

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/

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1990
USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION
OF THE
#14 BATTERY COMBUSTION STACK

Prepared for:

USS CLAIRTON WORKS
A DIVISION OF USX CORPORATION
CLAIRTON, PA

Prepared by:

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

PROJECT NO. 601050-03

NOVEMBER 1990

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ABSTRACT

On June 20, 1990, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #14 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 0.012 gr/dscf and 3.31 lb/hr, respectively. The allowable concentration is 0.015 gr/dscf. Thus, the emissions from the stack are in compliance. The visible emissions observed from the stack during the tests were also in compliance.

1.0 INTRODUCTION

On June 20, 1990, a compliance test program was conducted for USS Clairton Works, Clairton, PA, on the #14 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 Mark Grunebach, Manager of the Monitoring Services Department, Daniel Keller, and John Shimshock of Keystone, and Richard Casselberry of Environmental Technical Services (ETS). Keystone and ETS are sister companies under the Chester Environmental Group. Visible emissions determinations were performed by Jim McKoy of ETS. All test procedures were witnessed by Phil Lawrence of the Allegheny County Health Department.

2.0 METHODOLOGIES

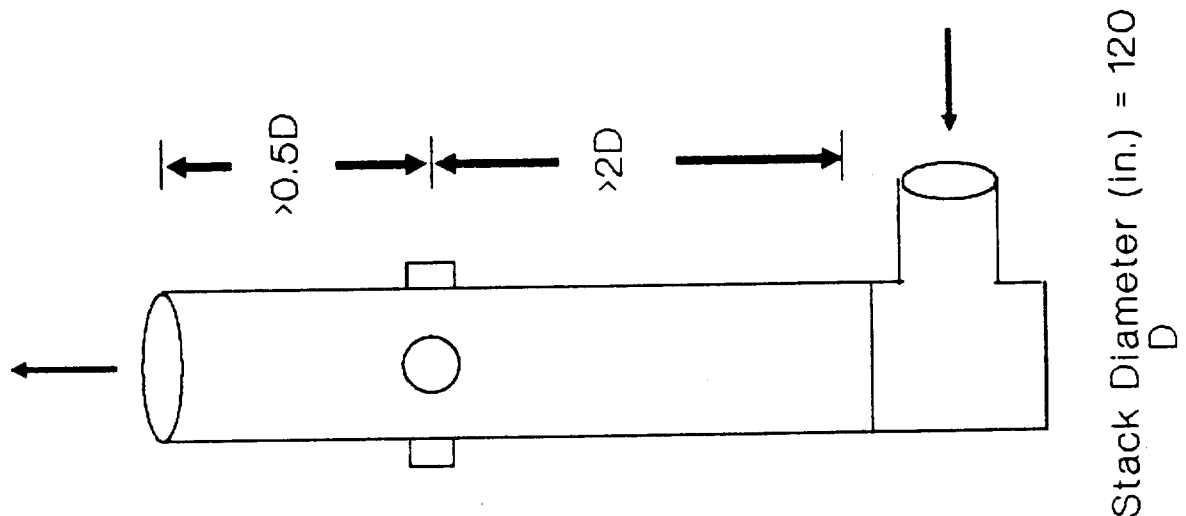
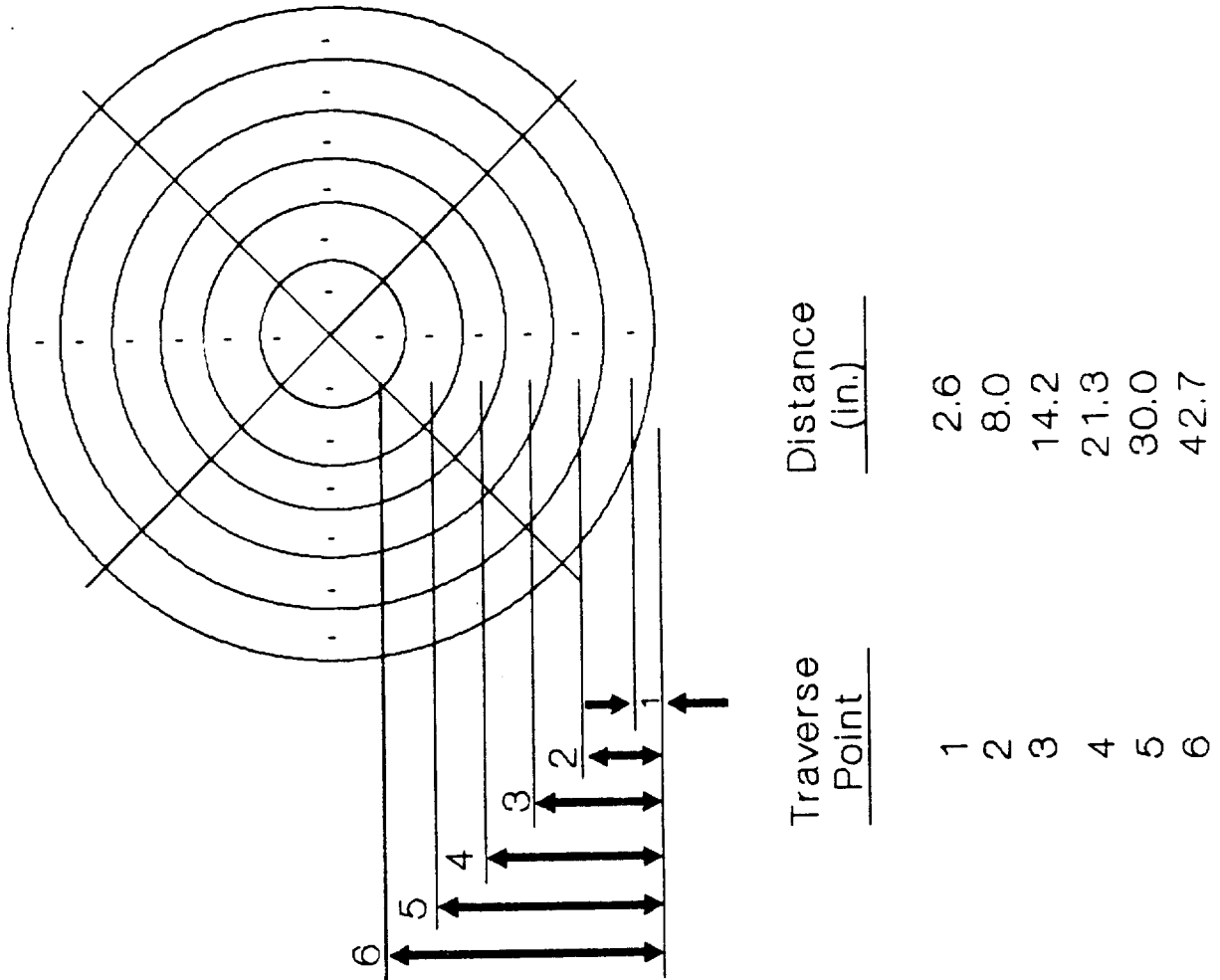
Particulate matter sampling was performed in accordance with EPA Stationary Source Sampling Methods 1 through 5 and Sections 139.11 and 139.12 of the Pennsylvania Department of Environmental Resources (PA DER) Source Testing Manual. The gas volume sampled for each 120 minute test was greater than 50 dry standard cubic feet.

The process exhausted through a 120" 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 CO₂, O₂, and N₂ (by difference) were determined with the use of a Fyrite apparatus as specified by EPA Method 3.

Clean up of the sampling train included a water and acetone rinse of both the front-half and back-half components. The water soluble and water insoluble portions of the front-half of the sampling train were determined as a total, while the water soluble and water insoluble portions of the back-half were determined separately in accordance with Section 139.12 of the PA DER Source Testing Manual. After filtration, the soluble back-half water was extracted with chloroform and ethyl ether; the extract was dried, desiccated, and weighed to a constant weight. The filtrate was then submitted for sulfate analysis via ion chromatography.

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.



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 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 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 0.012 grains per dry standard cubic foot (gr/dscf) and 3.31 pounds per hour (lb/hr), respectively.

As promulgated by the Amended Mon Valley Consent Decree, Paragraph V.A.(6), the particulate matter standard for #14 Battery Combustion Stack is 0.015 gr/dscf. 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.

The analytical results of the sulfate determination of the soluble back-half water can be found in Appendix E. These results have been summarized below:

<u>Test #</u>	<u>Sample Volume (mL)</u>	<u>Concentration (mg/L)</u>	<u>Total Sulfate (mg)</u>
1	750	31.5	23.6
2	890	40.8	36.4
3	880	51.9	45.6

**USS CLAIRTON WORKS
CLAIRTON, PA**

TABLE 3-1

PARTICULATE MATTER EMISSIONS DATA

<u>EMISSIONS</u>	<u>TEST #1</u>	<u>TEST #2</u>	<u>TEST #3</u>	<u>AVERAGE</u>
gr/dscf	0.012	0.016	0.009	0.012
lb/hr	3.00	4.52	2.41	3.31
 <u>STACK CONDITIONS</u>				
Flow (acfm)	68016	73645	66674	69445
Flow (scfm)	35663	38666	35292	36540
Moisture Content (%)	15.08	15.16	13.58	14.61
Stack Temp. (°F)	517	516	508	514
 <u>SAMPLING CONDITIONS</u>				
Sampling Time (min)	120	120	120	
Sample Volume (scfd)	75.521	83.939	77.739	
Isokinetics (%)	96.80	99.32	98.94	

Copies of the field data sheets for the visible emissions determinations can be found in Appendix F. All visible emissions observed during the three tests were less than or equal to 15% opacity. 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 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.

**USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION
OF THE NUMBER 14 BATTERY COMBUSTION STACK**

**APPENDIX A
OPERATIONAL RECORDS**

UNITED STATES STEEL CORPORATION
LAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 45

12 Hrs. Beginning 12:00 AM

Date 6-20-90

BATTERY NO. <u>B-14</u>				BATTERY NO. <u>A-13</u>				BATTERY NO. <u>B-13</u>			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	2 48	3 22		1	3 02	3 40		1	3 12	3 50	
3	3 24	4 00		3	3 42	4 10		3	3 52	4 22	
5	4 02	4 34		5	4 12	4 46		5	4 24	5 00	
7	4 36	5 10		7	4 48	5 22		7	5 02	5 34	
9	5 12	5 46		9	5 24	6 00		9	5 36	6 10	
11	5 48	6 22		11	6 02	6 34		11	6 12	6 46	
13	6 24	7 04		13	6 36	7 15		13	6 48	7 26	
15	7 06	7 38		15	7 17	7 51		15	7 28	8 02	-5-
17	7 40	8 19		17	7 53	8 30		17	8 04	8 52	
19	8 21	9 04		19	8 32	9 20		19	8 54	9 31	
21	9 06	9 49		21	9 22	10 00		21	9 33	10 12	
23	9 51	10 35		23	10 02	11 47		23	10 14	11 57	
25	10 37			25	10 49			25	10 59		
27				27				27			
29				29				29			
31	X X X X			31				31	X X X X		
2				2				2			
4				4				4			
6				6				6			
8				8				8			
10				10				10			
12				12				12			
14				14				14			
16				16				16		11 01	
18				18		11 24		18	11 03	11 35	
20	11 15	11 46		20	11 26	12 00		20	11 37	12 10	
22	11 49	12 02		22	12 02	12 34		22	12 12	12 46	
24	12 24	1 00		24	12 36	1 10		24	12 48	1 22	
26	1 02	1 34		26	1 12	1 46		26	1 24	2 00	
28	1 36	2 10		28	1 48	2 22		28	2 02	2 34	
30	2 12	2 46		30	2 24	3 00		30	2 36	3 10	
1	X X X X		17/18	1	X X X X		17/18	1	X X X X		
2	X X X X		17/18	2	X X X X		17/18	2	X X X X		

