USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION
OF THE #7 BATTERY COMBUSTION STACK

1990

Prepared for:

USS CLAIRTON WORKS
A DIVISION OF USX CORPORATION
CLAIRTON, PA

Prepared by:

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

PROJECT NO. 601050-07

SEPTEMBER 1990

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ABSTRACT

On August 22, 1990, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #7 Battery Combustion Stack operated at the Clairton Coke and Coal Chemical Works. The purpose of the testing was to determine the (1) concentration and mass emissions of particulate matter, and (2) presence 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 0.014 gr/scfd and 4.32 lb/hr, respectively. The allowable concentration is 0.030 gr/scfd. Thus, the emissions from the stack are in compliance. No visible emissions were observed from the stack during any of the tests.

USS
Clairton Works
400 State Street
Clairton, PA 15025

November 14, 1990

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

Deputy Director
Allegheny County Health Department
Bureau of Air Pollution Control
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
1303 Highland Building
121 South Highland Avenue
Pittsburgh, PA 15026

Gentlemen:

Subject: Compliance Demonstration
Clairton Batteries #7, 8, 9, 14, and 15

Please find enclosed with this letter the reports on Batteries #7, 8, 9, 14, and 15 compliance mass emission stack tests, conducted at USS Clairton Works, Division of USX Corporation, on August 22, October 2, October 3, June 20, and July 12, 1990 respectively.

Please refer questions concerning these reports to Paul Kiswardy at (412) 233-1046.

Very truly yours,

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

GTW/BAC-nt
Attachment

1.0 INTRODUCTION

On August 22, 1990, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #7 Battery Combustion Stack operated at the Clairton Coke and Coal Chemical Works. The purpose of the testing was to determine the (1) concentration and mass emissions of particulate matter, and (2) presence of visible emissions from the stack as required by the Amended Mon Valley Consent Decree, Paragraph V.A.(6) and Appendix 4.A.

Testing was performed by the Air Quality Engineering Division of Keystone Environmental Resources, Inc. (Keystone). The test crew was comprised of Richard Casselberry, Thomas Morgan, and John Shimshock. Visible emissions determinations were performed by Ken Kuiros and Jim McKoy of Environmental Technical Services (ETS). Keystone and ETS are sister companies under the Chester Environmental Group. All test procedures were witnessed by Phil Lawrence of the Allegheny County Health Department.

2.0 METHODOLOGIES

Particulate matter sampling was performed in accordance with EPA Stationary Source Sampling Methods 1 through 5. The gas volume sampled for each 120 minute test was greater than 50 dry standard cubic feet.

The process exhaust exited through a 114" 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 4 equally spaced ports, with each traverse point sampled for 5 minutes. A schematic diagram of the stack and traverse points is presented in Figure 2-1.

A total of three test runs were performed. During each test, gas concentrations of CO_2, O_2, and N_2 (by difference) were determined with the use of a Fyrite apparatus as specified by EPA Method 3.

Clean up of the sampling train included an acetone rinse of the front-half components. The water soluble and water insoluble portions of the front-half of the sampling train were determined as a total. The rinses were dried, desiccated, and weighed to a constant weight. These weights were added to the filter weights to determine the total catch. These procedures followed the methodology of EPA Method 5.

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

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

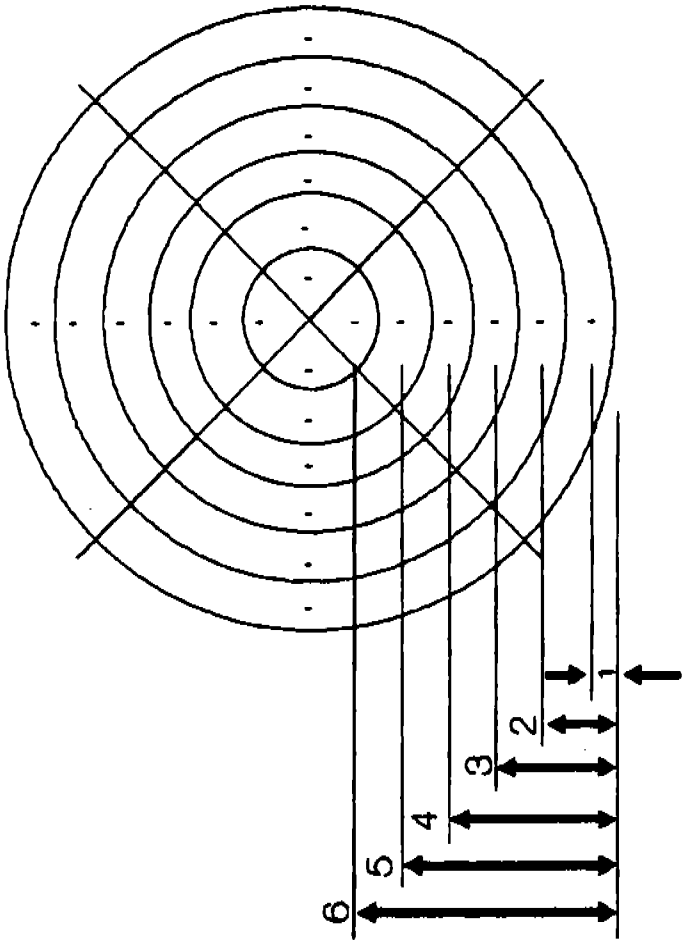
3000 TECH CENTER DRIVE
MONROEVILLE, PA 15146

SKETCH SHEET

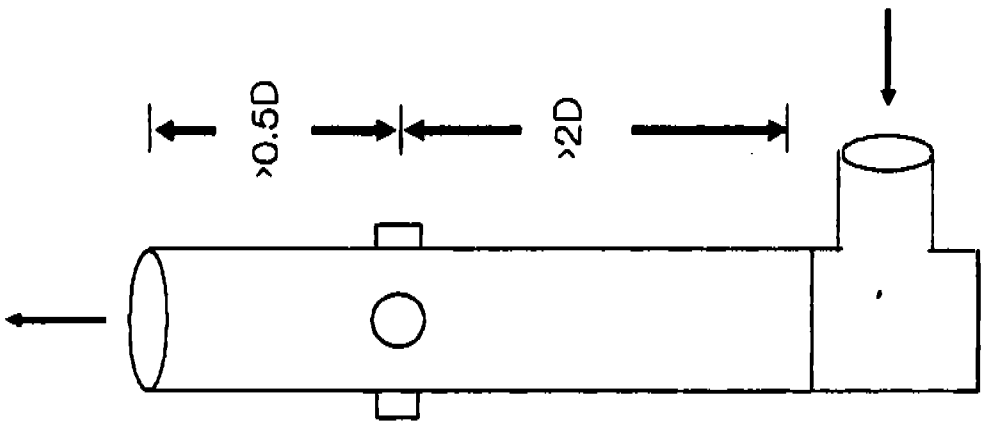
NAME DATE

DRAWN

CHECKED



Traverse Point	Distance (in.)
1	2.4
2	7.6
3	13.5
4	20.2
5	28.5
6	40.6



Stack Diameter (in.) = 114
D

2-1a

ACTIVITY No.

REVISION

TITLE

SCHEMATIC DIAGRAM OF THE
STACK AND TRAVERSE POINTS

FIGURE 2-1

3.0 RESULTS

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

The probes and sampling trains were operate 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 can be found in Appendix B.

Copies of the field data sheets for the particulate matter sampling can be found in Appendix C. The emissions calculations for each test can be found in Appendix D. The results have been summarized in Table 3-1. The average particulate matter concentration and emission rate are 0.014 grains per standard cubic foot dry (gr/scfd) and 4.32 pounds per hour (lb/hr), respectively.

As promulgated by the Amended Mon Valley Consent Decree, Paragraph V.A.(6), the particulate matter standard for #7 Battery Combustion Stack is 0.030 gr/scfd. Thus, the emissions from the stack are in compliance.

Table 3-1 also lists other pertinent stack and sampling parameters including the 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, stack gas temperature, gas volume sampled for each test (scfd), 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% and 110% is considered acceptable.

Copies of the field data sheets for the visible emissions determinations can be found in Appendix E. No visible emissions were observed during any of the three tests. As promulgated by the Amended Mon Valley Consent Decree, Paragraph V.A.(6), the visible emissions shall not equal or exceed 20% opacity for a period or periods

USS CLAIRTON WORKS
CLAIRTON, PA

TABLE 3-1

PARTICULATE MATTER EMISSIONS DATA

EMISSIONS	TEST #1	TEST #2	TEST #3	AVERAGE
gr/dscf	0.014	0.019	0.010	0.014
lb/hr	4.36	5.94	2.67	4.32
STACK CONDITIONS				
Flow (acfm)	78233	75390	66007	73210
Flow (scfm)	42551	40800	35941	39764
Moisture Content (%)	12.10	12.16	11.88	12.05
Stack Temp. (^{0}F)	489	493	488	490
SAMPLING CONDITIONS				
Sampling Time (min)	120	120	120	
Sample Volume (scfd)	59.714	60.955	53.133	
Isokinetics (%)	97.09	100.08	97.81	

aggregating in excess of 3 minutes in any 60-minute period and shall never equal or exceed 60% opacity. Thus, the emissions are in compliance.

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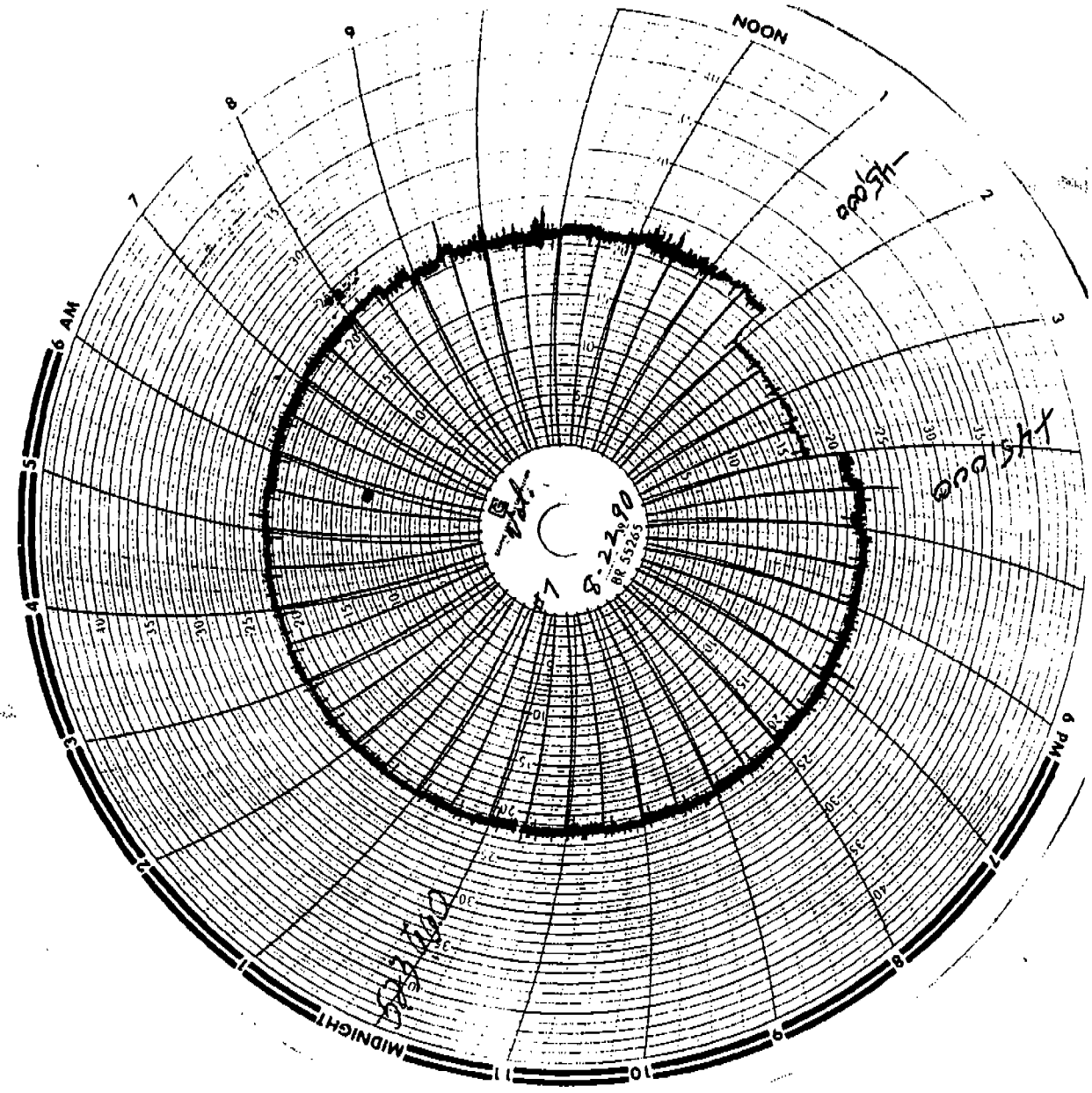
RESULTS OF THE
COMPLIANCE DEMONSTRATION OF THE
#7 BATTERY COMBUSTION STACK

