm	8:55pm
49	B7 /3	######	8:41pm	8:51pm	9:01pm
50	A7 /1	######	8:47pm	8:57pm	9:07pm
51	B9 /3	######	8:53pm	9:03pm	9:13pm
52	A9 /1	######	8:59pm	9:09pm	9:19pm
53	B11/3	######	9:05pm	9:15pm	9:25pm
54	A11/1	######	9:12pm	9:22pm	9:32pm
55	B13/3	######	9:18pm	9:28pm	9:38pm
56	A13/1	######	9:24pm	9:34pm	9:44pm
57	B15/3	######	9:30pm	9:40pm	9:50pm
58	A15/1	######	9:36pm	9:46pm	9:56pm
59	B17/3	######	9:42pm	9:52pm	10:02pm
60	A17/1	######	9:48pm	9:58pm	10:08pm
61	B19/3	######	9:54pm	10:04pm	10:14pm
62	A19/1	######	10:00pm	10:10pm	10:20pm
63	B21/3	######	10:06pm	10:16pm	10:26pm
64	A21/1	######	10:12pm	10:22pm	10:32pm
65	B23/3	######	10:18pm	10:28pm	10:38pm
66	A23/1	######	10:24pm	10:34pm	10:44pm
67	B25/3	######	10:31pm	10:41pm	10:51pm
68	A25/1	######	10:37pm	10:47pm	10:57pm
69	B27/3	######	10:43pm	10:53pm	11:03pm
70	A27/1	######	10:49pm	10:59pm	11:09pm
71	B29/3	20:11	10:55pm	11:05pm	11:15pm
72	A29/1	20:11	11:01pm	11:11pm	11:21pm
73	B31/3	20:10	11:07pm	11:17pm	11:27pm
74	A31/1	20:10	11:13pm	11:23pm	11:33pm
75	C2 /3	20:10	11:19pm	11:29pm	11:39pm
76	A2 /2	20:10	11:25pm	11:35pm	11:45pm
77	B2 /1	20:10	11:31pm	11:41pm	11:51pm
78	A4 /2	20:09	11:37pm	11:47pm	11:57pm
79	B4 /1	######	11:43pm	11:53pm	12:03am

1-B31

Wednesday, August 4, 1993 Turn 1

Batteries: 1-3_2

Seq #	Oven	Last Pushed	Earliest	Desired	Latest
1	B29/2	######	11:50pm	12:00am	12:10am
2	A30/3	######	11:57pm	12:06am	12:16am
3	C1 /2	######	12:02am	12:12am	12:22am
4	B1 /3	######	12:08am	12:18am	12:28am
5	A1 /1	######	12:14am	12:24am	12:34am
6	B3 /3	######	12:21am	12:31am	12:41am
7	A3 /1	######	12:27am	12:37am	12:47am
8	B5 /3	######	12:33am	12:43am	12:53am
9	A5 /1	######	12:39am	12:49am	12:59am
10	B7 /3	######	12:46am	12:56am	1:06am
11	B9 /3	######	12:52am	1:02am	1:12am
12	B11/3	######	12:58am	1:08am	1:18am
13	B13/3	######	1:04am	1:14am	1:24am
14	A13/1	######	1:11am	1:21am	1:31am
15	B15/3	######	1:17am	1:27am	1:37am
16	A15/1	######	1:23am	1:33am	1:43am
17	B17/3	######	1:29am	1:39am	1:49am
18	A17/1	######	1:35am	1:45am	1:55am
19	B19/3	######	1:42am	1:52am	2:02am
20	A19/1	######	1:48am	1:58am	2:08am
21	B21/3	######	1:54am	2:04am	2:14am
22	A21/1	######	2:00am	2:10am	2:20am
23	B23/3	######	2:07am	2:17am	2:27am
24	A23/1	######	2:13am	2:23am	2:33am
25	B25/3	######	2:19am	2:29am	2:39am
26	A25/1	######	2:25am	2:35am	2:45am
27	B27/3	######	2:32am	2:42am	2:52am
28	A27/1	######	2:38am	2:48am	2:58am
29	B29/3	######	2:44am	2:54am	3:04am
30	A29/1	######	2:50am	3:00am	3:10am
31	B31/3	######	2:57am	3:07am	3:17am
32	A31/1	######	3:03am	3:13am	3:23am
33	C2 /3	######	3:09am	3:19am	3:29am
34	A2 /2	######	3:15am	3:25am	3:35am
35	B2 /1	######	3:21am	3:31am	3:41am
36	A4 /2	######	3:28am	3:38am	3:48am
37	A6 /2	######	3:34am	3:44am	3:54am
38	B6 /1	######	3:40am	3:50am	4:00am
39	A8 /2	######	3:46am	3:56am	4:06am
40	B8 /1	######	3:53am	4:03am	4:13am
41	A10/2	######	3:59am	4:09am	4:19am
42	B10/1	######	4:05am	4:15am	4:25am
43	A12/2	######	4:11am	4:21am	4:31am
44	B12/1	######	4:18am	4:28am	4:38am
45	A14/2	######	4:24am	4:34am	4:44am
46	B14/1	######	4:30am	4:40am	4:50am
47	A16/2	######	4:36am	4:46am	4:56am
48	B16/1	######	4:42am	4:52am	5:02am
49	A18/2	######	4:49am	4:59am	5:09am
50	B18/1	######	4:55am	5:05am	5:15am
51	A20/2	######	5:01am	5:11am	5:21am
52	B20/1	######	5:07am	5:17am	5:27am
53	A22/2	######	5:14am	5:24am	5:34am
54	A24/2	######	5:20am	5:30am	5:40am
55	A26/2	######	5:26am	5:36am	5:46am
56	A28/2	######	5:32am	5:42am	5:52am
57	B28/1	######	5:39am	5:49am	5:59am
58	A30/2	######	5:45am	5:55am	6:05am
59	B30/1	######	5:51am	6:01am	6:11am
60	C1 /1	######	5:57am	6:07am	6:17am
61	A1 /3	######	6:04am	6:14am	6:24am
62	B1 /2	######	6:10am	6:20am	6:30am
63	A3 /3	######	6:16am	6:26am	6:36am
64	B3 /2	######	6:22am	6:32am	6:42am
65	A5 /3	######	6:28am	6:38am	6:48am
66	B5 /2	######	6:35am	6:45am	6:55am
67	A7 /3	######	6:41am	6:51am	7:01am
68	B7 /2	######	6:47am	6:57am	7:07am
69	A9 /3	######	6:53am	7:03am	7:13am
70	B9 /2	0:00	7:00am	7:10am	7:20am
71	B22/1	0:00	7:06am	7:16am	7:26am
72	A11/3	######	7:12am	7:22am	7:32am
73	B11/2	######	7:18am	7:28am	7:38am
74	A13/3	######	7:25am	7:35am	7:45am
75	B13/2	######	7:31am	7:41am	7:51am
76	A15/3	######	7:37am	7:47am	7:57am
77	B15/2	######	7:43am	7:53am	8:03am

