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

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

AP-42 Section 12.2
Reference 4
Report Sect. 4
Reference 73

Reviewed
AS

USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA

Report on

COMPLIANCE DEMONSTRATION NO. 13, 14, 15 BATTERY PUSHING EMISSIONS CONTROL

DECEMBER 1993

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Project No.: 300261-01

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EXECUTIVE SUMMARY

A demonstration of the pushing emissions control system for Batteries 13, 14, and 15 operated at USS Clairton Works was conducted on October 19, 20, and 21, 1993. The purpose of the test program was to determine (1) the particulate matter emissions rate in the exhaust of the baghouse, (2) the opacity of the plumes of the baghouse exhaust, (3) the opacity of the plume which resulted from the pushing of the coke into the hot car, and (4) the opacity of the plume which resulted from the travelling of the hot car to the quenching station. Emissions testing was conducted only when coke was pushed from an oven in Battery 13, 14, or 15.

The results of the testing showed an average particulate matter emissions rate of 0.46 pounds per hour, while the allowable emissions rate is 4.81 pounds per hour. The maximum plume opacity observed from the baghouse stacks during the test program was 5 percent. Over the three day test program, 182 pushing events (each event includes a pushing and travelling operation) were observed. A maximum plume opacity during the pushing operation greater than or equal to 20 percent was observed 12 times. A maximum plume opacity during the travelling operation greater than 10 percent was observed 12 times. Both opacities for the pushing event were greater than their specified reference values 9 times.

1.0 INTRODUCTION

As required by Paragraph V.A. (5)(f) of the amended Mon Valley Consent Decree, a demonstration of the pushing emissions control system for Batteries 13, 14, and 15 operated at USS Clairton Works was conducted on October 19, 20, and 21, 1993. A baghouse controls the emissions which result from the pushing operations from the ovens of Batteries 13, 14, and 15. The purpose of the test program was to determine (1) the particulate matter emissions rate in the exhaust of the baghouse, (2) the opacity of the plumes of the baghouse exhaust, (3) the opacity of the plume which resulted from the pushing of the coke into the hot car, and (4) the opacity of the plume which resulted from the travelling of the hot car to the quenching station. Emissions testing was conducted only when coke was pushed from an oven in Battery 13, 14, or 15.

The field work activities were completed by Chester Environmental. All test procedures were witnessed by a representative from the Allegheny County Health Department - Division of Air Quality (DAQ).

2.0 METHODOLOGIES

A test protocol was prepared by Chester Environmental and submitted to DAQ prior to the execution of the test program. A copy of the test protocol can be found in Appendix A. Specific methodologies employed in the test program are outlined below.

The baghouse exhausts through four stacks; the emissions from each of these 36 inch diameter stacks were sampled simultaneously. A total of three test runs were completed on each of the four baghouse stacks with one series of tests completed on each of the three days of testing. Testing was performed only during periods of normal plant operation.

Each traverse for each stack included 12 traverse points as calculated from EPA Method 1 (40 CFR 60 Appendix A). For each stack, sampling was conducted along a total of five traverses, or 60 traverse points, with each push sampled for the required one minute at one traverse point. Sampling was conducted on each stack through two sampling ports which are separated by 90 degrees in the same horizontal plane. Three traverses were travelled through one port, while the remaining two traverses were travelled through the other port.

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

Gas concentrations of carbon dioxide (CO_2), oxygen (O_2), and nitrogen (N_2, by difference) were measured using Fyrite apparatus as specified by EPA Method 3. Gas concentrations were used to obtain molecular weight of the process gas on a dry basis.

Percent moisture content, by volume, of the exhaust gas was measured from the weight gain of the four sample train impingers in accordance with EPA Method 4.

Particulate matter sampling was performed in accordance with EPA Method 5, the Amended Installation Permit for Nos. 13, 14, and 15 Batteries, and Sections 139.11 and 139.12 of the Pennsylvania Department of Environmental Resources (PA DER) Source Testing Manual (Revision Number 1, January 1983) with the exception that the DER

operation, the maximum plume opacity and length of time (in seconds) when the plume opacity was greater than 10 percent were recorded. Visible emissions from the baghouse stacks were recorded for one minute for each push in which emissions testing was conducted.

3.0 RESULTS

The particulate matter emissions test results have been summarized in Tables 1 through 4. The total particulate matter emissions rate for each day of testing was obtained by summing the emissions rates from each stack. The three day average particulate matter emissions rate is 2.79 pounds per hour of pushing (lb/hr pushing). Since emissions do not occur continuously, the mass emission rate has to be adjusted for the number of pushes which occurred during the testing periods. Since there were, on average, 9.85 pushes of coke per hour, and each push was sampled for one minute, the actual emission rate (based on a continuous operation) is equal to the following:

$$\frac{2.79\ \text{lb}}{\text{hr pushing}} \times \frac{1\ \text{hr pushing}}{60\ \text{min pushing}} \times \frac{1\ \text{min pushing}}{1\ \text{push}} \times \frac{9.85\ \text{pushes}}{\text{hr}} = 0.46\ \text{lb/hr}$$

The allowable particulate matter emissions rate is equal to the lowest allowable emission rate standard (LAER) of 0.040 pounds per ton of coke pushed. Since there were on average 12.20 tons of coke per oven, and on average 9.85 ovens were pushed per hour, the particulate matter emissions rate is equal to (0.040 lbs / ton coke pushed) x (12.20 tons coke pushed / oven) x (9.85 ovens pushed / hour), or 4.81 lb/hr. Thus, the average particulate matter emissions rate determined in the test program is less than the allowable emissions rate.

Tables 1 through 3 also list other pertinent stack and sampling parameters including the exhaust gas flow rate in units of actual cubic feet per minute (acfm), standard cubic feet per minute (scfm), and dry standard cubic feet per minute (dscfm), moisture content of the exhaust gas, exhaust gas temperature, gas volume sampled for each test (dscf), and the isokinetics value for each test. The isokinetics value is equal to the ratio of the average linear gas velocity sampled through the probe nozzle to the average exhaust gas velocity. An isokinetics value between 90 percent and 110 percent is considered acceptable. All sample volumes were greater than 30 dscf per test. All isokinetics values were within the acceptable range.