APPENDIX A

OPERATIONAL RECORDS

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.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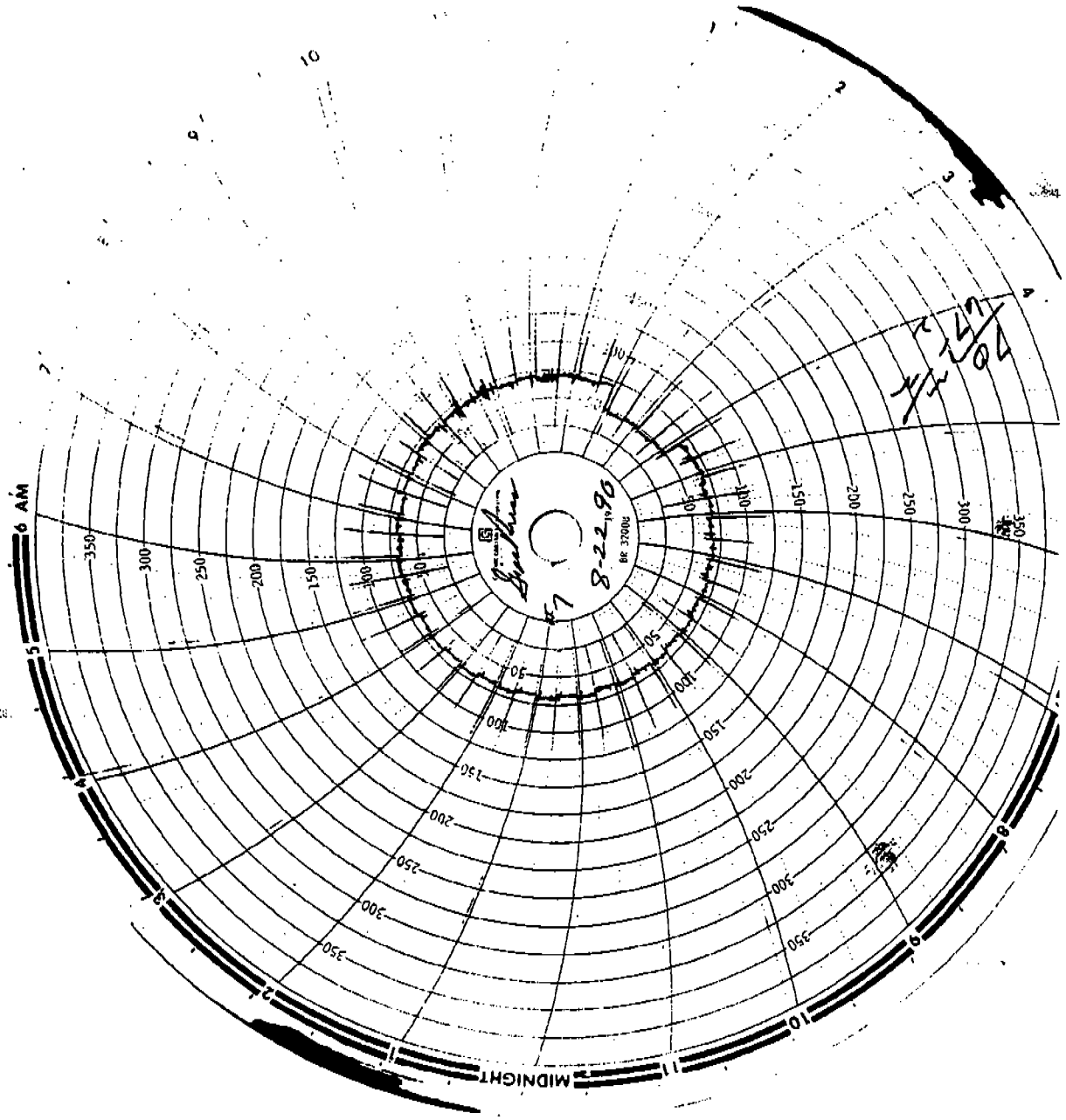
6 PM
MIDNIGHT
6 AM
8.22.90
BR 55265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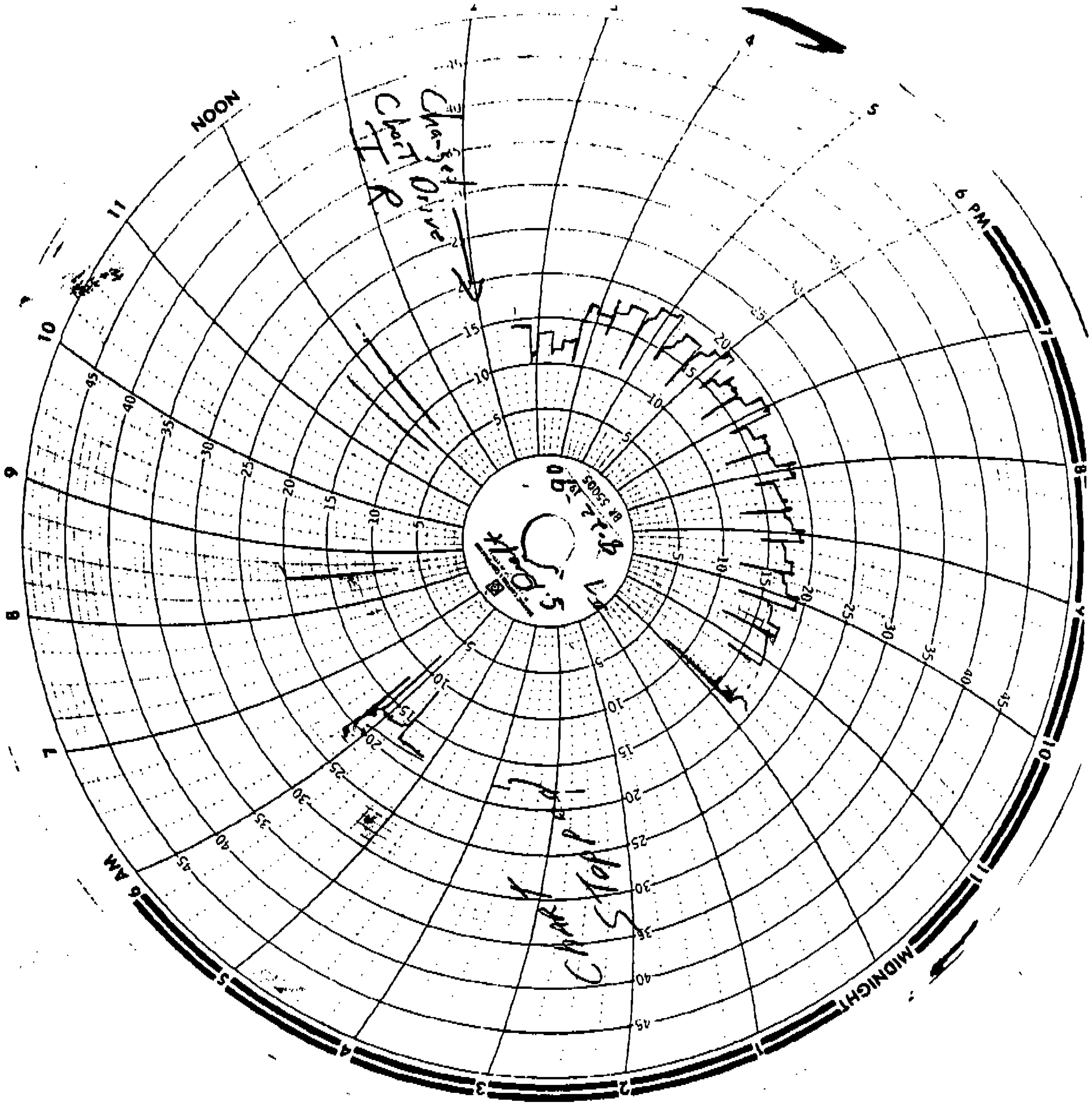

NOON
6 PM
MIDNIGHT
6 AM

PUSHING SCHEDULE FOR BATTERIES 7-9

EQ #	PUSH	CHARGE	STATION	EARLIEST	DESIRED	LATEST
1	B 7/ 8	B 5/ 8		7:45	8: 0	8:20
2	B 7/ 9	B 5/ 9		7:51	8: 6	8:26
3	A 7/ 7	A 5/ 7		7:57	8:12	8:32
4	A 7/ 8	A 5/ 8		8: 3	8:18	8:38
5	B 7/ 7	B 5/ 7		8: 9	8:24	8:44
6	A 9/ 9	A 7/ 9		8:16	8:31	8:51
7	B 9/ 8	B 7/ 8		8:22	8:37	8:57
8	B 9/ 9	B 7/ 9		8:28	8:43	9: 3
9	A 9/ 7	A 7/ 7		8:34	8:49	9: 9
10	A 9/ 8	A 7/ 8		8:41	8:56	9:16
11	B 9/ 7	B 7/ 7		8:47	9: 2	9:22
12	A11/ 9	A 9/ 9		8:53	9: 8	9:28
13	B11/ 8	B 9/ 8		8:59	9:14	9:34
14	B11/ 9	B 9/ 9		9: 6	9:21	9:41
15	A11/ 7	A 9/ 7		9:12	9:27	9:47
16	A11/ 8	A 9/ 8		9:18	9:33	9:53
17	B11/ 7	B 9/ 7		9:24	9:39	9:59
18	A13/ 9	A11/ 9		9:30	9:45	10: 5
19	B13/ 8	B11/ 8		9:37	9:52	10:12
20	B13/ 9	B11/ 9		9:43	9:58	10:18
21	A13/ 7	A11/ 7		9:49	10: 4	10:24
22	A13/ 8	A11/ 8		9:55	10:10	10:30
23	B13/ 7	B11/ 7		10: 2	10:17	10:37
24	A15/ 9	A13/ 9		10: 8	10:23	10:43
25	B15/ 8	B13/ 8		10:14	10:29	10:49
26	B15/ 9	B13/ 9		10:20	10:35	10:55
27	A15/ 7	A13/ 7		10:27	10:42	11: 2
28	A15/ 8	A13/ 8		10:33	10:48	11: 8
29	B15/ 7	B13/ 7		10:39	10:54	11:14
30	A17/ 9	A15/ 9		10:45	11: 0	11:20
31	B17/ 8	B15/ 8		10:52	11: 7	11:27
32	B17/ 9	B15/ 9		10:58	11:13	11:33
33	A17/ 7	A15/ 7		11: 4	11:19	11:39
34	A17/ 8	A15/ 8		11:10	11:25	11:45
35	A19/ 9	A17/ 9		11:16	11:31	11:51
36	B19/ 8	B17/ 8		11:23	11:38	11:58
37	B19/ 9	B17/ 9		11:29	11:44	12: 4
38	A19/ 7	A17/ 7		11:35	11:50	12:10
39	A19/ 8	A17/ 8		11:41	11:56	12:16
40	B19/ 7	B17/ 7		11:48	12: 3	12:23
41	A21/ 9	A19/ 9		11:54	12: 9	12:29
42	B21/ 8	B19/ 8		12: 0	12:15	12:35
43	B21/ 9	B19/ 9		12: 6	12:21	12:41
44	A21/ 7	A19/ 7		12:13	12:28	12:48
45	A21/ 8	A19/ 8		12:19	12:34	12:54
46	B21/ 7	B19/ 7		12:25	12:40	1: 0
47	A23/ 9	A21/ 9		12:31	12:46	1: 6
48	B23/ 8	B21/ 8		12:37	12:52	1:12
49	B23/ 9	B21/ 9		12:44	12:59	1:19
50	A23/ 7	A21/ 7		12:50	1: 5	1:25
51	A23/ 8	A21/ 8		12:56	1:11	1:31
52	B23/ 7	B21/ 7		1: 2	1:17	1:37
53	B25/ 8	B23/ 8		1: 9	1:24	1:44
54	B25/ 9	B23/ 9		1:15	1:30	1:50
55	A25/ 7	A23/ 7		1:21	1:36	1:56
56	A25/ 8	A23/ 8		1:27	1:42	2: 2
57	B25/ 7	B23/ 7		1:34	1:49	2: 9
58	A27/ 9	A25/ 9		1:40	1:55	2:15
59	B27/ 8	B25/ 8		1:46	2: 1	2:21
60	B27/ 9	B25/ 9		1:52	2: 7	2:27
61	A27/ 7	A25/ 7		1:59	2:14	2:34
62	A27/ 8	A25/ 8		2: 5	2:20	2:40
63	B27/ 7	B25/ 7		2:11	2:26	2:46
64	A29/ 9	A27/ 9		2:17	2:32	2:52
65	B29/ 8	B27/ 8		2:23	2:38	2:58
66	B29/ 9	B27/ 9		2:30	2:45	3: 5
67	A29/ 7	A27/ 7		2:36	2:51	3:11
68	A29/ 8	A27/ 8		2:42	2:57	3:17
69	B29/ 7	B27/ 7		2:48	3: 3	3:23
70	A31/ 9	A29/ 9		2:55	3:10	3:30
71	B31/ 8	B29/ 8		3: 1	3:16	3:36
72	B31/ 9	B29/ 9		3: 7	3:22	3:42
73	A31/ 7	A29/ 7		3:13	3:28	3:48
74	A31/ 8	A29/ 8		3:20	3:35	3:55
75	B31/ 7	B29/ 7		3:26	3:41	4: 1
76	A 2/ 9	B31/ 9		3:32	3:47	4: 7
77	B 2/ 8	A31/ 8		3:38	3:53	4:10

