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.

AP-42 Section 12.2
Reference
Report Sect. 4
Reference 68

reviewed

USS CLAIRTON WORKS
A DIVISION OF USX CORPORATION
CLAIRTON, PA

Report on
COMPLIANCE DEMONSTRATION
#7 BATTERY COMBUSTION STACK

JANUARY 1993

Prepared By: Chester Environmental
Project No.: 605087-01

CHESTER
ENVIRONMENTAL

39

AHF

~~Sr. J. Geetz~~

02-03-93

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

For your information and disposition.

CC: G. W. Leney
(cover letter only)

January 29,

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

Deputy Direc
Allegheny Co
Bureau of Ai
301 Thirty-ninth Street
Pittsburgh, PA 15201

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 #7

I have enclosed with this letter the mass emission report on #7 Battery Combustion Stack. The compliance demonstration was conducted at USS Clairton Works, Clairton, PA, a division of USX Corporation, on November 19-20, 1992.

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
Attachment

Steel the recycled material

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ABSTRACT

On November 19 and 20, 1992, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #7 Battery Combustion Stack. The purpose of the testing was to determine the (1) concentration and mass emission rates of particulate matter, and (2) presence and extent of visible emissions from the stack as required by the Amended Mon Valley Consent Decree, Paragraph V. A. (6) and Appendix 4.A.

The allowable particulate matter concentration for #7 Battery Combustion Stack, as required by the Amended Mon Valley Consent Decree, is 0.030 gr/dscf. The results of three test runs produced an average particulate matter concentration and emission rate of 0.0089 gr/dscf and 3.11 lb/hr, respectively. The Amended Mon Valley Consent Decree requires that visible emissions shall not equal or exceed 20 percent opacity for a period or periods aggregating in excess of 3 minutes in any 60-minute period and shall never equal or exceed 60 percent opacity. No visible emissions were recorded during any of the stack tests.

1.0 INTRODUCTION

On November 19 and 20, 1992, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #7 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. The test crew was comprised of Richard Casselberry, Bernie May, and Tom Morgan. All test procedures were witnessed by Phil Lawrence of the Allegheny County Health Department Bureau of Air Pollution Control (BAPC).

The test program was completed over a two day period due to a delay in the operation of the Battery #7. Emissions testing was suspended during the first stack test on November 19 since USS planned to suspend pushing and charging operations on Battery #7 for approximately three hours. Once Chester Environmental was notified that normal battery operations were being conducted (about 11:40 AM), emissions testing was resumed and the first stack test was subsequently completed. The second emissions test was completed on November 19 while the third emissions test was completed on November 20.

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 and Sections 139.11 and 139.12 of the Pennsylvania Department of Environmental Resources (PA DER) Source Testing Manual. Three two-hour tests were executed during normal, 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. A schematic diagram of the combustion stack and traverse points can be found in Figure 2-1.

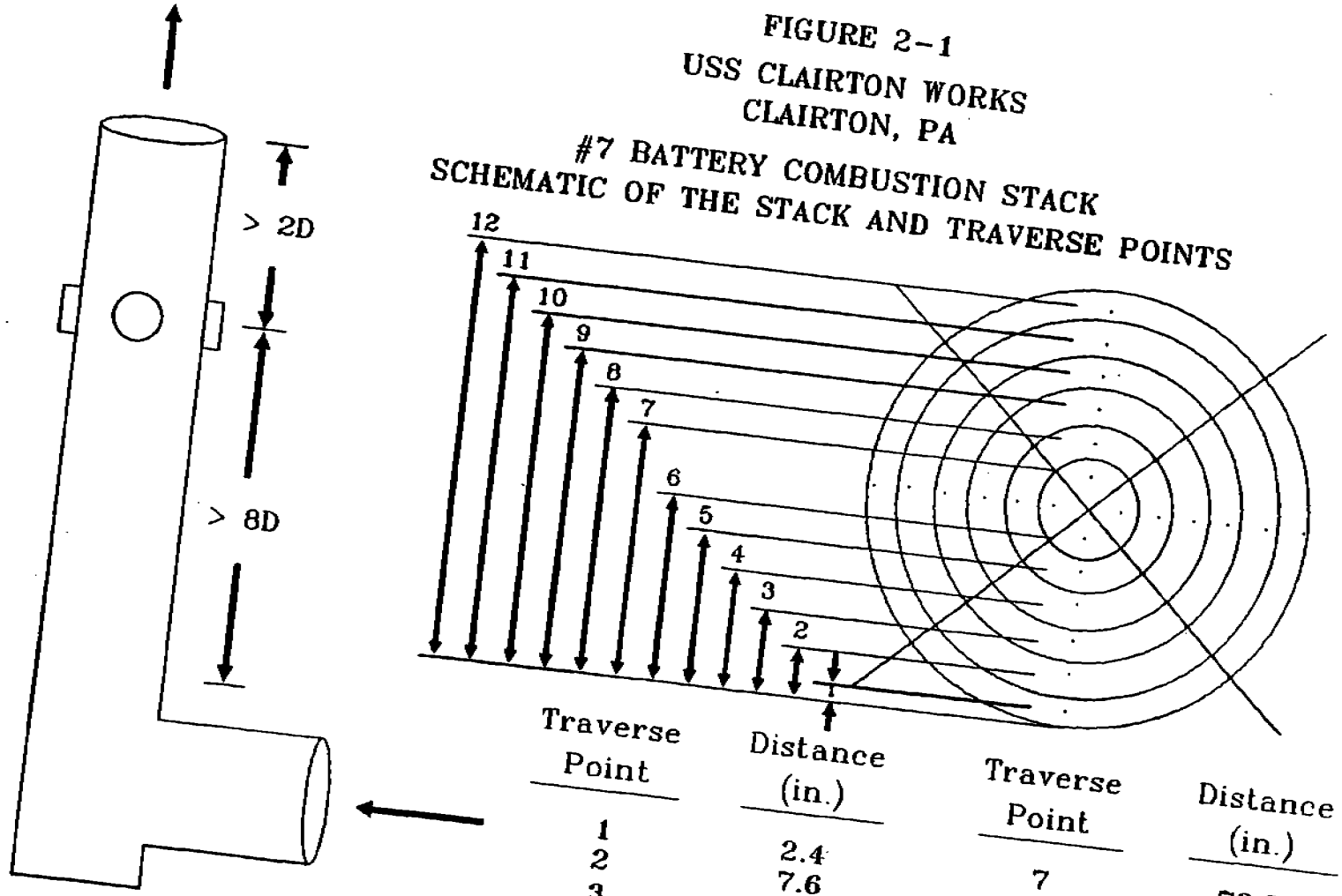
In accordance with EPA Method 2, velocities and volumetric flow rates of the exhaust gas were determined using a calibrated S type Pitot tube. Positive and negative Pitot lines were leak-checked at the beginning and end of each test run. Gas velocity differential pressures along with stack gas temperatures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

At the beginning and end of each test, gas concentrations of 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 sampling 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. The acetone rinses were evaporated to

FIGURE 2-1
USS CLAIRTON WORKS
CLAIRTON, PA
#7 BATTERY COMBUSTION STACK
SCHEMATIC OF THE STACK AND TRAVERSE POINTS



Stack Diameter (D) = 114 inches

Traverse Point	Distance (in.)	Traverse Point	Distance (in.)
1	2.4	7	73.5
2	7.6	8	85.5
3	13.5	9	93.8
4	20.2	10	100.5
5	28.5	11	106.4
6	40.6	12	111.6

CHESTER ENVIRONMENTAL

dryness, desiccated, and weighed to a constant weight. The sample train filters were dried, desiccated for 24 hours, and weighed to a constant weight. Rinse residue weights and filter weights were measured to the nearest 0.1 milligram. One acetone blank was prepared in the same manner as the test sample acetone rinses. The blank residue weight was subtracted from the test sample rinse residue weights. Front-half acetone rinse residue weights (after blank correction) 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.

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.

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

The analytical results and emissions calculations for the three test runs can be found in Appendix C. The test results for particulate matter have been summarized in Table 3-1. As promulgated by the Amended Mon Valley Consent Decree, Paragraph V.A.(6), the allowable particulate matter concentration for #7 Battery Combustion Stack is 0.030 gr/dscf. The results of the testing yielded an average particulate matter concentration and emission rate of 0.0089 grains per dry standard cubic feet (gr/dscf) and 3.11 pounds per hour (lb/hr), respectively.

Table 3-1 also lists other pertinent stack and sampling parameters which include stack gas flow rate expressed in units of actual cubic feet per minute (acfm), standard cubic feet per minute (scfm), and dry standard cubic feet per minute (dscfm), 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 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. A sample volume greater than 50 dscf was required for each of the three test runs. The isokinetics values and sample volumes are in the acceptable ranges.

Visible emissions data is summarized in Table 3-2. Plume opacities were determined and recorded at 15 second intervals for the duration of each stack test. 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." No visible emissions were recorded during any of the stack tests.

TABLE 3-1

USS CLAIRTON WORKS
CLAIRTON, PA

#7 BATTERY COMBUSTION STACK
PARTICULATE MATTER EMISSIONS DATA

		Run 1	Run 2	Run 3	Average
Test Number		CLR-7BS-1	CLR-7BS-2	CLR-7BS-3	
Test Date		11-19-92	11-19-92	11-20-92	
Mass Emission Rate and Concentration					
Particulate Matter	(lb/hr)	4.59	2.34	2.39	3.11
	(gr/dscf)	0.0134	0.0068	0.0065	0.0089
Stack Conditions					
Flow Rate	(acfm)	84632	84771	84913	84772
	(scfm)	45371	45664	48332	46456
	(dscfm)	40108	40358	42904	41123
Temperature	(°F)	508	504	502	505
Moisture Content	(%)	11.6	11.6	11.2	11.5
Sampling Conditions					
Test times		0820 to 0850	1340 to 1410	0820 to 0850	
		1145 to 1215	1415 to 1445	0854 to 0924	
		1220 to 1250	1450 to 1520	0927 to 0957	
		1255 to 1325	1525 to 1555	1000 to 1030	
Sampling Time	(minutes)	120	120	120	
Sample Volume	(dscf)	68.355	68.423	66.256	
Isokinetics	(%)	100.8	100.2	91.3	

TABLE 3-2

USS CLAIRTON WORKS
CLAIRTON, PA

#7 BATTERY COMBUSTION STACK
VISIBLE EMISSIONS DATA

Run Number	1	2	3
Observation Date	11-19-92	11-19-92	11-20-92
Observation Times	08:15 to 08:50	13:30 to 15:55	08:20 to 10:30
	11:45 to 13:30		
Total Number of Readings	568	584	524
Number of Readings with Opacity ≤ 20%	568	584	524
Greatest Opacity	0%	0%	0%

COMPLIANCE DEMONSTRATION
#7 BATTERY COMBUSTION STACK

USS CLAIRTON WORKS
CLAIRTON, PA

APPENDIX A

TEST PROTOCOL, FIELD DATA SHEETS, CALIBRATION RESULTS

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TEST PROTOCOL
COMPLIANCE DEMONSTRATION OF
#7 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, computer-generated emissions calculations, and analytical results for each test.