The plume opacity data has been summarized in Table 5. The maximum plume opacity observed from the baghouse stacks during the test program was 5 percent. Over the three day test program, 182 pushing events (each event includes a pushing and travelling

operation) were observed. A maximum plume opacity during the pushing operation greater than or equal to 20 percent was observed 12 times. A maximum plume opacity during the travelling operation greater than 10 percent was observed 12 times. Both opacities for the pushing event were greater than their specified reference values 9 times.

A pushing performance or travel performance of 100 percent was registered if the maximum plume opacity observed during the pushing or travelling operation was less than 20 percent or less than or equal to 10 percent, respectively. A pushing performance or travel performance of 0 percent was registered if the maximum plume opacity was greater than or equal to 20 percent or greater than 10 percent, respectively. The average pushing performance for test program was 93.4 percent, while the average travel performance was also 93.4 percent. During the pushing operation, the plume opacity was greater than or equal to 20 percent for an average of 0.5 seconds. During the travelling operation, the plume opacity was greater than 10 percent for an average of 0.8 seconds.

All testing was performed during periods of normal plant operation. Copies of the field data sheets can be found in Appendix A. Copies of the plant operational data for each day of the test program for Batteries 13, 14, and 15 can be found in Appendix B.

All sampling equipment was calibrated and operated in accordance with EPA Methods 1 through 5. Copies of the pre-test calibration results, post-test calibration results, and results of an audit of the control boxes conducted with a critical orifice provided by DAQ can be found in Appendix A.

The analytical results and emissions calculations for each test can be found in Appendix C.

USS CLAIRTON WORKS
CLAIRTON, PA

TABLE 1

BATTERIES 13, 14, AND 15
PUSHING EMISSIONS CONTROL SYSTEM
PARTICULATE MATTER EMISSIONS DATA

DAY 1
TEST DATE: 10-19-93
TEST TIME: 0905 TO 1520

Stack Number Test Number		2-1 CLR-2-1-1	2-2 CLR-2-2-1	2-3 CLR-2-3-1	2-4 CLR-2-4-1	Total
Mass Emission Rate and Concentration						
Particulate Matter	(lb/hr pushing)	0.42	0.84	1.00	1.64	3.90
	(gr/dscf)	0.0017	0.0036	0.0046	0.0078	
Stack Conditions						
Flow Rate	(acfm)	31900	31000	28700	27400	
	(scfm)	28700	27700	25900	25000	
	(dscfm)	28100	27200	25400	24500	
Temperature	(°F)	118	122	117	111	
Moisture Content	(%)	2.0	1.9	2.0	1.9	
Sampling Conditions						
Sampling Time	(minutes)	60	60	60	60	
Sample Volume	(dscf)	45.872	46.779	37.506	35.590	
Isokinetics	(%)	97.6	100.9	95.3	91.6	

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TABLE 2

BATTERIES 13, 14, AND 15
PUSHING EMISSIONS CONTROL SYSTEM
PARTICULATE MATTER EMISSIONS DATA

DAY 2
TEST DATE: 10-20-93
TEST TIME: 0810 TO 1413

Stack Number Test Number		2-1 CLR-2-1-2	2-2 CLR-2-2-2	2-3 CLR-2-3-2	2-4 CLR-2-4-2	Total
Mass Emission Rate and Concentration						
Particulate Matter	(lb/hr pushing)	0.31	0.48	0.66	0.65	2.10
	(gr/dscf)	0.0013	0.0021	0.0030	0.0031	
Stack Conditions						
Flow Rate	(acfm)	31900	31100	28700	27400	
	(scfm)	28800	27700	25900	25100	
	(dscfm)	28100	27100	25300	24500	
Temperature	(°F)	116	124	116	108	
Moisture Content	(%)	2.4	2.3	2.3	2.3	
Sampling Conditions						
Sampling Time	(minutes)	60	60	60	60	
Sample Volume	(dscf)	46.164	47.030	37.003	37.384	
Isokinetics	(%)	98.3	101.9	94.3	96.2	

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TABLE 3

BATTERIES 13, 14, AND 15
PUSHING EMISSIONS CONTROL SYSTEM
PARTICULATE MATTER EMISSIONS DATA

DAY 3
TEST DATE: 10-21-93
TEST TIME: 0758 TO 1412

Stack Number Test Number		2-1 CLR-2-1-3	2-2 CLR-2-2-3	2-3 CLR-2-3-3	2-4 CLR-2-4-3	Total
Mass Emission Rate and Concentration						
Particulate Matter	(lb/hr pushing)	0.37	0.47	0.72	0.80	2.36
	(gr/dscf)	0.0015	0.0021	0.0033	0.0044	
Stack Conditions						
Flow Rate	(acfm)	32100	30700	28900	23900	
	(scfm)	28600	27100	25700	21600	
	(dscfm)	28000	26500	25100	21100	
Temperature	(°F)	121	126	121	112	
Moisture Content	(%)	2.2	2.2	2.3	2.2	
Sampling Conditions						
Sampling Time	(minutes)	60	60	60	60	
Sample Volume	(dscf)	47.083	44.371	36.389	33.059	
Isokinetics	(%)	100.7	98.1	93.5	98.8	

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TABLE 4

BATTERIES 13, 14, AND 15
PUSHING EMISSIONS CONTROL SYSTEM
PARTICULATE MATTER EMISSIONS DATA

SUMMARY OF DAYS 1, 2, AND 3

Day	Test Date	Particulate Matter Emissions (lb/hr pushing)
1	10-19-93	3.90
2	10-20-93	2.10
3	10-21-93	2.36
Average		2.79

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TABLE 5

13, 14, AND 15 BATTERY PUSHING EMISSIONS CONTROL
VISIBLE EMISSIONS DATA SUMMARY

Baghouse Stacks

Observation Date	Number of Observations	Greatest Opacity (%)
10-19-93	1440	5
10-20-93	1344	0
10-21-93	1496	0

Pushing Operation

Observation Date	Number of Observations	Number of Observations with Opacity >=20%	Pushing Performance (%)	Average Time with Opacity > 20% (sec)
10-19-93	60	3	95.0	0.3
10-20-93	60	5	91.7	0.9
10-21-93	62	4	93.5	0.3
Average			93.4	0.5