WED AUG 22 1990 8X 4 TURN

PUSHING SCHEDULE FOR BATTERIES 7-9

EQ #	PUSH	CHARGE	STATION	EARLIEST	DESIRED	LATEST
1	A31/ 7	A29/ 7		3:45	4: 0	4:20
2	A31/ 8	A29/ 8		3:51	4: 6	4:26
3	A 2/ 9	B31/ 9		3:57	4:12	4:32
4	B 2/ 8	A31/ 8		4: 3	4:18	4:38
5	B 2/ 9	A31/ 9		4: 9	4:24	4:44
6	C 2/ 8	B31/ 8		4:15	4:30	4:50
7	C 2/ 9	A 2/ 9		4:21	4:36	4:56
8	A 2/ 7	B31/ 7		4:27	4:42	5: 2
9	A 2/ 8	B 2/ 8		4:33	4:48	5: 8
10	B 2/ 7	A31/ 7		4:39	4:54	5:14
11	A 4/ 9	A 2/ 7		4:45	5: 0	5:20
12	B 4/ 8	C 2/ 9		4:51	5: 6	5:26
13	B 4/ 9	C 2/ 8		4:57	5:12	5:32
14	A 4/ 7	B 2/ 9		5: 3	5:18	5:38
15	A 4/ 8	A 2/ 8		5:10	5:25	5:45
16	B 4/ 7	B 2/ 7		5:16	5:31	5:51
17	A 6/ 9	A 4/ 9		5:22	5:37	5:57
18	B 6/ 8	B 4/ 8		5:28	5:43	6: 3
19	B 6/ 9	B 4/ 9		5:34	5:49	6: 9
20	A 6/ 7	A 4/ 7		5:40	5:55	6:15
21	A 6/ 8	A 4/ 8		5:46	6: 1	6:21
22	B 6/ 7	B 4/ 7		5:52	6: 7	6:27
23	A 8/ 9	A 6/ 9		5:58	6:13	6:33
24	B 8/ 8	B 6/ 8		6: 4	6:19	6:39
25	B 8/ 9	B 6/ 9		6:10	6:25	6:45
26	A 8/ 7	A 6/ 7		6:16	6:31	6:51
27	A 8/ 8	A 6/ 8		6:22	6:37	6:57
28	B 8/ 7	B 6/ 7		6:29	6:44	7: 4
29	A10/ 9	A 8/ 9		6:35	6:50	7:10
30	B10/ 8	B 8/ 8		6:41	6:56	7:16
31	B10/ 9	B 8/ 9		6:47	7: 2	7:22
32	A10/ 7	A 8/ 7		6:53	7: 8	7:28
33	A10/ 8	A 8/ 8		6:59	7:14	7:34
34	B10/ 7	B 8/ 7		7: 5	7:20	7:40
35	A12/ 9	A10/ 9		7:11	7:26	7:46
36	B12/ 8	B10/ 8		7:17	7:32	7:52
37	B12/ 9	B10/ 9		7:23	7:38	7:58
38	A12/ 7	A10/ 7		7:29	7:44	8: 4
39	A12/ 8	A10/ 8		7:35	7:50	8:10
40	B12/ 7	B10/ 7		7:41	7:56	8:16
41	A14/ 9	A12/ 9		7:48	8: 3	8:23
42	B14/ 8	B12/ 8		7:54	8: 9	8:29
43	B14/ 9	B12/ 9		8: 0	8:15	8:35
44	A14/ 7	A12/ 7		8: 6	8:21	8:41
45	A14/ 8	A12/ 8		8:12	8:27	8:47
46	B14/ 7	B12/ 7		8:18	8:33	8:53
47	A16/ 9	A14/ 9		8:24	8:39	8:59
48	B16/ 8	B14/ 8		8:30	8:45	9: 5
49	B16/ 9	B14/ 9		8:36	8:51	9:11
50	A16/ 7	A14/ 7		8:42	8:57	9:17
51	A16/ 8	A14/ 8		8:48	9: 3	9:23
52	B16/ 7	B14/ 7		8:54	9: 9	9:29
53	A18/ 9	A16/ 9		9: 0	9:15	9:35
54	B18/ 8	B16/ 8		9: 7	9:22	9:42
55	B18/ 9	B16/ 9		9:13	9:28	9:48
56	A18/ 7	A16/ 7		9:19	9:34	9:54
57	A18/ 8	A16/ 8		9:25	9:40	10: 0
58	B18/ 7	B16/ 7		9:31	9:46	10: 6
59	A20/ 9	A18/ 9		9:37	9:52	10:12
60	B20/ 8	B18/ 8		9:43	9:58	10:18
61	B20/ 9	B18/ 9		9:49	10: 4	10:24
62	A20/ 7	A18/ 7		9:55	10:10	10:30
63	A20/ 8	A18/ 8		10: 1	10:16	10:36
64	B20/ 7	B18/ 7		10: 7	10:22	10:42
65	A22/ 9	A20/ 9		10:13	10:28	10:48
66	B22/ 8	B20/ 8		10:19	10:34	10:54
67	B22/ 9	B20/ 9		10:26	10:41	11: 1
68	A22/ 7	A20/ 7		10:32	10:47	11: 7
69	A22/ 8	A20/ 8		10:38	10:53	11:13
70	B22/ 7	B20/ 7		10:44	10:59	11:19
71	A24/ 9	A22/ 9		10:50	11: 5	11:25
72	B24/ 8	B22/ 8		10:56	11:11	11:31
73	B24/ 9	B22/ 9		11: 2	11:17	11:37
74	A24/ 7	A22/ 7		11: 8	11:23	11:43
75	A24/ 8	A22/ 8		11:14	11:29	11:49
76	B24/ 7	B22/ 7		11:20	11:35	11:55
77	A26/ 9	A24/ 9		11:26	11:41	12: 1
78	B26/ 8	B24/ 8		11:32	11:47	12: 7
79	B26/ 9	B24/ 9		11:38	11:53	12:13

WED AUG 22 1990 4X12 TURN

.MSCAN *RUNTIME ERROR* 0494 @ 36232

PUSHING SCHEDULE FOR BATTERIES 7-9

TRIP #	PUSH	CHARGE	STATION	EARLIEST	DESIRED	LATEST
1	A12/ 7	A10/ 7		11:45	12: 0	12:20
2	A12/ 8	A10/ 8		11:51	12: 6	12:26
3	B12/ 7	B10/ 7		11:57	12:12	12:32
4	B31/ 7	A12/ 9		12: 3	12:18	12:38
5	A14/ 9	A12/ 9		12: 9	12:24	12:44
6	B14/ 8	B12/ 8		12:15	12:30	12:50
7	B14/ 9	B12/ 9		12:21	12:36	12:56
8	A14/ 7	A12/ 7		12:27	12:42	1: 2
9	A14/ 8	A12/ 8		12:33	12:48	1: 8
10	B14/ 7	B31/ 7		12:39	12:54	1:14
11	A16/ 9	A14/ 9		12:45	1: 0	1:20
12	B16/ 8	B14/ 8		12:51	1: 6	1:26
13	B16/ 9	B14/ 9		12:57	1:12	1:32
14	A16/ 7	A14/ 7		1: 3	1:18	1:38
15	A16/ 8	A14/ 8		1:10	1:25	1:45
16	B16/ 7	B14/ 7		1:16	1:31	1:51
17	A18/ 9	A16/ 9		1:22	1:37	1:57
18	B18/ 8	B16/ 8		1:28	1:43	2: 3
19	B18/ 9	B16/ 9		1:34	1:49	2: 9
20	A18/ 7	A16/ 7		1:40	1:55	2:15
21	A18/ 8	A16/ 8		1:46	2: 1	2:21
22	B18/ 7	B16/ 7		1:52	2: 7	2:27
23	A20/ 9	A18/ 9		1:58	2:13	2:33
24	B20/ 8	B18/ 8		2: 4	2:19	2:39
25	B20/ 9	B18/ 9		2:10	2:25	2:45
26	A20/ 7	A18/ 7		2:16	2:31	2:51
27	A20/ 8	A18/ 8		2:22	2:37	2:57
28	B20/ 7	B18/ 7		2:29	2:44	3: 4
29	A22/ 9	A20/ 9		2:35	2:50	3:10
30	B22/ 8	B20/ 8		2:41	2:56	3:16
31	B22/ 9	B20/ 9		2:47	3: 2	3:22
32	A22/ 7	A20/ 7		2:53	3: 8	3:28
33	A22/ 8	A20/ 8		2:59	3:14	3:34
34	B22/ 7	B20/ 7		3: 5	3:20	3:40
35	A24/ 9	A22/ 9		3:11	3:26	3:46
36	B24/ 8	B22/ 8		3:17	3:32	3:52
37	B24/ 9	B22/ 9		3:23	3:38	3:58
38	A24/ 7	A22/ 7		3:29	3:44	4: 4
39	A24/ 8	A22/ 8		3:35	3:50	4:10
40	B24/ 7	B22/ 7		3:41	3:56	4:16
41	A26/ 9	A24/ 9		3:48	4: 3	4:23
42	B26/ 8	B24/ 8		3:54	4: 9	4:29
43	B26/ 9	B24/ 9		4: 0	4:15	4:35
44	A26/ 7	A24/ 7		4: 6	4:21	4:41
45	A26/ 8	A24/ 8		4:12	4:27	4:47
46	B26/ 7	B24/ 7		4:18	4:33	4:53
47	A28/ 9	A26/ 9		4:24	4:39	4:59
48	B28/ 8	B26/ 8		4:30	4:45	5: 5
49	B28/ 9	B26/ 9		4:36	4:51	5:11
50	A28/ 7	A26/ 7		4:42	4:57	5:17
51	A28/ 8	A26/ 8		4:48	5: 3	5:23
52	B28/ 7	B26/ 7		4:54	5: 9	5:29
53	A30/ 9	A28/ 9		5: 0	5:15	5:35
54	B30/ 8	B28/ 8		5: 7	5:22	5:42
55	B30/ 9	B28/ 9		5:13	5:28	5:48
56	A30/ 7	A28/ 7		5:19	5:34	5:54
57	A30/ 8	A28/ 8		5:25	5:40	6: 0
58	B30/ 7	B28/ 7		5:31	5:46	6: 6
59	A 1/ 9	B30/ 9		5:37	5:52	6:12
60	B 1/ 9	A30/ 9		5:43	5:58	6:18
61	C 1/ 8	B30/ 8		5:49	6: 4	6:24
62	C 1/ 9	A30/ 8		5:55	6:10	6:30
63	A 1/ 7	A30/ 7		6: 1	6:16	6:36
64	A 1/ 8	A 1/ 9		6: 7	6:22	6:42
65	B 1/ 7	B30/ 7		6:13	6:28	6:48
66	B 1/ 8	B 1/ 9		6:19	6:34	6:54
67	A 3/ 9	A 1/ 7		6:26	6:41	7: 1
68	B 3/ 8	C 1/ 8		6:32	6:47	7: 7
69	B 3/ 9	B 1/ 8		6:38	6:53	7:13
70	A 3/ 7	C 1/ 9		6:44	6:59	7:19
71	A 3/ 8	B 1/ 7		6:50	7: 5	7:25
72	B 3/ 7	A 1/ 8		6:56	7:11	7:31
73	A 5/ 9	A 3/ 9		7: 2	7:17	7:37
74	B 5/ 8	B 3/ 8		7: 8	7:23	7:43
75	B 5/ 9	B 3/ 9		7:14	7:29	7:49
76	A 5/ 7	A 3/ 7		7:20	7:35	7:55
77	A 5/ 8	A 3/ 8		7:26	7:41	8: 1
78	B 5/ 7	B 3/ 7		7:32	7:47	8: 7
79	A 7/ 9	A 5/ 9		7:38	7:53	8:10

WED AUG 22 1990 12X 8 TURN

USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION OF THE
#7 BATTERY COMBUSTION STACK

APPENDIX B

PRE-TEST AND POST-TEST
CALIBRATION AND AUDIT RESULTS

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

CONTROL BOX CALIBRATION

THREE POINT CALIBRATION

BOX NO. 1
DATE 6-12-90
BP 29.1
OPERATOR TJH

	TIME	WET TEST METER TEMP T_W	WET TEST METER VOLUME V_M	PRESSURE P_W	PRESSURE T_I	PRESSURE T_O	DRY TEST METER TEMP IN T_A	DRY TEST METER TEMP OUT P_D	DRY TEST METER TEMP AVG V_D	ORIFICE Y	ORIFICE $H_@$	VOLUME	METER CORRECT	ORIFICE COEIFFICE
START				0.000		29.10					0.50	464.200		
HALF			78.0				94.0		92.0	93.0				
STOP	11.50			5.000								469.118		
CALCULATION	11.50	538.0		5.057	29.10					553.0	29.14	4.918	1.0555	1.475
START				0.000	29.10						1.00	470.000		
HALF			78.0				98.0		91.0	94.5				
STOP	8.43			5.000								474.977		
CALCULATION	8.43	538.0		5.057	29.10					554.5	29.17	4.977	1.0445	1.580
START				0.000	29.10						2.00	476.000		
HALF			78.0				99.0		92.0	95.5				
STOP	6.12			5.000								480.920		
CALCULATION	6.12	538.0		5.057	29.10					555.5	29.25	4.920	1.0558	1.663
AVERAGE													1.0519	1.573