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT #7 Battery Stack
PROJECT NO. 1005087-01
CONTROL BOX OPERATOR RPC
BAROMETRIC PRESSURE 29.50

TEST DATE 11-19-92
TEST NO. CLR-785-1
NOZZLE (SIZE,#) .428 #56
STATIC PRESSURE -1.2
PORT DIRECTION EAST, NORTH

ORIFICE CORRECTION 1.756
METER CORRECTION .9721
CALIBRATION DATE 06-03-92
PITOT CORRECTION 0.841
CONTROL BOX NO. FOO R

HOT BOX NO. 3
COLD BOX NO. 3
PROBE NO. 10-1
FILTER NO. 957
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
40.6	08:20	975.630	.06	.95	.95	57	55	4.0	512	250	<68°F ~60	250	5 min/pt
28.5			.085	1.35	1.35	57	53	6.0	522				EPA Method 5
20.2			.065	1.03	1.03	58	55	6.0	528	240	49	240	clean-up
13.5			.065	1.03	1.03	57	56	5.5	534				10' probe
7.6			.06	.95	.95	59	57	4.6	481	239	50	240	nozzle size = 0.431
2.4	08:50	993.635	.060	.95	.95	61	58	4.5	490				
40.6	11:45	993.635	.08	1.25	1.25	53	52	5.0	504	250	<68°F ~60	250	2 m/test
28.5			.09	1.40	1.40	55	51	6.0	510				>50 dscf
20.2			.095	1.48	1.48	55	53	6.5	519	239	48	248	
13.5			.075	1.17	1.17	55	54	5.6	523				DELAY FROM 850
7.6			.06	.94	.94	57	55	4.5	500	245	48	250	TO 1145 DUE TO
2.4	12:15	1012.325	.055	.86	.86	58	56	4.0	490				PUSHING SCHEDULE

Estimates:
MW= 27.9
%H2O= 12%

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.0	<0.01 cfm
After	7.0	0.012 cfm

PITOT LEAK CHECK

	Positive	Negative
Before	0F/15sec	0F/15sec
After	0F/15sec	0F/15sec

	1	2
CO2	3.5	3.5
O2	13.0	13.0
CO	~~3.5~~	~~3.5~~
N2	83.5	83.5

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100mL H2O	695.3	549.3	146
2.	100mL H2O	583.9	558.3	25.6
3.	Empty	436.8	434.6	2.2
4.	200g Silica Gel	646.1	629.6	16.5
5.				

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KEYSTONE

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT #7 Battery Stack
PROJECT NO. 605087 (01)
CONTROL BOX OPERATOR RPC
BAROMETRIC PRESSURE 29.50

TEST DATE 11-19-92
TEST NO. CU2 - 705 - 1
NOZZLE (SIZE,#) .428 #50
STATIC PRESSURE -1.2
PORT DIRECTION WEST, SOUTH

ORIFICE CORRECTION 1.756
METER CORRECTION .9721
CALIBRATION DATE 06-03-92
PITOT CORRECTION 0.84
CONTROL BOX NO. POOR

HOT BOX NO. 3
COLD BOX NO. 3
PROBE NO. 10-1
FILTER NO. 957
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
40.6	12:20	1012.385	.09	1.40	1.40	57	56	5.0	489	250	68°C 70	250	5 min/point
28.5		10:2 325	.085	1.32	1.32	59	58	5.0	524				
20.2			.085	1.32	1.32	59	58	5.0	530	241	49	250	
13.5			.070	1.09	1.09	60	59	4.5	531				
7.6			.050	.78	.78	60	59	3.0	500	240	51	250	
2.4	12:50	1029.580	.045	.70	.70	61	60	3.0	488				
40.6	12:55	1029.580	.06	.94	.94	62	59	4.0	500	250	68°C	250	
20.5			.06	.94	.94	62	60	4.5	518				
20.2			.05	.78	.78	62	61	4.0	525	248	48	250	
13.5			.045	.70	.70	62	61	4.0	490				
7.6			.045	.70	.70	63	62	4.0	490	248	48	245	
2.4	13:25	1045.365	.050	.78	.78	63	62	4.0	488				

Estimates:
MW= 27.9
%H2O=12%

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.				

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KEYSTONE

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT #7 Battery Stack
PROJECT NO. 605027-01
CONTROL BOX OPERATOR RPC
BAROMETRIC PRESSURE 29.50

TEST DATE 11-19-92
TEST NO. CLR-7BS-2
NOZZLE (SIZE,#) .428 #50
STATIC PRESSURE -1.2
PORT DIRECTION SOUTH WEST

ORIFICE CORRECTION 1.756
METER CORRECTION .9721
CALIBRATION DATE 06-03-92
PITOT CORRECTION 0.84
CONTROL BOX NO. FOUR

HOT BOX NO. 4
COLD BOX NO. 4
PROBE NO. 10-2
FILTER NO. 956
STACK DIA. 144"

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
40.6	13:40	1045.700	.07	1.10	1.10	63	60	3.5	500	250	<68°F	250°	5 min/point
28.5			.06	.94	.94	63	61	3.5	495				
20.2			.05	.79	.79	64	63	3.5	498	256	48	255	
13.5			.04	.63	.63	64	62	3.5	505				
7.6			.03	.47	.47	64	62	3.0	489	258	48	251	
2.4	14:10	1060.560	.047	.71	.71	64	62	3.5	489				
40.6	14:15	1060.560	.09	1.42	1.42	64	61	4.5	501	250	<68°F	250	
28.5			.095	1.49	1.49	64	62	4.5	508				
20.2			.08	1.26	1.26	65	63	4.0	514	251	49	258	
13.5			.075	1.18	1.18	66	64	4.0	519				
7.6			.065	1.02	1.02	65	63	4.0	499	258	49	260	
2.4	1445	1080.176	.065	1.02	1.02	65	62	4.0	491				

Estimates:
MW= 27.9
%H2O= 12%

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.0	<0.01 cfm
After	7.0	0.01 cfm

PITOT LEAK CHECK

	Positive	Negative
Before	0 in/15 sec	0 in/15 sec
After	0 in/15 sec	0 in/15 sec

	1	2
CO2	3.0	3.0
O2	12.5	12.5
CO	~~3.0~~	~~3.0~~
N2	84.5	84.5

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100mL H_2O	723.3	576.1	147.2
2.	100mL H_2O	597.1	573.1	24.0
3.	Empty	380.1	378.7	1.4
4.	200g Silica Gel	575.9	577.7	18.2
5.				

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KEYSTONE

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT #7 Battery Stack
PROJECT NO. 605047-01
CONTROL BOX OPERATOR RPC
BAROMETRIC PRESSURE 29.50

TEST DATE 11-19-92
TEST NO. CU2-7BS-2
NOZZLE (SIZE,#) #50.428
STATIC PRESSURE -1.2
PORT DIRECTION NORTH, EAST

ORIFICE CORRECTION 1.756
METER CORRECTION .9721
CALIBRATION DATE 06-03-92
PITOT CORRECTION 0.84
CONTROL BOX NO. FOUR

HOT BOX NO. 4
COLD BOX NO. 4
PROBE NO. 10.2
FILTER NO. 956
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
40.6	14:50	1080.176	.09	1.42	1.41	63	60	4.0	501	250	<68°F	250°	5min/point
28.5			.10	1.57	1.57	64	62	5.0	501				
20.2			.085	1.35	1.35	65	63	4.0	506	259	49	253	
13.5			.10	1.57	1.57	63	62	5.0	521				
7.6			.06	.94	.94	63	62	3.5	500	250	50	250	
2.4	15:20	1098.755	.05	.79	.79	63	61	3.5	500				
40.6	15:25	1098.755	.085	1.34	1.34	63	61	4.0	511	250	<68°F from	250°F	
28.5			.060	.94	.94	65	62	3.5	510				
20.2			.055	.87	.87	65	63	3.5	521	248	51	252	
13.5			.06	.94	.94	64	63	3.0	520				
7.6			.055	.87	.87	64	63	3.0	500	246	51	252	
2.4	15:55	116.200	.04	.63	.63	65	64	3.0	486				

Estimates:
MW=27.9
%H2O=12%

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

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT #7 Battery Stack
PROJECT NO. 605087-01
CONTROL BOX OPERATOR RPC
BAROMETRIC PRESSURE 29.55

TEST DATE 11-20-92
TEST NO. CLR-785-3
NOZZLE (SIZE,#) .428 #50
STATIC PRESSURE -1.2
PORT DIRECTION SOUTH, WEST

ORIFICE CORRECTION 1.756
METER CORRECTION .9721
CALIBRATION DATE 06-03-92
PITOT CORRECTION 0.84
CONTROL BOX NO. FOUR

HOT BOX NO. 5
COLD BOX NO. 5
PROBE NO. 10-2
FILTER NO. 961
STACK DIA. 14'

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
40.6	0820	116.435	.085	1.31	1.31	58	54	4.5	510	250°F	<68°F	250°F	Sample point
28.5			.075	1.16	1.16	57	56	4.5	515				
20.2			.065	1.00	1.00	57	56	4.5	519	246	45	251	
13.5			.065	1.00	1.00	57	56	4.0	526				
7.6	0850		.05	.77	.77	57	56	3.5	508	251	46	250	
2.4		133.740	.04	.62	.62	58	57	3.0	495				
	08:54												
40.6		133.740	.095	1.47	1.47	57	57	5.0	500	250	<68°F	250	
28.5			.10	1.54	1.54	60	57	5.0	504				
20.2		.085	.085	1.31	1.31	60	59	5.0	510	245	45	250	
13.5			.08	1.23	1.23	61	59	4.5	495				
7.6	09:24		.065	1.00	1.00	60	58	4.5	481	245	46	257	
2.4		153.150	.04	.62	.62	61	58	3.5	489				

Estimates:
MW=27.9
%H2O=[illegible]

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.0	<0.011 cfm
After	6.0	0.016 cfm

PITOT LEAK CHECK

	Positive	Negative
Before	OK/15 sec	OK/15 sec
After	OK/15 sec	OK/15 sec

	1	2
CO2	3.0	3.0
O2	12.5	12.5
CO	[illegible]	[illegible]
N2	84.5	84.5

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100 mL H_2O	696.4	566.8	128.6
2.	100 mL H_2O	578.7	550.4	28.3
3.	Empty	460.7	458.0	2.7
4.	200g Silica Gel	612.3	595.1	17.2
5.				