REMARKS:

Condition of Signals

OK

Condition of Pusher

OK

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	
11-12	5	5		5-6	5	5		
12-1	5	5		6-7	5	5		Total Ovens Pushed 56
1-2	5	5		7-8	5	5		Total Ovens Charged 51
2-3	5	5		8-9	4	4		
3-4	5	5		9-10	4	4		Pusherman ME
4-5	5	5		10-11	5	5		Battery Position YOU
30	29			20	25			

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 45

12 Hrs. Beginning 12:00 P.M.

Date 6-20-90

BATTERY NO. <u>14B</u>				BATTERY NO. <u>13A</u>				BATTERY NO. <u>13B</u>			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	10 34			1	10 44			1	10 53		
3				3				3			
5				5				5			
7				7				7			
9				9				9			
11				11				11			
13				13				13			
15				15				15			
17				17				17			
19				19				19			
21				21				21			
23				23				23			
25		11 43		25		12 00		25		12 11	
27	11 45	12 31		27	12 02	12 41		27	12 13	1 03	
29	12 33	1 18		29	12 43	1 52		29	1 03	1 39	
31	1 20	1 58		31	12 54	1 28		31	=	=	=
2	1 30	2 58		2	1 30	2 06		2	1 41	2 20	
4	1 36	2 35		4	2 08	2 47		4	2 22	2 57	
6	2 37	4 39 *		6	2 49	3 26		6	2 59	3 41	
8	3 15	3 24		8	3 28	3 48		8	3 43	4 25	
10	4 02	4 09		10	4 12	4 30		10	4 27	5 02	
12	4 41	5 13		12	4 53	5 23		12	5 04	5 34	
14	5 15	5 44		14	5 25	5 56		14	5 36	6 06	
16	5 46	6 17		16	5 58	6 27		16	6 08	6 37	
18	6 19	6 47		18	6 29	6 57		18	6 39	7 43	
20	6 49	7 54		20	6 59	8 04		20	7 45	8 15	
22	7 56	8 26		22	8 06	8 36		22	8 17	8 47	
24	8 28	8 57		24	8 38	9 07		24	8 49	9 17	
26	8 59	9 27		26	9 09	9 37		26	9 19	9 47	
28	9 29	9 57		28	9 39	10 10		28	9 49	10 21	
30	9 59	10 32		30	10 12	10 42		30	10 23	10 53	
070	-	+	070	070	X	÷	X	070	0	P	0
070	+	-	070	070	÷	X	÷	070	P	0	P

REMARKS:

Condition of Signals OK

Condition of Pusher OK

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	
1-1	1	1		5-1	6	6		HA HA HA HA
1-2	5	5		5-2	6	6		
1-3	5	5		5-3	2	2		
1-4	5	5		5-4	6	6		
1-5	3	4		5-5	6	6		Pusherman <u>ME</u>
1-6	5	4		5-6	5	5		Battery Foreman <u>YOU</u>
24	24	24		31	31	31		

Total Ovens Pushed 55

Total Ovens Charged 55

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 5

12 Hrs. Beginning 12:00A. M

Date 6-20-90

BATTERY NO. <u>15-A</u>				BATTERY NO. <u>15-B</u>				BATTERY NO. <u>14-A</u>			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	2 20	2 48		1	2 30	3 34		1	2 40	3 45	
3	2 50	3 55		3	3 36	4 05		3	3 47	4 15	
5	3 57	4 25		5	4 07	4 36		5	4 17	4 47	
7	4 27	4 57		7	4 38	5 07		7	4 49	5 18	
9	4 59	5 30		9	5 09	5 42		9	5 20	5 54	
11	5 32	6 06		11	5 44	6 18		11	5 56	6 30	
13	6 08	6 42		13	6 20	7 10		13	6 32	7 23	
15	6 44	7 33		15	7 12	7 43		15	7 25	7 56	
17	7 35	8 14		17	7 45	8 28		17	7 58	8 40	
19	8 16	9 00		19	8 30	9 18		19	8 42	9 28	
21	9 02	9 45		21	9 20	9 56		21	9 30	10 08	
23	9 47	10 33		23	9 58	10 43		23	10 10	10 15	
25	10 35			25	10 45			25	10 55		
27				27				27			
29				29				29			
31				31				31			
2				2				2			
4				4				4			
6				6				6			
8				8				8			
10				10				10			
12				12				12			
14				14				14			
16				16				16			
18		11 07		18		11 18		18		11 29	
20	11 09	11 40		20	11 20	11 50		20	11 31	12 02	
22	11 42	12 11		22	11 52	12 22		22	12 04	12 32	
24	12 13	12 44		24	12 24	12 52		24	12 35	1 07	
26	12 46	1 17		26	12 58	1 27		26	1 09	1 37	
28	1 19	1 47		28	1 29	1 56		28	1 39	2 07	
30	1 49	2 18		30	1 58	2 28		30	2 09	2 38	
1	X	X	17/19	1	X	X	17/19	1	X	X	17/19
2	X	X	17/19	2	X	X	17/19	2	X	X	17/19

REMARKS:

Condition of Signals _____ Condition of Pusher _____

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
11-12	5	5		5-6	5	5	
12-1	6	6		6-7	4	4	
1-2	6	6		7-8	5	5	
2-3	5	5		8-9	3	3	
3-4	3	3		9-10	5	5	
4-5	6	6		10-11	4	4	
	31	31			26	26	

Total Ovens Pushed 57

Total Ovens Charged 57

Pusherman _____

Battery Foreman _____

UNITED STATES STEEL CORPORATION
CLAIRTON CORE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 5

12 Hrs. Beginning 12:00P M

Date 6-20-90

BATTERY NO. <u>15A</u>				BATTERY NO. <u>15B</u>				BATTERY NO. <u>14A</u>			
OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES	OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	10 27			1	10 38			1	10 57		
3				3				3			
5				5				5			
7				7				7			
9				9				9			
11				11				11			
13				13				13			
15				15				15			
17				17				17			
19				19				19			
21				21				21			
23				23				23			
25		11 40		25		11 53		25			
27	11 42	12 18		27	11 55	12 34		27	12 13	11 05	
29	12 20	12 24		29	12 40	1 23		29	12 50	12 59	
31	12 26	1 13		31	X X X X			31	1 05	1 10	
2	1 15	1 46		2	1 25	2 00		2	1 05	1 40	
4	1 48	2 36		4	2 04	2 49		4	2 13	2 26	
6	2 32	3 14		6	2 43	3 25		6	2 34	3 09	
8	3 10	4 02		8	3 22	4 10		8	3 38	3 49	
10	3 56	4 39		10	4 07	4 50		10	4 21	4 28	
12	4 35	5 05		12	4 47	5 13		12	4 57	5 22	
14	5 09	5 37		14	5 17	5 46		14	5 33	5 58	
16	5 42	6 08		16	5 53	6 18		16	6 03	6 33	
18	6 14	6 26		18	6 24	6 39		18	6 35	7 06	
20	6 45	7 47		20	6 52	7 54		20	7 42	8 09	
22	7 51	8 17		22	8 01	8 26		22	8 12	8 37	
24	8 22	8 47		24	8 13	8 58		24	8 43	9 11	
26	8 54	9 22		26	9 04	9 30		26	9 14	9 40	
28	9 24	9 52		28	9 35	10 01		28	9 45	10 12	
30	9 55	10 05		30	10 08	10 22		30	10 17	10 44	
1	X	X	19/19	1	X	X	18/18	1	X	X	19/19
2	X	X		2	X	X		2	X	X	

REMARKS:

Condition of Signals

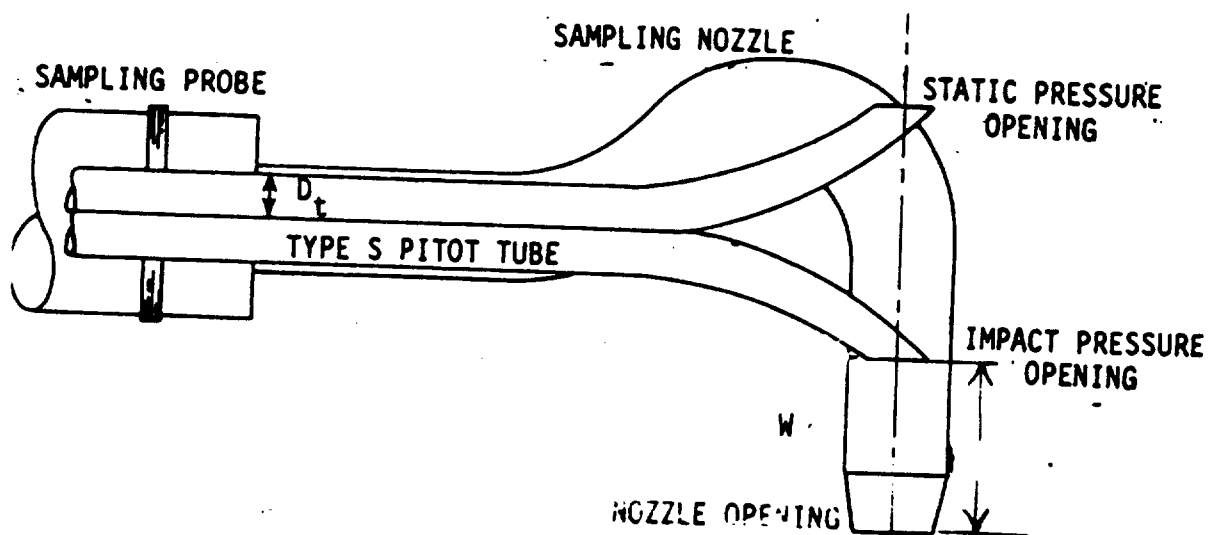
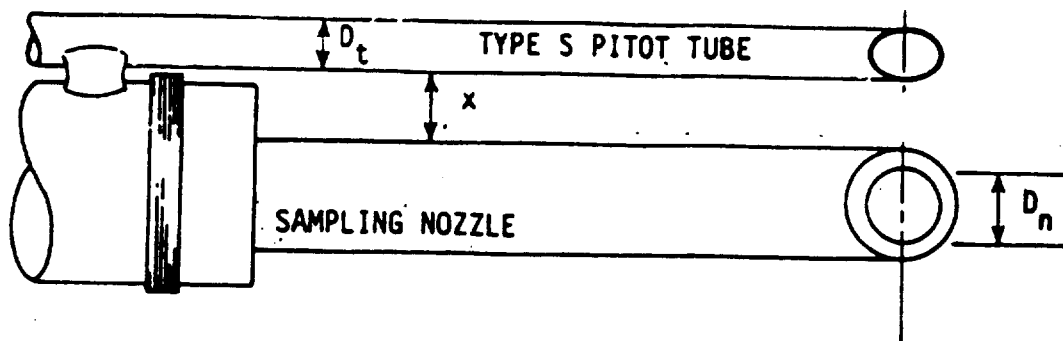
Condition of Pusher

HOURLY REPORT OF OPERATION

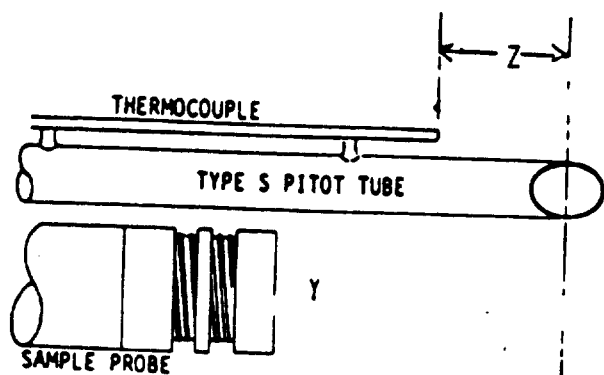
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11-12	2	3		5-6	5	6		
12-1	5	4		6-7	6	5		Total Ovens Pushed 56
1-2	5	5		7-8	2	3		Total Ovens Charged 55
2-3	5	4		8-9	6	6		
3-4	4	4		9-10	6	5		Pusherman
4-5	5	5		10-11	5	5		Battery Foreman
	26	25			30	30		

**USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION
OF THE NUMBER 14 BATTERY COMBUSTION STACK**

**APPENDIX B
PRE-TEST AND POST-TEST
CALIBRATION AND AUDIT RESULTS**



D_n = Nozzle diameter
 D_t = 3/16 to 3/8"



$W \geq 0$
 $X \geq 3/4"$ for 1/2" Nozz
 $Y \geq 3"$
 $Z \geq 2"$

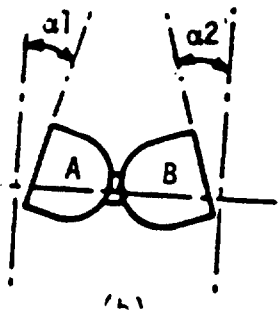
GEOMETRIC PITOT CALIBRATION

Probe No. 7-81

Date 4-24-80

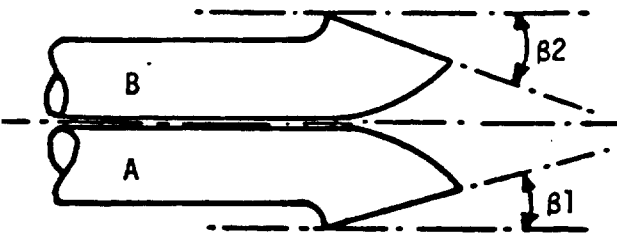
Initials 7/11

pre-test

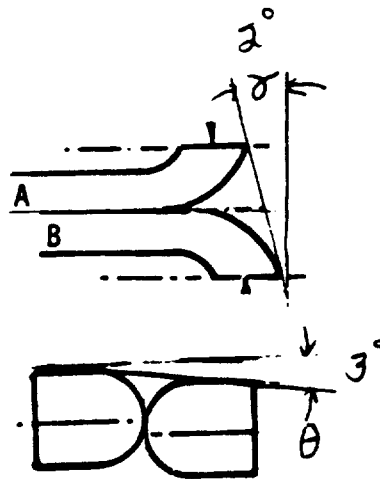
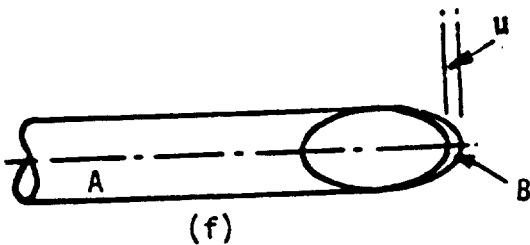


$\alpha_1, \alpha_2 < 10^\circ$

$\alpha_1 = .5^\circ$
 $\alpha_2 = 4^\circ$
 $\beta_1 = 1^\circ$
 $\beta_2 = 2^\circ$
 $A = 1.57$
 $\mu = .054$
 $V = .082$
 $W = 20$
 $X = .880$
 $Y = \geq 3''$
 $Z = \geq 2'$
 $U_t = .377$

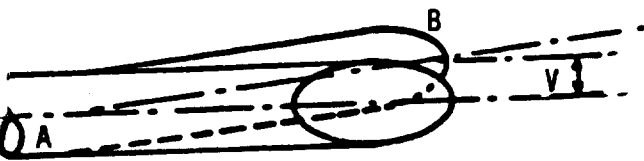


$\beta_1, \beta_2 < 5^\circ$

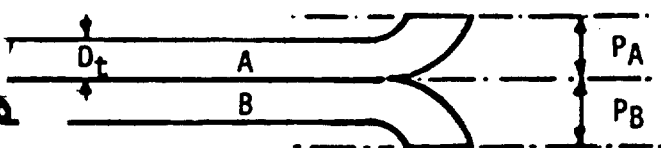


$\mu = A \sin \theta$

$V = A \sin \phi$



A-SIDE PLANE

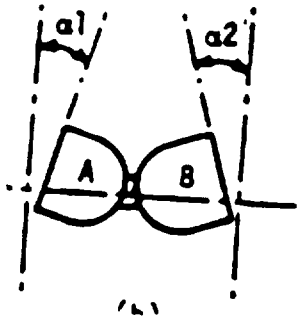


B-SIDE PLANE

$.375$ $.565$
 $1.05 D_t < P < 1.50 D_t$
 $P_A = P_B$
 $2.10 D_t < A < 3.00 D_t$
 $.791$ 1.131

GEOMETRIC PITOT CALIBRATION

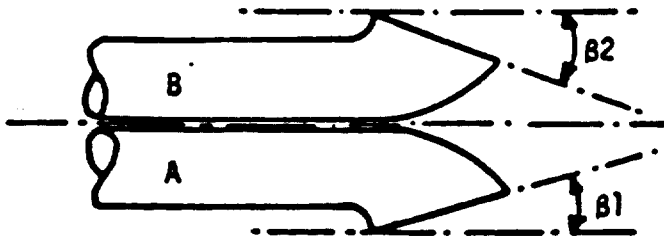
Probe No. 1-1
 Date 6/9/90
 Initials MTS



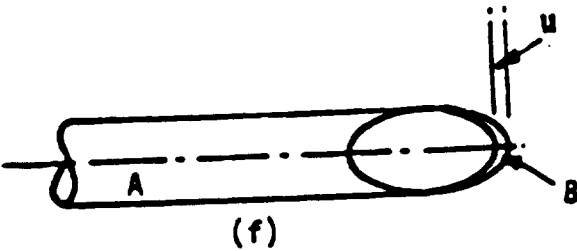
$\alpha 1, \alpha 2 < 10^\circ$

$\alpha 1 = 2^\circ$
 $\alpha 2 = 1^\circ$
 $B1 = 2^\circ$
 $B2 = 4^\circ$
 $A = 1.059$
 $u = \cancel{1.059} .018$
 $v = 0$
 $w = 0$
 $x = 2.74''$
 $y = 2.3''$
 $z = 2.2''$
 $U_t = 380$

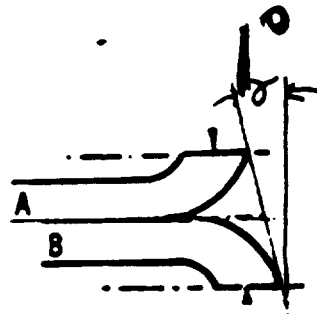
post-test



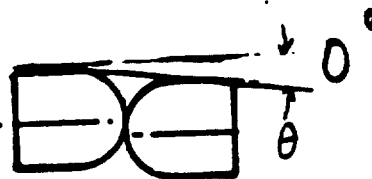
$B1, B2 < 5$



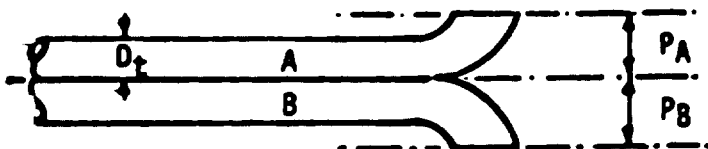
(f)



$u = A \sin \theta$
 $v = A \sin \theta$



A-SIDE PLANE



B-SIDE PLANE

.399 .570
 $1.05 D_t < P < 1.50 D_t$
 $P_A = P_B$
 $2.10 D_t < A < 3.00 D_t$
 .798 1.14

GEOMETRIC PITOT CALIBRATION

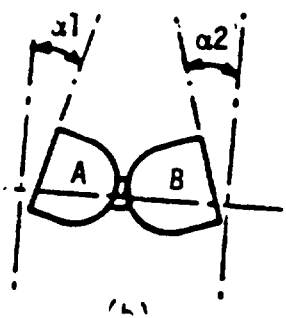
Probe No. 7-2

Date 7-24-90

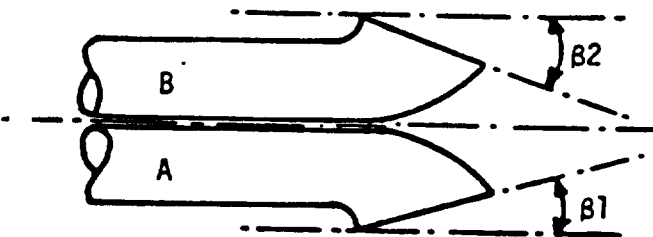
Initials 7/11/

pre-test

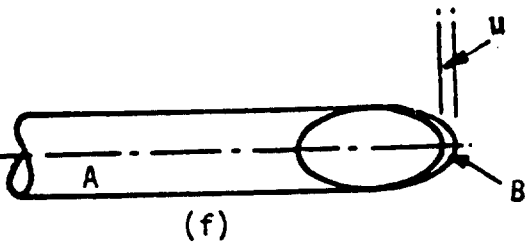
$\alpha_1 = 1^\circ$
 $\alpha_2 = 3^\circ$
 $\beta_1 = 4^\circ$
 $\beta_2 = 1^\circ$
 $A = .962$
 $\mu = .067$
 $V = .033$
 $W = \geq 0$
 $X = .989$
 $Y = \geq 3''$
 $Z = \geq 2''$
 $U_i = .376$



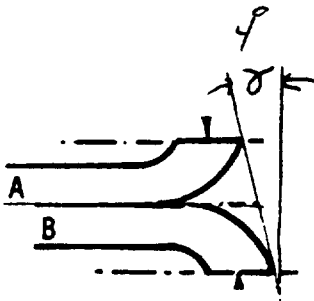
$\alpha_1, \alpha_2 < 10^\circ$



$\beta_1, \beta_2 < 5$

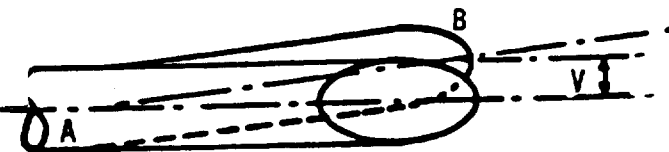


(f)

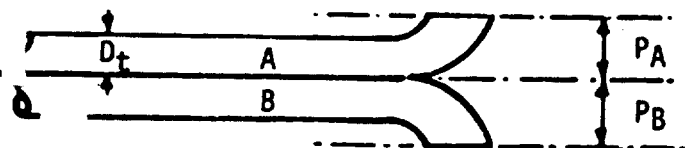


$\mu = A \sin \theta$

$V = A \sin \theta$



A-SIDE PLANE



B-SIDE PLANE

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

GEOMETRIC PITOT CALIBRATION

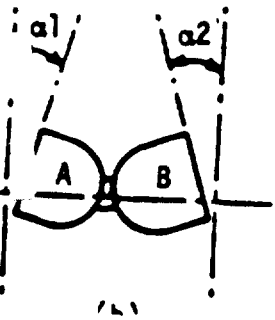
Probe No. 7-6

Date 6-29-90

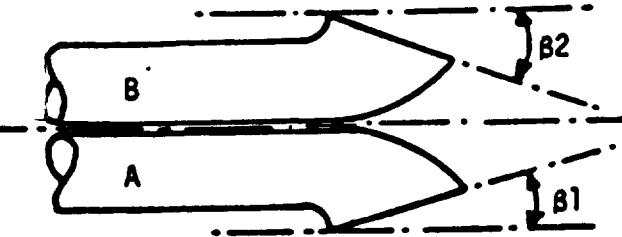
Initials ATS

$\alpha_1 = 4^\circ$
 $\alpha_2 = 3^\circ$
 $\beta_1 = 1^\circ$
 $\beta_2 = 3^\circ$
 $A = .988$
 $\mu = .034$
 $V = .069$
 $W = > 0$
 $X = > 3/4"$
 $Y = > 3"$
 $Z = 72"$
 $D_t = .385$