POST TEST

BOX NO.	1
DATE	9-4-90
BP	29.15
OPERATOR	KS

	TIME	WET TEST METER TEMP T_W	WET TEST METER VOLUME V_M	P_W	PRESSURE T_I	T_O	DRY TEST METER TEMP IN T_A	TEMP OUT P_D	V_D	TEMP AVG Y	ORIFICE $H_@$	VOLUME	METER CORRECT	ORIFICE COEIFFICE
START				0.000		29.15					0.75	724.000		
HALF			78.0				96.0		95.0	95.5				
STOP	10.18			5.000								729.124		
CALCULATION	10.18	538.0	5.057		29.15					555.5	29.21	5.124	1.0170	1.722
START				0.000	29.15						0.75	729.700		
HALF			78.0				98.0		94.0	96.0				
STOP	10.20			5.000								734.827		
CALCULATION	10.20	538.0	5.057		29.15					556.0	29.21	5.127	1.0173	1.728
START				0.000	29.15						0.75	735.100		
HALF			78.0				98.0		94.0	96.0				
STOP	13.13			6.500								741.777		
CALCULATION	13.13	538.0	6.573		29.15					556.0	29.21	6.677	1.0155	1.694
AVERAGE													1.0166	1.715
DIFFERENCE													3.48%	-8.29%

MAGNAHELIC CALIBRAATION

DATE 9-4-90

OPERATOR MGG

P 0-10		P 0-.5		H	
MAGNEHILIC	MANOMETER	MAGNEHILIC	MANOMETER	MAGNEHILIC	MANOMETER
0.50	0.50	0.50	0.50	4.00	4.00
1.00	1.00	0.40	0.40	3.00	3.00
2.00	2.00	0.30	0.30	2.00	2.00
4.00	4.00	0.20	0.20	1.00	1.00
6.00	6.00	0.10	0.10	0.50	0.50
8.00	8.00				

LEAK CHECK

DATE 9-4-90

OPERATOR KS

	START CF	STOP CF	VOL	TIME	LEAK RATE
DRY	722.690	722.977	0.287	10.000	0.015
WET	0.000	0.434	0.434		

PYROMETER CALIBRATION

DATE 04-28-88

OPERATOR AGL

mV input	temp °F	temp rdg °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

PYROMETER CHECK

DATE 8-6-90

OPERATOR TM

mV input	temp °F	temp rdg
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	300.0
8.31	400	400.0
10.57	500	500.0

Name: KEYSTONE ENV. RES. Phone: 825-976

Date 9/21/90 Train ID BOX 1 DGM Cal. Factor, Y 1.0519 Orifice No. BAC-3

Type of Meter Box NAPP 100 Type of Pump DIAPHR+M

			Run Number		
		Example	1	2	3
DGM					
Final reading	ft^3	966.461	338.857	345.980	353.06
Initial reading	ft^3	946.602	331.900	339.000	346.10
Difference, V_m	ft^3	9.859	6.957	6.980	6.966
Percent Accuracy, ZA					
Inlet/Outlet temperatures					
Initial	°F.	108/88	77/74	78/76	77/75
After 5 minutes		110/88	77/74	78/75	78/7
After 10 minutes		111/88	77/74	78/75	78/75
Final		112/89	76/74	77/75	77/75
Avg. temperature, t_d	°F/°R	99.3/559.3	75.4 535.4	76.8 536.5	76.3 536
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	28.981	28.98	28.98
Ambient temperature, t_i	°F/°C	74/23.3	82/27.8	82/27.8	82/27
Pump vacuum	in. Hg	18.8	19.5	19.5	19.5
$V_{m(std)}$'	ft^3	9.2815			
DGM cal. factor, Y_c		1.0593			
*Vm(std)(M)	m^3	0.2629			

*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.

Box 1 8-21-90

VOLUMETRIC FLOW DEVICE CALCULATION SHEET

Eq. 8-1 $Vm(std) = VmY \left(\frac{Tstd}{Tm}\right) \left(\frac{Pbar + \frac{Delta\ H}{13.6}}{Pstd}\right)$

Run #1 $Vm(std)' = Vm \times Y \times \frac{528}{Tm} \times \left(\frac{Pbar + \frac{Delta\ H}{13.6}}{29.92}\right)$

$Vm(std)' = \frac{(6.957)(1.011)(0.9862)(0.9704)}{1.0519}$

$Vm(std)' = \frac{6.731}{7.002}$ ft³ (round to 3 decimals)

Run #2 $Vm(std)' = \frac{(6.980)(1.011)(0.9842)(0.9704)}{1.0519}$

$Vm(std)' = \frac{6.740}{7.011}$ ft³

Run #3 $Vm(std)' = \frac{(6.966)(1.011)(0.9845)(0.9704)}{1.0519}$

$Vm(std)' = \frac{6.728}{6.999}$ ft³

$Vstd(M) = \frac{Vm(std)' \text{ Run \#1} + Vm(std)' \text{ Run \#2} + Vm(std)' \text{ Run \#3}}{3}$

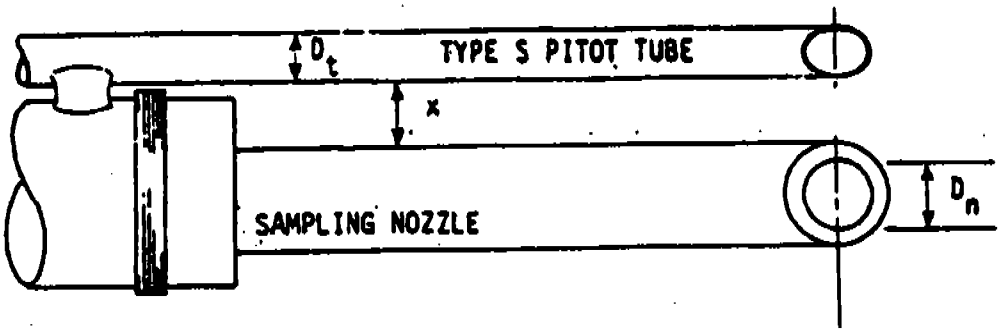
$Vstd(M) = \frac{6.733}{7.004}$ ft³

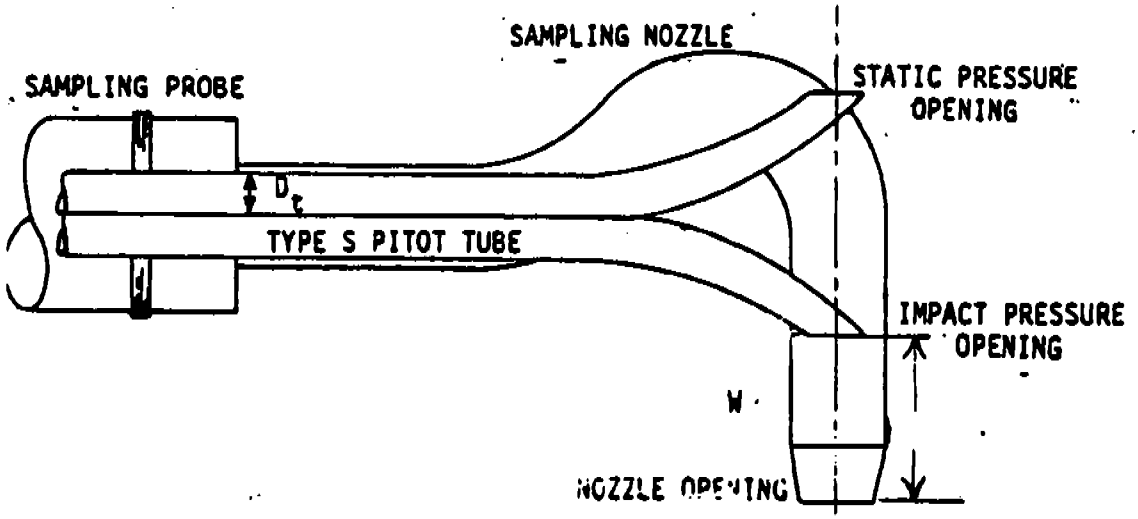
(To Be Completed By Auditor)

$\%\ A = \frac{Vstd(M) - Vstd(A)}{Vstd(A)} \times 100 \leq \pm\ 3\%$

$\%\ A = \_\_\_\_\_ \times 100$

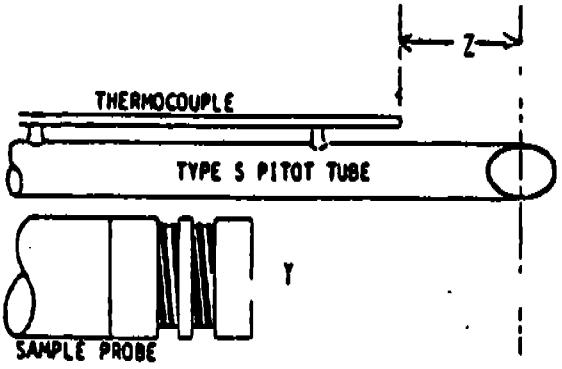
$\%\ A = \_\_\_\_\_ \%$





D_n = Nozzle diameter

D_t = 3/16 to 3/8"



$W \geq 0$

$X \geq 3/4"$ for 1/2" Nozzl

$Y \geq 3"$

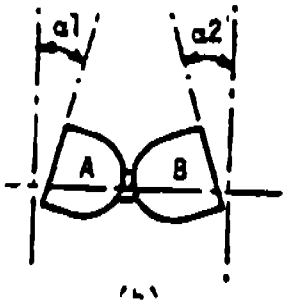
$Z \geq 2"$

Probe No. 7-1

Date 8-20-96

Initials JM

GEOMETRIC PITOT CALIBRATION



α1, α2 <10°

α1 = 4° (Feedback)

α2 = 1°

β1 = 3°

β2 = 0°

A = 1.055

μ = .036

V = .036

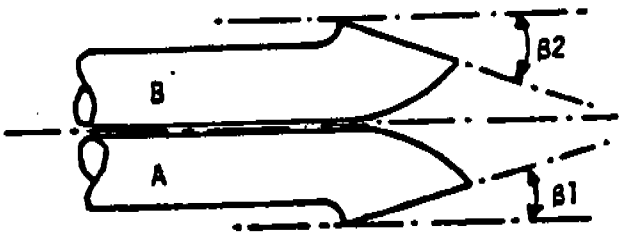
W = ≥0

X = .528

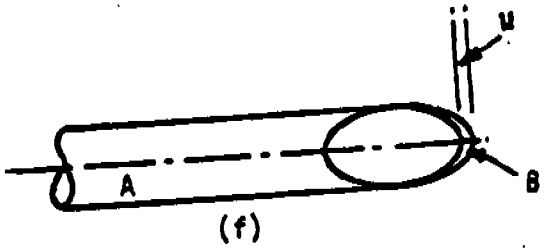
Y = ≥3

Z = ≥2

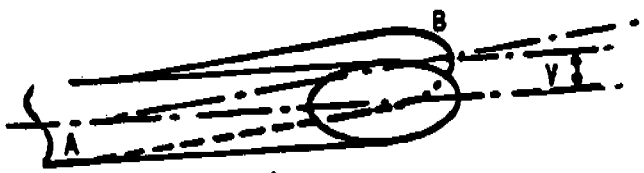
D_t = 38

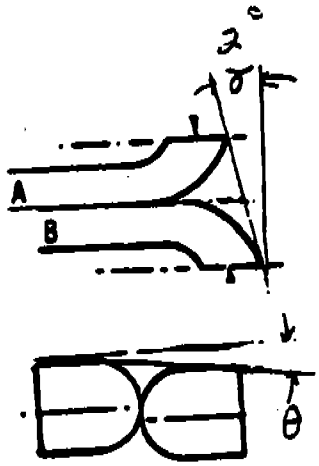


β1, β2 <5



(f)

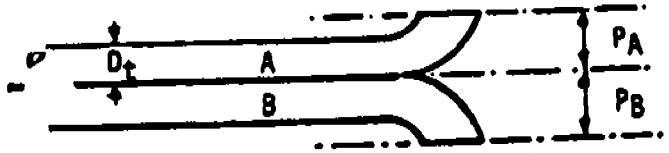




2° μ = A SIN γ

2° V = A SIN θ

A-SIDE PLANE



B-SIDE PLANE

405 .529

1.05 D_t <P <1.50 D_t

$P_A = P_B$

2.10 D_t <A <3.00 D_t

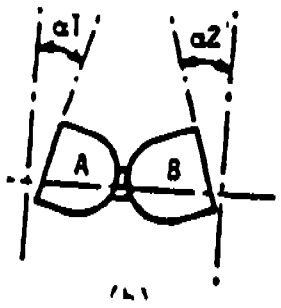
.811 1.14

GEOMETRIC PITOT CALIBRATION

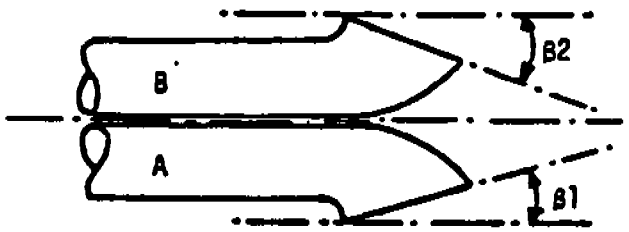
Probe No. 2-3
Date 8-20-90
Initials JM

pre-check

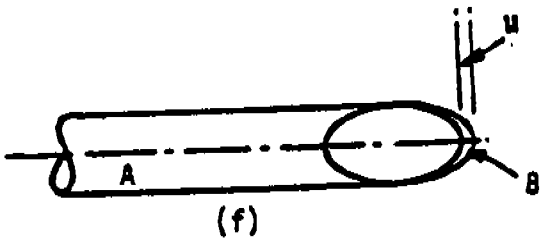
α1 = 2°
α2 = 2°
β1 = 1°
β2 = 0°
A = .961
μ = .016
V = .067
W = 20
X = .945
Y = ≥3"
Z = ≥2"
D_t = .327