AQE 2/92

KEYSTONE

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT #7 Battery Stack
PROJECT NO. 605087-01
CONTROL BOX OPERATOR RPC
BAROMETRIC PRESSURE 29.55

TEST DATE 11-20 92
TEST NO. CLR-7B5-3
NOZZLE (SIZE,#) .428 #50
STATIC PRESSURE -1.2
PORT DIRECTION NORTH, EAST

ORIFICE CORRECTION 1.756
METER CORRECTION .9721
CALIBRATION DATE 06 03 92
PITOT CORRECTION 0.84
CONTROL BOX NO. FOUR

HOT BOX NO. 5
COLD BOX NO. 5
PROBE NO. 10 5
FILTER NO. 761
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
40.6	09:27	153.150	.08	1.23	1.23	59	58	4.5	495	250	68	250	5min/point
29.5			.075	1.16	1.16	61	59	4.0	519				
20.2			.06	.93	.93	62	60	4.0	513	249	48	246	
13.5			.06	.93	.93	62	60	3.5	475				
7.6			.07	1.08	1.08	62	61	4.0	489	253	48	248	
2.4	09:57	169.920	.035	.54	.54	62	60	2.5	489				
40.6	10:00	169.920	.065	.07	.07	62	61	3.5	490	250	[illegible]	250	
28.5			.065	1.00	1.00	63	58	3.5	508				
20.2			.50	.77	.77	63	60	3.5	511	255	49	250	
13.5			.045	.69	.69	62	60	3.5	499				
7.6			.045	.69	.69	62	60	3.5	498	255	49	255	
2.4	10:30	184.100	.04	.62	.62	62	60	3.5	498				

Estimates:
MW= 27.9
%H2O= 12%

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.		696.4	566.8	
2.		578.7	550.4	
3.		460.7	458.0	
4.		612.3	595.1	
5.				

AQE 2/92

KEYSTONE

VISIBLE EMISSIONS OBSERVATIONS FORM

23 [illegible]

7 STACK

OBSERVER: [illegible]

DATE: 11-17-[illegible]

FACILITY: [illegible]

OBSERVATION: START TIME: 5 15

END TIME: 8 50

OBSERVATION POINT:

HIGHWAY SOUTH END OF 19 BATTERY

SOURCE:

DISTANCE: 500 FT

DIRECTION FROM: N.W

HEIGHT: 200 FT

WIND:

SPEED: 7

DIRECTION: N.E

TEMPERATURE: 37

SKY CONDITION: OVERCAST

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION:

TOTAL No. OF READINGS: 144

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: 5 FOREMAN: HALL

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
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59				

VISIBLE EMISSIONS OBSERVATIONS FORM

7 STACK

OBSERVER: Bruce May

DATE: 11-19-92

FACILITY: U.S.X CLAIRTON

OBSERVATION: START TIME: 11:45

END TIME: 12:45

OBSERVATION POINT:

ROADWAY SOUTH END OF 19 BATTERY

SOURCE:

DISTANCE: 800 FT.

DIRECTION FROM: N.W

HEIGHT: 200 FT.

WIND:

SPEED: 6. MPH

DIRECTION: N.E

TEMPERATURE: 38°

SKY CONDITION: OVERCAST

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: HALL

COMMENTS:

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

VISIBLE EMISSIONS OBSERVATIONS FORM

7 STACK

OBSERVER: [illegible]

DATE: 11-19-92

FACILITY: U.S.R. CLAIRTON

OBSERVATION: START TIME: 12:45

END TIME: 1:45

OBSERVATION POINT:

ROADWAY SOUTH END OF 19 BATTERY

SOURCE:

DISTANCE: 800 F.T.

DIRECTION FROM: N.W

HEIGHT: 200 F.T.

WIND:

SPEED: 6 M.P.H.

DIRECTION: N.E

TEMPERATURE: 39°

SKY CONDITION: OVERCAST.

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: HALL

COMMENTS:

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

VISIBLE EMISSIONS OBSERVATIONS FORM

7 STACK

OBSERVER: Bernie May

DATE: 11-19-92

FACILITY: USX CLAIRTON

OBSERVATION: START TIME: 1:45

END TIME: 2:45

OBSERVATION POINT:

ROADWAY SOUTH END OF 19 BATTERY

SOURCE: #7 STACK

DISTANCE: 800 F.T.

DIRECTION FROM: N.W

HEIGHT: 200 F.T.

WIND:

SPEED: 3 M.P.H.

DIRECTION: NORTH

TEMPERATURE: 45°

SKY CONDITION: OVERCAST

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: HALL

COMMENTS:

1:45	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
50	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
55	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
20	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
5	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
10	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

15	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
20	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
25	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
30	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
35	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
40	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

7 STACK

OBSERVER: [illegible]

DATE: 11-19-92

FACILITY: U.S.K CLAIATON

OBSERVATION: START TIME: 2:45

END TIME: 3:45

OBSERVATION POINT:

ROADWAY SOUTH END OF 19 BATTERY

SOURCE: # 7 STACK

DISTANCE: 800 F.T.

DIRECTION FROM: N.W

HEIGHT: 200 F.T.

WIND:

SPEED: 6. MPH

DIRECTION: N.E

TEMPERATURE: 44°

SKY CONDITION: OVERCAST

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: HALL

COMMENTS:

1:45	0	0	0	0	0	15	30	0	0	0	0
	1	0	0	0	0		31	0	0	0	0
	2	0	0	0	0		32	0	0	0	0
	3	0	0	0	0		33	0	0	0	0
	4	0	0	0	0		34	0	0	0	0
50	5	0	0	0	0	30	35	0	0	0	0
	6	0	0	0	0		36	0	0	0	0
	7	0	0	0	0		37	0	0	0	0
	8	0	0	0	0		38	0	0	0	0
	9	0	0	0	0		39	0	0	0	0
55	10	0	0	0	0	45	40	0	0	0	0
	11	0	0	0	0		41	0	0	0	0
	12	0	0	0	0		42	0	0	0	0
	13	0	0	0	0		43	0	0	0	0
	14	0	0	0	0		44	0	0	0	0
2:00	15	0	0	0	0	50	45	0	0	0	0
	16	0	0	0	0		46	0	0	0	0
	17	0	0	0	0		47	0	0	0	0
	18	0	0	0	0		48	0	0	0	0
	19	0	0	0	0		49	0	0	0	0
5	20	0	0	0	0	55	50	0	0	0	0
	21	0	0	0	0		51	0	0	0	0
	22	0	0	0	0		52	0	0	0	0
	23	0	0	0	0		53	0	0	0	0
	24	0	0	0	0		54	0	0	0	0
10	25	0	0	0	0	60	55	0	0	0	0
	26	0	0	0	0		56	0	0	0	0
	27	0	0	0	0		57	0	0	0	0
	28	0	0	0	0		58	0	0	0	0
	29	0	0	0	0		59	0	0	0	0

VISIBLE EMISSIONS OBSERVATIONS FORM

7 STACK

OBSERVER: [illegible]

DATE: 11-19-92

FACILITY: USS CLAIRTON

OBSERVATION: START TIME: 3:45

END TIME: 3:55

OBSERVATION POINT:

ROADWAY SOUTH END OF 19 BATTERY

SOURCE:

DISTANCE: 800 FT

DIRECTION FROM: N.W

HEIGHT: 200 FT

WIND:

SPEED: 6 M.P.H

DIRECTION: N.E

TEMPERATURE: 43°

SKY CONDITION: OVERCAST

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION:

TOTAL No. OF READINGS: 44

No. READINGS >= 20% 0

No. READINGS >= 40% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: HALL

COMMENTS:

34r	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
50	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
55	10	0	0	0	0
	11				
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59					

VISIBLE EMISSIONS OBSERVATIONS FORM

7 STACK

OBSERVER: [illegible]

DATE: [illegible]

FACILITY: [illegible]

OBSERVATION: START TIME: [illegible]

END TIME: [illegible]

OBSERVATION POINT:

[illegible]

SOURCE: [illegible]

DISTANCE: 500 FT.

DIRECTION FROM: N.W.

HEIGHT: 400 FT.

WIND:

SPEED: 4 M.P.H.

DIRECTION: EAST

TEMPERATURE: 37°

SKY CONDITION: [illegible]

BACKGROUND: SKY

READING CONDITIONS: GOOD

COLOR OF EMISSION:

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: HALL

COMMENTS:

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

PAGE # 2 of 3

VISIBLE EMISSIONS OBSERVATIONS FORM

7 STACK

OBSERVER: [illegible]

DATE: 11 [illegible]

FACILITY: [illegible]

OBSERVATION: START TIME: 9:00

END TIME: 10:13

OBSERVATION POINT:

ROAD WAY SOUTH END OF #17 BATTERY

SOURCE: #7 STACK

DISTANCE: 500 F.T.

DIRECTION FROM: N W

HEIGHT: 200 F.T.

WIND:

SPEED: [illegible] M.P.H.

DIRECTION: EAST

TEMPERATURE: 42°

SKY CONDITION: MAINLY CLOUDY

BACKGROUND: SKY

READING CONDITIONS: GOOD

COLOR OF EMISSION:

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: 6 FOREMAN: HALL

COMMENTS:

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

VISIBLE EMISSIONS OBSERVATIONS FORM

7 STACK

OBSERVER: [illegible]

DATE: 11-20-92

FACILITY: U S X [illegible]

OBSERVATION: START TIME: 10:[illegible]

END TIME: [illegible]

OBSERVATION POINT:

ROADWAY SOUTH END OF #19 BATTERY

SOURCE: #7 STACK

DISTANCE: 800 FT

DIRECTION FROM: N W

HEIGHT: 200 FT

WIND:

SPEED: 5 M.P.H

DIRECTION: S.E

TEMPERATURE: 44°

SKY CONDITION: PARTLY CLOUDY

BACKGROUND: SKY

READING CONDITIONS: GOOD

COLOR OF EMISSION:

TOTAL No. OF READINGS: 44

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: HALL

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
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CONTROL BOX CALIBRATION

THREE POINT CALIBRATION

BOX # 4 BP 28.9 In. Hg
DATE 06-03-92 OPERATOR RPC

	WET TEST METER				DRY TEST METER					METER COEFFICIENT	ORIFICE COEFFICIENT
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD	Y	ΔH@
START			0.000	28.90				0.50	525.800		
HALF		73.0			93.0	89.0	91.0				
STOP	12.17		5.000						531.165		
CALCULATION	12.17	533.0	5.013	28.90			551.0	28.94	5.365	0.9646	1.667
START			0.000	28.90				1.00	531.500		
HALF		73.0			94.0	90.0	92.0				
STOP	8.85		5.000						536.800		
CALCULATION	8.85	533.0	5.013	28.90			552.0	28.97	5.300	0.9770	1.760
START			0.000	28.90				2.00	537.600		
HALF		73.0			94.0	90.0	92.0				
STOP	6.40		5.000						542.899		
CALCULATION	6.40	533.0	5.013	28.90			552.0	29.05	5.299	0.9747	1.841
AVERAGE										0.9721	1.756