2/ - B30

1/ - A7 - B22
- A9 - B24
- A11 - B26
- B4

B22/1 after 6 1/2

Thursday, August 5, 1993 Turn 2
Batteries: 1-3_2

Seq #	Oven	Last Pushed	Earliest	Desired	Latest
1	B24/3	19:05	7:50am	8:00am	8:25am
2	A24/1	19:05	7:57am	8:06am	8:31am
3	A2 /1	19:11	8:02am	8:12am	8:37am
4	B26/3	19:11	8:08am	8:18am	8:43am
5	A26/1	19:11	8:14am	8:24am	8:49am
6	B28/3	19:11	8:20am	8:30am	8:55am
7	A28/1	19:10	8:26am	8:36am	9:01am
8	B30/3	19:11	8:33am	8:43am	9:08am
9	C1 /3	19:11	8:39am	8:49am	9:14am
10	A11/1	19:17	8:45am	8:55am	9:20am
11	A30/1	19:17	8:51am	9:01am	9:26am
12	A1 /2	19:17	8:57am	9:07am	9:32am
13	B1 /1	19:17	9:03am	9:13am	9:38am
14	A3 /2	19:17	9:10am	9:20am	9:45am
15	B3 /1	19:17	9:16am	9:26am	9:51am
16	A5 /2	19:17	9:22am	9:32am	9:57am
17	B5 /1	19:17	9:28am	9:38am	10:03am
18	A7 /2	19:17	9:34am	9:44am	10:09am
19	B7 /1	######	9:40am	9:50am	10:15am
20	A9 /2	19:17	9:46am	9:56am	10:21am
21	A6 /1	19:24	9:53am	10:03am	10:28am
22	B9 /1	######	9:59am	10:09am	10:34am
23	A11/2	19:23	10:05am	10:15am	10:40am
24	B11/1	19:23	10:11am	10:21am	10:46am
25	A13/2	######	10:17am	10:27am	10:52am
26	B13/1	######	10:23am	10:33am	10:58am
27	A15/2	######	10:30am	10:40am	11:05am
28	B15/1	######	10:36am	10:46am	11:11am
29	A17/2	######	10:42am	10:52am	11:17am
30	B17/1	######	10:48am	10:58am	11:23am
31	A19/2	######	10:54am	11:04am	11:29am
32	B19/1	######	11:00am	11:10am	11:35am
33	A21/2	######	11:06am	11:16am	11:41am
34	B21/1	######	11:13am	11:23am	11:48am
35	A23/2	######	11:19am	11:29am	11:54am
36	B23/1	######	11:25am	11:35am	12:00pm
37	A25/2	######	11:31am	11:41am	12:06pm
38	A27/2	######	11:37am	11:47am	12:12pm
39	B27/1	######	11:43am	11:53am	12:18pm
40	A29/2	######	11:50am	12:00pm	12:25pm
41	B29/1	######	11:56am	12:06pm	12:31pm
42	A31/2	######	12:02pm	12:12pm	12:37pm
43	B31/1	28:06	12:08pm	12:18pm	12:43pm
44	C2 /1	######	12:14pm	12:24pm	12:49pm
45	A2 /3	######	12:20pm	12:30pm	12:55pm
46	B2 /2	######	12:26pm	12:36pm	1:01pm
47	A4 /3	######	12:33pm	12:43pm	1:08pm
48	B4 /2	######	12:39pm	12:49pm	1:14pm
49	A6 /3	######	12:45pm	12:55pm	1:20pm
50	B6 /2	######	12:51pm	1:01pm	1:26pm
51	A8 /3	######	12:57pm	1:07pm	1:32pm
52	B8 /2	######	1:03pm	1:13pm	1:38pm
53	B10/2	######	1:09pm	1:19pm	1:44pm
54	A12/3	######	1:16pm	1:26pm	1:51pm
55	B12/2	######	1:22pm	1:32pm	1:57pm
56	A14/3	######	1:28pm	1:38pm	2:03pm
57	B14/2	######	1:34pm	1:44pm	2:09pm
58	A16/3	######	1:40pm	1:50pm	2:15pm
59	B16/2	######	1:46pm	1:56pm	2:21pm
60	A18/3	######	1:53pm	2:03pm	2:28pm
61	B18/2	######	1:59pm	2:09pm	2:34pm
62	A20/3	######	2:05pm	2:15pm	2:40pm
63	B20/2	######	2:11pm	2:21pm	2:46pm
64	A22/3	######	2:17pm	2:27pm	2:52pm
65	B22/2	######	2:23pm	2:33pm	2:58pm
66	A24/3	######	2:29pm	2:39pm	3:04pm
67	B24/2	######	2:36pm	2:46pm	3:11pm
68	A26/3	######	2:42pm	2:52pm	3:17pm
69	B26/2	######	2:48pm	2:58pm	3:23pm
70	A28/3	######	2:54pm	3:04pm	3:29pm
71	B28/2	######	3:00pm	3:10pm	3:35pm
72	A30/3	######	3:06pm	3:16pm	3:41pm
73	C1 /2	######	3:13pm	3:23pm	3:48pm
74	B1 /3	######	3:19pm	3:29pm	3:54pm
75	A1 /1	######	3:25pm	3:35pm	4:00pm
76	B3 /3	######	3:31pm	3:41pm	4:06pm
77	A3 /1	######	3:37pm	3:47pm	4:12pm
78	B5 /3	######	3:43pm	3:53pm	4:18pm

1/- B25

3/- A10

2/- B30

A2/1 ac [illegible] A24/1

A4/1 ag [illegible] C1/3

A6/1 ag [illegible] A9/2

Thursday, August 5, 1993 Turn 3
Batteries: 1-3_2

Seq #	Oven	Last Pushed	Earliest	Desired	Latest
1	A16/3	######	3:50pm	4:00pm	4:10pm
2	B16/2	######	3:57pm	4:06pm	4:16pm
3	A18/3	######	4:02pm	4:12pm	4:22pm
4	B18/2	######	4:08pm	4:18pm	4:28pm
5	A20/3	######	4:14pm	4:24pm	4:34pm
6	B20/2	######	4:20pm	4:30pm	4:40pm
7	A22/3	######	4:26pm	4:36pm	4:46pm
8	B22/2	######	4:32pm	4:42pm	4:52pm
9	A24/3	######	4:38pm	4:48pm	4:58pm
10	B24/2	######	4:44pm	4:54pm	5:04pm
11	A26/3	######	4:50pm	5:00pm	5:10pm
12	B26/2	######	4:56pm	5:06pm	5:16pm
13	A28/3	######	5:02pm	5:12pm	5:22pm
14	B28/2	######	5:08pm	5:18pm	5:28pm
15	A30/3	######	5:15pm	5:25pm	5:35pm
16	C1 /2	######	5:21pm	5:31pm	5:41pm
17	B1 /3	######	5:27pm	5:37pm	5:47pm
18	A1 /1	######	5:33pm	5:43pm	5:53pm
19	B3 /3	######	5:39pm	5:49pm	5:59pm
20	A3 /1	######	5:45pm	5:55pm	6:05pm
21	B5 /3	######	5:51pm	6:01pm	6:11pm
22	A5 /1	######	5:57pm	6:07pm	6:17pm
23	B7 /3	######	6:03pm	6:13pm	6:23pm
24	A7 /1	######	6:09pm	6:19pm	6:29pm
25	B9 /3	######	6:15pm	6:25pm	6:35pm
26	A9 /1	######	6:21pm	6:31pm	6:41pm
27	B11/3	######	6:27pm	6:37pm	6:47pm
28	A11/1	######	6:34pm	6:44pm	6:54pm
29	B13/3	######	6:40pm	6:50pm	7:00pm
30	A13/1	######	6:46pm	6:56pm	7:06pm
31	B15/3	######	6:52pm	7:02pm	7:12pm
32	A15/1	######	6:58pm	7:08pm	7:18pm
33	B17/3	######	7:04pm	7:14pm	7:24pm
34	A17/1	######	7:10pm	7:20pm	7:30pm
35	A10/3	0:06	7:16pm	7:26pm	7:36pm
36	B19/3	######	7:22pm	7:32pm	7:42pm
37	A19/1	######	7:28pm	7:38pm	7:48pm
38	B21/3	######	7:34pm	7:44pm	7:54pm
39	A21/1	######	7:40pm	7:50pm	8:00pm
40	B23/3	######	7:46pm	7:56pm	8:06pm
41	A23/1	######	7:53pm	8:03pm	8:13pm
42	B25/3	######	7:59pm	8:09pm	8:19pm
43	A25/1	######	8:05pm	8:15pm	8:25pm
44	B27/3	######	8:11pm	8:21pm	8:31pm
45	A27/1	######	8:17pm	8:27pm	8:37pm
46	B29/3	21:28	8:23pm	8:33pm	8:43pm
47	A29/1	21:28	8:29pm	8:39pm	8:49pm
48	B31/3	21:28	8:35pm	8:45pm	8:55pm
49	A31/1	21:28	8:41pm	8:51pm	9:01pm
50	C2 /3	21:28	8:47pm	8:57pm	9:07pm
51	A2 /2	21:28	8:53pm	9:03pm	9:13pm
52	B2 /1	21:28	8:59pm	9:09pm	9:19pm
53	A4 /2	21:28	9:05pm	9:15pm	9:25pm
54	B4 /1	21:29	9:12pm	9:22pm	9:32pm
55	A6 /2	21:28	9:18pm	9:28pm	9:38pm
56	B30/2	41:50	9:24pm	9:34pm	9:44pm
57	B6 /1	21:34	9:30pm	9:40pm	9:50pm
58	A8 /2	21:34	9:36pm	9:46pm	9:56pm
59	B8 /1	21:34	9:42pm	9:52pm	10:02pm
60	A10/2	21:34	9:48pm	9:58pm	10:08pm
61	B10/1	21:33	9:54pm	10:04pm	10:14pm
62	A12/2	21:33	10:00pm	10:10pm	10:20pm
63	B12/1	21:33	10:06pm	10:16pm	10:26pm
64	A14/2	21:33	10:12pm	10:22pm	10:32pm
65	B14/1	21:32	10:18pm	10:28pm	10:38pm
66	A16/2	21:32	10:24pm	10:34pm	10:44pm
67	B16/1	21:33	10:31pm	10:41pm	10:51pm
68	A18/2	21:33	10:37pm	10:47pm	10:57pm
69	B18/1	21:32	10:43pm	10:53pm	11:03pm
70	A20/2	21:32	10:49pm	10:59pm	11:09pm
71	B20/1	21:32	10:55pm	11:05pm	11:15pm
72	A22/2	21:32	11:01pm	11:11pm	11:21pm
73	B22/1	40:01	11:07pm	11:17pm	11:27pm
74	A24/2	21:38	11:13pm	11:23pm	11:33pm
75	B24/1	37:57	11:19pm	11:29pm	11:39pm
76	A26/2	21:43	11:25pm	11:35pm	11:45pm
77	B26/1	37:29	11:31pm	11:41pm	11:51pm
78	A28/2	21:49	11:37pm	11:47pm	11:57pm
79	B28/1	21:49	11:43pm	11:53pm	12:03am