α1, α2 <10°



β1, β2 <5



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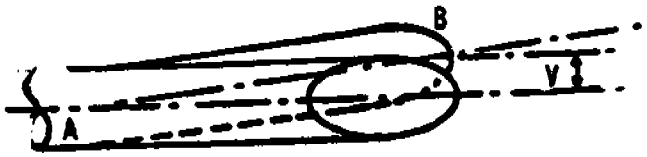
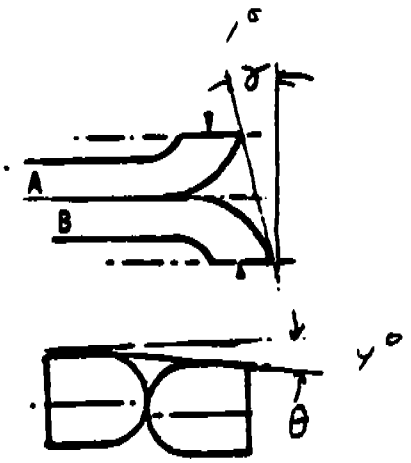
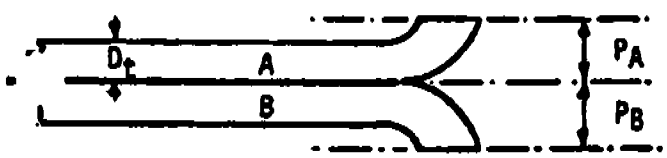




μ = A SIN γ
V = A SIN θ

A-SIDE PLANE



B-SIDE PLANE

.305 .365

1.05 D_t <P <1.50 D_t

P_A = P_B

2.10 D_t <A <3.00 D_t

.771 1.13

USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION OF THE
#7 BATTERY COMBUSTION STACK

APPENDIX C

FIELD DATA SHEETS
FOR PARTICULATE MATTER EMISSIONS

KEYSTONE
ENVIRONMENTAL RESOURCES, INC

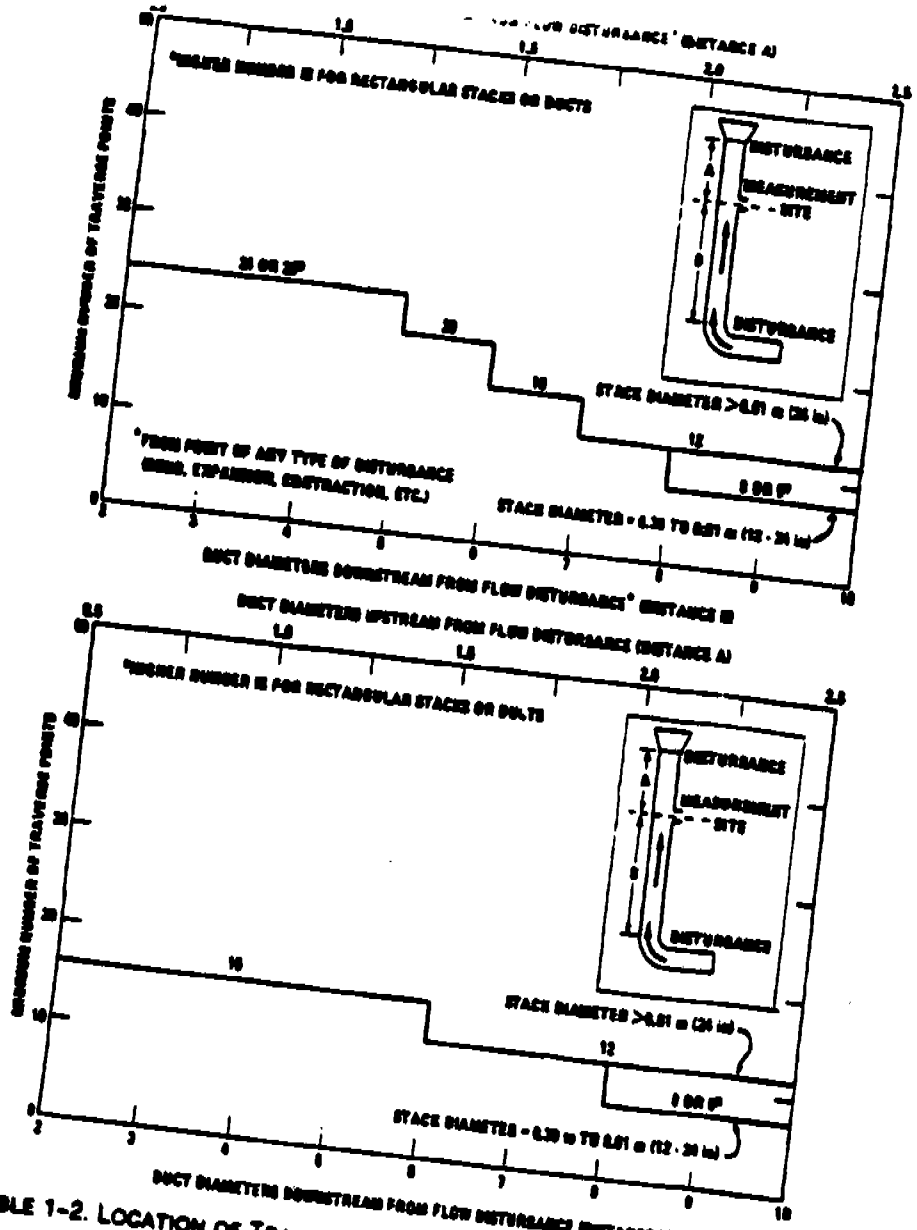


TABLE 1-2. LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	8.8	8.5	7.5	6.7	6.0	5.5
4		85.3	70.4	32.3	22.6	17.7	14.6	12.5	10.8	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.8	28.3	23.6	20.4	18.0	16.1
8				96.8	86.4	75.0	63.4	37.5	29.8	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.8	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	86.4	78.0	70.4	61.2	36.3	32.3
12						97.9	90.1	83.1	78.4	69.4	60.7	38.8
13							94.3	87.5	81.2	75.0	68.6	60.2
14							98.2	91.8	88.4	79.6	78.8	67.7
15								96.1	88.1	83.6	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.8
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.9
20										96.7	94.0	89.8
21											96.5	92.6
22											98.9	95.1
23												97.4
24												98.9

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

Number of traverse points	Matrix layout
9	3 x 3
12	4 x 3
16	4 x 4
20	5 x 4
25	5 x 5
30	6 x 5
36	6 x 6
42	7 x 6
49	7 x 7

YSTONE
ENTAL RESOURCES, INC.

STACK SAMPLING DATA SHEET

IT USX Clairton — DATE: 8/22/90 — ΔH@: 1.573 (6-12-90) — HOT BOX NO.: 1

TION: #7 Battery Combustion — TEST NO.: CLR 7CS-1 — METER CORRECTION: 1.0519 — COLD BOX NO.: 1

ITY NO.: 0 Stack — NOZZLE: #1 0.422 — PITOT CORRECTION: 0.84 — PROBE NO.: 7-1

ROL BOX OPERTOR: _____ — STATIC PRESSURE Ps: -1.0 — CONTROL BOX NO.: 1 — FILTER NO.: 438

E HANDLER: _____ — PORT DIRECTION: A, B — NOMOGRAPH SET POINT: _____ — STACK DIA.: 114"

N UP: _____ — BAROMETRIC PRESSURE: 29.31 — LENGTHS OF UMBILICAL _____ x 25' _____ x 50'

	Time	Meter Reading (dry) CF	Velocity HD in. H_2O	Orifice ΔH in. H_2O Req.	Orifice ΔH in. H_2O Act.	Meter Temp °F In	Meter Temp °F Out	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
2	0840	353.125	0.060	0.77	0.77	66	64	4.0	489	260	<68°F Ice down	250	5 min/pt
			0.065	0.83	0.83	73	66	4.5	497				
			0.055	0.71	0.71	76	68	4.0	503				
			0.055	0.71	0.71	78	70	4.0	507				
			0.030	0.38	0.38	79	72	3.0	453				
	0910	366.876	0.035	0.45	0.45	80	73	3.0	422				
	0926	366.976	0.065	0.83	0.83	80	77	4.0	505				
			0.065	0.82	0.82	83	77	4.0	535				
			0.065	0.82	0.82	85	77	4.0	539				
			0.040	0.50	0.50	84	78	3.0	488				
			0.025	0.32	0.32	84	78	2.0	462				
	0956	379.517	0.010	0.13	0.13	83	78	1.0	438	[redacted]	66°F		

AK CHECK

in. Hg.	Rate
5.0	<0.02 cfm
6.0	<0.02

ORSAT

	1	2
CO_2	3.5	
O_2	13.5	
CO	0.0	
N	83	

PITOT LEAK CHECK

POS.	NEG.

Impinger No.	Final	Initial	Difference	
1	665.9	522.8	143.1	100 ml H_2O
2	584.0	564.3	19.7	recovered H_2O
3	436.1	434.8	1.3	empty
4	650.5	640.2	10.3	Silica gel

7

YSTONE
MENTAL RESOURCES, INC.

STACK SAMPLING DATA SHEET

NT USX Clairton — DATE: 8/22/90 — ΔH@: 1.573 — HOT BOX NO.: 6

ATION: #7 Battery Combustion — TEST NO.: CLR-705-3 — METER CORRECTION: 1.0579 — COLD BOX NO.: 6

IVITY NO.: Stack — NOZZLE: # 50 0.431 — PITOT CORRECTION: 0.84 — PROBE NO.: 7 1

TROL BOX OPERTOR: — STATIC PRESSURE Ps: -1.0 — CONTROL BOX NO.: 1 — FILTER NO.: 423

BE HANDLER: — PORT DIRECTION: C,D — NOMOGRAPH SET POINT: — STACK DIA.: 114"

AN UP: — BAROMETRIC PRESSURE: 29.31 — LENGTHS OF UMBILICAL ____ x 25' ____ x 50'

	Time	Meter Reading (dry) CF	Velocity HD in. H_2O	Orifice ΔH in. H_2O Req.	Orifice ΔH in. H_2O Act.	Meter Temp °F In	Meter Temp °F Out	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
6	1540	497.867	0.065	0.94	094	91	87	7.0	463	260	<60°F Ambient	250	Some ppt
5			0.055	0.80	0.80	94	87	6.5	486				
2			0.060	0.87	0.87	94	87	6.5	490				
5			0.035	0.51	0.51	93	87	5.0	472				
			0.035	0.51	0.51	94	88	5.0	489				
1	1610	512.305	0.035	0.51	0.51	93	88	5.0	488				
6	1613	512.305	0.070	1.01	1.01	92	88	7.5	477		43F		
5			0.070	1.01	1.01	95	88	7.5	507				
2			0.070	1.01	1.01	95	88	7.5	514				
5			0.065	0.94	0.94	95	88	7.2	518				
			0.040	0.58	0.58	94	88	5.5	481				
	1643	527.391	0.010	0.14	0.14	93	88	3.0	458				

EAK CHECK

in. Hg.	Rate

ORSAT

	1	2
CO_2		
O_2		
CO		
N		

PITOT LEAK CHECK

POS.	NEG.

Impinger No.	Final	Initial	Difference
1			
2			
3			
4			

7

YSTONE
MENTAL RESOURCES, INC.