POST TEST

BOX # 4 BP 29.05 in. Hg
DATE 01-07-93 OPERATOR RPC

	WET TEST METER				DRY TEST METER					METER COEFFICIENT	ORIFICE COEFFICIENT
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD	Y	ΔH@
START			0.000	29.05				1.00	494.100		
HALF		70.0			77.0	76.0	76.5				
STOP	8.63		5.000						499.250		
CALCULATION	8.63	530.0	5.013	29.05			536.5	29.12	5.150	0.9828	1.694
START			0.000	29.05				1.00	499.600		
HALF		70.0			80.0	79.0	79.5				
STOP	8.65		5.000						504.766		
CALCULATION	8.65	530.0	5.013	29.05			539.5	29.12	5.166	0.9852	1.692
START			0.000	29.05				1.00	505.100		
HALF		70.0			83.0	81.0	82.0				
STOP	8.61		5.000						510.247		
CALCULATION	8.61	530.0	5.013	29.05			542.0	29.12	5.147	0.9934	1.669
AVERAGE										0.9871	1.685
DIFFERENCE										-1.5%	4.2%

PRE-TEST MAGNEHELIC CALIBRATION

BOX# 4
DATE 06-03-92
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 06-03-92
OPERATOR RPC

	START CF	STOP CF	VOLUME CF	TIME (min)	LEAK RATE
DRY	508.320	508.433	0.113	10.000	-0.000
WET	0.000	0.111	0.111		

PYROMETER CALIBRATION

DATE 04-28-88
OPERATOR AGL

VOLTAGE INPUT (mV)	TARGET TEMP (°F)	TEMP READING (°F)
0.18	40	40.0
0.40	60	60.0
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 06-03-92
OPERATOR RPC

VOLTAGE INPUT (mV)	TARGET TEMP (°F)	TEMP READING (°F)
0.18	40	40.0
0.40	60	60.0
0.84	70	69.0
1.29	90	90.0
1.74	110	109.0
2.66	150	150.0
3.82	200	200.0
6.09	300	300.0
8.31	400	400.0
10.57	500	500.0

POST-TEST MAGNEHELIC CALIBRATION

BOX# 4
DATE 01-07-93
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 01-07-93
OPERATOR RPC

	START CF	STOP CF	VOLUME CF	TIME (min)	LEAK RATE
DRY	493.445	493.574	0.129	10.000	-0.0008
WET	0.000	0.121	0.121		

PYROMETER CALIBRATION

DATE 04-28-88
OPERATOR AGL

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	301.0
8.31	400	400.0
10.57	500	500.0

POST-TEST PYROMETER CHECK

DATE 01-07-93
OPERATOR RPC

VOLTAGE INPUT (mV)	TARGET TEMP (°F)	TEMP READING (°F)
0.18	40	41.0
0.40	50	51.0
0.84	70	70.0
1.29	90	91.0
1.74	110	111.0
2.66	150	151.0
3.82	200	201.0
6.09	300	301.0
8.31	400	402.0
10.57	500	502.0

QA ORIFICE AUDIT

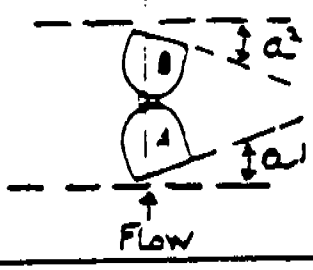
ORIFICE	BAPC-3	DATE	12-C7-92	B.P.	28.85
OPERATOR	RPC	BOX #	4		

RUN	1		2		3	
INITIAL CF	483.900		496.500		504.600	
FINAL CF	491.400		504.010		512.121	
DIFFERENCE	7.500		7.510		7.521	
	IN	OUT	IN	OUT	IN	OUT
TEMP INITIAL	71	69	78	75	82	80
TEMP 5 MIN	74	73	78	77	83	80
TEMP 10 MIN	75	74	80	78	85	81
TEMP 15 MIN	78	76	81	79	85	83
		TEMP R		TEMP R		TEMP R
TEMP AVG	73.75	533.75	78.25	538.25	82.375	542.375
TIME (MIN.)	15.00		15.00		15.00	
	IN WATE	IN HG	IN WATER	IN HG	IN WATER	IN HG
ORIFICE	0.65	0.05	0.65	0.05	0.65	0.05
METER PRESSURE		28.90		28.90		28.90
	°F	°C	°F	°C	°F	°C
AMBIENT TEMP.	75.0	23.9	75.0	23.9	75.0	23.9
VACUUM IN HG	19.0		19.0		19.0	
DGM CAL Y	0.9721		0.9721		0.9721	
STD CF	6.992		6.943		6.900	
STD CUBIC METERS	0.1980		0.1966		0.1954	

GEOMETRIC PITOT CALIBRATION

Caliper # XES-66 Probe #: 10-1
Precheck ✓ Date: 11 3 92
Post Check Initials: TM

①

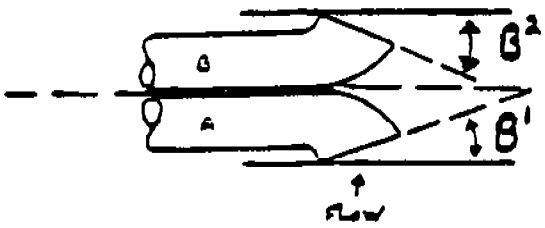


a¹ = 4C°
a² = 4C°
a¹, a² = <10°

B¹ = 3.0°
B² = 3.5°
B¹, B² = <5°

F = 0.952"

②

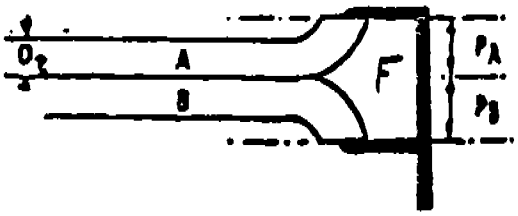


μ = 0.01462 μ = ≤ 0.1250" (μ = F TAN γ)

V = 0.01462 V = ≤0.03125" (V = F TAN θ)

W = 0.438 W ≥ 0"

③



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

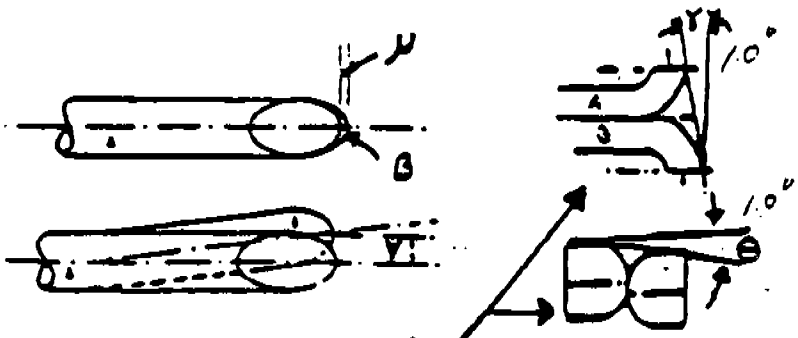
X = 0.844 X ≥ 0.750" (3/4" using 1/2" nozzle)

Y = 6.324 Y ≥ 3.0"

Z = 3.756 Z > 2.0"

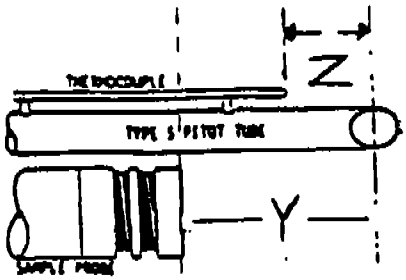
D_t = 0.375 D_t > .1875" to .375" (3/16" to 3/8")

④

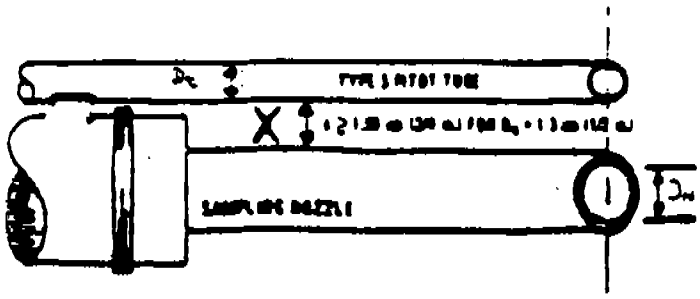


(γ, θ EXPRESSED IN DEGREES)

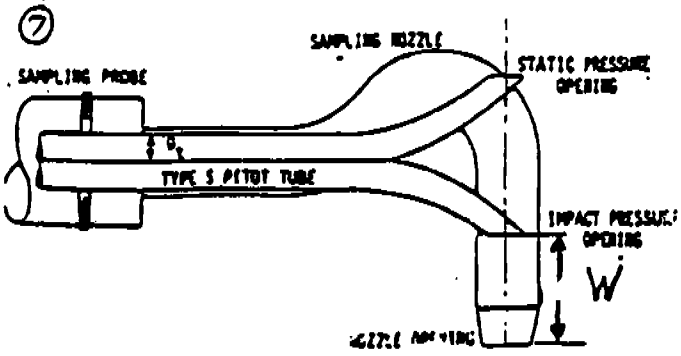
⑥



⑤



⑦

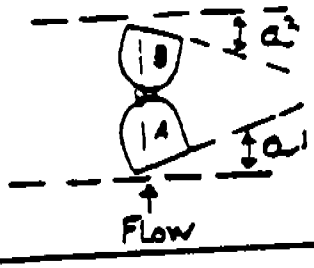


GEOMETRIC PITOT CALIBRATION

Caliper # [illegible]
Precheck ✓
Post Check

Probe #: 10-5
Date: [illegible]
Initials: [illegible]

①

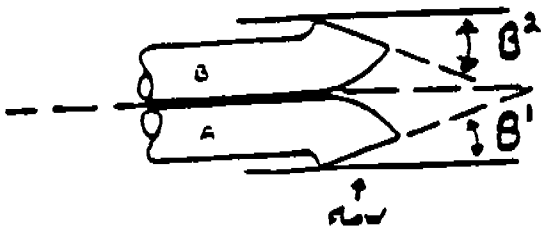


a¹ = 3.5°
a² = 10°
a¹, a² = <10°

B¹ = 7.0
B² = 0
B¹, B² = <5°

F = 0.932"

②



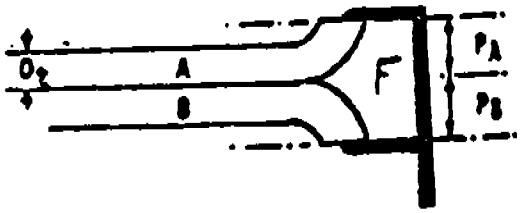
μ = 0 — μ = ≤ 0.1250" (μ = F sin a¹)

V = 0 — V = ≤0.03125" (V = F sin a²)

W = 0.286 — W ≥ 0"

X = 0.943 — X ≥ 0.750" (3/4" using 1/2" nozzle)