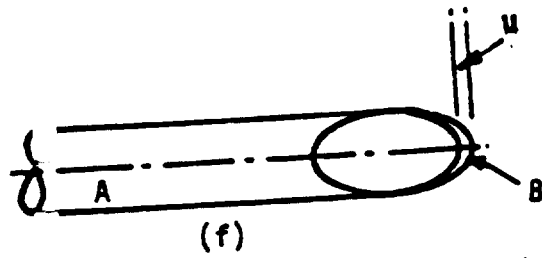
post-test



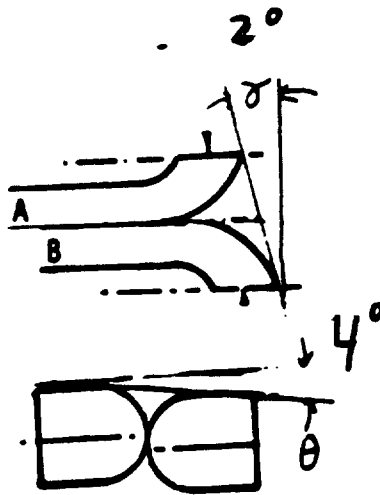
$\alpha_1, \alpha_2 < 10^\circ$



$\beta_1, \beta_2 < 5^\circ$



(f)

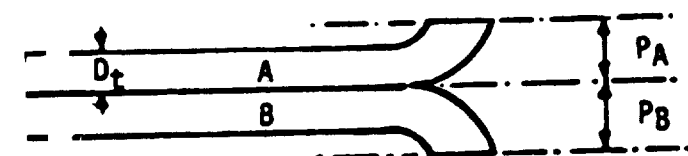


$$\mu = A \sin \theta$$

$$V = A \sin \phi$$



A-SIDE PLANE



B-SIDE PLANE

.404 .5775

$$1.05 D_t < P < 1.50 D_t$$

$$P_A = P_B$$

$$2.10 D_t < A < 3.00 D_t$$

.808 1.155

CONTROL BOX CALIBRATION

THREE POINT CALIBRATION

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

	TIME	WET TEST METER			PRESSURE	DRY TEST METER					ORIFICE	VOLUME	METER CORRECT	ORIFICE COEFFICE	
		TEMP T _W	VOLUME V _M	P _W		TEMP IN T _I	TEMP OUT T _O	TEMP AVG T _A	TEMP OUT T _D	TEMP AVG T _D					TEMP AVG T _D
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 6-25-90
 BP 28.94
 OPERATOR DRK

	TIME	WET TEST METER			PRESSURE	DRY TEST METER				ORIFICE	VOLUME	METER CORRECT	ORIFICE COEFFICE	
		TEMP	VOLUME			TEMP IN	TEMP OUT	TEMP AVG						
		T _W	V _M	P _W		T _I	T _O	T _A	P _D					V _D
START				0.000	28.94						1.00	88.800		
HALF			82.0				95.0	87.0	91.0					
STOP	8.88			5.000								93.752		
CALCULATION	8.88		542.0	5.057	28.94					551.0	29.01	4.952	1.0354	1.801
START				0.000	28.94						1.00	94.000		
HALF			81.0				98.0	90.0	94.0					
STOP	8.87			5.000								99.095		
CALCULATION	8.87		541.0	5.057	28.94					554.0	29.01	5.095	1.0137	1.781
START				0.000	28.94						1.00	99.300		
HALF			81.0				100.0	91.0	95.5					
STOP	8.88			5.000								104.418		
CALCULATION	8.88		541.0	5.057	28.94					555.5	29.01	5.118	1.0119	1.780
AVERAGE													1.0203	1.787
DIFFERENCE													3.10%	-12.01%

MAGNAHELIC CALIBRAATION

DATE 6-25-90
OPERATOR DRK

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 6-25-90
OPERATOR DRK

	START CF	STOP CF	VOL	TIME	LEAK RATE
DRY	576.760	576.960	0.200	10.000	-0.001
WET	0.000	0.190	0.190		

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 6-25-90
OPERATOR DRK

mV input °F	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	301	300.0
8.31	400	400.0
10.57	500	500.0

Name: Keystone Env. ResourcesPhone: 825-9761Date 6/1/90 Train ID Box 1 DGM Cal. Factor, Y L0350Orifice No. BAPL 3Type of Meter Box NAPP 100 Type of Pump Diaphragm

		Run Number			
		Example	1	2	3
<u>DGM</u>					
Final reading	ft ³	966.461	<u>354.211</u>	<u>362.453</u>	<u>370.285</u>
Initial reading	ft ³	946.602	<u>347.500</u>	<u>355.400</u>	<u>363.000</u>
Difference, V _m	ft ³	9.859	<u>7.211</u>	<u>7.253</u>	<u>7.285</u>
Percent Accuracy, %A					
Inlet/Outlet temperatures					
Initial	°F.	108.88	<u>82.129</u>	<u>84.183</u>	<u>87.186</u>
After 5 minutes		110.88	<u>83.180</u>	<u>86.184</u>	<u>88.186</u>
After 10 minutes		111.88	<u>84.181</u>	<u>87.185</u>	<u>88.186</u>
Final		112.89	<u>84.182</u>	<u>87.185</u>	<u>88.187</u>
Avg. temperature, t _d	°F/°R	99.3/559.3	<u>81.9/541.9</u>	<u>85.1/545.1</u>	<u>87.1/547</u>
Time, θ	min	15.0	<u>15.0</u>	<u>15.0</u>	<u>15.0</u>
Orifice man. rdg., delta H		1.35	<u>.65</u>	<u>.65</u>	<u>.65</u>
Bar. pressure, P _{bar}		29.75	<u>29.13</u>	<u>29.13</u>	<u>29.13</u>
Ambient temperature, t _a	°F/°C	74/23.3	<u>72°/22°</u>	<u>72°/22°</u>	<u>72°/22°</u>
Pump vacuum	in. Hg	18.8	<u>19.0</u>	<u>19.0</u>	<u>19.0</u>
V _m (std)	ft ³	9.2815			
DGM cal. factor, Y _c		1.0593			
*V _m (std) (M)	m ³	0.2629			

*If you calculate dry gas volume in English Units, use the conversion factor of 0.02832 m³/ft³ to obtain the volume in metric units.

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

$Vm(std)' = \frac{(7.211)(1.0350)(.9743)(.9751)}{29.92}$

$Vm(std)' = \underline{7.091} \text{ ft}^3 \text{ (round to 3 decimals)}$

Run #2 $Vm(std)' = \frac{(7.253)(1.0350)(.9686)(.9751)}{29.92}$

$Vm(std)' = \underline{7.090} \text{ ft}^3$

Run #3 $Vm(std)' = \frac{(7.285)(1.0350)(.9653)(.9751)}{29.92}$

$Vm(std)' = \underline{7.097} \text{ ft}^3$

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

$Vstd(M) = \underline{7.093} \text{ ft}^3$

(To Be Completed By Auditor)

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

$\% A = \underline{\hspace{2cm}} \times 100$

$\% A = \underline{\hspace{2cm}} \%$

Site: Keystone Env. Res

Phone: 825-9761

Date 6-25-90 Train ID Box 1 DGM Cal. Factor, Y 1.0519 Orifice No. BAPC#3

Type of Meter Box Napp 100 Type of Pump Diaphragm

DGM

		Run Number			
		Example	1	2	3
Final reading	ft ³	966.461	114.340	121.375	128.575
Initial reading	ft ³	946.602	107.300	114.400	121.400
Difference, V _m	ft ³	9.859	7.040	6.975	6.975
Percent Accuracy, ZA					
Inlet/Outlet temperatures					
Initial	°F.	108/88	92.192	89.189	89.189
After 5 minutes		110/88	91.190	90.189	91.190
After 10 minutes		111/88	91.190	90.189	92.190
Final		112/89	90.189	90.190	92.191
Avg. temperature, t _d	°F/°R	99.3/559.3	90.6/650.6	89.5/549.5	90.9/55
Time, θ	min	15.0	15.0	15.0	15.0
Orifice man. rdg., delta H		1.35	.70	.70	.70
Bar. pressure, P _{bar}		29.75	28.94	28.94	28.94
Ambient temperature, t _a	°F/°C	74/23.3	74.1233	74.1233	74.123
Pump vacuum	in. Hg	18.8	19.0	19.0	19.0
V _m (std)	ft ³	9.2815			
DGM cal. factor, Y _c		1.0593			
*V _m (std) (M)	m ³	0.2629			

*If you calculate dry gas volume in English Units, use the conversion factor of 0.02832 m³/ft³ to obtain the volume in metric units.

VOLUMETRIC FLOW DEVICE CALCULATION SHEET

Eq. 8-1 $V_m(\text{std}) = V_m Y \left(\frac{T_{\text{std}}}{T_m} \right) \left(\frac{P_{\text{bar}} + \frac{\Delta H}{13.6}}{P_{\text{std}}} \right)$

Run #1 $V_m(\text{std})' = V_m \times Y \times \frac{528}{T_m} \times \left(\frac{P_{\text{bar}} + \frac{\Delta H}{13.6}}{29.92} \right)$

$V_m(\text{std})' = \frac{(7.040)(1.0519)(.9590)(.9690)}{}$

$V_m(\text{std})' = 6.882 \text{ ft}^3 \text{ (round to 3 decimals)}$

Run #2 $V_m(\text{std})' = \frac{(6.975)(1.0519)(.9608)(.9690)}{}$

$V_m(\text{std})' = 6.831 \text{ ft}^3$

Run #3 $V_m(\text{std})' = \frac{(6.975)(1.0519)(.9591)(.9690)}{}$

$V_m(\text{std})' = 6.819 \text{ ft}^3$

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

$V_{\text{std}}(\text{M}) = 6.844 \text{ ft}^3$

.....
(To Be Completed By Auditor)