STACK SAMPLING DATA SHEET

NT USX Clairton
ATION: #7 Battery Coalstream
IVITY NO.: Stack
TROL BOX OPERTOR:
BE HANDLER:
AN UP:

DATE: 6/22/90
TEST NO.: Cur-705 1
NOZZLE: #1 0.422
STATIC PRESSURE Ps: -1.0
PORT DIRECTION: C.D
BAROMETRIC PRESSURE: 29.31

ΔH@: [redacted] 1.573
METER CORRECTION: 1.0514
PITOT CORRECTION: 0.84
CONTROL BOX NO.: 1

HOT BOX NO.: 1
COLD BOX NO.: 1
PROBE NO.: 7-1
FILTER NO.: 438
NOMOGRAPH SET POINT:
STACK DIA.: 114"
LENGTHS OF UMBILICAL ____ x 25' ____ x 50'

	Time	Meter Reading (dry) CF	Velocity HD in. H_2O	Orifice ΔH in. H_2O Req.	Act.	Meter Temp °F In	Out	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
6	1007	379.517	0.080	1.06	1.06	83	81	5.0	481	260	<60°F Ice/Dry?	250	5 min/pt
5			0.095	1.25	1.25	87	81	6.0	523				
4			0.095	1.25	1.25	89	80	6.0	511				
3			0.075	0.99	0.99	88	80	5.0	516		58°F		
2			0.065	0.86	0.86	87	80	4.0	482				
1	1037	396.201	0.045	0.59	0.59	87	80	3.5	499				
2	1041	396.201	0.090	1.19	1.19	85	82	6.0	481				
3			0.090	1.19	1.19	89	82	6.0	496				
4			0.090	1.19	1.19	90	81	6.0	502				
5			0.080	1.06	1.06	90	81	6.0	507				
6			0.045	0.59	0.59	88	81	4.0	469				
	1111	412.259	0.010	0.13	0.13	87	82	2.0	441				

AK CHECK

in. Hg.	Rate

ORSAT

	1	2
CO_2	~~17.5~~	
O_2	~~3.0~~	
CO	~~0.0~~	
N	~~81.5~~	

PITOT LEAK CHECK

POS.	NEG.

Impinger No.	Final	Initial	Difference
1			
2			
3			
4			

'STONE
NTAL RESOURCES, INC.

STACK SAMPLING DATA SHEET

r USX Clairton — DATE: 8/22/90 — ΔH@: 1.573 — HOT BOX NO.: 7
TION: #7 Battery Combustion — TEST NO.: CLR-705-2 — METER CORRECTION: 1.0514 — COLD BOX NO.: 4
'ITY NO.: 1 Stack — NOZZLE: #56 0.429 — PITOT CORRECTION: 0.84 — PROBE NO.: 7 3
ROL BOX OPERTOR: — STATIC PRESSURE Ps: -1.0 — CONTROL BOX NO.: 1 — FILTER NO.: 424
E HANDLER: — PORT DIRECTION: A, B — NOMOGRAPH SET POINT: — STACK DIA.: 114"
N UP: — BAROMETRIC PRESSURE: 29.31 — LENGTHS OF UMBILICAL ____ x 25' ____ x 50'

	Time	Meter Reading (dry) CF	Velocity HD in. H_2O	Orifice ΔH in. H_2O Req.	Orifice ΔH in. H_2O Act.	Meter Temp °F In	Meter Temp °F Out	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
	1147	412.700	0.070	0.98	0.98	80	80	5.0	498	260	46°F Ice Bath	250	Simultaneous
			0.060	0.84	0.84	86	80	4.5	508				
			0.065	0.91	0.91	87	80	4.5	512				
			[illegible]	0.70	0.70	87	80	4.0	513				
			[illegible]	0.21	0.21	85	80	1.5	471				
	1217	426.482	0.010	0.14	0.14	85	80	1.5	468				
	1222	426.482	0.070	0.98	0.98	85	82	5.0	514				
			0.070	0.98	0.98	89	81	5.0	529				
			0.075	1.05	1.05	87	81	5.5	536				
			0.045	0.63	0.63	81	82	4.0	487				
			0.020	0.28	0.28	87	82	2.0	479				
	1252	440.342	0.010	0.14	0.14	87	82	2.0	460				

EAK CHECK

in. Hg.	Rate
5.0	[illegible] cfm
[illegible]	0.015

ORSAT

	1	2
CO_2	3.0	3.5
O_2	13.5	13.5
CO	0.0	0.0
N	[illegible]	[illegible]

PITOT LEAK CHECK

POS.	NEG.

Impinger No.	Final	Initial	Difference	
1	711.9[redacted]	567.2	144.7	[illegible]
2	554.0	533.1	20.9	[illegible]
3	449.8	447.4	2.4	empty
4	646.9	636.0	10.9	[illegible]

'STONE
NTAL RESOURCES, INC.

STACK SAMPLING DATA SHEET

r USX Clairton — DATE: 8/22/90 — ΔH@: 1.573 — HOT BOX NO.: 4
TION: #7 Battery Combustion — TEST NO.: CLR 7C5-2 — METER CORRECTION: 1.0319 — COLD BOX NO.: 4
ITY NO.: 1 Stack — NOZZLE: #56 0.429 — PITOT CORRECTION: 0.84 — PROBE NO.: 7-3
ROL BOX OPERTOR: _____ — STATIC PRESSURE Ps: -1.0 — CONTROL BOX NO.: 1 — FILTER NO.: 424
E HANDLER: _____ — PORT DIRECTION: C.D — NOMOGRAPH SET POINT: _____ — STACK DIA.: 114"
N UP: _____ — BAROMETRIC PRESSURE: 29.31 — LENGTHS OF UMBILICAL _____ x 25' _____ x 50'

	Time	Meter Reading (dry) CF	Velocity HD in. H_2O	Orifice ΔH in. H_2O Req.	Act.	Meter Temp °F In	Out	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
o	1258	440.342	0.090	1.26	1.26	87	84	6.5	520	260	<60°F Ice/hour	250	5 min./pt
5			0.100	1.41	1.41	92	84	7.0	517				
2			0.095	1.34	1.34	92	83	7.0	490				
5			0.080	1.13	1.13	92	83	6.0	503				
			0.060	0.85	0.85	91	83	5.0	501				
	1328	457.941	0.020	0.28	0.28	89	83	2.0	444				
o	1331	457.949	0.070	0.99	0.99	89	85	5.0	503		55°F		
5			0.090	1.27	1.27	92	85	6.5	486				
2			0.090	1.27	1.27	93	84	6.5	488				
5			0.080	1.13	1.13	93	84	6.0	495				
			0.025	0.35	0.35	91	84	3.0	465				
	1401	473.648	0.010	0.14	0.14	89	85	2.0	443				

EAK CHECK

in. Hg.	Rate

ORSAT

	1	2
CO_2		
O_2		
CO		
N		

PITOT LEAK CHECK

POS.	NEG.

Impinger No.	Final	Initial	Difference
1			
2			
3			
4			

'STONE
NTAL RESOURCES, INC.

STACK SAMPLING DATA SHEET

USX Clairton — DATE: 8/22/90 — ΔH@: 1.573 — HOT BOX NO.: 6
TION: #7 Battery Combustion — TEST NO.: CLE-705-3 — METER CORRECTION: 1.0519 — COLD BOX NO.: 6
ITY NO.: 1 Stack — NOZZLE: #50 0.431 — PITOT CORRECTION: 0.84 — PROBE NO.: 7 1
OL BOX OPERTOR: — STATIC PRESSURE Ps: -10 — CONTROL BOX NO.: 1 — FILTER NO.: 123
HANDLER: — PORT DIRECTION: A B — NOMOGRAPH SET POINT: — STACK DIA.: 114"
UP: — BAROMETRIC PRESSURE: 29.31 — LENGTHS OF UMBILICAL ____ x 25' ____ x 50'

	Time	Meter Reading (dry) CF	Velocity HD in. H_2O	Orifice ΔH in. H_2O Req.	Act.	Meter Temp °F In	Out	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
	1435	473.845	0.055	0.79	0.79	86	85	6.0	524	260	<66°F Ice Down	252	S. mica/pt
			0.055	0.79	0.79	91	85	6.0	481				
			0.050	0.72	0.72	92	85	6.0	487				
			0.040	0.57	0.57	91	85	5.0	490				
			0.030	0.43	0.43	91	85	4.5	483				
	1505	486.862	0.010	0.14	0.14	90	86	2.5	471				
	1507	486.862	0.045	0.65	0.65	90	86	5.5	470				
			0.040	0.58	0.58	93	86	5.0	492				
			0.030	0.43	0.43	92	87	4.0	499				
			0.030	0.43	0.43	92	87	4.0	520		49°F		
			0.020	0.29	0.29	92	87	3.5	481				
	1537	497.867	0.010	0.14	0.14	91	87	2.5	460				

AK CHECK

in. Hg.	Rate
5.0	<0.02 cfm
7.5	0.014 cfm

ORSAT

	1	2
CO_2	3.0	5.0
O_2	13.0	12.0
CO	0.0	0.0
N	84.0	83.0

PITOT LEAK CHECK

POS.	NEG.

Impinger No.	Final	Initial	Difference	
1	626.1	504.2	121.9	100 ml H2O
2	578.7	559.8	18.9	100 ml H2O
3	453.8	451.8	2.0	empty
4	667.2	658.1	9.1	Si Gel

USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION OF THE
#7 BATTERY COMBUSTION STACK

APPENDIX D

PARTICULATE MATTER
EMISSIONS CALCULATIONS

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION OF THE
#7 BATTERY COMBUSTION STACK

APPENDIX E

FIELD DATA SHEETS
FOR VISIBLE EMISSIONS

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

(1)

VISIBLE EMISSIONS OBSERVATIONS FORM

#7 - Test

OBSERVER: K. Kuhns

DATE: 8/22/90

FACILITY: USX-Clairton

OBSERVATION: START TIME: 8 40 A

END TIME: 9 40 A

OBSERVATION POINT:

Maple Ave Plant Lot

SOURCE: #7-Stack

DISTANCE: 900'

DIRECTION FROM: S/W

HEIGHT: 200'

WIND:

SPEED: 10 MPH

DIRECTION: N/E

TEMPERATURE: 66

SKY CONDITION: Overcast

BACKGROUND: SKY

READING CONDITIONS: Fair

COLOR OF EMISSION: 0

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: Shelton

COMMENTS:

	0	0	0	0	
	1	0	0	0	0
	2	0	0	0	0
	3	0	0	0	0
	4	0	0	0	0
45	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
50	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
55	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
9 00 A	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
5	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
10	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
15	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
20	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
25	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
30	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
35	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

(2)

VISIBLE EMISSIONS OBSERVATIONS FORM

#7-STACK-TEST

OBSERVER: K. KUIROS

DATE: 8/22/90

FACILITY: USX-CLAIRTON

OBSERVATION: START TIME: 9 40 A

END TIME: 10 40 A

OBSERVATION POINT: Maple Ave Park Lot

SOURCE: #7-STACK

DISTANCE: 900'

DIRECTION FROM: S/W

HEIGHT: 200'

WIND:

SPEED: 9 MPH

DIRECTION: E

TEMPERATURE: 67

SKY CONDITION: OVERCAST HAZE

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: 0

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: SHELTON

COMMENTS:

9 40 A	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
45	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
50	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
55	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
10 M	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
5	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

10	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
15	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
20	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
25	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
30	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
35	55	0	0	0	0
	56	0	0	0	0
	57	0	0	0	0
	58	0	0	0	0
	59	0	0	0	0

(3)

VISIBLE EMISSIONS OBSERVATIONS FORM

#7 - Test

OBSERVER: K. KUIROS

DATE: 8/22/90

FACILITY: USX-CLAIRTON

OBSERVATION: START TIME: 10 40 A

END TIME: 11 40 A

OBSERVATION POINT: Maple Ave Park Lot

SOURCE: #2 Stack

DISTANCE: 900'

DIRECTION FROM: SW

HEIGHT: 200'

WIND:

SPEED: 10 MPH

DIRECTION: E

TEMPERATURE: 68

SKY CONDITION: Overcast/Rain

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: 0

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: Shelton

COMMENTS:

10 40 A	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
45	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
50	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
55	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
11 00 A	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
5	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

10	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
15	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
20	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
25	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
30	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
35	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

END 1st Test

(4)

VISIBLE EMISSIONS OBSERVATIONS FORM

#7-Test

OBSERVER: K. Kuikos

DATE: 8/22/90

FACILITY: USX-Clairton

OBSERVATION: START TIME: 11 AM

END TIME: 12 PM

OBSERVATION POINT: Middle Ave Parking Lot

SOURCE: #7-STACK

DISTANCE: 900'

DIRECTION FROM: S/W

HEIGHT: 200'

WIND:

SPEED: 10 MPH

DIRECTION: E

TEMPERATURE: 68

SKY CONDITION: Overcast/Rain

BACKGROUND: Sky

READING CONDITIONS: Fair

COLOR OF EMISSION: 0

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: Shelton

COMMENTS:

11:00	0	0	0	0	0	10	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
45	5	0	0	0	0	15	35	0	0	0	0
	6	0	0	0	0		36	0	0	0	0
Start 2nd Test	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
50	10	0	0	0	0	20	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
55	15	0	0	0	0	25	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
12:00	20	0	0	0	0	30	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
5	25	0	0	0	0	35	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

(5)

VISIBLE EMISSIONS OBSERVATIONS FORM

#7-TEST

OBSERVER: K. KUROS

DATE: 8/22/90

FACILITY: USX-CLAIRTON

OBSERVATION: START TIME: 12 40 P

END TIME: 1 40 P

OBSERVATION POINT:
Maple Ave Park Lot

SOURCE: #7-STACK

DISTANCE: 900'

DIRECTION FROM: S/W

HEIGHT: 200'

WIND:

SPEED: 12 MPH

DIRECTION: E

TEMPERATURE: 68

SKY CONDITION: OVERCAST

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: 0

TOTAL No. OF READINGS: 240

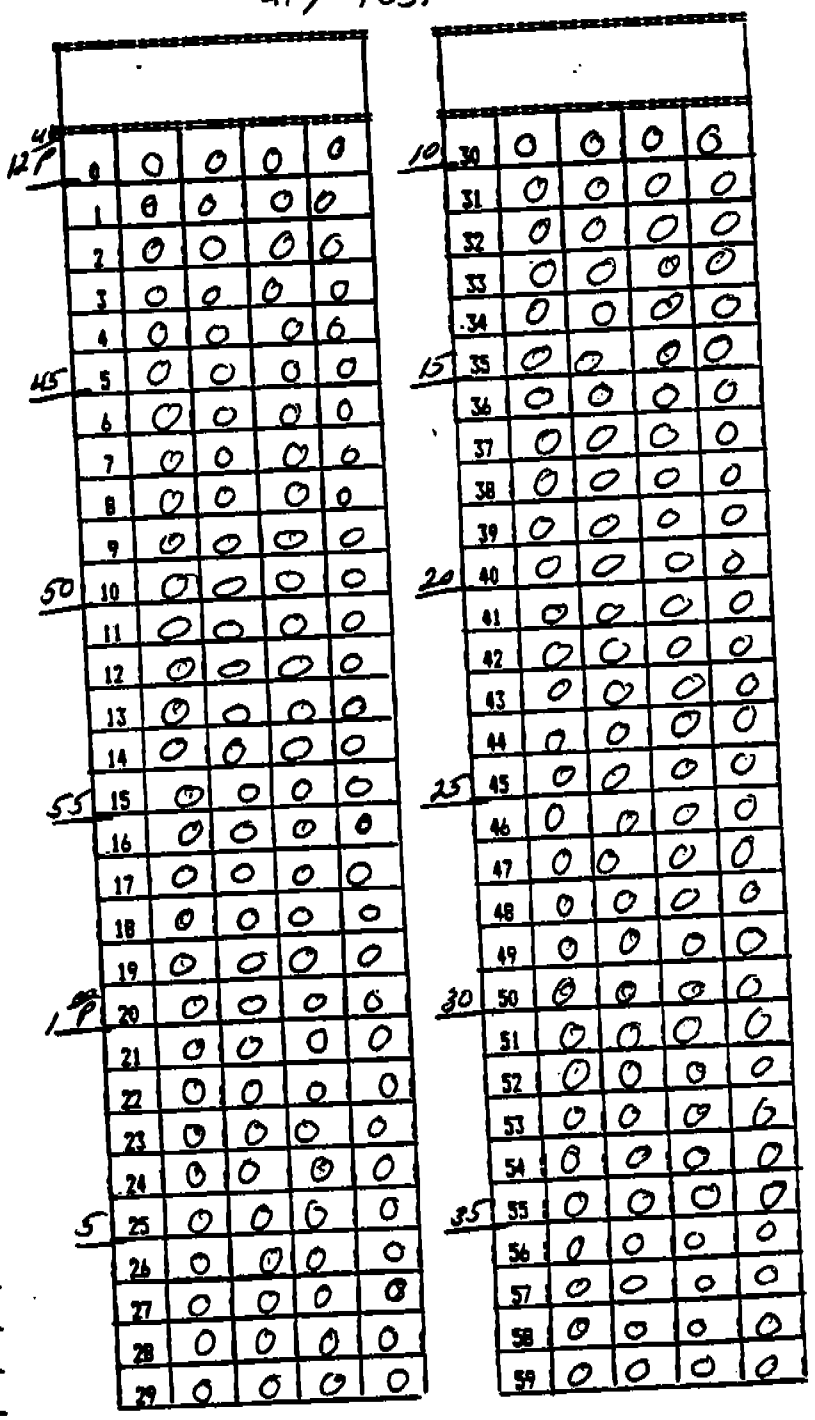
No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: SHELTON

COMMENTS:



VISIBLE EMISSIONS OBSERVATIONS FORM

(6)

#7-Test

OBSERVER: K. Kuiros

DATE: 8/22/90

FACILITY: USX-Clairton

OBSERVATION: START TIME: 1140 P

END TIME: 2 30 P

OBSERVATION POINT: Maple Ave Ball Lot

SOURCE: #7-STACK

DISTANCE: 900'

DIRECTION FROM: S/W

HEIGHT: 200'

WIND:

SPEED: 12 MPH

DIRECTION: E

TEMPERATURE: 67

SKY CONDITION: OVERCAST

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: 0

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: SHELTON

COMMENTS:

1140 P	0	0	0	0	0	10	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
45	5	0	0	0	0	15	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
50	10	0	0	0	0	20	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
55	15	0	0	0	0	25	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
2 00 P	20	0	0	0	0	30	50	0	0	0	0
END 2nd Test	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
5	25	0	0	0	0	35	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

START 3rd Test

(7)

VISIBLE EMISSIONS OBSERVATIONS FORM

#7-TEST

OBSERVER: K. KUIROS

DATE: 8/22/90

FACILITY: USX-CLAIRTON

OBSERVATION: START TIME: 2 40 P

END TIME: 3 40

OBSERVATION POINT: Route Ave - Park Lot

SOURCE: #7-STACK

DISTANCE: 900'

DIRECTION FROM: S/W

HEIGHT: 300'

WIND:

SPEED: 12 MPH

DIRECTION: E

TEMPERATURE: 67

SKY CONDITION: OVERCAST

BACKGROUND: SKY

READING CONDITIONS: FAIR

COLOR OF EMISSION: N/A

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: SHELTON

COMMENTS:

2 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
45	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
50	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
55	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
3 00 P	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
5	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

10	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
15	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
20	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
25	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
30	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
35	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

(8)

VISIBLE EMISSIONS OBSERVATIONS FORM

OBSERVER: Mc Kay

DATE: 22 August 1990

FACILITY: USX Clairton

OBSERVATION: START TIME: 3:40 PM

END TIME: 4:40 PM

OBSERVATION POINT: Maple Ave Parking Lot #7

SOURCE: Battery Draft Stack

DISTANCE: 0-900'

DIRECTION FROM: S W of

HEIGHT: 0-246

WIND:

SPEED: 10-mPH

DIRECTION: → NE

TEMPERATURE: 68°

SKY CONDITION: Overcast

BACKGROUND: Sky

READING CONDITIONS: Fair

COLOR OF EMISSION: N/A

TOTAL No. OF READINGS: 240

No. READINGS >= 20% 0

No. READINGS >= 60% 0

GREATEST OPACITY: 0

CREW: C FOREMAN: Shelton

COMMENTS:

7 - Test

	0	0	0	0	:10	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
:45	5	0	0	0	0	:45	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
:50	10	0	0	0	0	:20	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
:55	15	0	0	0	0	:25	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
:00	20	0	0	0	0	:30	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
:05	25	0	0	0	0	:35	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

(9)

VISIBLE EMISSIONS OBSERVATIONS FORM

OBSERVER: Mc Kay

DATE: 22 August 1990

FACILITY: 215 E Clinton

OBSERVATION: START TIME: 4:40 end
END TIME: 4:43

OBSERVATION POINT:
Maple Ave Parking Lot
#7

SOURCE: Battery Shaft Stack

DISTANCE: a 900'

DIRECTION FROM: SW of

HEIGHT: a 200'

WIND:

SPEED: 10-mph

DIRECTION: → N.E.

TEMPERATURE: 68°

SKY CONDITION: sun Coat

BACKGROUND: Sky

READING CONDITIONS: Fair

COLOR OF EMISSION: N/A

TOTAL No. OF READINGS: 16

No. READINGS >= 20%: 0

No. READINGS >= 60%: 0

GREATEST OPACITY: 0

CREW: D FOREMAN: Karpel

COMMENTS:

#7 Test

0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4				
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: Clairton Steel

Date: 5/27/96

ty No. 601050-07

PARTICULATE REPORTING FORM

Test lumber	Component	Molecular Weight	Cyclone Weight	Particulate Filter Weight (g)	Insol. Part. in Front Half	Insol. Part. in Back Half	Soluble Part. in Back Half	Soluble Part. in Front Half (g)
?-7CS-1	Particulate			0.0365				0.0162
-7CS-2	Particulate			0.0513				0.0252
-7CS-3	Particulate			0.0221				0.0118

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA
BATTERY COMBUSTION STACK NO.7

DATE: 8-22-90
CHARGE #: ...150-601050
TEST #: CLR-7CS-1

1. EMISSION RESULTS

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01359	4.35704

2. STACK CONDITIONS

FLOW (ACFM)	78233.
(SCFM)	42551.
MOISTURE CONTENT (%)	12.10
STACK TEMPERATURE (F)	488.6

3. SAMPLING CONDITIONS

SAMPLE TIME (MIN.)	120.0
SCFD GAS SAMPLED	59.714
PERCENT ISOKINETIC	97.09

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA
CLR-7CS-1

BATTERY COMBUSTION
8-22-90

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	CORRECTED VELOCITY FT/SEC
40.6A	840.0	353.125	.060	.77	.77	66.	64.	4.0	489.	19.0
28.5			.065	.83	.83	73.	66.	4.5	497.	19.8
20.2			.055	.71	.71	76.	68.	4.0	503.	18.3
13.5			.055	.71	.71	78.	70.	4.0	507.	18.3
7.6			.030	.38	.38	79.	72.	3.0	453.	13.2
2.4A	910.0	366.876	.035	.45	.45	80.	73.	3.0	422.	14.0
40.6B	926.0	366.876	.065	.83	.83	80.	77.	4.0	505.	19.9
28.5			.065	.82	.82	83.	77.	4.0	535.	20.2
20.2			.065	.82	.82	85.	77.	4.0	539.	20.3
13.5			.040	.50	.50	84.	78.	3.0	488.	15.5
7.6			.025	.32	.32	84.	78.	2.0	462.	12.1
2.4B	956.0	379.517	.010	.13	.13	83.	78.	1.0	438.	7.5
40.6C	1007.0	379.517	.080	1.06	1.06	83.	81.	5.0	481.	21.8
28.5			.095	1.25	1.25	87.	81.	6.0	503.	24.0
20.2			.095	1.25	1.25	89.	80.	6.0	511.	24.1
13.5			.075	.99	.99	88.	80.	5.0	516.	21.5
7.6			.065	.86	.86	87.	80.	4.0	482.	19.7
2.4C	1037.0	396.201	.045	.59	.59	87.	80.	3.5	499.	16.5
40.6D	1041.0	396.201	.090	1.19	1.19	85.	82.	6.0	481.	23.1
28.5			.090	1.19	1.19	89.	82.	6.0	496.	23.3
20.2			.090	1.19	1.19	90.	81.	6.0	502.	23.4
13.5			.080	1.06	1.06	90.	81.	4.0	507.	22.1
7.6			.045	.59	.59	88.	81.	4.0	469.	16.3
2.4D	1111.0	412.259	.010	.13	.13	87.	82.	2.0	441.	7.5

O R S A T

CO2	3.5
O2	13.5
CO	.0
N	83.0

IMPINGER NO.	1	143.1
	2	19.7
	3	1.3
	4	.0
ABSORBED H2O		10.3

CONTROL BOX CALIBRATIONS

	FACTOR	DATE
ORIFICE	1.573	6-12-90
METER	1.0519	6-12-90
PITOT	0.84	8-20-90

LEAK CHECK

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

CONTROL BOX NO. 1 PROBE NO. 7-1 NOZZLE NO. 1

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA
CLR-7CS-1

BATTERY COMBUSTION
8-22-90

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG.	29.31
B.	AVG. DELTA H (IN H2O)	.78
C.	METER PRESSURE (IN. HG.)	29.37
D.	STATIC PRESSURE (IN. H2O)	-1.00
E.	STATIC PRESSURE (IN. HG.)	-.074
F.	STACK PRESSURE (IN. HG.) (A+E)	29.24
G.	STACK DIAMETER (IN.)	114.00
H.	STACK AREA (SQ. FT.)	70.88
	NOZZLE DIAMETER	.4220
I.	NOZZLE AREA (SQ. FT.)	.000971
J.	AVG. STACK TEMP (DEG. R.)	948.6
K.	AVG. METER TEMP (DEG. R.)	540.2
L.	CONDENSATE VOL. (ML)	164.1
M.	ABSORBED H2O (ML)	10.3
N.	TOTAL H2O (ML)	174.4
O.	METERED GAS (CF)	59.134
P.	GAS METER CORRECTION	1.0519
Q.	CORRECTED METERED GAS (CF)	62.203
R.	H2O GAS VOLUME (CF) (0.00267N(K/C)	8.566
S.	TOTAL SAMPLED VOLUME (CF) (Q+R)	70.769
T.	PERCENT H2O (100R/S)	12.10
	THEORETICAL MAXIMUM	100.00
	PERCENT WATER USED	12.10
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K))	59.714

V. MOLECULAR WEIGHT OF STACK GAS

COMPONENT	ORSAT-DRY VOL.PCT./100		MOISTURE CORRECTION (1-T/100)		MOLECULAR WEIGHT		WEIGHT PER MOLE
CO2	.035	X	.8790	X	44.0	=	1.35
CO	.000	X	.8790	X	28.0	=	.00
O2	.135	X	.8790	X	32.0	=	3.80
N2	.830	X	.8790	X	28.2	=	20.57
H2O		X	T/100= .1210	X	18.0	=	2.18
					MOLECULAR WEIGHT OF STACK GAS	=	27.90

W.	PITOT CORRECTION	.840
X.	AVERAGE CORRECTED VELOCITY (FPS)	18.39
	[85.49*W*SQRT((J*DELTA P)/(V*F))]	
Y.	AVG. FLOW RATE (CFM) (X*H*60)	78233.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92)	42551.
	STACK FLOW RATE (DRY)	37401.
AA.	SAMPLE TIME (SEC)	7200.
BB.	PERCENT ISOKINETIC	97.09
	(J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA
CLR-7CS-1

BATTERY COMBUSTION
8-22-90

PARAMETER	CYCLONE WT. (G)	MATL.ON FILTER(G)	INSOL.MATL. IN PROBE(G)	SOL.MATL. IN PROBE(G)
PARTICULATE	.00000	.03650	.00000	.01620

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

PARTICULATE	.05270
ALL MATLS.	.05270

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01359	4.35704

Emission rates are based on EPA Method 5.