③



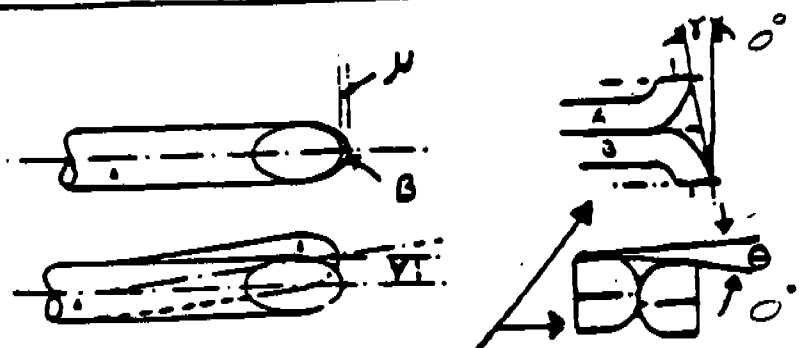
1.05 D_t < d < 1.50 D_t
P_A = P_B
2.10 D_t < l < 3.00 D_t

Y = 5.589 — Y ≥ 3.0"

Z = 3.206 — Z > 2.0"

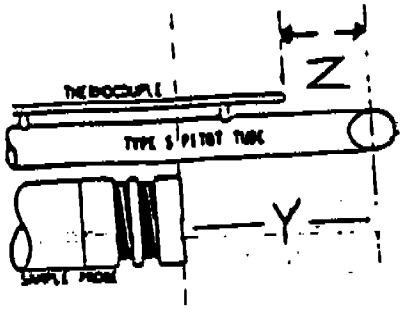
D_t = 0.376 — D_t > .1875" to .375" (3/16" to 3/8")

④



(γ, θ EXPRESSED IN DEGREES)

⑥



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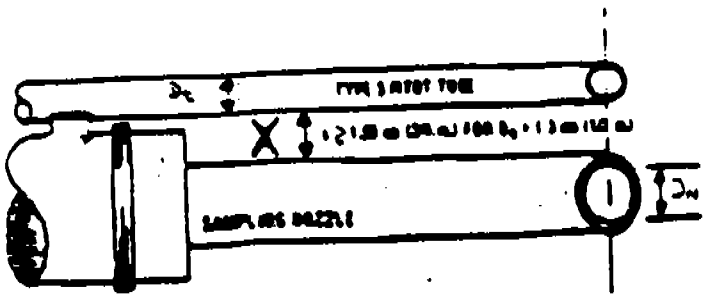
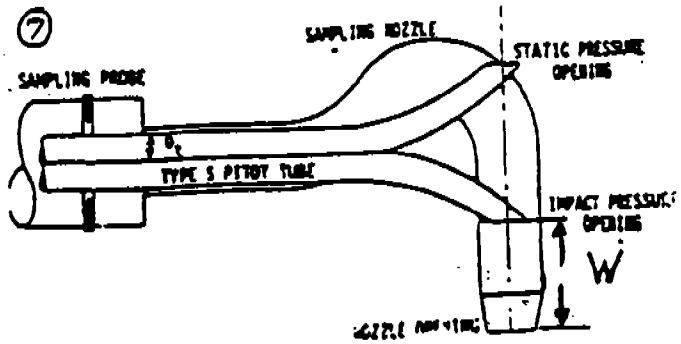


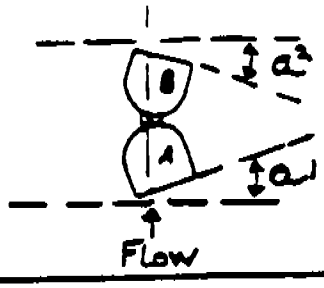
⑦



GEOMETRIC PITOT CALIBRATION

Caliper # YES-68 Probe #: 01
Precheck
Post Check ✓ Date: 01-02-93
Initials: CPC

①



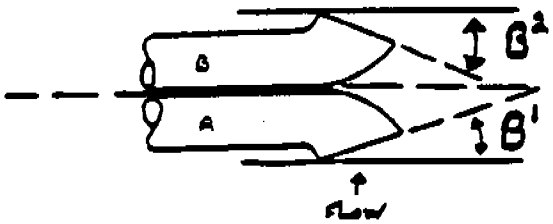
a¹ = 4°
a² = 4°
B¹ = 3°
B² = 4°

a¹, a² = <10°

B¹, B², = <5°

F = .952"

②



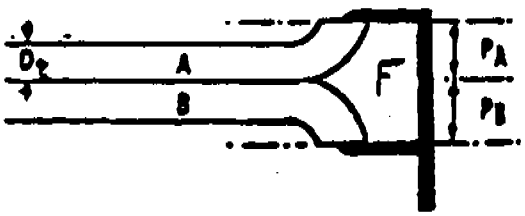
μ = .0146 — μ = ≤ 0.1250" (μ = F TAN γ)

V = .0146 — V = ≤0.03125" (V = F TAN θ)

W = .433 — W ≥ 0"

X = .849 — X ≥ 0.750" (3/4" using 1/2" nozzle)

③



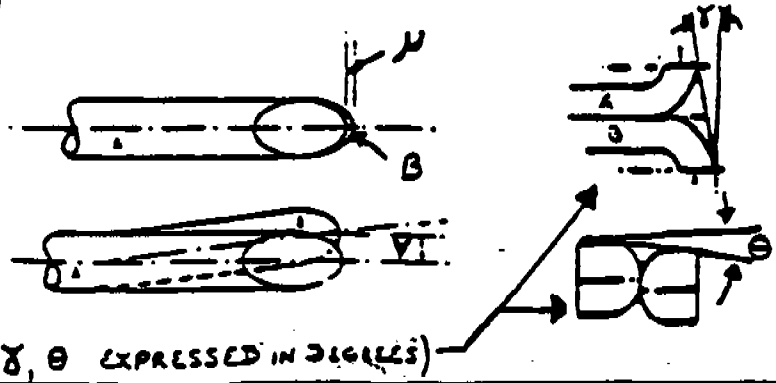
1.05 D_t < A < 1.50 D_t
$P_A = P_B$
2.10 D_t < A < 3.00 D_t

Y = 6.32 — Y ≥ 3.0"

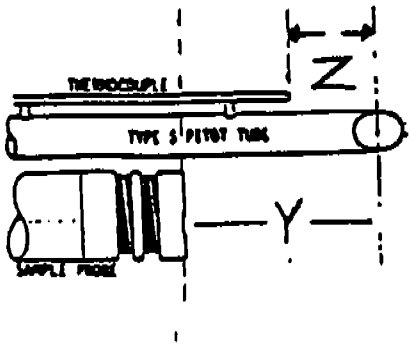
Z = 2.95 — Z > 2.0"

D_t = .375 — D_t > .1875" to .375" (3/16" to 3/8")

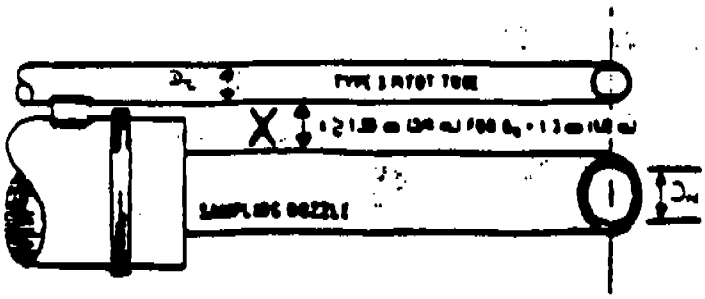
④



⑥



⑤



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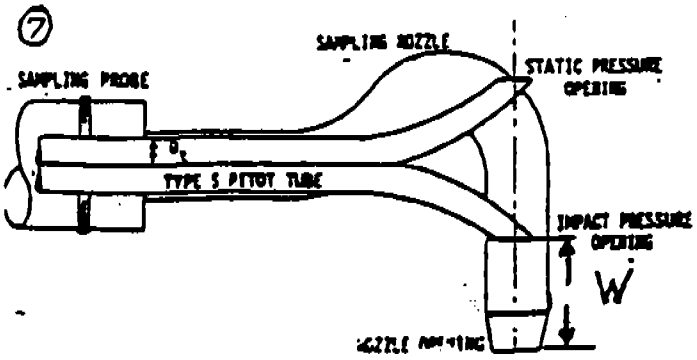
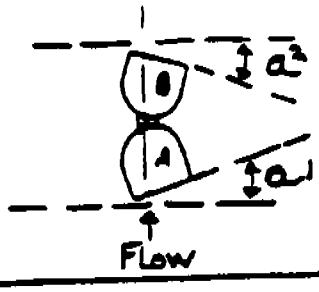


GEOMETRIC PITOT CALIBRATION

Caliper # VFS 68 | Probe #: 10.2
Precheck | Date: 10-08-93
Post Check ✓ | Initials: RPC

①

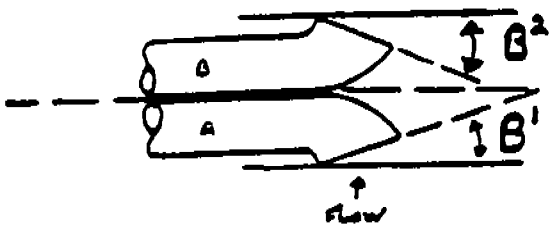


a¹ = 4°
a² = 1°
a¹, a² = <10°

B¹ = 2
B² = .5
B¹, B², = <5°

F = .932"

②



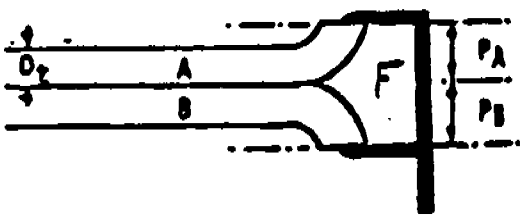
μ = 0 — μ = ≤ 0.1250" (μ = F TAN γ)

V = 0 — V = ≤0.03125" (V = F TAN θ)

W = .280 — W ≥ 0"

X = .943 — X ≥ 0.750" (3/4" using 1/2" nozzle)

③



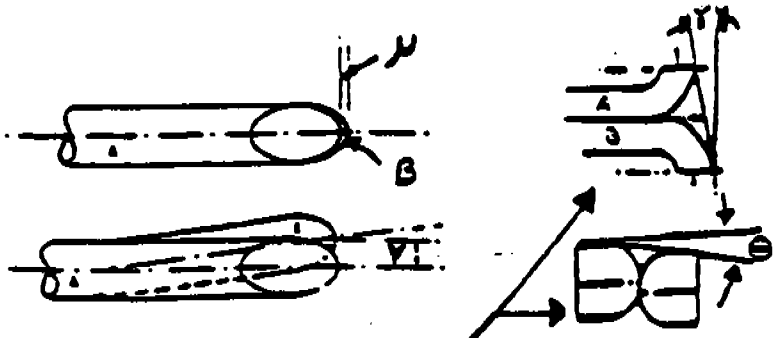
1.05 D_t < P_A < 1.50 D_t
P_A = P_B
2.10 D_t < A < 3.00 D_t