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

$\% A = \text{_____} \times 100$

$\% A = \text{_____} \%$

**USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION
OF THE NUMBER 14 BATTERY COMBUSTION STACK**

**APPENDIX C
FIELD DATA SHEETS
FOR PARTICULATE MATTER EMISSIONS**

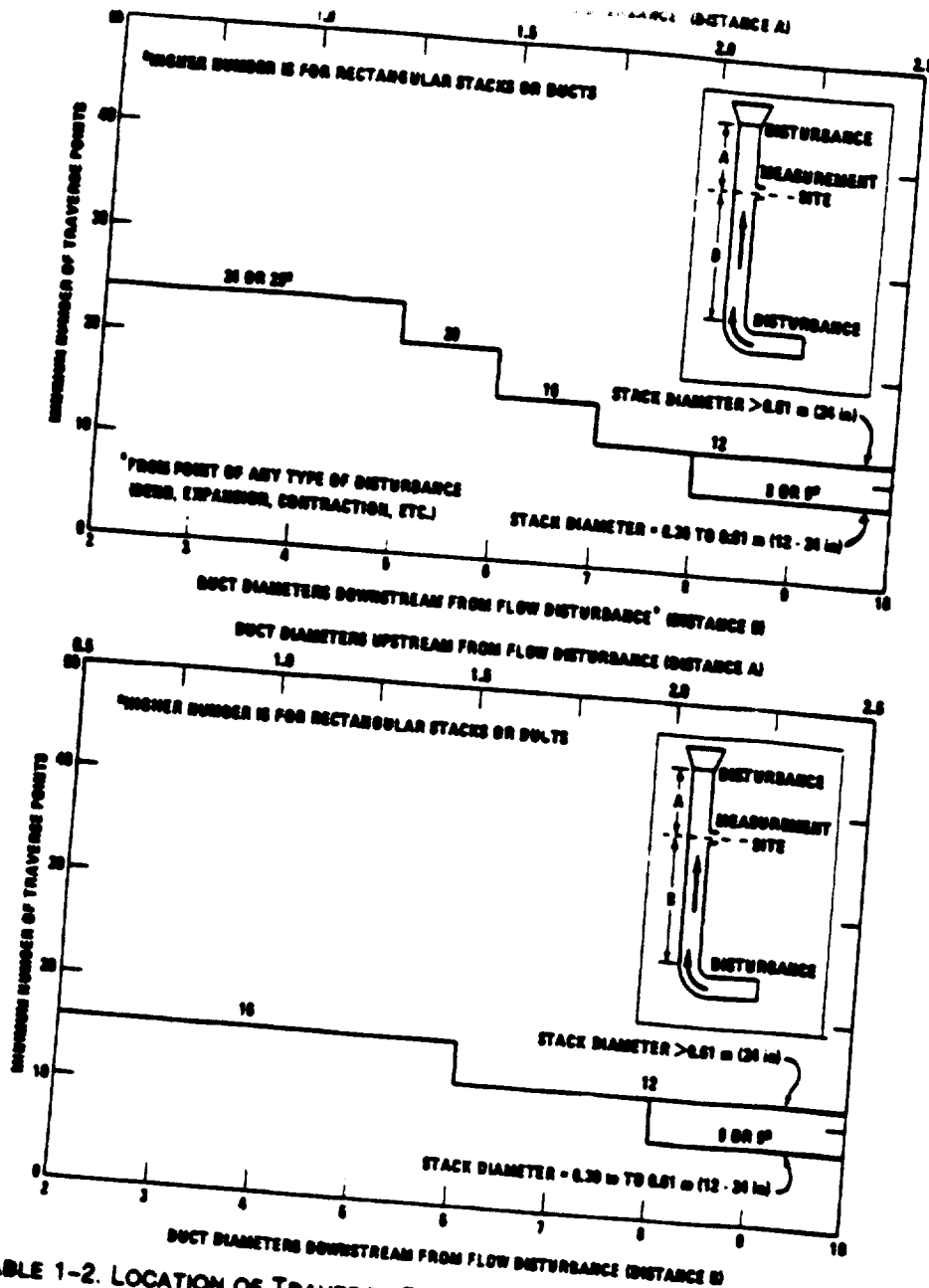


TABLE 1-2. LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS
(Percent of stack diameter from inside wall to traverse point)

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	86.4	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	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			86.4	67.7	34.2	25.0	20.1	16.8	14.6	12.9	11.6	10.5
6			95.6	80.6	65.6	35.6	26.9	22.0	18.6	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.6	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.6	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	66.4	40.7	36.6
13							94.3	87.5	81.2	75.0	66.5	40.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.6
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.6
20										98.7	94.0	89.6
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

PLANT USX Clouston

DATE: 6-20-90

LOCATION: Combustion Stack #4

ACTIVITY NO.: _____

CONTROL BOX OPERATOR: _____

PROBE HANDLER: _____

CLEAN UP: _____

TEST NO.: CUR-CSM-1

NOZZLE: #52 0.556

STATIC PRESSURE PS: -1.2

PORT DIRECTION: A, B

BAROMETRIC PRESSURE: 29.12

STACK SAMPLING DATA SHEET

DATE: 6-12-90

METER CORRECTION: 1.0519

PITOT CORRECTION: 0.84

CONTROL BOX NO.: 1

NOMOGRAPH SET POINT: _____

LENGTHS OF UMBILICAL _____ x 25' _____ x 50'

HOT BOX NO.: 2

COLD BOX NO.: 2

PROBE NO.: 7-2

FILTER NO.: 387

STACK DIA.: 120"

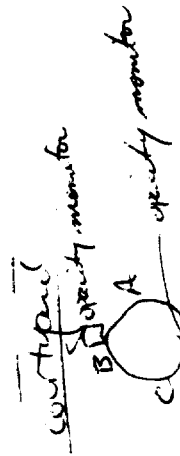
Point	Time	Meter Reading (dry) CF	Velocity HD in. H ₂ O	Orifice Δ H in. H ₂ O	Meter Temp In Out °F	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
42.7	0850	638.020	0.040	1.46	68	6.0	517	260	268°F Feed Down	250	5 min/pt
30.0			0.035	1.27	75	6.0	522				
21.3			0.035	1.27	79	6.0	527				
14.2			0.035	1.30	82	6.0	531				
8.0			0.035	1.30	83	6.0	494		56°F		
2.6	0920	656.960	0.035	1.30	85	6.0	490				
42.7	0923	656.960	0.040	1.48	84	6.0	520				
30.0			0.040	1.51	87	6.0	533		43°F		
21.3			0.035	1.32	89	6.0	538				
14.2			0.030	1.13	89	5.0	544				
8.0			0.030	1.13	90	5.0	490				
2.6	0953	675.535	0.020	0.76	90	4.0	482				

ORSAT

in. Hg.	Rate	CO ₂	CO	N	ORSA	CO ₂	O ₂	CO	N	PITOT LEAK CHECK	Impinger No.	Final	Initial	Difference
5.0	40.07 CFM				1	4.5	10.5			POS.	1	747.1	531.9	215.2
6.5	0.005 CFM				2	10.5	10.5			NEG.	2	540.2	494.8	45.4
					3	0	0			OK	3	484.0	478.8	5.2
					4	85.0	86.0			OK	4	605.4	586.8	18.6

LEAK CHECK

in. Hg.	Rate	CO ₂	O ₂	CO	N	PITOT LEAK CHECK	Impinger No.	Final	Initial	Difference
5.0	40.07 CFM					POS.	1	747.1	531.9	215.2
6.5	0.005 CFM					NEG.	2	540.2	494.8	45.4
						OK	3	484.0	478.8	5.2
						OK	4	605.4	586.8	18.6



STACK SAMPLING DATA SHEET

PLANT USX Christian DATE: 6-20-90 ΔH@: 1.573 (6-12-90) HOT BOX NO.: 2
 LOCATION: Combustion Stack 14 TEST NO.: CLR - CS14-1 METER CORRECTION: 1.0579 COLD BOX NO.: 2
 ACTIVITY NO.: #52 NOZZLE: 0.556 PITOT CORRECTION: 0.84 PROBE NO.: 7-2
 CONTROL BOX OPERATOR: STATIC PRESSURE PS: -1.2 CONTROL BOX NO.: 1 FILTER NO.: 387
 PROBE HANDLER: PORT DIRECTION: C, D NOMOGRAPH SET POINT: STACK DIA: 120"
 CLEAN UP: BAROMETRIC PRESSURE: 29.12 LENGTHS OF UMBILICAL 25' x 50'

Point	Time	Meter Reading (dry) CF	Velocity HD in. H ₂ O	Orifice ΔH in. H ₂ O	Meter Temp In °F	Meter Temp Out °F	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp °C/°F	Hot Box °F	Comments
42.7	0957	675.535	0.035	1.32	86	81	6.0	515	260	468°F Test Down	250	5 min/st
30.0			0.040	1.53	91	81	6.0	538				
21.3			0.035	1.34	91	82	6.0	535				
14.2			0.035	1.34	92	82	6.0	538		460°F		
8.0			0.030	1.15	93	83	5.0	483		454°F		
2.6	1027	693.655	0.010	0.38	91	84	3.0	480				
42.7	1031	693.655	0.040	1.53	91	85	6.0	524				
30.0			0.040	1.53	95	86	6.0	513				
21.3			0.040	1.52	96	86	6.5	550				
14.2			0.040	1.52	97	87	6.5	537		487°F		
8.0			0.030	1.14	96	87	5.5	483				
2.6	1101	713.675	0.020	0.76	96	87	4.5	480				

ORSAT

Impinger No.	Final	Initial	Difference
1			
2			
3			
4			

LEAK CHECK

in. Hg.	Rate
CO ₂	
O ₂	
CO	
N	

PITOT LEAK CHECK	POS.	NEG.
1		
2		
3		
4		

STACK SAMPLING DATA SHEET

PLANT: USX Clanton DATE: 6-20-90 ΔH : 1.573 (6-12-90) HOT BOX NO.: 6
 LOCATION: Combustion Stack 14 TEST NO.: CUR-C54-2 METER CORRECTION: 1.0579 COLD BOX NO.: 6
 ACTIVITY NO.: #52 NOZZLE: 0.556 PITOT CORRECTION: 0.84 PROBE NO.: 7-1
 CONTROL BOX OPERATOR: Static Pressure Ps: -1.2 CONTROL BOX NO.: 1 FILTER NO.: 408
 PROBE HANDLER: PORT DIRECTION: D, C NOMOGRAPH SET POINT: STACK DIA: 12.5"
 CLEAN UP: BAROMETRIC PRESSURE: 29.12 LENGTHS OF UMBILICAL x 25' x 50'

Point	Time	Meter Reading (dry) CF	Velocity HD in. H ₂ O	Orifice ΔH in. H ₂ O	Meter Temp In °F Out °F	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C °F	Hot Box °F	Comments
42.7	1125	713.960	0.040	1.52	97 91	6.0	522	260	268°F Lead Down	250	5 min pot
30.0			0.040	1.55	100 92	6.0	530				
21.3			0.040	1.55	100 92	6.0	535				
14.2			0.040	1.55	100 91	6.0	539				
8.0			0.040	1.55	101 91	6.0	547		55°F		
2.6	1125	735.351	0.035	1.36	101 92	5.0	489				
42.7	1159	735.351	0.040	1.55	97 91	6.0	507				
30.0			0.040	1.58	101 92	6.0	528				
21.3			0.040	1.58	102 93	6.0	532				
14.2			0.040	1.58	103 93	6.0	536				
8.0			0.040	1.58	103 94	6.0	494				
2.6	1229	756.657	0.025	0.98	104 95	4.0	488				

LEAK CHECK				ORSAT				Impinger No.				Final		Initial		Difference	
in. Hg.	Rate	in. Hg.	Rate	CO ₂	O ₂	CO	N	1	2	3	4	805.5	544.7	550.5	463.5	255.8	100 ml H ₂ O
5.0	40.07 CFM	5.0	40.07 CFM	10.0	10.5	0	0	1	2	3	4	584.8	550.5	550.5	463.5	34.3	100 ml H ₂ O
8.0	0.005 CFM	8.0	0.005 CFM	0	0	0	0	1	2	3	4	468.6	463.5	463.5	463.5	5.1	empty
				8.5	8.5	8.5	8.5	1	2	3	4	661.5	638.7	638.7	638.7	22.8	5.1 cc Gas

PITOT LEAK CHECK	
POS.	NEG.
OK 15 sec	OK 15 sec

STACK SAMPLING DATA SHEET

PLANT: USX Clouston DATE: 6-20-90 ΔH@: 1.573 (6-12-90) HOT BOX NO.: 6
 LOCATION: Combustion Stack 14 TEST NO.: CUR-CSM-2 METER CORRECTION: 1.0579 COLD BOX NO.: 6
 ACTIVITY NO.: #52 0.556 NOZZLE: #52 0.556 PITOT CORRECTION: 0.84 PROBE NO.: 7-1
 CONTROL BOX OPERATOR: STATIC PRESSURE PS: -1.2 CONTROL BOX NO.: 1 FILTER NO.: 408
 PROBE HANDLER: PORT DIRECTION: A, B NOMOGRAPH SET POINT: STACK DIA: 120"
 CLEAN UP: BAROMETRIC PRESSURE: 29.12 LENGTHS OF UMBILICAL x 25' x 50'

Point	Time	Meter Reading (dry) CF	Velocity HD in. H ₂ O	Orifice ΔH in. H ₂ O	Meter Temp In °F Out °F	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/°F	Hot Box °F	Comments
42.7	1232	756.657	0.050	1.97	1.97	96	8.0	520	260	250	5 min pt
30.0			0.050	1.97	1.97	95	8.0	538			
21.3			0.050	1.94	1.94	95	8.0	544			
14.2			0.045	1.75	1.75	95	7.0	578			
8.0			0.040	1.85	1.85	96	6.5	458			
2.6	1302	779.514	0.025	1.04	1.04	96	4.5	447	50°F		
42.7	1306	779.514	0.045	1.76	1.76	97	7.5	521			
30.0			0.040	1.57	1.57	98	7.0	531			
21.3			0.040	1.56	1.56	99	7.0	533	56°F		
14.2			0.030	1.17	1.17	100	5.0	511			
8.0			0.025	1.00	1.00	100	5.0	510			
2.6	1336	800.364	0.040	1.60	1.60	100	7.5	496			

ORSAT

	1	2
CO ₂		
O ₂		
CO		
N		

LEAK CHECK

in. Hg.	Rate
0.5	
1	
2	
3	
4	

Impinger No.