2/-B30

A19/3 2 to A17/1

B30/2 2 to A19/3

Thursday, August 5, 1993 Turn 1
Batteries: 1-3_2

Seq #	Oven	Last Pushed	Earliest	Desired	Latest
1	A6 /2	20:16	11:50pm	12:00am	12:10am
2	B6 /1	20:16	11:57pm	12:06am	12:16am
3	A8 /2	20:16	12:02am	12:12am	12:22am
4	B8 /1	20:15	12:08am	12:18am	12:28am
5	A10/2	20:15	12:14am	12:24am	12:34am
6	B10/1	20:16	12:21am	12:31am	12:41am
7	A12/2	20:16	12:27am	12:37am	12:47am
8	B12/1	20:15	12:33am	12:43am	12:53am
9	A14/2	20:15	12:39am	12:49am	12:59am
10	B14/1	20:16	12:46am	12:56am	1:06am
11	A16/2	20:16	12:52am	1:02am	1:12am
12	B16/1	20:16	12:58am	1:08am	1:18am
13	A18/2	20:15	1:04am	1:14am	1:24am
14	B18/1	20:16	1:11am	1:21am	1:31am
15	A20/2	20:16	1:17am	1:27am	1:37am
16	B20/1	20:16	1:23am	1:33am	1:43am
17	A22/2	20:15	1:29am	1:39am	1:49am
18	A24/2	20:15	1:35am	1:45am	1:55am
19	A26/2	20:16	1:42am	1:52am	2:02am
20	A28/2	20:16	1:48am	1:58am	2:08am
21	B28/1	20:15	1:54am	2:04am	2:14am
22	A30/2	******	2:00am	2:10am	2:20am
23	B30/1	******	2:07am	2:17am	2:27am
24	C1 /1	******	2:13am	2:23am	2:33am
25	A1 /3	******	2:19am	2:29am	2:39am
26	B1 /2	******	2:25am	2:35am	2:45am
27	A3 /3	******	2:32am	2:42am	2:52am
28	B3 /2	******	2:38am	2:48am	2:58am
29	A5 /3	******	2:44am	2:54am	3:04am
30	B5 /2	******	2:50am	3:00am	3:10am
31	A7 /3	******	2:57am	3:07am	3:17am
32	B7 /2	******	3:03am	3:13am	3:23am
33	A9 /3	******	3:09am	3:19am	3:29am
34	B9 /2	******	3:15am	3:25am	3:35am
35	A11/3	******	3:21am	3:31am	3:41am
36	B11/2	******	3:28am	3:38am	3:48am
37	A13/3	******	3:34am	3:44am	3:54am
38	B13/2	******	3:40am	3:50am	4:00am
39	A15/3	******	3:46am	3:56am	4:06am
40	B15/2	******	3:53am	4:03am	4:13am
41	A17/3	******	3:59am	4:09am	4:19am
42	B17/2	******	4:05am	4:15am	4:25am
43	A19/3	******	4:11am	4:21am	4:31am
44	B19/2	******	4:18am	4:28am	4:38am
45	A21/3	******	4:24am	4:34am	4:44am
46	B21/2	******	4:30am	4:40am	4:50am
47	A23/3	******	4:36am	4:46am	4:56am
48	B23/2	******	4:42am	4:52am	5:02am
49	A25/3	******	4:49am	4:59am	5:09am
50	B25/2	******	4:55am	5:05am	5:15am
51	A27/3	******	5:01am	5:11am	5:21am
52	B27/2	******	5:07am	5:17am	5:27am
53	A29/3	******	5:14am	5:24am	5:34am
54	B29/2	******	5:20am	5:30am	5:40am
55	A31/3	******	5:26am	5:36am	5:46am
56	B31/2	******	5:32am	5:42am	5:52am
57	C2 /2	******	5:39am	5:49am	5:59am
58	B2 /3	******	5:45am	5:55am	6:05am
59	B4 /3	******	5:51am	6:01am	6:11am
60	B6 /3	******	5:57am	6:07am	6:17am
61	B8 /3	******	6:04am	6:14am	6:24am
62	A8 /1	******	6:10am	6:20am	6:30am
63	B10/3	******	6:16am	6:26am	6:36am
64	A10/1	******	6:22am	6:32am	6:42am
65	B12/3	******	6:28am	6:38am	6:48am
66	A12/1	******	6:35am	6:45am	6:55am
67	B14/3	******	6:41am	6:51am	7:01am
68	A14/1	******	6:47am	6:57am	7:07am
69	B16/3	******	6:53am	7:03am	7:13am
70	A16/1	******	7:00am	7:10am	7:20am
71	B18/3	******	7:06am	7:16am	7:26am
72	A18/1	19:04	7:12am	7:22am	7:32am
73	B20/3	19:04	7:18am	7:28am	7:38am
74	A20/1	19:05	7:25am	7:35am	7:45am
75	B22/3	19:05	7:31am	7:41am	7:51am
76	A2 /1	19:04	7:37am	7:47am	7:57am
77	A22/1	******	7:43am	7:53am	8:03am

1/ - B22 - A2
- B24 - A4
- B26 - A6

A2/1 can't be B22 ?

CC-10295 REV 1161
03.001.0020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1
12 Hrs. Beginning 12:00 AM
Date 5-4-93

BATTERY NO. B-2

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	6 57	7 28	—
3	7 06	7 40	—
5	7 15	8 05	—
7	7 30	8 10	—
9	7 42	8 14	—
11	8 18	8 34	—
13	8 29	8 44	—
15	8 35	8 59	—
17	8 53	9 12	—
19	9 07	9 37	—
21	9 17	9 35	—
23	9 36	9 47	—
25	9 42	9 58	—
27	9 53	10 08	—
29	10 03	10 21	—
31	10 16	10 37	—
2			
4			
6			
8			
10			
12			
14			
16			
18			
20			
22		12 04	—
24		12 16	—
26		12 28	—
28	12 06	12 40	—
30			
1	12 19	12 52	—
Q	10 22	10 48	—

BATTERY NO. A-1

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	12 30	1 05	—
3	12 42	1 17	—
5	12 54	1 29	—
7			
9			
11			
13	1 07	1 41	—
15	1 19	1 53	—
17	1 31	2 04	—
19	1 43	2 16	—
21	1 55	2 28	—
23	2 06	2 48	—
25	2 18	3 08	—
27	2 30	3 40	—
29	2 50	4 —	—
31	3 10	4 12	—
2	10 24	10 50	—
4	10 45	11 01	—
6	10 56	11 15	—
8	11 10	11 45	—
10	11 40		
12	11 45		
14	11 54		
16			
18			
20			
22			
24			
26			
28			
30			
1			
2			

BATTERY NO. B-1

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1			
3			
5			
7			
9			
11			
13			
15			
17			
19			
21			
23			
25			
27			
29			
31	8 02		
2	3 50	4 24	—
4			
6	4 02	4 36	—
8	4 14	4 45	—
10	4 26	5 03	—
12	4 33	5 15	—
14	4 50	6 05	—
16	5 05	6 23	—
18	5 17	6 35	—
20	6 07	6 47	—
22	7 48		
24	11 24		
26	11 29		
28	6 25	6 55	—
30	6 37	7 04	—
1	6 49	7 16	—
2			

REMARKS: 19/22 20/17 46/12 55/51

Condition of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
12-1	5	5	
1-2	5	5	
2-3	4	4	
3-4	2	2	
4-5	5	5	
5-6	2	2	
	23	23	

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

Total Ovens Pushed 55
Total Ovens Charged 51

Pusherman

Battery Foreman

CC-10295 REV. 1161
03 083 0020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. /