Y = 5.5 — Y ≥ 3.0"

Z = 3.2 — Z > 2.0"

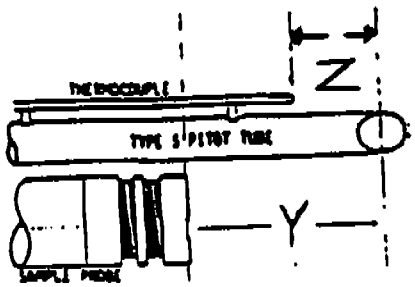
D_t = .375 — D_t > .1875" to .375" (3/16" to 3/8")

④

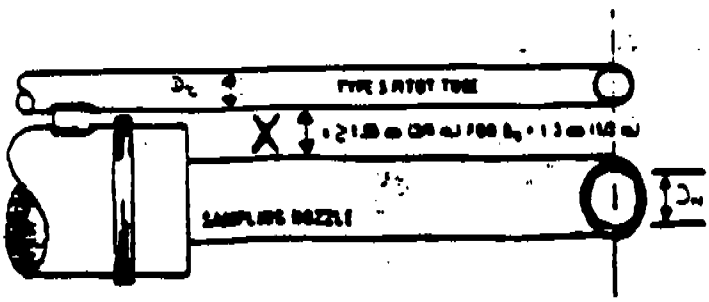


(γ, θ EXPRESSED IN DEGREES)

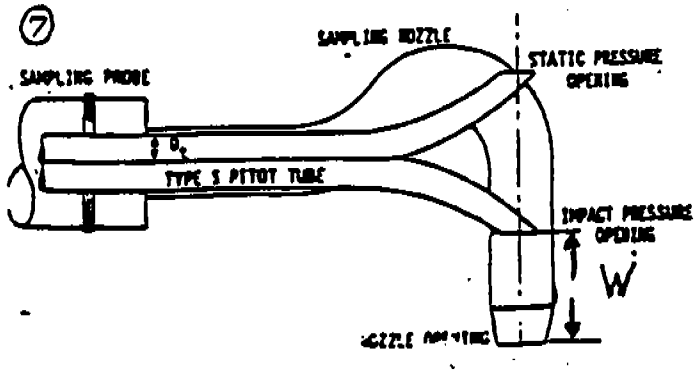
⑥



⑤



⑦



COMPLIANCE DEMONSTRATION
#7 BATTERY COMBUSTION STACK

USS CLAIRTON WORKS
CLAIRTON, PA

APPENDIX B

OPERATIONAL DATA

CHESTER
ENVIRONMENTAL

CC-10289 REV. 1181
03.001.0020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 3
12 Hrs. Beginning 12:00 AM
Date 11-19-72

BATTERY NO. B-8

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	8 40	9 04	
3	8 52	9 16	
5	9 06	9 28	
7	9 18	9 40	
9	9 30	9 52	
11	9 42	10 04	
13	9 55	11 16	
15	10 06	10 28	
17	10 18	10 40	
19	10 30	10 52	
21	10 42	11 04	
23	10 55	11 16	
25	11 06	11 28	
27	11 18	11 40	
29	11 30	11 52	
31	11 42		
2			
4			
6			
8		12 09	
10		12 21	
12	12 11	12 32	
14	12 23	12 45	
16	12 34	12 55	
18	12 47	1 07	
20	12 57	1 18	
22	1 09	1 30	
24	1 20	1 41	
26	1 32	1 52	
28	1 43	1 57	
30	1 54	2 09	
1	1 59	2 21	
3	11 55		

BATTERY NO. A-7

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	2 11	2 31	
3	2 23	2 42	
5	2 33	2 53	
7	2 44	3 03	
9	2 55	3 13	
11	3 05	3 23	
13	3 15	3 34	
15	3 25	3 45	
17	3 36	3 57	
19	3 47	4 08	
21	3 59	4 19	
23	4 10	4 30	
25	4 21	4 45	
27	4 32	4 57	
29	4 47	5 15	
31	4 59	5 26	
2			
4			
6			
8			
10			
12			
14			
16			
18			
20			
22			
24			
26			
28			
30			
1			
2			

BATTERY NO. B-7

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1			
3			
5			
7			
9			
11			
13			
15			
17			
19			
21			
23			
25			
27			
29			
31	12 07		
2	5 11	5 36	
4	5 28	5 45	
6	5 33	5 57	
8	5 47	6 11	
10	5 55	6 23	
12	6 13	6 35	
14	6 25	6 44	
16	6 32	6 56	
18	6 46	7 08	
20	6 58	7 20	
22	7 10	7 32	
24	7 22	7 37	
26	7 34	7 41	
28	8 10	8 12	
30	8 20	8 22	Run #1
1			
2			

REMARKS: 28/28 16/16 16/16

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	6	6		7-8	3	5	
2-3	5	5		8-9	4	2	
3-4	6	6		9-10	5	5	
4-5	5	5		10-11	5	5	
5-6	5	5		11-12	5	5	
	33	33			27	27	

Total Ovens Pushed 60
Total Ovens Charged 60

Pusherman
Battery Foreman

CC-10295 REV. 1151
03.001.0020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 3

12 Hrs. Beginning 12:00 PM

Date 11-19-92

BATTERY NO. B5-8						BATTERY NO. A5-7						BATTERY NO. B5-7					
OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES	OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES	OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1						1	8	55	8	59		1	3	04	3	06	
3						3	9	10	9	15		3	3	14	3	16	
5						5	9	20	9	25		5	3	24	3	26	
7						7	9	30	9	35		7	3	34	3	36	
9						9	9	40	9	45		9	3	44	3	46	
11						11	9	50	9	55		11	4	07	4	10	
13						13	10	05	10	10		13	4	20	4	25	
15						15	10	20	10	25		15	4	30	4	35	
17						17	10	30	10	35		17	4	40	4	45	
19						19	10	40	10	45		19	4	50	4	55	
21						21	10	55	10	59		21	5	05	5	10	
23						23	11	10	11	15		23	5	15	5	20	
25						25	11	20	11	25		25	5	25	5	30	
27						27	11	30	11	35		27	5	35	5	40	
29						29						29	5	55	5	59	
31			12	00		31						31	—	—	—	—	
2	6	10	6	28		2	12	06	12	10	Run #1	2					
4	6	20	6	38		4	12	18	12	20		4					
6	6	30	6	48		6	12	38	12	40	Run #1	6					
8	6	40	7	03		8	12	50	12	53		8					
10	6	50	7	13		10	1	03	1	05		10					
12	7	05	7	23		12	1	13	1	15	Run	12					
14	7	15	7	33		14	1	23	1	25		14					
16	7	25	7	43		16	1	33	1	35		16					
18	7	35	7	53		18	1	43	1	45		18					
20	7	45	8	03		20	1	53	1	55		20					
22	7	55	8	18		22	2	04	2	06		22					
24	8	10	8	28		24	2	16	2	18		24					
26	8	20	8	38		26	2	28	2	30		26					
28	8	30	8	43		28	2	40	2	42		28					
30	8	40	8	47		30	2	52	2	55		30					
1	8	45	8	52		1						1					
2			12	04		2						2					

REMARKS:

16/18 29/29 15/15

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	4	6		6-7	5	[illegible]	
1-2	6	6		7-8	6	6	
2-3	5	5		8-9	6	8	
3-4	5	5		9-10	[illegible]	5	
4-5	5	5		10-11	5	5	
5-6	5	5		11-12	3	3	
	30	32			30	30	