Final Initial Difference

PITOT LEAK CHECK	1	2	3	4
POS.				
NEG.				

STACK SAMPLING DATA SHEET

PLANT USX Clinton
 LOCATION: Combustion Stack #1
 ACTIVITY NO.:
 CONTROL BOX OPERATOR:
 PROBE HANDLER:
 CLEAN UP:

DATE: 6-20-90
 TEST NO.: CR-CSR-3
 NOZZLE: #52 0.56
 STATIC PRESSURE PS: -1.2
 PORT DIRECTION: A, B
 BAROMETRIC PRESSURE: 29.12

ΔH@: 1.573 (6-12-90)
 METER CORRECTION: 1.0519
 PITOT CORRECTION: 0.84
 CONTROL BOX NO.: 1
 NOMOGRAPH SET POINT:
 LENGTHS OF UMBILICAL 25' x 50'

HOT BOX NO.: 7
 COLD BOX NO.: 7
 PROBE NO.: 7-1
 FILTER NO.: 420
 STACK DIA.: 120"

Point	Time	Meter Reading (dry) CF	Velocity HD in. H ₂ O	Orifice ΔH in. H ₂ O	Meter Temp In °F	Meter Temp Out °F	Vacuum in. Hg	Stack Temp °F	Probe Temp °F	Imp. Temp. °C/F	Hot Box °F	Comments
42.7	1402	820.541	0.035	1.36	136	94	4.5	516	260	<66°F Fuel Burn	250	5 min/pt
30.0			0.040	1.55	155	101	5.0	520				
21.3			0.040	1.55	155	103	5.0	524				
14.2			0.040	1.55	155	104	5.0	527				
8.0			0.025	0.97	0.97	104	3.5	505				
2.6	1432	821.219	0.035	1.39	139	94	5.0	496				
42.7	1435	821.219	0.045	1.78	178	102	6.0	503				
30.0			0.045	1.76	176	104	6.0	523				
21.3			0.030	1.18	118	103	4.0	528				
14.2			0.030	1.20	120	102	4.0	508				
8.0			0.030	1.20	120	102	4.0	503				
2.6	1505	841.715	0.040	1.60	160	102	5.0	493		50°F		

ORSAT

	1	2
CO ₂	11.0	11.5
O ₂	3.5	4.5
CO	0	0
N	85.5	84.0

Impinger No.

	1	2	3	4
PITOT LEAK CHECK	POS.	NEG.	15 sec	15 sec

Difference

Final	751.6	545.8	205.8	100 ml H ₂ O
Initial	554.5	522.4	32.1	100 ml H ₂ O
	451.3	447.6	3.7	empty
	661.9	644.4	17.5	Silica Gel

LEAK CHECK

in. Hg.	Rate
5.0	<0.02 CFM
6.0	0.005 CFM

**USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION
OF THE NUMBER 14 BATTERY COMBUSTION STACK**

**APPENDIX D
PARTICULATE MATTER
EMISSIONS CALCULATIONS**

Plan: Clayton Steel

Activity No. 601050-03

PARTICULATE REPORTING FORM

[illegible]

AIR QUALITY ENGINEERING

USX CLAIRTON COKE WORKS
COMBUSTION
STACK 14

DATE:6/20/90
CHARGE #: ...150-601050
TEST #:CLR-CS14-1

1. EMISSION RESULTS

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01156	3.00147

2. STACK CONDITIONS

FLOW (ACFM)	68016.
(SCFM)	35663.
MOISTURE CONTENT (%)	15.08
STACK TEMPERATURE (F)	517.1

3. SAMPLING CONDITIONS

SAMPLE TIME (MIN.)	120.0
SCFD GAS SAMPLED	75.521
PERCENT ISOKINETIC	96.80

AIR QUALITY ENGINEERING

USX CLAIRTON COKE WORKS
COMBUSTION STACK 14
CLR-CS14-1 6/20/90

FIELD DATA AND VELOCITY CALCULATIONS

POINT	TIME	METER	DELTA P	ORIFICE		METER		VACUUM	STACK	CORRECTED
		READING (DRY) CF		DELTA H	REQ ACT	DEG F	IN OUT		TEMP	VELOCITY
			IN. H2O					IN. HG.	DEG F	FT/SEC
42.7A	850.0	638.020	.040	1.46	1.46	68.	63.	6.0	516.	15.9
30.0			.035	1.27	1.27	75.	66.	6.0	522.	14.9
21.3			.035	1.27	1.27	79.	68.	6.0	527.	14.9
14.2			.035	1.30	1.30	82.	71.	6.0	531.	15.0
8.0			.035	1.30	1.30	83.	72.	6.0	494.	14.7
2.6A	920.0	656.960	.035	1.30	1.30	85.	74.	6.0	490.	14.6
47.2B	923.0	656.960	.040	1.48	1.48	84.	76.	6.0	520.	15.9
30.0			.040	1.51	1.51	87.	77.	6.0	533.	16.0
21.3			.035	1.32	1.32	89.	79.	6.0	538.	15.0
14.2			.030	1.13	1.13	89.	79.	5.0	544.	13.9
8.0			.030	1.13	1.13	90.	80.	5.0	490.	13.6
2.6B	953.0	675.535	.020	.76	.76	90.	81.	4.0	482.	11.0
42.7C	957.0	675.535	.035	1.32	1.32	86.	81.	6.0	515.	14.8
30.0			.040	1.53	1.53	91.	81.	6.0	538.	16.0
21.3			.035	1.34	1.34	91.	82.	6.0	535.	15.0
14.2			.035	1.34	1.34	92.	82.	6.0	538.	15.0
8.0			.030	1.15	1.15	93.	83.	5.0	483.	13.5
2.6C	1027.0	693.655	.010	.38	.38	91.	84.	3.0	480.	7.8
42.7D	1031.0	693.655	.040	1.53	1.53	91.	85.	6.0	524.	15.9
30.0			.040	1.53	1.53	95.	86.	6.0	543.	16.1
21.3			.040	1.52	1.52	96.	86.	6.5	550.	16.1
14.2			.040	1.52	1.52	97.	87.	6.5	554.	16.2
8.0			.030	1.14	1.14	96.	87.	5.5	483.	13.5
2.6D	1101.0	713.675	.020	.76	.76	96.	87.	4.5	480.	11.0

O R S A T

CO2	4.0	IMPINGER NO. 1	215.2
O2	10.5	2	45.4
CO	.0	3	5.2
N	85.5	4	.0
		ABSORBED H2O	18.6

CONTROL BOX CALIBRATIONS

	FACTOR	DATE
ORIFICE	1.573	6-12-90
METER	1.0519	6-12-90
PITOT	0.84	4-24-90

LEAK CHECK

	RATE	IN. HG
INITIAL LT	0.02CFM	5.0
FINAL LT	0.02CFM	6.5

CONTROL BOX NO. 1

PROBE NO. 7-2

NOZZLE NO. 52

AIR QUALITY ENGINEERING

USX CLAIRTON COKE WORKS
COMBUSTION STACK 14
CLR-CS14-1 6/20/90

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG.....	29.12
B.	AVG. DELTA H (IN H2O).....	1.26
C.	METER PRESSURE (IN. HG.).....	29.21
D.	STATIC PRESSURE (IN. H2O).....	-1.20
E.	STATIC PRESSURE (IN. HG.).....	-.088
F.	STACK PRESSURE (IN. HG.) (A+E).....	29.03
G.	STACK DIAMETER (IN.).....	120.00
H.	STACK AREA (SQ. FT.).....	78.54
	NOZZLE DIAMETER.....	.5560
I.	NOZZLE AREA (SQ. FT.).....	.001686
J.	AVG. STACK TEMP (DEG. R.).....	977.1
K.	AVG. METER TEMP (DEG. R.).....	543.6
L.	CONDENSATE VOL. (ML).....	265.8
M.	ABSORBED H2O (ML).....	18.6
N.	TOTAL H2O (ML).....	284.4
O.	METERED GAS (CF).....	75.655
P.	GAS METER CORRECTION.....	1.0519
Q.	CORRECTED METERED GAS (CF).....	79.581
R.	H2O GAS VOLUME (CF) (0.00267N(K/C).....	14.130
S.	TOTAL SAMPLED VOLUME (CF) (Q+R).....	93.712
T.	PERCENT H2O (100R/S).....	15.08
	THEORETICAL MAXIMUM.....	100.00
	PERCENT WATER USED.....	15.08
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K)).....	75.521

V. MOLECULAR WEIGHT OF STACK GAS

COMPONENT	ORSAT-DRY VOL.PCT./100	X	MOISTURE CORRECTION (1-T/100)	X	MOLECULAR WEIGHT	=	WEIGHT PER MOLE
CO2	.040	X	.8492	X	44.0	=	1.49
CO	.000	X	.8492	X	28.0	=	.00
O2	.105	X	.8492	X	32.0	=	2.85
N2	.855	X	.8492	X	28.2	=	20.48
H2O		X	T/100= .1508	X	18.0	=	2.71
MOLECULAR WEIGHT OF STACK GAS							= 27.54

W.	PITOT CORRECTION.....	.840
X.	AVERAGE CORRECTED VELOCITY (FPS).....	14.43
	[85.49*W*SQRT((J*DELTA P)/(V*F))]	
Y.	AVG. FLOW RATE (CFM) (X*H*60).....	68016.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92).....	35663.
	STACK FLOW RATE (DRY).....	30286.
AA.	SAMPLE TIME (SEC).....	7200.
BB.	PERCENT ISOKINETIC.....	96.80
	(J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	

AIR QUALITY ENGINEERING

USX CLAIRTON COKE WORKS
 COMBUSTION STACK 14
 CLR-CS14-1 6/20/90

PARAMETER	CYCLONE WT. (G)	MATL.ON FILTER(G)	INSOL.MATL. IN PROBE(G)	SOL.MATL. IN PROBE(G)
PARTICULATE	.00000	.03860	.00000	.01620

PARAMETER	INSOL.MATL. IN IMP.(G)	SOLUBLE MATL. IN IMP.(G)
PARTICULATE	.00190	.00500

PARTICULATE	.06170
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ALL MATLS.	.06170
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PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01156	3.00147