12 Hrs. Beginning 12:00 M

Date 8-4-93

BATTERY NO. As-3

OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1	6	56	6	59	
3	7	08	7	11	
5	7	19	7	25	
7	7	30	7	35	
9	7	41	7	46	
11	8	10	8	15	
13	8	20	8	25	
15	8	30	8	35	
17	8	45	8	50	
19	8	58	8	59	
21	9	10	9	15	
23	9	20	9	25	
25	9	25	9	40	
27	9	45	9	50	
29	9	55	9	57	
31	10	20	10	25	
2					
4					
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					
28					
30	12	08	12	15	
1					
2					

BATTERY NO. Bs-3

OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1	12	22	12	29	
3	12	33	12	40	
5	12	43	12	51	
7	12	54	12	57	
9	12	59	1	12	
11	1	10	1	16	
13	1	18	1	34	
15	1	29	1	43	
17	1	36	1	49	
19	1	46	1	59	
21	1	57	2	06	
23	2	08	2	06	
25	2	18	2	27	
27	2	29	2	38	
29	2	40	2	47	
31	2	51	2	56	
2	10	10	10	45	
4	10	40	10	55	
6	10	50	10	57	
8	11	00	11	05	
10	11	15	11	20	
12	11	30	11	35	
14	11	40	11	45	
16					
18					
20					
22					
24					
26					
28					
30					
1					
C-2	3	59	4	08	

BATTERY NO. As-2

OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1					
3					
5					
7					
9					
11					
13					
15					
17					
19					
21					
23					
25					
27					
29					
31					
2	4	01	4	18	
4	4	16	4	25	
6	4	29	5	12	
8	5	10	5	19	
10	5	15	5	25	
12	5	21	5	31	
14	5	27	5	37	
16	5	33	5	47	
18	5	43	5	55	
20	5	53	6	13	
22	6	01	6	12	
24	6	07	6	18	
26	6	20	6	28	
28	6	34	6	38	
30	6	44	6	53	
1					
2					

REMARKS: 17/17 24/24 15/15 56 56

Condition of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
12-1	6	5	
1-2	6	6	
2-3	5	6	
3-4	1	0	
4-5	3	3	
5-6	4	7	
	28	27	

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

Total Ovens Pushed 56

Total Ovens Charged 56

Pusherman

Battery Foreman

CC-16295 REV. 1161
03.00R.0020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1

12 Hrs. Beginning 12:00 PM

Date 8-4-93

BATTERY NO. B-2					
OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1					
3					
5					
7					
9					
11					
13					
15					
17					
19					
21					
23					
25					
27					
29					
31					
2	5	40	6	10	
4	5	51	6	20	
6	6	02	6	30	
8	6	13	6	40	
10	6	22	6	50	
12	6	32	7	—	
14	6	42	7	10	
16	6	52	7	20	
18	7	02	7	30	
20	7	13	8	08	
22	7	22	8	14	
24	7	32	8	20	
26	8	10	8	26	
28	8	16	8	38	
30	8	22	8	56	
C1	8	38	9	06	
2					

BATTERY NO. A-1					
OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1	8	40	9	18	
3	8	58	9	28	
5	9	08	9	30	
7	9	20	9	48	
9	9	30	9	57	
11	9	40	10	10	
13	9	50	10	20	
15	9	59	10	30	
17	10	12	10	40	
19	10	22	10	50	
21	10	32	11	—	
23	10	42	11	12	
25	10	52	11	22	
27	11	02	11	33	
29	11	14	11	43	
31	11	24			
2					
4					
6					
8					
10			12	41	—
12			12	46	—
14			12	51	—
16	12	30	12	35	—
18	12	50	1	01	—
20	1	01	1	18	—
22	1	13	1	23	—
24	1	18	1	41	—
26	1	36	1	52	—
28	1	47	2	12	—
30	2	07	2	16	—
1					
2					

BATTERY NO. B-1					
OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
X1	2	17	2	34	—
3	2	29	2	45	—
5	2	40	2	55	—
7	2	50	3	06	—
9	3	07	3	16	—
11	3	11	3	26	—
13	3	21	3	37	—
15X	3	32	4	06	
17	3	43	4	20	
19	3	54	5	—	
21	4	08	5	10	
23	4	22	5	22	
25	8	52	9	43	
27	5	02	5	30	
29	5	12	5	49	
31	—	—	5	53	
2	11	35			
4	11	45			
6					
8					
10					
12					
14					
16					
18					
20					
22			12	47	—
24			12	53	—
26			1	33	—
28					
30					
1					
C2	5	24	6	—	

REMARKS: 16/16 24/26 18/20 58 62

Condition of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
12-1	2	6	
1-2	5	6	
2-3	5	5	
3-4	4	4	
4-5	2	2	
5-6	5	6	
	25	29	

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
6-7	6	6	
7-8	4	4	
8-9	7	6	
9-10	6	7	
10-11	5	5	
11-12	5	5	
	33	33	

Total Ovens Pushed 58

Total Ovens Charged 62

Pusherman

Battery Foreman

CC-10235 REV. 1161
03.001.0020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1

12 Hrs. Beginning 12:00 PM

Date 8-4-93

BATTERY NO. A-1

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1			
3			
5			
7			
9			
11			
13			
15			
17			
19			
21			
23			
25			
27			
29			
31			
(2)	5 34	6 08	
4	5 46	6 18	
6	5 56	6 28	
8	6 06	6 38	
10	6 16	10 42	PURGE
12	6 26	6 48	
14	6 36	7 07	
16	6 46	7 17	
18	6 56	7 27	
20	7 05	7 37	
22	7 15	7 44	
24	7 25	7 50	
26	7 35	7 57	
28	7 42	8 11	
30	7 48	8 22	
1			
2			

BATTERY NO. A-3

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	7 55	9 04	
3	8 02	9 14	
5	9 02	9 24	
7	9 12	9 34	
9	9 22	9 44	
11	9 32	9 54	
13	9 42	10 04	
15	9 52	10 14	
17	10 02	10 24	
19	10 12	10 34	
21	10 22	10 48	
23	10 32	10 58	
25	10 46	11 10	
27	10 56	11 20	
29	11 08	11 30	
31	11 18	11 40	
2			
4			
6			
8			
10			
12			
14			
16	12 30	12 35	
18	12 40	12 45	
20	12 55	12 57	
22	1 05	1 10	
24	1 20	1 25	
26	1 30	1 37	
28	1 40	1 45	
30	1 50	1 52	
C1	1 57	1 59	
C2	11 28	11 50	

BATTERY NO. A-2

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
(1)	2 10	2 25	
3	2 20	2 29	
5	2 30	2 45	
7	2 40	2 57	
9	2 50	3 10	
11	3 05	3 17	
13	3 15	3 27	
(15)	3 25	3 37	
17	3 35	4 17	
19	3 45	4 27	
(21)	3 59	4 37	
23	4 15	4 58	
25	4 25	5 19	
27	4 42	5 38	
29	4 56	5 49	
31	5 17	5 59	
2	11 33		
(4)	11 43		
6			
8			
10			
12			
14			
16			
18			
20			
22			
24			
26			
28			
30			
1			
2			

REMARKS: 15/15 26/26 16/16 59 57

Condition of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
12-1	7	7	
1-2	6	6	
2-3	5	4	
3-4	6	4	
4-5	4	4	
5-6	4	4	
	28	25	

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
6-7	6	5	
7-8	7	7	
8-9	1	2	
9-10	6	6	
10-11	6	7	
11-12	5	5	
	31	32	

Total Ovens Pushed 59

Total Ovens Charged 57

Pusherman

Battery Foreman

CC-10235 REV. 1161
03.001.0020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1

12 Hrs. Beginning 12:00 AM

Date 8-5-93

BATTERY NO. B-2

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	2 17	2 51	
3	2 29	3 02	
5	2 41	3 14	
7	2 53	3 26	
9	3 04	3 38	
11	3 16	3 50	
13	3 28	4 30	
15	3 40	4 40	
17	3 52	4 51	
19	4 32	5 03	
21	4 42	5 18	
23	4 53	5 33	
25	5 05	5 49	
27	5 20	6 03	
29	5 35	6 18	
31	5 50	6 33	
2			
4			
6		17	
8			
10		18	
12			
14			
16			
18			
20			
22			
24			
26			
28			
30		12 30	
1			
2	6 05	6 53	

BATTERY NO. A-1

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1			
3			
5			
7			
9			
11			
13			
15			
17			
19			
21		15	
23		14	
25			
27			
29			
31		12 04	
2	8 03	11 15	
4	8 46		
6	8 52		
8	6 20	7 08	
10	6 35	7 19	
12	6 55	7 25	
14	7 10	7 35	
16	7 20	7 49	
18	7 30	8 13	
20	7 40	8 24	
22	7 50	8 35	
24	8 15	9 43	
26	8 26	9 53	
28	8 30	10 01	
30	9 45	10 29	
1			
2			