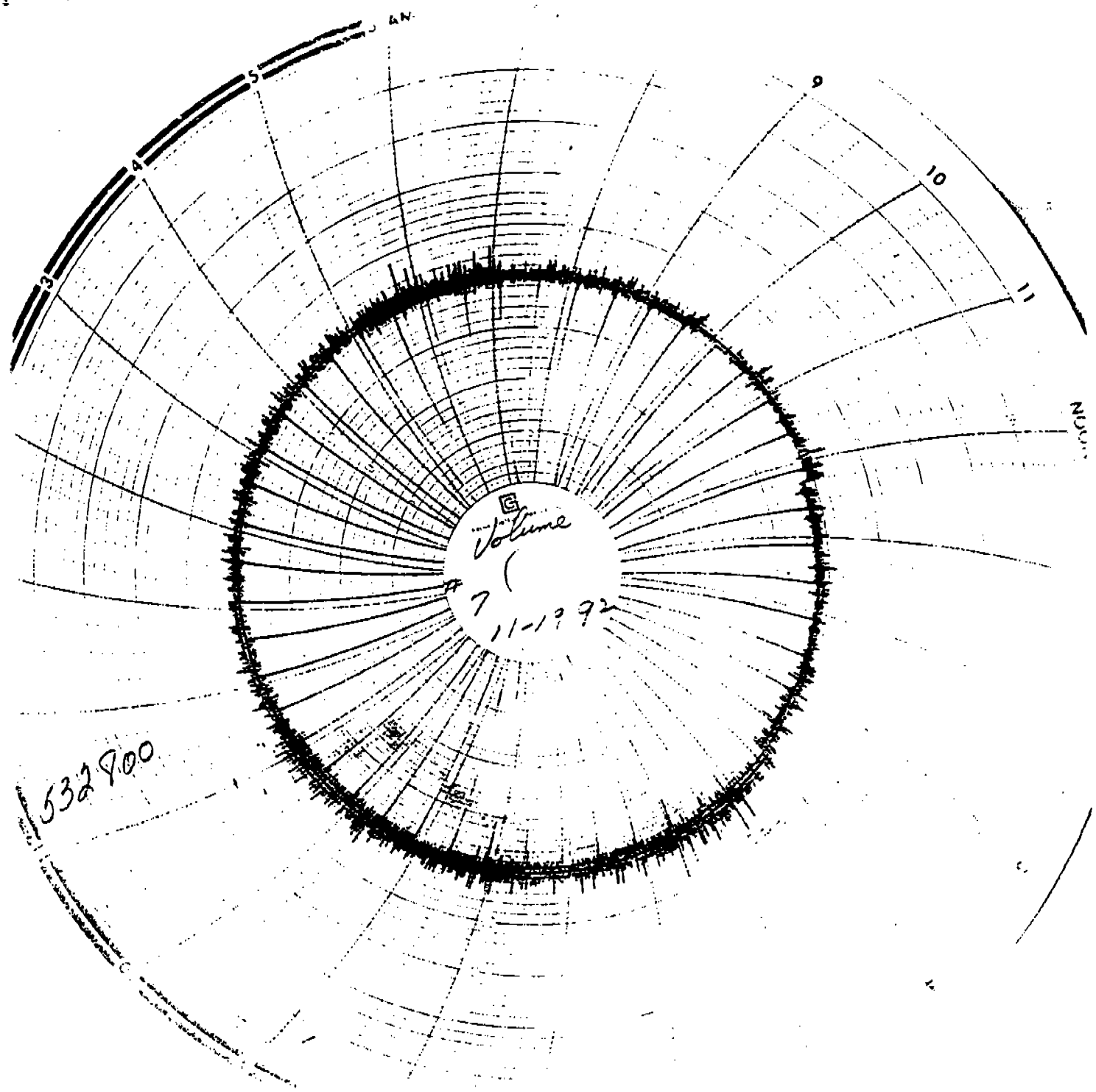
Total Ovens Pushed 60

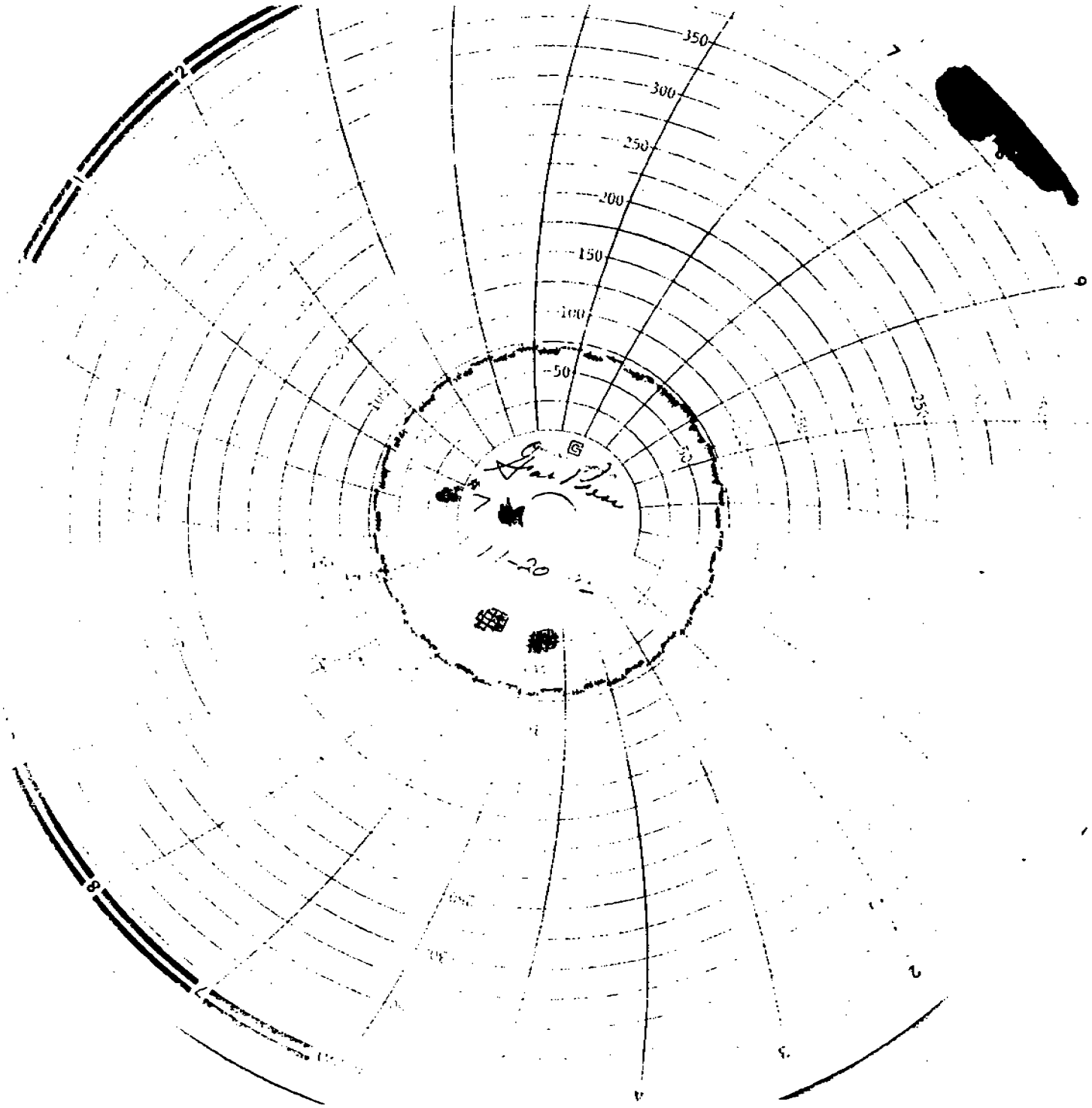
Total Ovens Charged 62

Pusherman

Battery Foreman

NOON
11
10
9
8
1
2
3
4
5
6
7
8
45
40
35
30
25
20
15
10
5
0


JAN
3
4
5
9
10
11
Volume
7
11-1-92
532800


350
300
250
200
150
100
50
11-20

MIDNIGHT
1
3
4
5
6
7
11
NOON
11-20-92
53/400

COMPLIANCE DEMONSTRATION
#7 BATTERY COMBUSTION STACK

USS CLAIRTON WORKS
CLAIRTON, PA

APPENDIX C

ANALYTICAL RESULTS, EMISSIONS CALCULATIONS

CHESTER
ENVIRONMENTAL

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON WORKS
CLAIRTON, PA
CLR-7BS-1

COMBUSTION STACK #7
11-19-92

FIELD DATA AND VELOCITY CALCULATIONS

POINT	TIME	METER READING (DRY) CF	DELTA P IN.H2O	ORIFICE DELTA H REQ	ORIFICE DELTA H ACT	METER TEMP DEG F IN	METER TEMP DEG F OUT	VACUUM IN.HG.	STACK TEMP DEG F	CORRECTE VELOCITY FT/SEC
40.6E	820.0	975.630	.060	.95	.95	57.	55.	4.0	512.	19.1
28.5			.085	1.35	1.35	57.	53.	6.0	522.	22.9
20.2			.065	1.03	1.03	58.	55.	6.0	528.	20.1
13.5			.065	1.03	1.03	57.	56.	5.5	534.	20.1
7.6			.060	.95	.95	59.	57.	4.5	491.	18.9
2.4E	850.0	993.635	.060	.95	.95	61.	58.	4.5	490.	18.9
40.6N	1145.0	993.635	.080	1.25	1.25	53.	52.	5.0	504.	22.0
28.5			.090	1.40	1.40	55.	51.	6.0	510.	23.4
20.2			.095	1.48	1.48	55.	53.	6.5	519.	24.2
13.5			.075	1.17	1.17	55.	54.	5.0	523.	21.5
7.6			.060	.94	.94	57.	55.	4.5	500.	19.0
2.4N	1215.0	1012.325	.055	.86	.86	58.	56.	4.0	490.	18.1
40.6W	1220.0	1012.325	.090	1.40	1.40	57.	56.	5.0	489.	23.1
28.5			.085	1.32	1.32	59.	58.	5.0	524.	22.9
20.2			.085	1.32	1.32	59.	58.	5.0	530.	23.0
13.5			.070	1.09	1.09	60.	59.	4.5	531.	20.9
7.6			.050	.78	.78	60.	59.	3.0	500.	17.4
2.4W	1250.0	1029.580	.045	.70	.70	61.	60.	3.0	488.	16.4
40.6S	1255.0	1029.580	.060	.94	.94	62.	59.	4.0	500.	19.0
28.5			.060	.94	.94	62.	60.	4.5	518.	19.2
20.2			.050	.78	.78	62.	61.	4.0	525.	17.6
13.5			.045	.70	.70	62.	61.	4.0	490.	16.4
7.6			.045	.70	.70	63.	62.	4.0	490.	16.4
2.4S	1325.0	1045.365	.050	.78	.78	63.	62.	4.0	488.	17.2

O R S A T	
CO2	3.5
O2	13.0
CO	.0
N	83.5

IMPINGER NO.	1	146.0
	2	25.6
	3	2.2
	4	.0
ABSORBED H2O		16.5

CONTROL BOX CALIBRATIONS

	FACTOR	DATE
ORIFICE	1.756	06-03-92
METER	.9721	06-03-92
PITOT	0.84	11-02-92

LEAK CHECK

	RATE	IN.HG
INITIAL	LT 0.02CFM	5.0
FINAL	LT 0.02CFM	7.0

CONTROL BOX NO. 4 PROBE NO. 10-1 NOZZLE NO. 56

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON WORKS
CLAIRTON, PA — COMBUSTION STACK #7
CLR-7BS-1 — 11-19-92

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG	29.50
B.	AVG. DELTA H (IN H2O)	1.03
C.	METER PRESSURE (IN. HG.)	29.58
D.	STATIC PRESSURE (IN. H2O)	-1.20
E.	STATIC PRESSURE (IN. HG.)	-.088
F.	STACK PRESSURE (IN. HG.) (A+E)	29.41
G.	STACK DIAMETER (IN.)	114.00
H.	STACK AREA (SQ. FT.)	70.88
	NOZZLE DIAMETER	.4280
I.	NOZZLE AREA (SQ. FT.)	.000999
J.	AVG. STACK TEMP (DEG. R.)	968.2
K.	AVG. METER TEMP (DEG. R.)	518.0
L.	CONDENSATE VOL. (ML)	173.8
M.	ABSORBED H2O (ML)	16.5
N.	TOTAL H2O (ML)	190.3
O.	METERED GAS (CF)	69.735
P.	GAS METER CORRECTION	.9721
Q.	CORRECTED METERED GAS (CF)	67.789
R.	H2O GAS VOLUME (CF) (0.00267N(K/C)	8.898
S.	TOTAL SAMPLED VOLUME (CF) (Q+R)	76.688
T.	PERCENT H2O (100R/S)	11.60
	THEORETICAL MAXIMUM	100.00
	PERCENT WATER USED	11.60
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K))	68.355
V.	MOLECULAR WEIGHT OF STACK GAS	

COMPONENT	ORSAT-DRY VOL.PCT./100	X	MOISTURE CORRECTION (1-T/100)	X	MOLECULAR WEIGHT	=	WEIGHT PER MOLE
CO2	.035	X	.8840	X	44.0	=	1.36
CO	.000	X	.8840	X	28.0	=	.00
O2	.130	X	.8840	X	32.0	=	3.68
N2	.835	X	.8840	X	28.2	=	20.81
H2O		X	T/100= .1160	X	18.0	=	2.09
					MOLECULAR WEIGHT OF STACK GAS	=	27.94

W.	PITOT CORRECTION	.840
X.	AVERAGE CORRECTED VELOCITY (FPS) [85.49*W*SQRT((J*DELTA P)/(V*F))]	19.90
Y.	AVG. FLOW RATE (CFM) (X*H*60)	84632.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92)	45371.
	STACK FLOW RATE (DRY)	40107.
AA.	SAMPLE TIME (SEC)	7200.
BB.	PERCENT ISOKINETIC (J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	100.76

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON WORKS
CLAIRTON, PA
CLR-7BS-1

COMBUSTION STACK #7
11-19-92

PARAMETER	CYCLONE WT. (G)	MATL.ON FILTER(G)	INSOL.MATL. IN PROBE(G)	SOL.MATL. IN PROBE(G)
PARTICULATE	.00000	.04370	.00000	.01560

PARAMETER	INSOL.MATL. IN IMP.(G)	SOLUBLE MATL. IN IMP.(G)
PARTICULATE	.00000	.00000

PARTICULATE	.05930
ALL MATLS.	.05930

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01336	4.59278

Emission rates are based on EPA Method 5.