Travelling Operation

Observation Date	Number of Observations	Number of Observations with Opacity >10%	Travelling Performance (%)	Average Time with Opacity >10% (sec)
10-19-93	60	5	91.7	0.6
10-20-93	60	5	91.7	1.5
10-21-93	62	2	96.8	0.4
Average			93.4	0.8

COMPLIANCE DEMONSTRATION
NO. 13, 14, 15 BATTERY
PUSHING EMISSIONS CONTROL

USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA

APPENDIX A

TEST PROTOCOL, FIELD DATA SHEETS, CALIBRATION RESULTS

TEST PROTOCOL
COMPLIANCE DEMONSTRATION
NOS. 13, 14, 15 BATTERY PEC

USS CLAIRTON WORKS
CLAIRTON, PA

As required by the amended Mon Valley Consent Decree (Paragraph V.A.(5)(f)), a compliance demonstration will be conducted on the baghouse which controls the pushing emissions from Batteries 13, 14, and 15 operated at USS Clairton Works. The purposes of this testing are to (1) determine the particulate matter emission rates and concentrations from the exhaust stacks of the baghouse, (2) compare the measured particulate matter emissions rate with the allowable particulate matter emissions rate, (3) determine the presence of visible emissions from the baghouse stacks, and (4) measure the opacity of the plumes which result from the pushing of the coke into the hot car and during the travelling of the hot car to the quenching station. The three day test program will be performed during periods of normal plant production and operation.

Particulate matter sampling will be performed in accordance with EPA Stationary Source Sampling Methods 1 through 5, the Amended Installation Permit for Nos. 13, 14, and 15 Batteries, requirements set forth in Chapter 18, Section F of the Allegheny County Health Department Bureau of Air Quality (BAQ) Source Testing Manual, and Sections 139.11 and 139.12 of the Pennsylvania Department of Environmental Resources (PA DER) Source Testing Manual (Revision Number 1, January 1983) with the exception that the PA DER requirement of 50 dry standard cubic feet sample volume of exhaust gas will be replaced with the requirement of sampling the emissions from 60 pushes. The emissions from each push will be sampled for 1 minute. Thus, a total of 60 minutes of sampling will be completed. A total of three test runs (one test run per day) will be performed for each of the 4 stacks of the baghouse with all stacks being tested simultaneously.

The baghouse exhausts through four individual stacks. All of the stacks measure 36 inches internal diameter. Each diametral traverse for the stack will include 12 traverse points as calculated by EPA Stationary Source Sampling Method 1. Sampling will conducted along a total of 5 traverses, or 60 traverse points, with each push sampled for the required 1 minute at one traverse point. Sampling will be conducted through 2 sampling ports which are separated

by 90 degrees in the same horizontal plane. Three traverses will be performed through one port, while the remaining two traverses will be performed through the other port.

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

During each test, gas concentrations of carbon dioxide (CO_2), oxygen (O_2), and nitrogen (N_2, by difference), will be determined with the use of a Bacharach "Fyrite" apparatus as specified by EPA Method 3. Gas concentrations will be used to obtain molecular weight of the exhaust gas on a dry basis.

Percent moisture content, by volume, of the exhaust gas will determined by measuring the weight gain of the four sample train impingers in accordance with EPA Method 4.

As specified by EPA Method 5, each sample train will be assembled as required by the method, leak-checked on site at the beginning and end of each test run, and operated such that isokinetic conditions are maintained. Clean up of the sampling train will include a water rinse followed by an acetone rinse of both the front-half and back-half components of the sample train, as per Section 139.12 of the PA DER particulate matter test methods. The water soluble and water insoluble portions of the front-half of the sampling train will be determined as a total; that is, the water rinse will not be filtered to determine soluble and insoluble portions. Front-half acetone and water rinses will be evaporated to dryness, desiccated, and weighed to a constant weight. The water soluble and water insoluble portions of the back-half will be determined separately in accordance with Section 139.12 of the PA DER Source Testing Manual. The back-half water rinses and first three impinger solutions will be combined and then filtered under suction through a preweighed 0.22 micrometer membrane filter. The filter used to capture the insoluble material will be dried, desiccated, and weighed to a constant weight. After filtration, the soluble back-half water will be extracted with chloroform and ethyl ether. The extracts will be evaporated to dryness, desiccated, and weighed to a constant weight. The filtrate, or remaining water from the extraction process, will then evaporated to dryness, desiccated, and weighed to a constant weight. The filtrate extract will then be

solubilized with 100 mL distilled deionized water and submitted for sulfate analysis via ion chromatography. Back-half acetone rinses will be evaporated to dryness, desiccated, and weighed to a constant weight. Sample train filters will be desiccated for 24 hours, and particulate matter weight will be determined gravimetrically. Rinse residue weights and filter weights will be measured to the nearest 0.1 mg. One acetone blank and one deionized distilled water blank will be prepared in the same manner as the test sample rinses. The blank residue weights will be subtracted from the test sample residue weights. After blank correction, front-half water and acetone rinse residue weights, sample train filter weights, and back-half water insoluble filter weights will be used to determine total particulate matter catch.

All visible emissions determinations from the baghouse exhausts stacks will be performed in accordance with EPA Stationary Source Sampling Method 9 and BAQ Method 18F. Visible emissions will be recorded for the duration of each of the sixty oven pushes. All plume opacity measurements will also be performed in accordance with EPA Method 9 and BAQ Method 18F. During the pushing operation, the maximum plume opacity and length of time (in seconds) when the plume opacity is greater than or equal to 20 percent will be recorded. During the travelling operation, the maximum plume opacity and length of time (in seconds) when the plume opacity is greater than 10 percent will be recorded.

A report summarizing the compliance test program will be submitted within 60 days following completion of the field work. The report will describe test methodologies utilized and present a textual and tabular summary of the emissions results and related sampling information. Copies of operational data will be included in the report to verify that all testing was performed during periods of normal plant operation. Also incorporated into the report will be copies of the pre-test calibration results, post-test calibration results, the results of an audit conducted with a critical orifice provided by the BAQ, field data sheets for the particulate matter sampling and visible emissions determinations, emissions calculation sheets, and analytical results for each test.