BATTERY NO. B-1

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	9 53	10 38	
3	10 03	10 46	
5	10 33	11 21	
7	10 40	11 25	
9	10 46	11 30	
11	11 17		
13	11 23		
15	11 28		
17			
19			
21			
23			
25		19	
27			
29		18	
31			
2		12 14	
4		12 24	
6	12 06	12 34	
8	12 16	12 44	
10	12 26	12 54	
12	12 36	1 05	
14	12 46	1 17	
16	12 56	1 29	
18	1 07	1 45	
20	1 19	2 03	
22			
24			
26			
28	1 31	2 15	
30	1 47	2 27	
1	2 05	2 39	
2			

51 / 50

REMARKS:

Condition of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
12-1	6	7	
1-2	4	4	
2-3	5	5	
3-4	5	5	
4-5	3	3	
5-6	4	4	
	27	28	

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
6-7	4	4	
7-8	5	5	
8-9	6	3	
9-10	2	2	
10-11	4	4	
11-12	3	4	
	24	22	

Total Ovens Pushed 51

Total Ovens Charged 50

Pusherman

Battery Foreman

SC-10215 REV. 1161
03.001.0020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1
12 Hrs. Beginning 12:00 AM
Date 8-5-93

BATTERY NO. A-3

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	2 20	2 41	
3	2 32	2 51	
5	2 43	3 03	
7	2 53	3 13	
9	3 05	3 24	
11	3 15	3 34	PB
13	3 26	3 49	
15	3 36	4 --	
17	3 51	4 19	
19	4 03	5 18	
21	4 41	5 31	
23	4 52	5 36	
25	5 04	5 42	
27	5 15	5 47	
29	5 33	5 56	
31	5 52	6 03	
2			
4			
6			
8			
10			
12			
14			
16			
18			
20			
22			
24			
26			
28			
30			
1			
2			

BATTERY NO. B-3

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1			
3			
5			
7			
9			
11			
13			
15			
17			
19			
21			
23			
25			
27			
29			
31			
2	6 06	6 15	
4	6 17	6 24	
6	6 26	6 34	
8	6 36	6 44	
10	6 46	6 53	
12	6 57	7 06	
14	7 08	7 13	
16	7 19	7 28	
18	7 30	7 38	
20	7 40	7 48	
22	7 50	7 53	
24	8 10	8 12	
26	8 20	9 00	
28	9 02	9 10	
30	9 08	9 18	
C1	9 15	9 40	
2			

BATTERY NO. A-2

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	10 15	10 55	
3	10 20	11 08	—
5	10 26	11 06	—
7	10 59	11 42	—
9	11 05	11 50	—
11	11 10	11 56	—
13	11 45		
15	11 50		
17	11 59		
19			
21			
23			
25			
27			
29			
31			
2	12 05		
4	12 16		
6	12 08	12 26	
8	12 19	12 37	
10	12 24	12 47	
12	12 35	12 53	
14	12 45	1 04	
16	12 53	1 14	
18	1 06	1 25	
20	1 11	1 30	
22	1 27	1 40	
24	1 32	1 47	
26	1 42	2 05	
28	1 49	2 17	
30	2 07	2 29	
1			
2			

REMARKS: 16/16 16/16 22/21 54 53

Condition of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
12-1	6	6	
1-2	6	6	
2-3	5	5	
3-4	5	5	
4-5	3	2	
5-6	4	6	
	29	30	

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
6-7	6	6	
7-8	5	6	
8-9	2	1	
9-10	2	4	
10-11	4	1	
11-12	5	5	
	25	23	

Total Ovens Pushed 54
Total Ovens Charged 53

Pusherman

Battery Foreman

CC-10295 REV 1161
03.001.3020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1
12 Hrs. Beginning 12:00 AM
Date 8-5-93

BATTERY NO. B-2						BATTERY NO. A-1						BATTERY NO. B-1					
OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES	OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES	OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1						1	5	35	6	20	PB, KO	1					
3						3	5	58	6	27	PB, KO	3					
5						5	6	12	6	40		5					
7						7	6	22	6	50		7					
9						9	6	32	7	—		9					
11						11	6	42	7	08		11			12	34	
13						13	6	52	7	24		13			12	39	
15						15	7	02	7	34		15			12	47	
17						17	7	10	7	42	PB	17	12	36	1	32	
19						19	7	26	7	51		19	12	41	1	43	
21						21	7	36	8	34		21	12	49	2	05	
23						23	7	44	8	44		23	1	33	2	33	
25						25	7	52	8	51		25	X	X	X	X	
27						27	8	36	9	08		27	1	45	2	49	
29						29	8	42	9	18		29	2	07	3	01	
31						31	8	52	9	32		31	5	52	6	30	
2	2	45	3	16		2						2	9	10	9	42	
4	2	57	3	25		4			1	05		4	9	20	9	52	
6	3	08	3	29		6			1	17		6	9	34	10	—	
8	3	18	3	42		8						8	9	44	10	10	
10	3	23	4	08		10						10	9	54	10	20	
12	3	31	4	20		12						12	10	02	10	30	
14	3	44	4	30		14						14	10	12	10	40	
16	4	10	4	42		16						16	10	22	10	50	
18	4	22	4	52		18						18	10	32	11	02	
20	4	32	5	02		20						20	10	42	11	16	
22	4	44	5	13		22						22	10	52	11	32	
24	4	54	5	23		24						24	11	04			
26	5	04	5	33		26						26	11	18			
28	5	15	5	56		28						28	11	34			
30	9	39				30						30					
C1	5	35	6	10		1						1					
2						2						C2	2	35	3	12	

REMARKS: 16/15 16/18 22/22 54 55

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	3	3		6-7	5	6	
1-2	2	4		7-8	6	6	
2-3	4	3		8-9	3	3	
3-4	5	6		9-10	4	5	
4-5	5	5		10-11	6	6	
5-6	6	5		11-12	3	3	
	25	26			29	29	

Total Ovens Pushed 54
Total Ovens Charged 55

Pusherman

Battery Foreman

CC-10295 REV. 1161
03.081.0020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 1
12 Hrs. Beginning 12:00 PM
Date 8-5-95

BATTERY NO. A-1					
OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1					
3					
5					
7					
9					
11					
13					
15					
17					
19					
21					
23					
25					
27					
29					
31					
2	2	40	3	05	
4	2	50	3	22	
6	3	00	3	30	
8	3	12	3	48	
10	3	14	11	06	AR PUSH
12	3	28	4	07	
14	3	40	4	18	
16	4	05	4	29	
18	4	16	4	39	
20	4	27	4	49	
22	4	37	5	-	
24	4	47	5	18	
26	4	57	5	28	
28	5	10	5	39	
30	5	20	6	04	
1					
2					

BATTERY NO. B-3					
OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1	5	31	6	14	
3	5	44	6	27	
5	6	02	6	37	
7	6	16	6	47	
9	6	25	6	57	
11	6	35	7	06	
13	6	45	7	22	
15	6	55	7	32	
17	7	04	7	42	
19	7	20	7	52	
21	7	30	8	33	
23	7	40	8	43	
25	7	50	8	53	
(27)	8	31	9	03	
29	8	41	9	07	
31	8	51	9	16	
2					
4					
6					
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					
28					
30					
1					
(2)	9	01	9	26	

BATTERY NO. A-2					
OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1					
3					
5					
7					
9					
11					
13			1	00	
15			1	15	
17			1	29	
19	1	05	1	50	
21	1	17	2	02	
23	1	27	2	12	
25	1	53	2	17	
27	2	00	2	30	
29	2	10	2	33	
31	2	27	2	37	
(2)	9	05	9	40	
4	9	14	9	50	
6	9	24	10	-	
8	9	38	10	08	
10	9	48	10	18	
12	9	58	10	28	
14	10	06	10	38	
16	10	16	10	48	
18	10	26	11	10	
20	10	36	11	20	
22	10	46	11	25	
24	11	03			
26	11	13			
(28)	11	23			
30					
1					
2					

REMARKS: 15/15 17/17 21/21 53 53

Condition of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
12-1	0	0	
1-2	4	4	
2-3	5	6	
3-4	4	4	
4-5	6	6	
5-6	4	3	
	23	23	