KEYSTONE ENVIRONMENTAL RESOURCES
AIR QUALITY ENGINEERING

USS CLAIRTON WORKS
CLAIRTON, PA
BATTERY STACK #7

DATE: 11-19-92
CHARGE #: ...150-606087
TEST #: CLR-7BS-2

1. EMISSION RESULTS

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.00675	2.33572

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2. STACK CONDITIONS

FLOW (ACFM)	84771.
(SCFM)	45664.
MOISTURE CONTENT (%)	11.62
STACK TEMPERATURE (F)	503.5

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3. SAMPLING CONDITIONS

SAMPLE TIME (MIN.)	120.0
SCFD GAS SAMPLED	68.423
PERCENT ISOKINETIC	100.23

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON WORKS
CLAIRTON, PA — BATTERY STACK #7
CLR-7BS-2 — 11-19-92

FIELD DATA AND VELOCITY CALCULATIONS

POINT	TIME	METER READING (DRY)CF	DELTA P IN.H2O	ORIFICE DELTA H REQ	ORIFICE DELTA H ACT	METER TEMP DEG F IN	METER TEMP DEG F OUT	VACUUM IN.HG.	STACK TEMP DEG F	CORRECTE VELOCITY FT/SEC
40.6S	1340	.01045.700	.070	1.10	1.10	63.	60.	3.5	500.	20.6
28.5			.060	.94	.94	63.	61.	3.5	495.	19.0
20.2			.050	.79	.79	64.	63.	3.5	498.	17.4
13.5			.040	.63	.63	64.	62.	3.0	505.	15.6
7.6			.030	.47	.47	64.	62.	3.0	489.	13.4
2.4S	1410	.01060.560	.047	.71	.71	64.	62.	3.5	489.	16.8
40.6W	1415	.01060.560	.090	1.42	1.42	64.	61.	4.5	501.	23.3
28.5			.095	1.49	1.49	64.	62.	4.5	508.	24.1
20.2			.080	1.26	1.26	65.	63.	4.0	514.	22.1
13.5			.075	1.18	1.18	66.	64.	4.0	519.	21.5
7.6			.065	1.02	1.02	65.	63.	4.0	499.	19.8
2.4W	1445	.01080.176	.065	1.02	1.02	65.	63.	4.0	491.	19.7
40.6N	1450	.01080.176	.090	1.42	1.42	63.	60.	4.0	501.	23.3
28.5			.100	1.57	1.57	64.	62.	5.0	501.	24.6
20.2			.085	1.35	1.35	65.	63.	4.0	506.	22.7
13.5			.100	1.57	1.57	64.	62.	5.0	521.	24.8
7.6			.060	.94	.94	63.	62.	3.5	500.	19.0
2.4N	1520	.01099.755	.050	.79	.79	63.	61.	3.5	500.	17.4
40.6E	1525	.01099.755	.085	1.34	1.34	63.	61.	4.0	511.	22.8
28.5			.060	.94	.94	65.	62.	3.5	510.	19.1
20.2			.055	.87	.87	65.	63.	3.5	521.	18.4
13.5			.060	.94	.94	64.	63.	3.0	520.	19.2
7.6			.055	.87	.87	64.	63.	3.0	500.	18.2
2.4E	1555	.01116.200	.040	.63	.63	65.	64.	3.0	486.	15.4

O R S A T

CO2	3.0
O2	12.5
CO	.0
N	84.5

IMPINGER NO.	1	147.2
	2	24.0
	3	1.4
	4	.0
ABSORBED H2O		18.2

CONTROL BOX CALIBRATIONS

	FACTOR	DATE
ORIFICE	1.756	06-03-92
METER	.9721	06-03-92
PITOT	0.84	11-02-92

LEAK CHECK

	RATE	IN.HG
INITIAL	LT 0.02CFM	5.0
FINAL	LT 0.02CFM	7.0

CONTROL BOX NO. 4 — PROBE NO. 10-2 — NOZZLE NO. 50

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON WORKS
CLAIRTON, PA BATTERY STACK #7
CLR-7BS-2 11-19-92

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG	29.50
B.	AVG. DELTA H (IN H2O)	1.05
C.	METER PRESSURE (IN. HG.)	29.58
D.	STATIC PRESSURE (IN. H2O)	-1.20
E.	STATIC PRESSURE (IN. HG.)	-.088
F.	STACK PRESSURE (IN. HG.) (A+E)	29.41
G.	STACK DIAMETER (IN.)	114.00
H.	STACK AREA (SQ. FT.)	70.88
	NOZZLE DIAMETER	.4280
I.	NOZZLE AREA (SQ. FT.)	.000999
J.	AVG. STACK TEMP (DEG. R.)	963.5
K.	AVG. METER TEMP (DEG. R.)	523.1
L.	CONDENSATE VOL. (ML)	172.6
M.	ABSORBED H2O (ML)	18.2
N.	TOTAL H2O (ML)	190.8
O.	METERED GAS (CF)	70.500
P.	GAS METER CORRECTION	.9721
Q.	CORRECTED METERED GAS (CF)	68.533
R.	H2O GAS VOLUME (CF) (0.00267N(K/C)	9.011
S.	TOTAL SAMPLED VOLUME (CF) (Q+R)	77.544
T.	PERCENT H2O (100R/S)	11.62
	THEORETICAL MAXIMUM	100.00
	PERCENT WATER USED	11.62
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K))	68.423
V.	MOLECULAR WEIGHT OF STACK GAS	

COMPONENT	ORSAT-DRY VOL.PCT./100	X	MOISTURE CORRECTION (1-T/100)	X	MOLECULAR WEIGHT	=	WEIGHT PER MOLE
CO2	.030	X	.8838	X	44.0	=	1.17
CO	.000	X	.8838	X	28.0	=	.00
O2	.125	X	.8838	X	32.0	=	3.54
N2	.845	X	.8838	X	28.2	=	21.06
H2O		X	T/100= .1162	X	18.0	=	2.09
					MOLECULAR WEIGHT OF STACK GAS	=	27.85

W.	PITOT CORRECTION	.840
X.	AVERAGE CORRECTED VELOCITY (FPS) [85.49*W*SQRT{(J*DELTA P)/(V*F)}]	19.93
Y.	AVG. FLOW RATE (CFM) (X*H*60)	84771.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92)	45664.
	STACK FLOW RATE (DRY)	40358.
AA.	SAMPLE TIME (SEC)	7200.
BB.	PERCENT ISOKINETIC (J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	100.23

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON WORKS
CLAIRTON, PA
CLR-7BS-2

BATTERY STACK #7
11-19-92

PARAMETER	CYCLONE WT. (G)	MATL.ON FILTER(G)	INSOL.MATL. IN PROBE(G)	SOL.MATL. IN PROBE(G)
PARTICULATE	.00000	.02480	.00000	.00520

PARAMETER	INSOL.MATL. IN IMP.(G)	SOLUBLE MATL. IN IMP.(G)
PARTICULATE	.00000	.00000

PARTICULATE	.03000
ALL MATLS.	.03000

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.00675	2.33572

Emission rates are based on EPA Method 5.

KEYSTONE ENVIRONMENTAL RESOURCES
AIR QUALITY ENGINEERING

USS CLAIRTON WORKS
CLAIRTON, PA
BATTERY STACK #7

DATE: 11-20-92
CHARGE #: ...150-605087
TEST #: CLR-7BS-3

1. EMISSION RESULTS

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.00651	2.39332

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2. STACK CONDITIONS

FLOW (ACFM)	89413.
(SCFM)	48332.
MOISTURE CONTENT (%)	11.23
STACK TEMPERATURE (F)	501.8

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3. SAMPLING CONDITIONS

SAMPLE TIME (MIN.)	120.0
SCFD GAS SAMPLED	66.256
PERCENT ISOKINETIC	91.30

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

USS CLAIRTON WORKS
CLAIRTON, PA — BATTERY STACK #7
CLR-7BS-3 — 11-20-92

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG	29.55
B.	AVG. DELTA H (IN H2O)	.95
C.	METER PRESSURE (IN. HG.)	29.62
D.	STATIC PRESSURE (IN. H2O)	-1.20
E.	STATIC PRESSURE (IN. HG.)	-.088
F.	STACK PRESSURE (IN. HG.) (A+E)	29.46
G.	STACK DIAMETER (IN.)	114.00
H.	STACK AREA (SQ. FT.)	70.88
	NOZZLE DIAMETER	.4280
I.	NOZZLE AREA (SQ. FT.)	.000999
J.	AVG. STACK TEMP (DEG. R.)	961.8
K.	AVG. METER TEMP (DEG. R.)	519.3
L.	CONDENSATE VOL. (ML)	160.6
M.	ABSORBED H2O (ML)	17.2
N.	TOTAL H2O (ML)	177.8
O.	METERED GAS (CF)	67.665
P.	GAS METER CORRECTION	.9721
Q.	CORRECTED METERED GAS (CF)	65.777
R.	H2O GAS VOLUME (CF) (0.00267N(K/C)	8.323
S.	TOTAL SAMPLED VOLUME (CF) (Q+R)	74.100
T.	PERCENT H2O (100R/S)	11.23
	THEORETICAL MAXIMUM	100.00
	PERCENT WATER USED	11.23
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K))	66.256
V.	MOLECULAR WEIGHT OF STACK GAS	

COMPONENT	ORSAT-DRY VOL.PCT./100	X	MOISTURE CORRECTION (1-T/100)	X	MOLECULAR WEIGHT	=	WEIGHT PER MOLE
CO2	.030	X	.8877	X	44.0	=	1.17
CO	.000	X	.8877	X	28.0	=	.00
O2	.125	X	.8877	X	32.0	=	3.55
N2	.845	X	.8877	X	28.2	=	21.15
H2O		X	T/100= .1123	X	18.0	=	2.02
					MOLECULAR WEIGHT OF STACK GAS	=	27.90

W.	PITOT CORRECTION	.840
X.	AVERAGE CORRECTED VELOCITY (FPS) [85.49*W*SQRT((J*DELTA P)/(V*F))]	21.02
Y.	AVG. FLOW RATE (CFM) (X*H*60)	89413.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92)	48332.
	STACK FLOW RATE (DRY)	42904.
AA.	SAMPLE TIME (SEC)	7200.
BB.	PERCENT ISOKINETIC (J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	91.30