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 300261-61
TEST CREW M. G & TD
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CLR-2-1-1
NOZZLE (SIZE,#) 0.190" Glass
STATIC PRESSURE +.90" H2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.673
METER CORRECTION (Y) 0.9912
CALIBRATION DATE 5-19-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 4

HOT/COLD BOX NO. 8
PROBE NO. 5-4
FILTER NO. 1109
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		526.975	1.9	2.19	2.19	58	56	4.0	117	~250	<68	~250	1 min./point
33.6		527.676	2.0	2.31	2.31	60	59	4.0	115				
31.7		528.470	1.7	1.97	1.97	58	58	3.5	117				
29.6		529.222	1.9	2.21	2.21	58	58	3.5	117				
27.0		530.017	1.5	1.74	1.74	59	58	3.0	115				
23.2		530.741	1.6	1.86	1.86	59	59	3.0	113				
12.8		531.518	1.4	1.63	1.63	60	60	3.0	117				
9.0		532.245	1.4	1.63	1.63	61	60	3.0	119				
6.4		532.950	1.2	1.39	1.39	61	60	3.0	119				
4.3		533.572	1.2	1.39	1.39	61	61	3.0	119				
2.4		534.260	1.0	1.16	1.16	62	62	3.0	114				
1.0		534.911	1.1	1.28	1.28	64	64	3.0	114				
		535.526											
			(1.474)		(1.70)		(59.8)		(116.3)				
													Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.0	.002
After	6.0	.011

PITOT LEAK CHECK 15sec

	Positive	Negative
Before	OK	OK
After	OK	OK

GAS	1	2
CO2	—	
O2	20.5	Air
CO	—	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100mL D.I. H2O	550.8	542.0	8.8
2.	100mL D.I. H2O	539.8	537.7	2.1
3.	Empty	440.5	439.6	0.9
4.	Silica Gel	656.0	648.3	7.7
5.				
6.			total=	19.5g
7.				
8.				

11.8g

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 300061-01
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CLR-2-1-1
NOZZLE (SIZE,#) 0.190"
STATIC PRESSURE 0.9" H_2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.673
METER CORRECTION (Y) 0.9912
CALIBRATION DATE 5-19-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 4

HOT/COLD BOX NO. 8
PROBE NO. 5-4
FILTER NO. 1109
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		535.526	1.1	1.28	1.28	65	65	3.0	113	~250	<68	~250	1 min./point
2.4		536.158	1.1	1.28	1.28	65	65	3.0	114				
4.3		536.838	1.0	1.16	1.16	66	65	3.0	119				
6.4		537.468	1.2	1.40	1.40	67	66	3.5	118				
9.0		538.158	1.3	1.51	1.51	68	68	3.5	119				
12.8		538.957	1.4	1.63	1.63	68	67	3.5	119				
23.2		539.752	1.6	1.86	1.86	68	67	3.5	118				
27.0		540.527	1.7	1.98	1.98	68	68	3.5	119				
29.6		541.354	1.9	2.21	2.21	69	68	4.0	118				
31.7		542.223	2.1	2.45	2.45	69	68	4.0	113				
33.6		543.107	2.0	2.33	2.33	70	69	4.0	114				
35.0		544.007	2.1	2.45	2.45	71	70	4.0	113				
		544.862											
			(1.516)		(1.76)		(67.5)		(116.4)				Estimates:
													MW=28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 30261-01
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CR-2-1-1
NOZZLE (SIZE,#) 0.190"
STATIC PRESSURE 1.0" H2O
PORT DIRECTION WEST

ORIFICE CORRECTION (ΔH@) 1.673
METER CORRECTION (Y) 0.9912
CALIBRATION DATE 5-19-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 4

HOT/COLD BOX NO. 8
PROBE NO. 5-4
FILTER NO. 1109
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		544.862	2.1	2.50	2.50	71	70	4.0	116	~250	<68	~250	1 min./point
33.6		545.741	2.0	2.38	2.38	71	69	4.0	118				
31.7		546.620	2.0	2.38	2.38	71	69	4.0	118				
29.6		547.601	1.9	2.26	2.26	71	70	4.0	118				
27.0		548.480	1.7	2.02	2.02	71	70	3.5	118				
23.2		549.305	1.5	1.78	1.78	71	71	3.5	118				
12.8		550.103	1.5	1.78	1.78	71	70	3.5	118				
9.0		550.860	1.3	1.55	1.55	72	72	3.5	120				
6.4		551.681	1.2	1.43	1.43	73	72	3.5	120				
4.3		552.356	1.2	1.43	1.43	73	73	3.5	120				
2.4		553.033	1.0	1.19	1.19	73	73	3.0	118				
1.0		553.694	1.0	1.19	1.19	74	73	3.0	117				
		554.341											
			(1.509)		(1.80)		(71.3)		(118.3)				Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13 - 15 Battery Pce
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CLR-2-1-1
NOZZLE (SIZE,#) 0.190"
STATIC PRESSURE 1.0" H2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.673
METER CORRECTION (Y) 0.9912
CALIBRATION DATE 5-19-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 2

HOT/COLD BOX NO. 8
PROBE NO. 5-4
FILTER NO. 1109
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0	5	554.341	2.1	2.50	2.50	74	73	4.0	120	~250	<68	~250	1 min./point
33.6		555.260	2.1	2.50	2.50	74	73	4.0	122				
31.7		556.085	2.0	2.38	2.38	74	73	4.0	123				
29.6		556.955	1.9	2.24	2.24	74	73	4.0	121				
27.0		557.823	1.8	2.12	2.12	74	74	4.0	123				
23.2		558.646	1.6	1.89	1.89	75	74	3.5	123				
18.8		559.449	1.4	1.65	1.65	75	74	3.5	124				
9.0		560.206	1.3	1.53	1.53	76	74	3.5	122				
6.4		560.923	1.4	1.65	1.65	76	74	3.5	123				
4.3		561.680	1.4	1.65	1.65	77	75	3.5	119				
2.4		562.423	1.4	1.65	1.65	77	75	3.5	118				
1.0		563.207	1.4	1.65	1.65	77	75	3.5	118				
		563.948											
			(1.637)		(1.93)		(74.58)		(121.3)				