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

AIR QUALITY ENGINEERING

USX CLAIRTON COKE WORKS
COMBUSTION
STACK 14

DATE:6/20/90
CHARGE #: ...150-601050
TEST #:CLR-CS14-2

1. EMISSION RESULTS

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01607	4.51929

2. STACK CONDITIONS

FLOW (ACFM)	73645.
(SCFM)	38666.
MOISTURE CONTENT (%)	15.16
STACK TEMPERATURE (F)	515.8

3. SAMPLING CONDITIONS

SAMPLE TIME (MIN.)	120.0
SCFD GAS SAMPLED	83.939
PERCENT ISOKINETIC	99.32

AIR QUALITY ENGINEERING

USX CLAIRTON COKE WORKS
COMBUSTION STACK 14
CLR-CS14-2 6/20/90

FIELD DATA AND VELOCITY CALCULATIONS

POINT	TIME	METER READING (DRY)CF	DELTA P IN.H2O	ORIFICE DELTA H REQ ACT	METER TEMP DEG F IN OUT	VACUUM IN.HG.	STACK TEMP DEG	CORRECTED VELOCITY FFT/SEC
42.7D	1125.0	713.960	.040	1.52 1.52	97. 91.	6.0	522.	15.9
30.0			.040	1.55 1.55	100. 92.	6.0	535.	16.0
21.3			.040	1.55 1.55	100. 92.	6.0	535.	16.0
14.2			.040	1.55 1.55	100. 91.	6.0	539.	16.0
8.0			.040	1.55 1.55	101. 91.	6.0	547.	16.1
2.6D	1155.0	735.351	.035	1.36 1.36	101. 92.	5.0	489.	14.6
42.7C	1159.0	735.351	.040	1.55 1.55	97. 91.	6.0	507.	15.8
30.0			.040	1.58 1.58	101. 92.	6.0	528.	15.9
21.3			.040	1.58 1.58	101. 93.	6.0	532.	16.0
14.2			.040	1.58 1.58	103. 93.	6.0	536.	16.0
8.0			.040	1.58 1.58	103. 94.	6.0	494.	15.7
2.6C	1229.0	756.657	.025	.98 .98	104. 95.	4.0	488.	12.4
42.7B	1232.0	756.657	.050	1.97 1.97	103. 96.	8.0	520.	17.8
30.0			.050	1.97 1.97	104. 95.	8.0	538.	17.9
21.3			.050	1.94 1.94	104. 95.	8.0	544.	18.0
14.2			.045	1.75 1.75	105. 95.	7.0	518.	16.8
8.0			.040	1.65 1.65	105. 96.	6.5	458.	15.4
2.6B	1302.0	779.514	.025	1.04 1.04	104. 96.	4.5	447.	12.1
42.7A	1306.0	779.514	.045	1.76 1.76	104. 97.	7.5	521.	16.9
30.0			.040	1.57 1.57	107. 98.	7.0	531.	16.0
21.3			.040	1.56 1.56	108. 99.	7.0	533.	16.0
14.2			.030	1.17 1.17	108. 100.	5.0	511.	13.7
8.0			.025	1.00 1.00	108. 100.	5.0	510.	12.5
2.6A	1336.0	800.364	.040	1.60 1.60	108. 100.	7.5	496.	15.7

O R S A T

CO2 4.5 IMPINGER NO. 1 255.8
O2 10.3 2 34.3
CO .0 3 5.1
N 85.3 4 .0

ABSORBED H2O 22.8

CONTROL BOX CALIBRATIONS

	FACTOR	DATE
ORIFICE	1.573	6-12-90
METER	1.0519	6-12-90
PITOT	0.84	4-24-90

LEAK CHECK

	RATE	IN.HG
INITIAL LT	0.02CFM	5.0
FINAL LT	0.02CFM	8.0

CONTROL BOX NO. 1

PROBE NO. 7-1

NOZZLE NO. 52

AIR QUALITY ENGINEERING

USX CLAIRTON COKE WORKS
COMBUSTION STACK 14
CLR-CS14-2 6/20/90

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG.....	29.12
B.	AVG. DELTA H (IN H2O).....	1.54
C.	METER PRESSURE (IN. HG.).....	29.23
D.	STATIC PRESSURE (IN. H2O).....	-1.20
E.	STATIC PRESSURE (IN. HG.).....	-.088
F.	STACK PRESSURE (IN. HG.) (A+E).....	29.03
G.	STACK DIAMETER (IN.).....	120.00
H.	STACK AREA (SQ. FT.).....	78.54
	NOZZLE DIAMETER.....	.5560
I.	NOZZLE AREA (SQ. FT.).....	.001686
J.	AVG. STACK TEMP (DEG. R.).....	975.8
K.	AVG. METER TEMP (DEG. R.).....	559.0
L.	CONDENSATE VOL. (ML).....	295.2
M.	ABSORBED H2O (ML).....	22.8
N.	TOTAL H2O (ML).....	318.0
O.	METERED GAS (CF).....	86.404
P.	GAS METER CORRECTION.....	1.0519
Q.	CORRECTED METERED GAS (CF).....	90.888
R.	H2O GAS VOLUME (CF) (0.00267N(K/C).....	16.235
S.	TOTAL SAMPLED VOLUME (CF) (Q+R).....	107.123
T.	PERCENT H2O (100R/S).....	15.16
	THEORETICAL MAXIMUM.....	100.00
	PERCENT WATER USED.....	15.16
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K)).....	83.939

V. MOLECULAR WEIGHT OF STACK GAS

COMPONENT	ORSAT-DRY VOL.PCT./100	X	MOISTURE CORRECTION (1-T/100)	X	MOLECULAR WEIGHT	=	WEIGHT PER MOLE
CO2	.045	X	.8484	X	44.0	=	1.68
CO	.000	X	.8484	X	28.0	=	.00
O2	.102	X	.8484	X	32.0	=	2.78
N2	.853	X	.8484	X	28.2	=	20.40
H2O		X	T/100= .1516	X	18.0	=	2.73
MOLECULAR WEIGHT OF STACK GAS							= 27.59

W.	PITOT CORRECTION.....	.840
X.	AVERAGE CORRECTED VELOCITY (FPS).....	15.63
	[85.49*W*SQRT{(J*DELTA P)/(V*F)}]	
Y.	AVG. FLOW RATE (CFM) (X*H*60).....	73645.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92).....	38666.
	STACK FLOW RATE (DRY).....	32806.
AA.	SAMPLE TIME (SEC).....	7200.
BB.	PERCENT ISOKINETIC.....	99.32
	(J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	

AIR QUALITY ENGINEERING
 USX CLAIRTON COKE WORKS
 COMBUSTION STACK 14
 CLR-CS14-2 6/20/90

PARAMETER	CYCLONE WT. (G)	MATL.ON FILTER(G)	INSOL.MATL. IN PROBE(G)	SOL.MATL. IN PROBE(G)
PARTICULATE	.00000	.04320	.00000	.04330

PARAMETER	INSOL.MATL. IN IMP.(G)	SOLUBLE MATL. IN IMP.(G)
PARTICULATE	.00110	.00730

PARTICULATE	.09490
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ALL MATLS.	.09490
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PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.01607	4.51929

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

AIR QUALITY ENGINEERING

USX CLAIRTON COKE WORKS
COMBUSTION
STACK 14

DATE:6/20/90
CHARGE #: ...150-601050
TEST #:CLR-CS14-3

1. EMISSION RESULTS

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.00923	2.41340

2. STACK CONDITIONS

FLOW (ACFM)	66676.
(SCFM)	35293.
MOISTURE CONTENT (%)	13.58
STACK TEMPERATURE (F)	507.9

3. SAMPLING CONDITIONS

SAMPLE TIME (MIN.)	120.0
SCFD GAS SAMPLED	77.739
PERCENT ISOKINETIC	98.94

AIR QUALITY ENGINEERING
USX CLAIRTON COKE WORKS
COMBUSTION STACK 14
CLR-CS14-3 6/20/90

FIELD DATA AND VELOCITY CALCULATIONS

POINT	TIME	METER READING (DRY) CF	DELTA P IN. H2O	ORIFICE DELTA H REQ ACT	METER TEMP DEG F IN OUT	VACUUM IN. HG.	STACK TEMP DEG	CORRECTED VELOCITY FFT/SEC
42.7A	1402.0	800.541	.035	1.36 1.36	96. 94.	4.5	516.	14.6
30.0			.040	1.55 1.55	101. 94.	5.0	520.	15.6
21.3			.040	1.55 1.55	103. 94.	5.0	524.	15.7
14.2			.040	1.55 1.55	104. 94.	5.0	527.	15.7
8.0			.025	.97 .97	104. 95.	3.5	505.	12.3
2.6A	1432.0	821.219	.035	1.39 1.39	103. 94.	5.0	496.	14.4
42.7B	1435.0	821.219	.045	1.78 1.78	102. 95.	6.0	503.	16.4
30.0			.045	1.76 1.76	104. 95.	6.0	523.	16.6
21.3			.030	1.18 1.18	103. 94.	4.0	528.	13.6
14.2			.030	1.20 1.20	102. 94.	4.0	508.	13.5
8.0			.030	1.20 1.20	102. 94.	4.0	503.	13.4
2.6B	1505.0	841.715	.040	1.60 1.60	102. 94.	5.0	493.	15.4
42.7C	1510.0	841.715	.040	1.57 1.57	96. 92.	5.0	508.	15.5
30.0			.030	1.18 1.18	100. 92.	4.0	525.	13.6
21.3			.030	1.16 1.16	100. 92.	4.0	505.	13.4
14.2			.035	1.39 1.39	101. 92.	5.0	509.	14.5
8.0			.035	1.39 1.39	101. 91.	5.0	500.	14.5
2.6C	1540.0	860.920	.015	.60 .60	101. 92.	2.5	482.	9.4
42.7D	1542.0	860.920	.040	1.59 1.59	99. 92.	5.0	495.	15.4
30.0			.030	1.19 1.19	101. 93.	4.0	526.	13.6
21.3			.030	1.19 1.19	101. 93.	4.0	502.	13.4
14.2			.030	1.19 1.19	103. 93.	4.0	505.	13.4
8.0			.030	1.19 1.19	101. 93.	4.0	494.	13.4
2.6D	1612.0	880.367	.025	.99 .99	101. 93.	4.0	492.	12.2

O R S A T

CO2 11.3
O2 4.0
CO .0
N 84.8

IMPINGER NO. 1 205.8
2 32.1
3 3.7
4 .0
ABSORBED H2O 17.5

CONTROL BOX CALIBRATIONS

	FACTOR	DATE
ORIFICE	1.573	6-12-90
METER	1.0519	6-12-90
PITOT	0.84	4-24-90

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. 52

AIR QUALITY ENGINEERING

USX CLAIRTON COKE WORKS
COMBUSTION STACK 14
CLR-CS14-3 6/20/90

STACK SAMPLING CALCULATIONS

A.	BAROMETRIC PRESSURE IN. HG.....	29.12
B.	AVG. DELTA H (IN H2O).....	1.32
C.	METER PRESSURE (IN. HG.).....	29.22
D.	STATIC PRESSURE (IN. H2O).....	-1.20
E.	STATIC PRESSURE (IN. HG.).....	-.088
F.	STACK PRESSURE (IN. HG.) (A+E).....	29.03
G.	STACK DIAMETER (IN.).....	120.00
H.	STACK AREA (SQ. FT.).....	78.54
	NOZZLE DIAMETER.....	.5560
I.	NOZZLE AREA (SQ. FT.).....	.001686
J.	AVG. STACK TEMP (DEG. R.).....	967.9
K.	AVG. METER TEMP (DEG. R.).....	557.3
L.	CONDENSATE VOL. (ML).....	241.6
M.	ABSORBED H2O (ML).....	17.5
N.	TOTAL H2O (ML).....	259.1
O.	METERED GAS (CF).....	79.826
P.	GAS METER CORRECTION.....	1.0519
Q.	CORRECTED METERED GAS (CF).....	83.969
R.	H2O GAS VOLUME (CF) (0.00267N(K/C).....	13.195
S.	TOTAL SAMPLED VOLUME (CF) (Q+R).....	97.164
T.	PERCENT H2O (100R/S).....	13.58
	THEORETICAL MAXIMUM.....	100.00
	PERCENT WATER USED.....	13.58
U.	SCFD GAS SAMPLED (528*Q*C/(29.9*K)).....	77.739

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	.112	X	.8642	X	44.0	=	4.28
CO	.000	X	.8642	X	28.0	=	.00
O2	.040	X	.8642	X	32.0	=	1.11
N2	.848	X	.8642	X	28.2	=	20.65
H2O		X	T/100= .1358	X	18.0	=	2.44
MOLECULAR WEIGHT OF STACK GAS							= 28.48