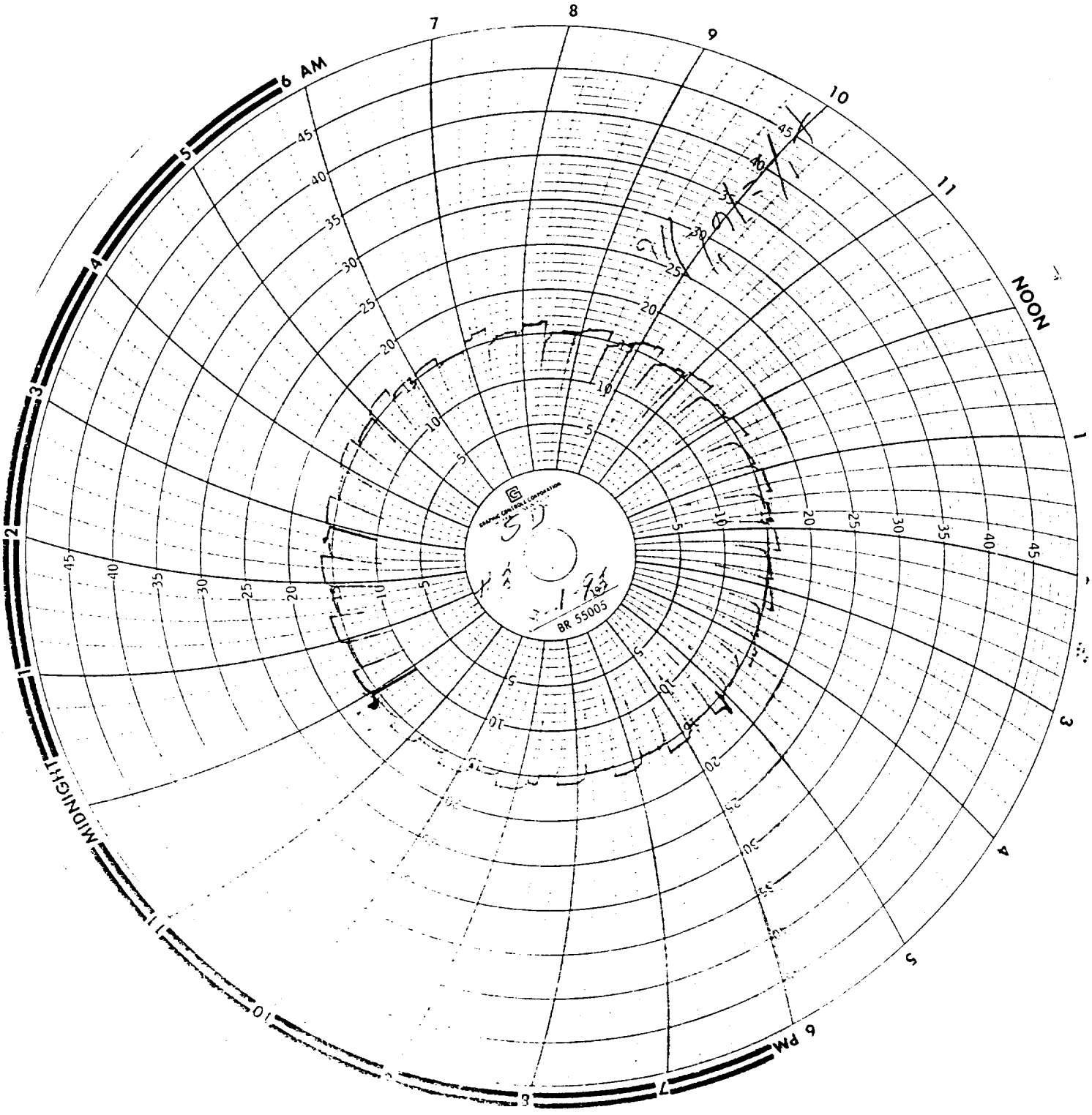
TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
6-7	6	6	
7-8	6	5	
8-9	3	3	
9-10	7	7	
10-11	5	5	
11-12	3	4	
	30	30	