Estimates:
MW= 28.8
%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery TEC
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-9-93
TEST NO. CLR-2-1-1
NOZZLE (SIZE,#) 0.190"
STATIC PRESSURE 1.0 "H2O
PORT DIRECTION SOUTH

ORIFICE CORRECTION (ΔH@) 1.673
METER CORRECTION (Y) 0.9912
CALIBRATION DATE 5-19-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 4

HOT/COLD BOX NO. 8
PROBE NO. 5-4
FILTER NO. 7109
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		563.948	1.3	1.53	1.53	78	76	3.5	117	~250	<68	~250	1 min./point
2.4		564.711	1.5	1.78	1.78	78	76	3.5	118				
4.3		565.473	1.5	1.78	1.78	78	76	3.5	117				
6.4		566.258	1.5	1.78	1.78	78	76	3.5	117				
9.0		567.036	1.5	1.78	1.78	78	76	3.5	118				
12.8		567.825	1.4	1.66	1.66	78	76	3.5	118				
23.2		568.554	1.5	1.78	1.78	77	75	3.5	118				
27.0		569.326	1.7	2.02	2.02	77	75	4.0	117				
29.6		570.223	2.0	2.38	2.38	75	74	4.0	114				
31.7		571.128	2.1	2.50	2.50	75	74	4.0	115				
33.6		572.046	2.2	2.70	2.70	76	74	4.0	114				
35.0		573.048	2.1	2.50	2.50	75	74	4.0	115				
		573.953											
Test	Δ=60	Δ=46.978	(ΔP)Avg =	(ΔH)Avg =		(Tmeter)Avg =			(Tstack)Avg = 118°F				
Averaged	min	dcf	~~1.678~~	~~2.00~~		~~76.0~~			~~116.5~~				Estimates:
H Values				1.86		75°F							MW= 28.8
			1.6										%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Tar
PROJECT NO. 300261-011
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-29-93
TEST NO. CL2-2-2-1
NOZZLE (SIZE,#) 0.192"
STATIC PRESSURE 0.2" H2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.572
METER CORRECTION (Y) 1.0151
CALIBRATION DATE 7-2-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 3

HOT/COLD BOX NO. 6
PROBE NO. 5-3
FILTER NO. 1111
STACK DIA. 76"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		357.365	1.9	2.16	2.16	64	64	4.0	120	~250	<68	~250	1 min./point
33.6		358.283	2.0	2.27	2.27	66	66	4.0	116				
31.7		359.081	1.8	2.04	2.04	70	66	4.6	116				
29.6		359.735	1.6	1.84	1.84	70	66	4.5	118				
27.0		360.501	1.8	2.07	2.07	70	66	4.6	120				
23.2		361.301	1.81	2.10	2.10	70	66	4.8	110				
12.8		362.154	1.4	1.61	1.61	74	66	4.5	120				
9.0		363.001	1.4	1.61	1.61	74	66	4.0	120				
6.4		363.809	1.2	1.24	1.24	76	68	3.8	120				
4.3		364.501	1.2	1.39	1.39	76	68	3.8	118				
2.4		365.325	0.90	1.08	1.08	78	68	3.2	100				
1.0		366.038	0.80	.96	.96	78	68	3.0	100				
		366.720											
			(1.457)	(1.64)		72.17	66.5		(114.83)				
						(69.4)							Estimates:
													MW=28.8
													%H2O= 1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5 ~~.009~~	.009
After	6.0	0.009

PITOT LEAK CHECK 15 sec

	Positive	Negative
Before	OK	OK
After	OK	OK

GAS	1	2
CO2	—	
O2	20.5	Air
CO	—	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100mL D.I. H2O	549.8	543.1	6.7
2.	100mL D.I. H2O	486.8	482.4	3.4
3.	Empty	463.7	462.7	1.0
4.	Silica Gel	651.3	642.9	8.4
5.				
6.			total	= 19.5g
7.				
8.				

11.1g

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-19-93	ORIFICE CORRECTION (ΔH@) 1.572	HOT/COLD BOX NO. 6
TEST UNIT 13-15 Battery PEC	TEST NO. CLR-2-2-1	METER CORRECTION (Y) 1.0151	PROBE NO. 5-3
PROJECT NO. 300261-61	NOZZLE (SIZE,in) 0.192"	CALIBRATION DATE 7-2-93	FILTER NO. 1111
TEST CREW	STATIC PRESSURE 0.90 H_2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.45	PORT DIRECTION WEST	CONTROL BOX NO. 3	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		366.720	.80	.96	.96	78	68	3.0	108	~250	<68	~250	1 min./point
2.4		367.316	.90	1.08	1.08	78	68	3.0	108				
4.3		367.961	1.10	1.32	1.32	80	70	3.5	108				
6.4		368.615	1.30	1.49	1.49	80	70	3.5	126				
9.0		369.356	1.35	1.55	1.55	80	70	4.0	125				
12.8		370.154	1.40	1.60	1.60	80	70	4.0	128				
23.2		370.999	1.40	1.60	1.60	82	70	4.0	126				
27.4		371.654	1.60	1.84	1.84	82	70	4.2	125				
29.6		372.468	1.80	2.08	2.08	84	72	4.5	126				
31.7		373.332	1.90	2.20	2.20	84	72	4.8	126				
33.6		374.248	2.00	2.31	2.31	84	72	5.0	126				
35.0		375.186	2.00	2.31	2.31	84	72	5.0	126				
		375.944											
						81.3	70.3		121.5				
			(1.435)	1.67			(75.8)						Estimates:
				1.67									MW=28.8
													%H2O=1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USI Clairton Works
TEST UNIT 12-15 Battery PCC
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CLR-2-2-1
NOZZLE (SIZE,#) 0.192"
STATIC PRESSURE 0.90" H2O
PORT DIRECTION Left

ORIFICE CORRECTION (ΔH@) 1.572
METER CORRECTION (Y) 1.0151
CALIBRATION DATE 7-2-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 3