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA
BATTERY COMBUSTION STACK NO.7

DATE: 8-22-90
CHARGE #: ...150-601050
TEST #: CLR-7CS-2

1. EMISSION RESULTS

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01933	5.93749

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2. STACK CONDITIONS

FLOW (ACFM)	75390.
(SCFM)	40800.
MOISTURE CONTENT (%)	12.16
STACK TEMPERATURE (F)	493.3

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3. SAMPLING CONDITIONS

SAMPLE TIME (MIN.)	120.0
SCFD GAS SAMPLED	60.955
PERCENT ISOKINETIC	100.08

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA — BATTERY COMBUSTION
CLR-7CS-2 — 8-22-90

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	CORRECTED VELOCITY FFT/SEC
40.6A	1147.0	412.700	.070	.98	.98	80.	80.	5.0	498.	20.6
28.5			.060	.84	.84	86.	80.	4.5	508.	19.2
20.2			.065	.91	.91	87.	80.	4.5	512.	20.0
13.5			.050	.70	.70	87.	80.	4.0	513.	17.5
7.6			.015	.21	.21	85.	80.	1.5	481.	9.4
2.4A	1217.0	426.482	.010	.14	.14	85.	80.	1.5	468.	7.7
40.6B	1222.0	426.482	.070	.99	.99	85.	82.	5.0	504.	20.7
28.5			.070	.99	.99	89.	81.	5.0	529.	20.9
20.2			.075	1.05	1.05	89.	81.	5.5	536.	21.7
13.5			.045	.63	.63	89.	82.	4.0	487.	16.4
7.6			.020	.28	.28	87.	82.	2.0	479.	10.9
2.4B	1252.0	440.342	.010	.14	.14	87.	82.	2.0	460.	7.6
40.6C	1258.0	440.342	.090	1.27	1.27	87.	84.	6.5	500.	23.4
28.5			.100	1.41	1.41	92.	84.	7.0	517.	24.9
20.2			.095	1.34	1.34	92.	83.	7.0	490.	23.9
13.5			.080	1.13	1.13	92.	83.	6.0	503.	22.1
7.6			.060	.85	.85	91.	83.	5.0	501.	19.1
2.4C	1328.0	457.947	.020	.28	.28	89.	83.	3.2	474.	10.9
40.6D	1331.0	457.947	.070	.99	.99	89.	85.	5.0	503.	20.6
28.5			.090	1.27	1.27	92.	85.	6.5	486.	23.2
20.2			.090	1.27	1.27	93.	84.	6.5	488.	23.2
13.5			.080	1.13	1.13	93.	84.	6.0	495.	22.0
7.6			.025	.35	.35	91.	84.	3.0	465.	12.1
2.4D	1401.0	473.648	.010	.14	.14	89.	85.	2.0	443.	7.6

O R S A T	
CO2	3.5
O2	13.5
CO	.0
N	83.0

IMPINGER NO. 1	144.7
2	20.9
3	2.4
4	.0
ABSORBED H2O	10.9

CONTROL BOX CALIBRATIONS

	FACTOR	DATE
ORIFICE	1.573	6-12-90
METER	1.0519	6-12-90
PITOT	0.84	8-20-90

LEAK CHECK

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

CONTROL BOX NO. 1 — PROBE NO. 7-3 — NOZZLE NO. 56

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA
CLR-7CS-2

BATTERY COMBUSTION
8-22-90

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG.	29.31
B.	AVG. DELTA H (IN H2O)	.80
C.	METER PRESSURE (IN. HG.)	29.37
D.	STATIC PRESSURE (IN. H2O)	-1.00
E.	STATIC PRESSURE (IN. HG.)	-.074
F.	STACK PRESSURE (IN. HG.) (A+E)	29.24
G.	STACK DIAMETER (IN.)	114.00
H.	STACK AREA (SQ. FT.)	70.88
	NOZZLE DIAMETER	.4290
I.	NOZZLE AREA (SQ. FT.)	.001004
J.	AVG. STACK TEMP (DEG. R.)	953.3
K.	AVG. METER TEMP (DEG. R.)	545.5
L.	CONDENSATE VOL. (ML)	168.0
M.	ABSORBED H2O (ML)	10.9
N.	TOTAL H2O (ML)	178.9
O.	METERED GAS (CF)	60.948
P.	GAS METER CORRECTION	1.0519
Q.	CORRECTED METERED GAS (CF)	64.111
R.	H2O GAS VOLUME (CF) (0.00267N(K/C)	8.872
S.	TOTAL SAMPLED VOLUME (CF) (Q+R)	72.983
T.	PERCENT H2O (100R/S)	12.16
	THEORETICAL MAXIMUM	100.00
	PERCENT WATER USED	12.16
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K))	60.955

V. MOLECULAR WEIGHT OF STACK GAS

COMPONENT	ORSAT-DRY VOL.PCT./100		MOISTURE CORRECTION (1-T/100)		MOLECULAR WEIGHT		WEIGHT PER MOLE
CO2	.035	X	.8784	X	44.0	=	1.35
CO	.000	X	.8784	X	28.0	=	.00
O2	.135	X	.8784	X	32.0	=	3.79
N2	.830	X	.8784	X	28.2	=	20.56
H2O		X	T/100= .1216	X	18.0	=	2.19
					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))]	17.73
Y.	AVG. FLOW RATE (CFM) (X*H*60)	75390.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92)	40800.
	STACK FLOW RATE (DRY)	35841.
AA.	SAMPLE TIME (SEC)	7200.
BB.	PERCENT ISOKINETIC (J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	100.08

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA
CLR-7CS-2

BATTERY COMBUSTION
8-22-90

PARAMETER	CYCLONE WT. (G)	MATL.ON FILTER(G)	INSOL.MATL. IN PROBE(G)	SOL.MATL. IN PROBE(G)
PARTICULATE	.00000	.05130	.00000	.02520

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

PARTICULATE	.07650
ALL MATLS.	.07650

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01933	5.93749

Emission rates are based on EPA Method 5.

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA
BATTERY COMBUSTION STACK NO.7

DATE: 8-22-90
CHARGE #: ...150-601050
TEST #: CLR-7CS-3

1. EMISSION RESULTS

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.00983	2.66733

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2. STACK CONDITIONS

FLOW (ACFM)	66007.
(SCFM)	35941.
MOISTURE CONTENT (%)	11.88
STACK TEMPERATURE (F)	487.5

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3. SAMPLING CONDITIONS

SAMPLE TIME (MIN.)	120.0
SCFD GAS SAMPLED	53.133
PERCENT ISOKINETIC	97.81

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA — BATTERY COMBUSTION
CLR-7CS-3 — 8-22-90

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	CORRECTED VELOCITY FFT/SEC
40.6A	1435.0	473.845	.055	.79	.79	86.	85.	6.0	524.	18.5
28.5			.055	.79	.79	91.	85.	6.0	481.	18.1
20.2			.050	.72	.72	92.	85.	6.0	487.	17.3
13.5			.040	.57	.57	91.	85.	5.0	490.	15.5
7.6			.030	.43	.43	91.	85.	4.5	483.	13.4
2.4A	1505.0	486.862	.010	.14	.14	90.	86.	2.5	471.	7.7
40.6B	1507.0	486.862	.045	.65	.65	90.	86.	5.5	470.	16.3
28.5			.040	.58	.58	93.	86.	5.0	492.	15.5
20.2			.030	.43	.43	92.	87.	4.0	499.	13.5
13.5			.030	.43	.43	92.	87.	4.0	500.	13.5
7.6			.020	.29	.29	92.	87.	3.5	481.	10.9
2.4B	1537.0	497.867	.010	.14	.14	91.	87.	2.5	460.	7.6
40.6C	1540.0	497.867	.065	.94	.94	91.	87.	7.0	463.	19.5
28.5			.055	.80	.80	94.	87.	6.5	486.	18.1
20.2			.060	.87	.87	94.	87.	6.5	490.	19.0
13.5			.035	.51	.51	93.	87.	5.0	492.	14.5
7.6			.035	.51	.51	94.	88.	5.0	489.	14.5
2.4C	1610.0	497.867	.035	.51	.51	93.	88.	5.0	488.	14.5
40.6D	1613.0	497.867	.070	1.01	1.01	92.	88.	7.5	477.	20.4
28.5			.070	1.01	1.01	95.	88.	7.5	507.	20.7
20.2			.070	1.01	1.01	95.	88.	7.5	514.	20.7
13.5			.065	.94	.94	95.	88.	7.2	518.	20.0
7.6			.040	.58	.58	94.	88.	5.5	481.	15.4
2.4D	1643.0	527.391	.010	.14	.14	93.	88.	3.0	458.	7.6

O R S A T		IMPINGER NO.	
CO2	3.5	1	121.9
O2	13.5	2	18.9
CO	.0	3	2.0
N	83.0	4	.0
		ABSORBED H2O	9.1

CONTROL BOX CALIBRATIONS

	FACTOR	DATE
ORIFICE	1.573	6-12-90
METER	1.0519	6-12-90
PITOT	0.84	8-20-90

LEAK CHECK

	RATE	IN.HG
INITIAL LT	0.02CFM	5.0
FINAL LT	0.02CFM	7.5

CONTROL BOX NO. 1 — PROBE NO. 7-1 — NOZZLE NO. 50

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA
CLR-7CS-3

BATTERY COMBUSTION
8-22-90

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG.	29.31
B.	AVG. DELTA H (IN H2O)	.62
C.	METER PRESSURE (IN. HG.)	29.36
D.	STATIC PRESSURE (IN. H2O)	-1.00
E.	STATIC PRESSURE (IN. HG.)	-.074
F.	STACK PRESSURE (IN. HG.) (A+E)	29.24
G.	STACK DIAMETER (IN.)	114.00
H.	STACK AREA (SQ. FT.)	70.88
	NOZZLE DIAMETER	.4310
I.	NOZZLE AREA (SQ. FT.)	.001013
J.	AVG. STACK TEMP (DEG. R.)	947.5
K.	AVG. METER TEMP (DEG. R.)	549.5
L.	CONDENSATE VOL. (ML)	142.8
M.	ABSORBED H2O (ML)	9.1
N.	TOTAL H2O (ML)	151.9
O.	METERED GAS (CF)	53.546
P.	GAS METER CORRECTION	1.0519
Q.	CORRECTED METERED GAS (CF)	56.325
R.	H2O GAS VOLUME (CF) (0.00267N(K/C)	7.592
S.	TOTAL SAMPLED VOLUME (CF) (Q+R)	63.917
T.	PERCENT H2O (100R/S)	11.88
	THEORETICAL MAXIMUM	100.00
	PERCENT WATER USED	11.88
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K))	53.133

V. MOLECULAR WEIGHT OF STACK GAS

COMPONENT	ORSAT-DRY VOL.PCT./100		MOISTURE CORRECTION (1-T/100)		MOLECULAR WEIGHT		WEIGHT PER MOLE
CO2	.035	X	.8812	X	44.0	=	1.36
CO	.000	X	.8812	X	28.0	=	.00
O2	.135	X	.8812	X	32.0	=	3.81
N2	.830	X	.8812	X	28.2	=	20.63
H2O		X	T/100= .1188	X	18.0	=	2.14
					MOLECULAR WEIGHT OF STACK GAS	=	27.93

W.	PITOT CORRECTION	.840
X.	AVERAGE CORRECTED VELOCITY (FPS) [85.49*W*SQRT((J*DELTA P)/(V*F))]	15.52
Y.	AVG. FLOW RATE (CFM) (X*H*60)	66007.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92)	35941.
	STACK FLOW RATE (DRY)	31672.
AA.	SAMPLE TIME (SEC)	7200.
BB.	PERCENT ISOKINETIC (J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	97.81

AIR QUALITY ENGINEERING

USX CLAIRTON
CLAIRTON PA
CLR-7CS-3

BATTERY COMBUSTION
8-22-90

PARAMETER	CYCLONE WT. (G)	MATL.ON FILTER(G)	INSOL.MATL. IN PROBE(G)	SOL.MATL. IN PROBE(G)
PARTICULATE	.00000	.02210	.00000	.01180

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

PARTICULATE	.03390
ALL MATLS.	.03390

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.00983	2.66733

Emission rates are based on EPA Method 5.