Total Ovens Pushed 53
Total Ovens Charged 53

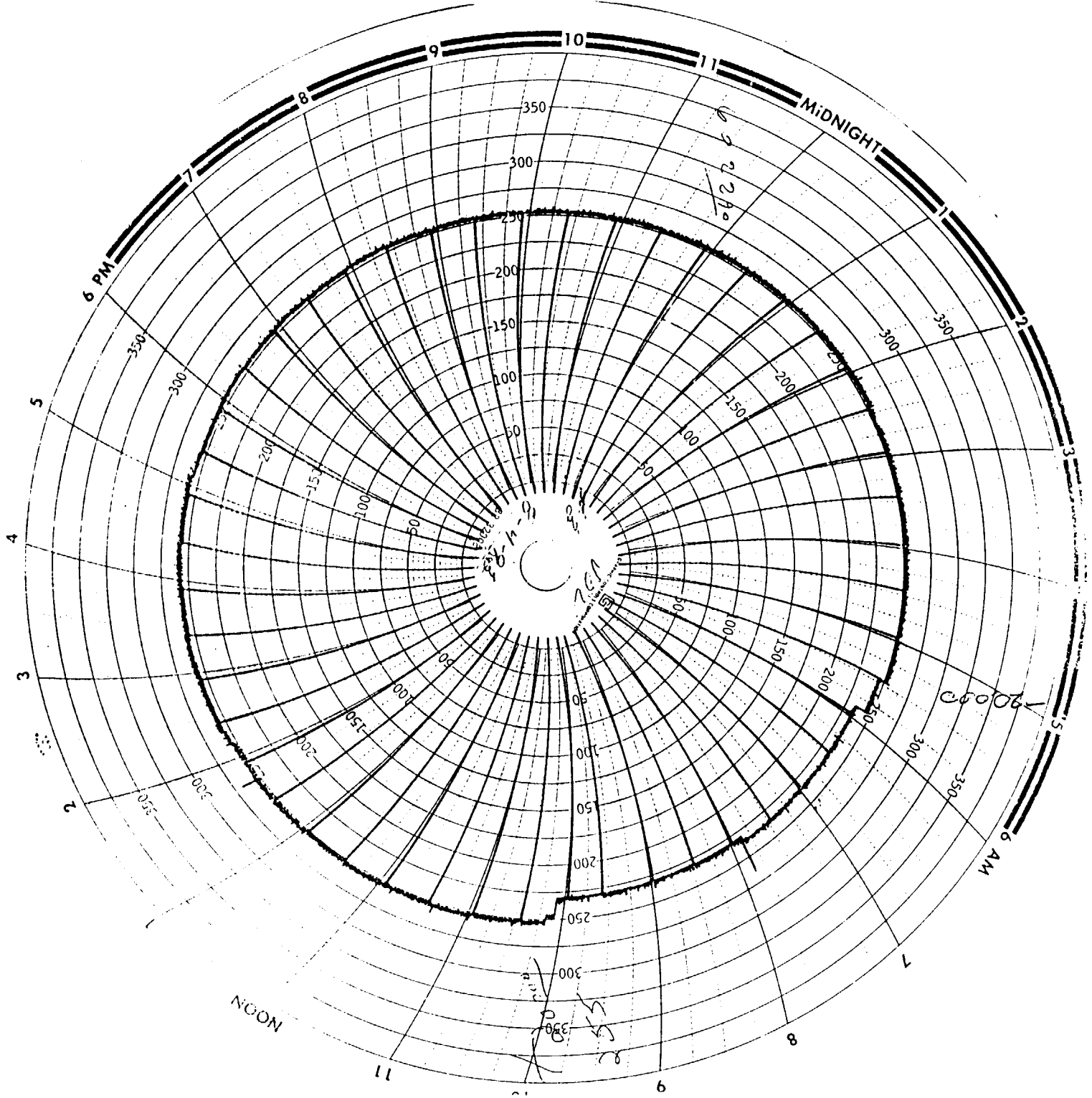
Pusherman

Battery Foreman

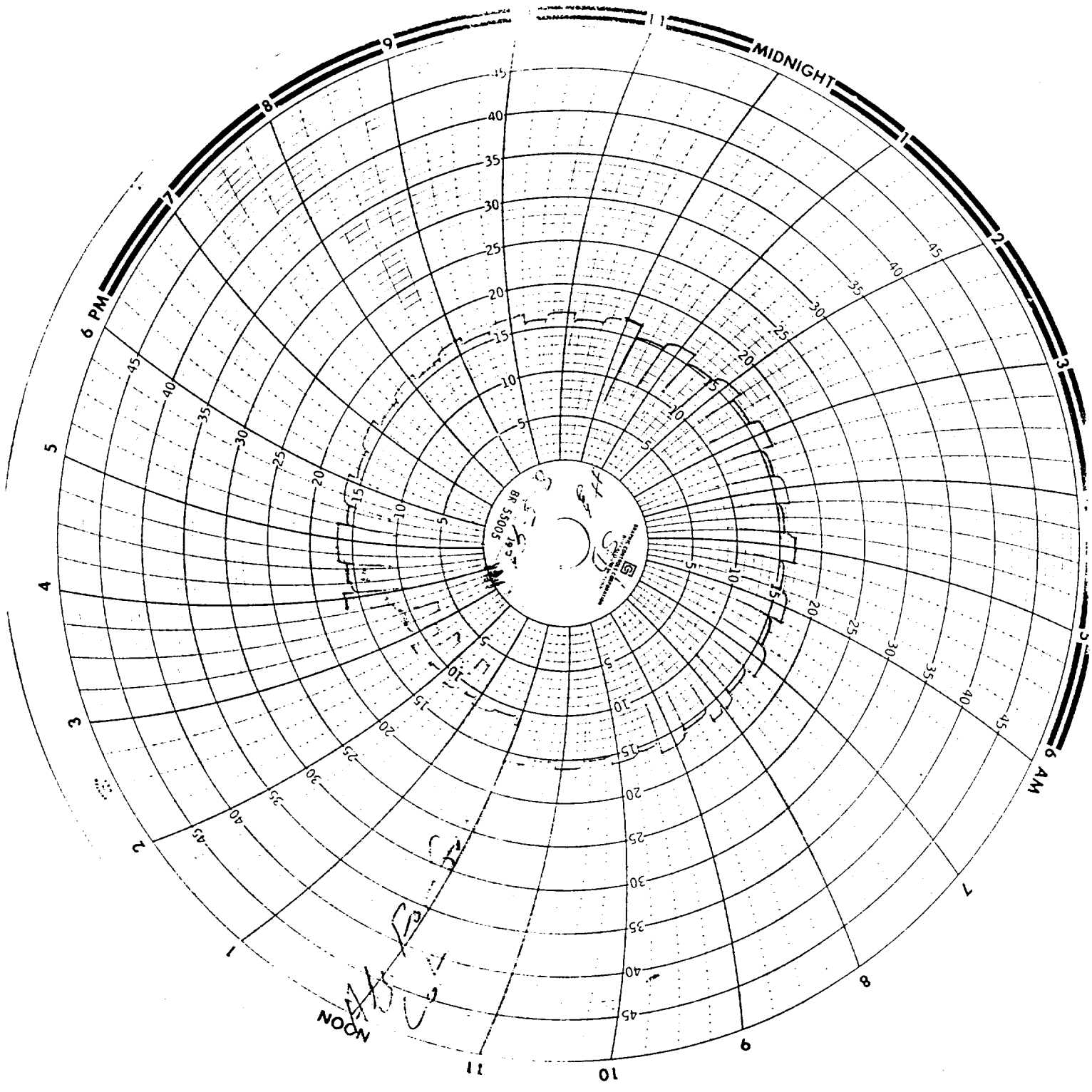
NOON
6 PM
MIDNIGHT
6 AM
BR 55005


6 AM
NOON
6 PM
MIDNIGHT
BR 55005

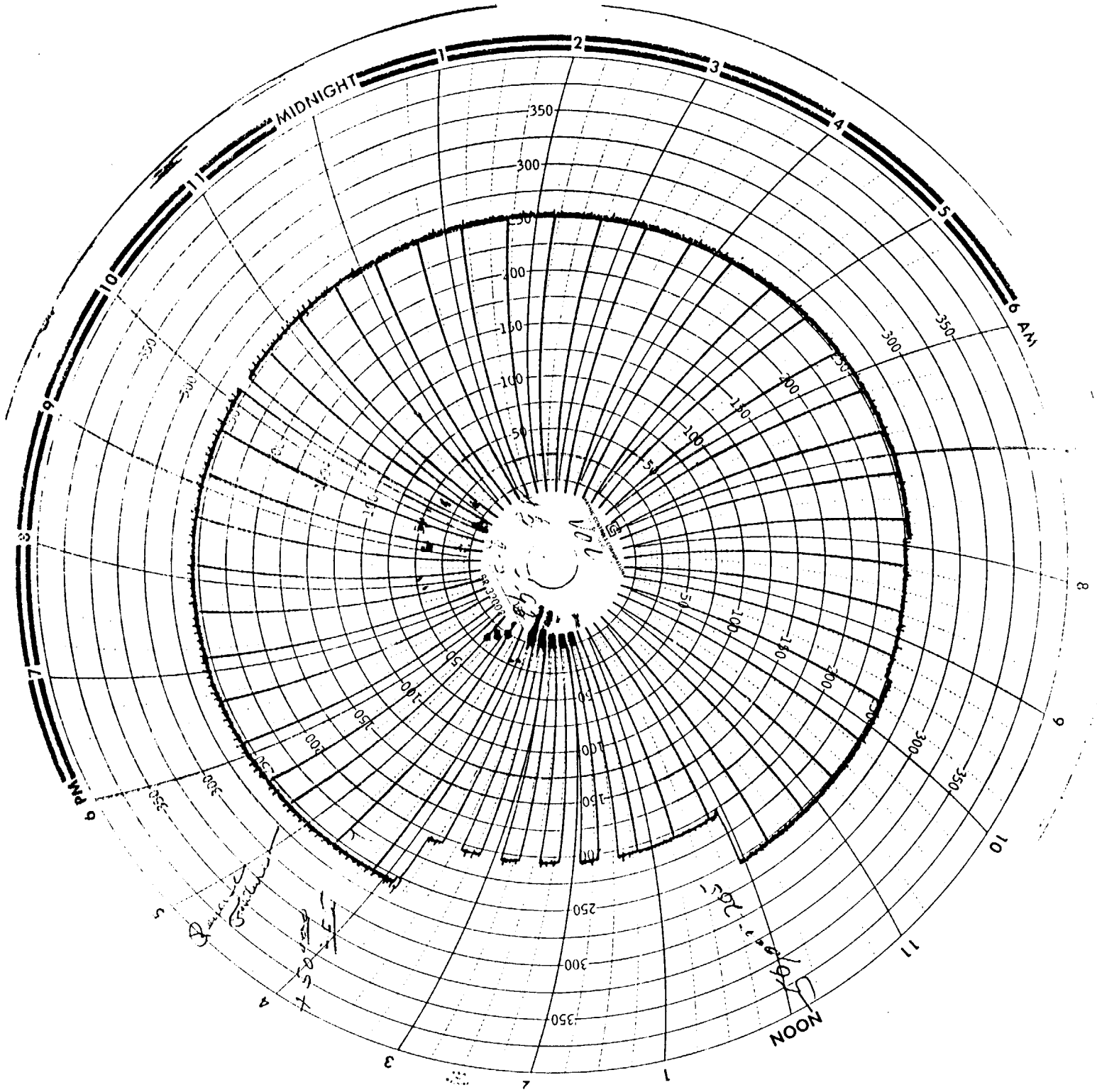
MIDNIGHT
6 AM
NOON
6 PM
350
300
250
200
150
100
50
BP 32008


MIDNIGHT
6 AM
NOON
6 PM
1
2
3
4
5
6
7
8
9
10
11
12
50
100
150
200
250
300
350

MIDNIGHT
6 PM
NOON
6 AM
BR SS005


MIDNIGHT
6 PM
NOON
6 AM
1
2
3
4
5
7
8
9
10
11
5
10
15
20
25
30
35
40
45

MIDNIGHT
6 PM
6 AM
NOON
10
11
12
1
2
3
4
5
6
7
8
9
350
300
250
200
150
100
50


MIDNIGHT
1
2
3
4
5
6 AM
7
8
9
10
11
NOON
1
2
3
4
5
6 PM
7
8
9
10
11
50
100
150
200
250
300
350

COMPLIANCE DEMONSTRATION
NO. 3 BATTERY COMBUSTION STACK
USS CLAIRTON WORKS

USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA

APPENDIX C

GRAVIMETRIC RESULTS, EMISSIONS CALCULATIONS

CHESTER
ENVIRONMENTAL

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

ANALYTICAL REPORTING FORM

CLIENT: USX - Clairton Steel
PLANT LOCATION: #3 Battery Stack
PROJECT NUMBER: 605041-01
UNIT TESTED: B53

TEST DATE: 8/4 & 8/5/93
DATE RECEIVED: 8/5/93
DATE ANALYZED: 8/9/93
ANALYTICAL METHOD:

Test Number	Component	Cyclone Weight Units ( )	Filter Weight Units (grams)	Insoluble Portion of Front Half Units ( )	0.22μ Filter Insoluble Portion of Back Half Units ( )	Soluble Portion of Back Half Units ( )	Soluble Portion of Front Half Units (grams)	Chloroform/ Ethyl Ether Extract Units ( )
CLR-B53-1	Particulate		0.1066				0.0296	
CLR-B53-2	Particulate		0.0345				0.0200	
CLR-B53-3	Particulate		0.0200				0.0139	
CLR-B53-Acet-Blank	Particulate						0.0000	