HOT/COLD BOX NO. 6
PROBE NO. 5-3
FILTER NO. 111
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		375.944	2.00	2.31	2.31	84	72	5.0	125	~250	68	~250	1 min./point
33.6		376.852	2.10	2.43	2.43	84	72	5.2	124				
31.7		377.881	1.90	2.20	2.20	84	72	5.0	124				
29.6		378.755	1.90	2.20	2.20	84	73	5.0	122				
27.0		379.645	1.80	2.09	2.09	84	73	4.5	123				
23.2		380.458	1.80	2.09	2.09	84	74	4.5	124				
12.8		381.342	1.45	1.68	1.68	84	74	3.8	124				
9.0		382.196	1.40	1.63	1.63	84	74	3.7	125				
6.4		382.873	1.20	1.40	1.40	85	75	3.4	124				
4.3		383.605	1.20	1.40	1.40	85	75	3.4	124				
2.4		384.264	.95	1.11	1.11	85	75	3.1	124				
1.0		384.931	.90	1.05	1.05	84	75	3.0	122				
		385.576											
						84.2	73.6		123.7				
			1.522		(1.77)	(78.9)							
													Estimates:
													MW=28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

1.16

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-19-93	ORIFICE CORRECTION (ΔH@) 1.572	HOT/COLD BOX NO. 6
TEST UNIT 13-15 Battery TEE	TEST NO. CLR-2-2-1	METER CORRECTION (Y) 1.0151	PROBE NO. 5-3
PROJECT NO. 300261-01	NOZZLE (SIZE,#) D. 1.92"	CALIBRATION DATE 7-2-93	FILTER NO. 1111
TEST CREW	STATIC PRESSURE 0.90"	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.45	PORT DIRECTION SOUTH	CONTROL BOX NO. 3	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		385.576	1.95	2.26	2.26	84	74	4.5	126	~250	<68	~250	1 min./point
33.1		386.482	1.95	2.26	2.26	84	74	4.5	126				
31.7		387.373	1.95	2.26	2.26	86	76	4.6	126				
29.6		388.248	1.90	2.21	2.21	86	76	4.6	126				
27.0		389.167	1.80	2.10	2.10	88	76	4.4	126				
23.2		390.059	1.45	1.69	1.69	88	76	3.9	126				
12.8		390.861	1.30	1.51	1.51	88	78	3.5	127				
9.0		391.635	1.30	1.51	1.51	88	78	3.5	127				
6.4		392.354	1.40	1.63	1.63	88	80	3.7	127				
4.3		393.164	1.20	1.41	1.41	89	81	3.3	123				
2.4		394.005	.90	1.06	1.06	89	81	3.0	123				
1.0		394.785	.85	1.00	1.00	89	81	3.0	123				
		395.289											
						87.2	77.6		125.5				
			1.47		(1.70)	(82.4)							
													Estimates:
													MW= 28.8
													%H2O= 2

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-19-93	ORIFICE CORRECTION (ΔH@) .572	HOT/COLD BOX NO. 6
TEST UNIT 13-15 Battery PEC	TEST NO. CLR-2-2-1	METER CORRECTION (Y) 1.0251	PROBE NO. 5-3
PROJECT NO. 300261-01	NOZZLE (SIZE,#) 0.192"	CALIBRATION DATE 7-2-93	FILTER NO. 1111
TEST CREW	STATIC PRESSURE .90 H2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.45	PORT DIRECTION South	CONTROL BOX NO. 3	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		395.289	1.00	1.18	1.18	89	81	3.1	123	~250	<68	~250	1 min./point
2.4		395.928	1.00	1.18	1.18	89	81	3.1	123				
4.3		396.618	1.30	1.52	1.52	89	81	3.5	125				
6.4		397.329	1.40	1.64	1.64	89	81	3.9	125				
9.0		398.194	1.40	1.64	1.64	89	81	3.9	126				
12.8		398.968	1.60	1.88	1.88	88	81	4.1	126				
23.2		399.730	1.65	1.93	1.93	88	81	4.2	126				
27.0		400.535	1.85	2.16	2.16	86	80	4.9	125				
29.6		401.422	1.90	2.22	2.22	85	78	5.0	123				
31.7		402.286	2.00	2.34	2.34	85	78	5.0	123				
33.6		403.146	2.10	2.46	2.46	84	76	5.1	120				
35.0		404.024	1.95	2.28	2.28	84	76	5.0	120				
		404.862											
						~~89.1~~	~~79.6~~		~~123.7~~				
Test	Δ=60	Δ=47.497	~~1.843~~		(~~2.16~~)	(~~83.3~~)							
Averages	min	dcf	$(\Delta P)_{Avg}$=	$(\Delta H)_{Avg}$ = 1.76		$(T_{Meter})_{Avg}$ = 78°F			$(T_{Stack})_{Avg}$ = 122°F				Estimates:
& Values													MW=28.8
			1.50										%H2O= 1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	6.0	.009
After		

PITOT LEAK CHECK 15 SEC

	Positive	Negative
Before		
After	OK	OK

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery REC
PROJECT NO. 300261-011
TEST CREW
BAROMETRIC PRESSURE 29.75

TEST DATE 10-19-93
TEST NO. CLR - 2-3-1
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 1.0" H2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 2
PROBE NO. 5-1
FILTER NO. 1107
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (Inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		756.360	1.5	1.56	1.56	68	62	2.5	116	~250	<68	~250	1 min./point
33.6		757.023	1.6	1.66	1.66	69	63	2.5	113				
31.7		757.750	1.7	1.76	1.76	70	64	3.0	116				
29.6		758.460	1.7	1.76	1.76	71	65	3.0	118				
27.0		759.229	1.4	1.48	1.48	71	65	2.0	116				
23.2		759.917	1.3	1.37	1.37	71	66	2.0	114				
12.8		760.570	1.2	1.27	1.27	71	66	2.0	118				
9.0		761.190	1.2	1.27	1.27	72	67	2.0	118				
6.4		761.813	1.2	1.27	1.27	72	67	2.0	118				
4.3		762.442	1.2	1.27	1.27	73	68	2.0	118				
2.4		763.090	1.0	1.06	1.06	74	68	2.0	107				
1.0		763.655	0.9	0.95	0.95	75	70	2.0	106				
		764.178											
													Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.0	0.005
After	5.0	0.010

PITOT LEAK CHECK 15 sec.