W.	PITOT CORRECTION.....	.840
X.	AVERAGE CORRECTED VELOCITY (FPS).....	14.15
	[85.49*W*SQRT((J*DELTA P)/(V*F))]	
Y.	AVG. FLOW RATE (CFM) (X*H*60).....	66676.
Z.	STACK FLOW RATE (SCFM) (528*Y/J*F/29.92).....	35293.
	STACK FLOW RATE (DRY).....	30500.
AA.	SAMPLE TIME (SEC).....	7200.
BB.	PERCENT ISOKINETIC.....	98.94
	(J*100*U*29.92)/(528*X*AA*I*F*(1-T/100))	

AIR QUALITY ENGINEERING
 USX CLAIRTON COKE WORKS
 COMBUSTION STACK 14
 CLR-CS14-3 6/20/90

PARAMETER	CYCLONE WT. (G)	MATL.ON FILTER(G)	INSOL.MATL. IN PROBE(G)	SOL.MATL. IN PROBE(G)
PARTICULATE	.00000	.03800	.00000	.00760

PARAMETER	INSOL.MATL. IN IMP. (G)	SOLUBLE MATL. IN IMP. (G)
PARTICULATE	.00100	.00810

PARTICULATE	.05470
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ALL MATLS.	.05470
------------	--------

PARAMETER	GR/SCFD	LB/HR
PARTICULATE	.00923	2.41340

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

**USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION
OF THE NUMBER 14 BATTERY COMBUSTION STACK**

**APPENDIX E
ANALYTICAL RESULTS**

RJ Lee Group

The Materials Characterization Specialists

July 24, 1990

Mr. Patrick Stockton
Keystone Environmental
3000 Tech Center Drive
Monroeville, PA 15146

Re: RJ Lee Project Number: CHH007012
Customer Purchase Order: 5598

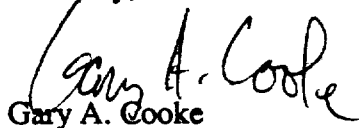
Dear Pat:

At your request, we examined 3 samples, provided by you for total sulfate (SO_4^{2-}) content. The solutions contained a mixture of isopropyl alcohol and water and were prepared for analysis by evaporation of a 100 ml aliquot to 25ml and rediluting back to the original 100ml volume. This removed the alcohol. The samples were then analyzed along with standard sulfate solutions on a Dionex 2000i ion chromatography unit. Results are calculated as milligrams per liter and then converted, total milligrams using the volumes of the solutions that you provided. These results are reported on the enclosed table. The precision of this analysis is $\pm 5\%$ of the value reported.

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of ninety (90) days before discarding. A shipping and handling fee will be assessed for the return of any samples.

If you have any questions on this report or if we can be of further assistance, please feel free to call me.

Sincerely,



Gary A. Cooke
Manager, Analytical Chemistry

GAC/ljm
Enclosure

E-1

Table I

CHH007012

For Keystone Environmental

Client Sample Number	RJ Lee Sample Number	SO ₄ ⁻² (mg/l)	Solution vol (ml)	SO ₄ ⁻² Total Mg
CLR-14CS-1	90134	31.5	750	23.6
CLR-14CS-2	90135	40.8	890	36.4
CLR-14CS-3	90136	51.9	880	45.6

Authorized Signature

Date



7/30/90

RJ Lee Group, Inc.
Headquarters

 350 Hochberg Road
 Monroeville, PA 15146

 (412) 325-1776
 FAX (412) 733-1799

**USS CLAIRTON WORKS
RESULTS OF THE
COMPLIANCE DEMONSTRATION
OF THE NUMBER 14 BATTERY COMBUSTION STACK**

**APPENDIX F
FIELD DATA SHEETS
FOR VISIBLE EMISSIONS**

VISIBLE EMISSIONS OBSERVATIONS FORM

OBSERVER: McKey

DATE: 20 June 1990

FACILITY: USC Clinton works

OBSERVATION: START TIME: 8:50 AM

END TIME: 9:50 AM

OBSERVATION POINT:

Wabash Employees Bath house lot
14

SOURCE: Battery Draft Stack

DISTANCE: 0.430'

DIRECTION FROM: S "GF"

HEIGHT: 0.200'

WIND:

SPEED: 6 m.p.h.

DIRECTION: → S E

TEMPERATURE: 61° 62°

SKY CONDITION: No 24

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: _____ FOREMAN: _____

COMMENTS: _____

14 Stack

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

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

change over

VISIBLE EMISSIONS OBSERVATIONS FORM

OBSERVER: McKay

DATE: 20 June, 1990

FACILITY: USC Clinton Works

OBSERVATION: START TIME: 9:50 AM

END TIME: 10:50 AM

OBSERVATION POINT:

Wabash Employee Bath house lot

14

SOURCE: Battery Stack

DISTANCE: @ 435'

DIRECTION FROM: S'06"

HEIGHT: @ 200'

WIND:

SPEED: 6- mph

DIRECTION: → SE

TEMPERATURE: 61°-65°

SKY CONDITION: W 2/4

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: _____ FOREMAN: _____

COMMENTS: _____

14 Stack

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

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

VISIBLE EMISSIONS OBSERVATIONS FORM

OBSERVER: McKoy

DATE: 20 June 1990

FACILITY: US 4 Clinton Works

OBSERVATION: START TIME: 10:50 AM

END TIME: 11:01

OBSERVATION POINT:

Wabash Employee Bath House lot

#14

SOURCE: Battery Stalk Stack

DISTANCE: 2400'

DIRECTION FROM: S 60° E

HEIGHT: 2200'

WIND:

SPEED: 8 mph

DIRECTION: → S-E

TEMPERATURE: 65°

SKY CONDITION: Hazy

BACKGROUND: SKY

READING CONDITIONS: Fair

COLOR OF EMISSION: N/A

TOTAL No. OF READINGS: _____

No. READINGS ≥ 20% _____

No. READINGS ≥ 60% _____

GREATEST OPACITY: _____

CREW: _____ FOREMAN: _____

COMMENTS: _____

#14 Stack

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				
13				
14				
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17				
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55				
56				
57				
58				
59				

VISIBLE EMISSIONS OBSERVATIONS FORM

OBSERVER: McKoy

DATE: 20 June, 1990

FACILITY: USC/ainton works

OBSERVATION: START TIME: 11:25

END TIME: 12:05

OBSERVATION POINT:

Wabash Emulsion Bath Plant
14

SOURCE: Battery Draft Stack

DISTANCE: 0.425'

DIRECTION FROM: S'60'W

HEIGHT: 200'

WIND:

SPEED: 10- mph

DIRECTION: → SW

TEMPERATURE: 70°-73°

SKY CONDITION: overcast

BACKGROUND: sky

READING CONDITIONS: fair

COLOR OF EMISSION: X/A

TOTAL No. OF READINGS: 240

No. READINGS ≥ 20% 0

No. READINGS ≥ 60% 0

GREATEST OPACITY: 0

CREW: _____ FOREMAN: _____

COMMENTS: _____

#14 Stack

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

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

VISIBLE EMISSIONS OBSERVATIONS FORM

OBSERVER: McKay

DATE: 20 June 1970

FACILITY: USK Clintonville

OBSERVATION: START TIME: 12:25 P.M.

END TIME: 1:25 P.M.

OBSERVATION POINT:

Wabash Employees Bath

SOURCE: #14
Battery St. Stack

DISTANCE: 0.440'

DIRECTION FROM: SE

HEIGHT: 0.200'

WIND:

SPEED: 10-15 m.p.h.

DIRECTION: SE

TEMPERATURE: 73°-78°

SKY CONDITION: Clear

BACKGROUND: Sky

READING CONDITIONS: Fair

COLOR OF EMISSION: Gray

TOTAL No. OF READINGS: 240

No. READINGS $\geq$ 20% 0

No. READINGS $\geq$ 60% 0

GREATEST OPACITY: 15%

CREW: _____ FOREMAN: _____

COMMENTS: _____

#14 Stack

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

VISIBLE EMISSIONS OBSERVATIONS FORM

OBSERVER: McKay

DATE: 20 June, 1990

FACILITY: USS Charleston works

OBSERVATION: START TIME: 1:25 PM

END TIME: 1:36

OBSERVATION POINT:

Wobash Employee Name List
at 14

SOURCE: Battery draft stock

DISTANCE: 2450'

DIRECTION FROM: S 85°

HEIGHT: 200

WIND:

SPEED: 10 m.p.h.

DIRECTION: 25°

TEMPERATURE: 74°-78

SKY CONDITION: clear

BACKGROUND: sky

READING CONDITIONS: fair

COLOR OF EMISSION: N/A

TOTAL No. OF READINGS: 49

No. READINGS $\geq$ 20% 0

No. READINGS $\geq$ 60% 0

GREATEST OPACITY: 0

CREW: _____ FOREMAN: _____

COMMENTS: _____

14 Stock

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
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VISIBLE EMISSIONS OBSERVATIONS FORM

OBSERVER: McKoy

DATE: 20 June, 1990

FACILITY: USC Clinton works

OBSERVATION: START TIME: 2:02 PM

END TIME: 3:02 PM

OBSERVATION POINT:

Wobash Employees Bath House
14

SOURCE: Battery Draft Stack

DISTANCE: 0.435'

DIRECTION FROM: S "OR"

HEIGHT: 0.200'

WIND:

SPEED: 14 m.p.h

DIRECTION: → S E

TEMPERATURE: 76°

SKY CONDITION: Overcast

BACKGROUND: Sky

READING CONDITIONS: Fair

COLOR OF EMISSION: Grey

TOTAL No. OF READINGS: 240

No. READINGS ≥ 20% 0

No. READINGS ≥ 60% 0

GREATEST OPACITY: 10%

CREW: _____ FOREMAN: _____

COMMENTS: _____

14 Stack

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	5	5	10	5
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0

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

VISIBLE EMISSIONS OBSERVATIONS FORM

OBSERVER: McKoy

DATE: 20 June, 1990

FACILITY: Miss Claire works

OBSERVATION: START TIME: 3:02 PM

END TIME: 4:02 PM

OBSERVATION POINT:

Wobash Employee Bath house Chart: 07

H

SOURCE: Battery Street Stack

DISTANCE: 0.450'

DIRECTION FROM: S. of F.

HEIGHT: 0.200'

WIND:

SPEED: 12-MPH

DIRECTION: → SE

TEMPERATURE: 76°

SKY CONDITION: overcast

BACKGROUND: sky

READING CONDITIONS: Fair

COLOR OF EMISSION: 11/A

TOTAL No. OF READINGS: 240

No. READINGS ≥ 20% 0

No. READINGS ≥ 60% 0

GREATEST OPACITY: 0

CREW: _____ FOREMAN: _____

COMMENTS: _____

14 Stack

0	0	0	0	0	:32	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	:37	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	:42	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	:47	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	:52	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	:57	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

OBSERVER: McKoy

DATE: 20 June 1990

FACILITY: USC Clinton works

OBSERVATION: START TIME: 4:02

END TIME: _____

OBSERVATION POINT: 026A :07

Wash Employee House lot
#14

SOURCE: Battery & 026A Stack

DISTANCE: 455' :12

DIRECTION FROM: S' OF stopped

HEIGHT: 200'

WIND:

SPEED: 12-mph

DIRECTION: → S.E.

TEMPERATURE: 73°

SKY CONDITION: cloud & Rain

BACKGROUND: SKY :22

READING CONDITIONS: fair

COLOR OF EMISSION: N/A

TOTAL No. OF READINGS: 44 :27

No. READINGS ≥ 20% 0

No. READINGS ≥ 60% 0

GREATEST OPACITY: 0

CREW: _____ FOREMAN: _____

COMMENTS: _____

#14 Stack

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1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
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