Extraction Method
Solvent

Analyst's Signature: Patricia A. Hostetter
Date: 8/10/93

Comments

AQE 3/92

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING
SAMPLING CALCULATIONS

CLIENT: USS Clairton Works TEST DATE: 8-4-93
TEST SITE: #3 Battery Stack TEST NUMBER: CLR-BS3-1

A.	Barometric Pressure	29.35	in. Hg	
B.	Static Pressure	-1.0	in. H2O	
C.	Stack Pressure	29.28	in. Hg	[A+(B/13.6)]
D.	Average ΔH	0.69	in. H2O	
E.	Meter Pressure	29.40	in. Hg	[A+(D/13.6)]
F.	Average ΔP	0.05	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	1.0151		
I.	Stack Diameter	114	in.	
J.	Stack Area	70.88	ft^2	$(0.00545*I^2)$
K.	Nozzle Diameter	0.428	in.	
L.	Nozzle Area	9.99×10^{-4}	ft^2	$(0.00545*K^2)$
M.	Average Stack Temperature	522	°F	
N.	Average Stack Temperature	982	°R	(460+M)
O.	Average Meter Temperature	94	°F	
P.	Average Meter Temperature	554	°R	(460+O)
Q.	Condensate Volume	161.6	mL	
R.	Absorbed H2O	11.2	mL	
S.	Total H2O	172.8	mL	(Q+R)
T.	Filter Particulate Weight	0.1066	g	
U.	Probe Particulate Weight	0.0296	g	
V.	Impinger Particulate Weight	—	g	
W.	Total Particulate Weight	0.1362	g	(T+U+V)
X.	Metered Gas Volume	58.885	dcf	
Y.	Corrected Metered Gas Volume	59.774	dcf	(X*H)
Z.	H2O Gas Volume	8.709	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	68.483	cf	(Y+Z)
BB.	Percent H2O	12.7	%	(100*Z/AA)
CC.	Gas Volume Sampled	55.979	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0375	gr/dscf	(15.4*W/CC)

EE. Average Molecular Weight:

Component	% Volume ÷100	* (1-BB/100)	* Molecular Weight	= Weight/Mol
H2O	0.127		18	2.286
CO2	0.130	0.873	44	4.994
CO	Ø		28	Ø
O2	0.040		32	1.117
N2	0.830		28	20.289
H2	Ø		2	Ø
Ar	Ø		40	Ø
Average Molecular Weight				28.69

FF.	Average Stack Velocity	17.4	fps	{85.49*G*SQRT [(F*N)/(C*EE)]}
GG.	Averge Flow Rate	73800	acfm	(60*FF*J)
HH.	Standard Flow Rate	38900	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	7200	sec	
JJ.	Percent Isokinetic	97.6	%	{[100*CC*60*J] / [HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	10.9	lb/hr	[DD*HH*(1-BB/100)*60/7000]

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING
SAMPLING CALCULATIONS

CLIENT: USS Clairton Works TEST DATE: 8-4-93
TEST SITE: #3 Battery Stack TEST NUMBER: CLR-BS3-2

A.	Barometric Pressure	29.35	in. Hg		
B.	Static Pressure	-1.0	in. H2O		
C.	Stack Pressure	29.28	in. Hg	[A+(B/13.6)]	
D.	Average ΔH	0.73	in. H2O		
E.	Meter Pressure	29.40	in. Hg	[A+(D/13.6)]	
F.	Average ΔP	0.05	in. H2O		
G.	Pitot Coefficient	0.84			
H.	Gas Meter Coefficient	1.0151			
I.	Stack Diameter	114	in.		
J.	Stack Area	70.88	ft²	(0.00545*I²)	
K.	Nozzle Diameter	0.428	in.		
L.	Nozzle Area	9.99×10^{-4}	ft²	(0.00545*K²)	
M.	Average Stack Temperature	551	°F		
N.	Average Stack Temperature	1011	°R	(460+M)	
O.	Average Meter Temperature	96	°F		
P.	Average Meter Temperature	556	°R	(460+O)	
Q.	Condensate Volume	184.6	mL		
R.	Absorbed H2O	13.5	mL		
S.	Total H2O	198.1	mL	(Q+R)	
T.	Filter Particulate Weight	0.0345	g		
U.	Probe Particulate Weight	0.0200	g		
V.	Impinger Particulate Weight	—	g		
W.	Total Particulate Weight	0.0545	g	(T+U+V)	
X.	Metered Gas Volume	61.603	dcf		
Y.	Corrected Metered Gas Volume	62.533	dcf	(X*H)	
Z.	H2O Gas Volume	10.020	cf	(0.00267*S*P/A)	
AA.	Total Sample Volume	72.553	cf	(Y+Z)	
BB.	Percent H2O	13.8	%	(100*Z/AA)	
CC.	Gas Volume Sampled	58.352	dscf	[Y*(528/P)*(E/29.92)]	
DD.	Grain Loading	0.0144	gr/dscf	(15.4*W/CC)	

EE. Average Molecular Weight:

Component	% Volume ÷100	* (1-BB/100)	* Molecular Weight	= Weight/Mol
H2O	0.138		18	2.484
CO2	0.130	0.862	44	4.931
CO	ø		28	ø
O2	0.040		32	1.103
N2	0.830		28	20.033
H2	ø		2	ø
Ar	ø	√	40	ø

Average Molecular Weight 28.55

FF.	Average Stack Velocity	17.7	fps	{85.49*G*SQRT [(F*N)/(C*EE)]}
GG.	Averge Flow Rate	75100	acfm	(60*FF*J)
HH.	Standard Flow Rate	38400	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	7200	sec	
JJ.	Percent Isokinetic	104.3	%	{[100*CC*60*J] / [HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	4.1	lb/hr	[DD*HH*(1-BB/100)*60/7000]

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING
SAMPLING CALCULATIONS

CLIENT: USS Clayton Works TEST DATE: 8-5-93
TEST SITE: #3 Battery Stack TEST NUMBER: CLR - BS3 - 3

A.	Barometric Pressure	29.43	in. Hg	
B.	Static Pressure	-1.1	in. H2O	
C.	Stack Pressure	29.35	in. Hg	[A+(B/13.6)]
D.	Average ΔH	0.70	in. H2O	
E.	Meter Pressure	29.48	in. Hg	[A+(D/13.6)]
F.	Average ΔP	0.05	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	1.0151		
I.	Stack Diameter	114	in.	
J.	Stack Area	70.88	ft²	(0.00545*I²)
K.	Nozzle Diameter	0.428	in.	
L.	Nozzle Area	9.99 x10⁻⁴	ft²	(0.00545*K²)
M.	Average Stack Temperature	540	°F	
N.	Average Stack Temperature	1000	°R	(460+M)
O.	Average Meter Temperature	86	°F	
P.	Average Meter Temperature	546	°R	(460+O)
Q.	Condensate Volume	179.6	mL	
R.	Absorbed H2O	12.3	mL	
S.	Total H2O	191.9	mL	(Q+R)
T.	Filter Particulate Weight	0.0200	g	
U.	Probe Particulate Weight	0.0139	g	
V.	Impinger Particulate Weight	—	g	
W.	Total Particulate Weight	0.0339	g	(T+U+V)
X.	Metered Gas Volume	60.951	dcf	
Y.	Corrected Metered Gas Volume	61.871	dcf	(X*H)
Z.	H2O Gas Volume	9.506	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	71.377	cf	(Y+Z)
BB.	Percent H2O	13.3	%	(100*Z/AA)
CC.	Gas Volume Sampled	58.951	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0089	gr/dscf	(15.4*W/CC)

EE. Average Molecular Weight:

Component	% Volume ÷100	* (1-BB/100)	* Molecular Weight	= Weight/Mol
H2O	0.133		18	2.394
CO2	0.130	0.867	44	4.959
CO	∅		28	∅
O2	0.040		32	1.110
N2	0.830		28	20.149
H2	∅		2	∅
Ar	∅		40	∅

Average Molecular Weight 28.61

FF.	Average Stack Velocity	17.5	fps	{85.49*G*SQRT [(F*N)/(C*EE)]}
GG.	Averge Flow Rate	74500	acfm	(60*FF*J)
HH.	Standard Flow Rate	38600	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	7200	sec	
JJ.	Percent Isokinetic	104.2	%	{[100*CC*60*J] / [HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	2.5	lb/hr	[DD*HH*(1-BB/100)*60/7000]