	Positive	Negative
Before	OK	OK
After		

GAS	1	2
CO2	0	
O2	20.5	
CO	0	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100mL D.I. H2O	475.4	467.7	7.7
2.	100mL D.I. H2O	554.8	553.3	1.5
3.	Empty	441.7	441.1	0.6
4.	Silica Gel	591.8	585.8	6.0
5.				
6.			Total =	15.8g
7.				
8.				

9.8g

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Pee
PROJECT NO. 300261-011
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-17-93
TEST NO. CLP-2-3-1
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 1.0" H2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 2
PROBE NO. 5-1
FILTER NO. 7107
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		764.178	0.8	0.84	0.84	76	70	1.5	109	~250	<68	~250	1 min./point
2.4		764.707	0.9	0.95	0.95	76	72	2.0	111				
4.3		765.252	1.0	1.06	1.06	78	72	2.0	113				
6.4		765.850	1.1	1.17	1.17	77	72	2.0	120				
9.0		766.419	1.1	1.17	1.17	75	71	2.0	119				
12.8		767.000	1.3	1.39	1.39	76	71	2.5	119				
23.2		767.667	1.3	1.39	1.39	76	71	2.5	118				
27.0		768.304	1.4	1.49	1.49	77	72	2.5	119				
29.6		768.965	1.5	1.60	1.60	77	72	3.0	119				
31.7		769.655	1.8	1.92	1.92	78	75	4.5	110				
33.6		770.416	1.8	1.92	1.92	78	74	4.5	111				
35.0		771.180	1.8	1.92	1.92	78	75	4.5	112				
		771.950											

Estimates:
MW=28.8
%H2O=1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Pet
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CLR-2-3-1
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 1.0" H2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 2
PROBE NO. 5-1
FILTER NO. 1107
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		771.950	1.5	1.60	1.60	78	74	3.0	115	~250	<68	~250	1 min./point
33.6		772.648	1.7	1.83	1.83	79	75	3.5	117				
31.7		773.397	1.6	1.72	1.72	79	74	3.0	117				
29.6		774.120	1.5	1.61	1.61	80	75	3.0	118				
27.0		774.872	1.4	1.61	1.51	81	75	2.8	118				
23.2		775.567	1.3	1.40	1.40	82	77	2.5	119				
12.8		776.218	1.2	1.29	1.29	82	77	2.5	120				
9.0		776.844	1.4	1.51	1.51	82	78	3.0	120				
6.4		777.524	1.3	1.40	1.40	82	78	2.5	121				
4.3		778.208	1.3	1.40	1.40	82	78	2.8	120				
2.4		778.872	0.9	0.97	0.97	80	77	2.0	118				
1.0		779.432	0.8	0.86	0.86	79	76	1.8	116				
		779.956											

Estimates:
MW=28.8
%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-19-93	ORIFICE CORRECTION (ΔH@) 1.84	HOT/COLD BOX NO. 2
TEST UNIT 13-15 Battery Pec	TEST NO. CLR-2-3-1	METER CORRECTION (Y) 0.9832	PROBE NO. 5-1
PROJECT NO. 300261-01	NOZZLE (SIZE,#) 0.183"	CALIBRATION DATE 5-17-93	FILTER NO. 1107
TEST CREW	STATIC PRESSURE 1.0" H_2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.45	PORT DIRECTION South	CONTROL BOX NO. 3	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		779.956	1.3	1.40	1.40	79	75	2.8	122	~250	<68	~250	1 min./point
33.6		780.597	1.5	1.61	1.61	79	76	3.0	122				
31.7		781.290	1.5	1.61	1.61	81	76	3.0	122				
29.6		781.980	1.4	1.51	1.51	81	77	2.8	121				
27.0		782.627	1.5	1.61	1.61	82	77	3.0	122				
23.2		783.325	1.3	1.39	1.39	82	78	2.5	123				
12.8		783.972	1.1	1.17	1.17	83	78	2.0	124				
9.0		784.586	1.0	1.07	1.07	83	79	2.0	122				
6.4		785.158	1.2	1.28	1.28	84	79	2.2	122				
4.3		785.783	1.2	1.28	1.28	85	80	2.2	119				
2.4		786.403	1.2	1.28	1.28	86	80	2.2	119				
1.0		787.002	1.2	1.28	1.28	85	81	2.2	118				
		787.612											
													Estimates:
													MW=28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 30261-01
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CLR-2-3-1
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 1.0" H2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 2
PROBE NO. 5-1
FILTER NO. 1107
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		787.612	1.2	1.28	1.28	85	81	2.2	117	~250	<68	~250	1 min./point
2.4		788.228	1.2	1.28	1.28	84	81	2.2	117				
4.3		788.865	1.2	1.28	1.28	84	80	2.2	115				
6.4		789.503	1.1	1.17	1.17	83	80	2.2	118				
9.0		790.128	1.1	1.17	1.17	84	80	2.2	121				
12.8		790.737	1.0	1.07	1.07	81	79	2.0	119				
23.2		791.328	1.3	1.39	1.39	80	78	2.5	117				
27.0		792.000	1.5	1.60	1.60	79	77	3.0	118				
29.6		792.686	1.6	1.70	1.70	79	76	3.0	112				
31.7		793.401	1.6	1.72	1.72	79	76	3.5	113				
33.6		794.119	1.5	1.61	1.61	80	76	3.0	113				
35.0		794.840	1.6	1.72	1.72	80	76	3.0	113				
		795.566											
Tot	θ=60	Δ=31.206	$(\Delta P)_{AVG}$=	$(\Delta H)_{AVG}$=1.40		$(T_{meter})_{AVG}$ = 76°F			$(T_{stack})_{AVG}$ = 117°F				
Averages	min	dcf											
Values			1.3										Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT US Clairton Works
TEST UNIT 13-15 Battery Pec
PROJECT NO. 300261-01
TEST CREW TM JS (No II) RC
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CLR-2-4-1
NOZZLE (SIZE,#) 0.186"
STATIC PRESSURE +0.60" H_2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9617
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 7

HOT/COLD BOX NO. 4
PROBE NO. 5-5
FILTER NO. 1108
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperatures In (°F)	Meter Temperatures Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		147.150	1.8	2.08	2.08	70	70	7.0	110	~250	<68	~250	1 min./point
33.6		147.750	1.8	2.08	2.08	70	68	7.0	109				
31.7		148.551	1.6	1.85	1.85	72	70	7.0	110				
29.6		148.234	1.7	1.96	1.96	73	71	7.0	112				
27.0		149.960	1.5	1.74	1.74	72	70	6.0	110				
23.2		150.610	1.2	1.39	1.39	74	72	5.0	108				
12.8		151.231	1.0	1.16	1.16	72	70	4.0	110				
9.0		151.840	1.2	1.39	1.39	74	72	5.5	109				
6.4		152.470	1.1	1.28	1.28	72	71	5.0	112				
4.3		152.991	1.2	#1.40	#1.40	80	70	5.0	109				
2.4		153.628	1.1	1.29	1.29	80	70	5.0	108				
1.0		154.240	1.1	1.28	1.28	80	71	5.0	111				
		154.878											
													Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	6.0	0.007
After	5.0	0.005

PITOT LEAK CHECK 15 sec.

	Positive	Negative
Before	OK	OK
After	OK	OK

GAS	1	2
CO2	0	
O2	20.5	
CO	0	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100 mL DI. H_2O	552.9	546.4	6.5
2.	100 mL DI. H_2O	482.9	482.0	0.9
3.	Empty	443.8	443.1	0.7
4.	Silica Gel	664.7	657.9	6.8
5.				
6.			total =	14.9 g
7.				
8.				

8.1 g

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Pre
PROJECT NO. 300261-011
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CLR-2-4-1
NOZZLE (SIZE,#) 0.185"
STATIC PRESSURE -0.60" H_2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9619
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 7

HOT/COLD BOX NO. 4
PROBE NO. 5-5
FILTER NO. 1108
STACK DIA. 16"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		154.878	1.1	1.28	1.28	82	72	5.5	110	~250	<68	~250	1 min./point
2.4		155.469	1.1	1.28	1.28	82	73	5.5	111				
4.3		156.071	1.1	1.29	1.29	82	74	5.0	112				
6.4		156.893	1.2	1.40	1.40	82	74	6.0	112				
8.0		157.445	1.2	1.40	1.40	81	72	6.0	111				
12.8		158.089	1.1	1.28	1.28	80	71	5.0	113				
27.2		158.690	1.2	1.40	1.40	80	72	5.5	111				
27.0		159.350	1.3	1.51	1.51	82	74	6.0	110				
29.6		160.078	1.4	1.64	1.64	82	74	6.5	110				
31.7		160.741	1.4	1.64	1.64	80	74	7.0	112				
33.6		161.574	1.6	1.87	1.87	82	74	7.5	113				
35.0		162.230	1.6	1.88	1.88	80	74	7.5	109				
		162.980											
													Estimates:
													MW=28.8
													%H2O=1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 30026 1-01
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CLR-2-4-1
NOZZLE (SIZE,#) 0.185"
STATIC PRESSURE +0.6" H_2O
PORT DIRECTION WEST

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9619
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 7

HOT/COLD BOX NO. X 4
PROBE NO. 5-5
FILTER NO. 1108
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		162.980	1.6	1.88	1.88	82	78	8.0	110	~250	<68	~250	2 min./point
33.6		163.670	1.6	1.88	1.88	82	76	8.0	109				
31.7		164.478	1.6	1.88	1.88	82	76	8.0	112				
29.6		165.263	1.5	1.76	1.76	84	78	8.0	113				
27.00		165.970	1.4	1.64	1.64	88	80	7.0	111				
23.2		166.681	1.2	1.42	1.42	88	80	6.0	112				
12.8		167.409	1.0	1.19	1.19	89	81	5.0	113				
9.0		167.850	1.1	1.30	1.30	89	81	5.5	113				
6.4		168.445	1.0	1.18	1.18	89	81	5.0	112				
4.3		169.021	1.0	1.18	1.18	85	83	5.0	111				
2.4		169.720	1.0	1.18	1.18	84	82	5.0	112				
1.0		170.351	1.0	1.18	1.18	85	80	5.0	110				
		170.979											

Estimates:
MW = 28.8
%H2O = 2

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CLR-2-4-1
NOZZLE (SIZE,#) 0.185"
STATIC PRESSURE +0.6" H2O
PORT DIRECTION North

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9619
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 7

HOT/COLD BOX NO. 84
PROBE NO. 5-5
FILTER NO. 1108
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		170.979	1.0	1.18	1.18	86	78	5.0	113	~250	<68	~250	2 min./point
33.6		171.520	1.2	1.40	1.40	87	84	6.0	115				
31.7		172.171	1.2	1.40	1.40	86	78	6.0	115				
29.6		172.789	1.2	1.40	1.40	90	80	6.5	114				
27.0		173.439	1.2	1.40	1.40	88	80	6.5	114				
23.2		174.060	1.1	1.29	1.29	88	80	6.0	115				
17.8		174.730	0.9	1.06	1.06	85	80	5.0	114				
9.0		175.302	0.7	0.83	0.83	90	82	4.5	115				
6.4		175.894	0.8	0.94	0.94	90	81	4.5	114				
4.3		176.350	0.9	1.06	1.06	88	82	5.0	114				
2.4		176.921	1.0	1.18	1.18	90	80	5.5	112				
1.0		177.524	1.0	1.18	1.18	88	81	5.5	111				
		178.060											

Estimates:
MW= 28.8
%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 17-15 Battery PEX
PROJECT NO. 30261-011
TEST CREW
BAROMETRIC PRESSURE 29.45

TEST DATE 10-19-93
TEST NO. CLR-2-4-1
NOZZLE (SIZE,#) 0.185"
STATIC PRESSURE -0.6" H_2O
PORT DIRECTION North

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9619
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 7

HOT/COLD BOX NO. K 4
PROBE NO. 5-5
FILTER NO. 1108
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		178.060	0.9	1.06	1.06	85	82	5.0	112	~250	<68	~250	1 min./point
2.4		178.670	1.0	1.18	1.18	88	80	6.0	111				
4.3		179.178	1.0	1.18	1.18	90	80	6.0	110				
6.4		179.780	1.0	1.18	1.18	88	80	5.5	111				
9.0		180.459	1.0	1.19	1.19	88	81	5.5	112				
12.8		180.970	1.0	1.19	1.19	89	80	5.5	111				
23.2		181.580	1.1	1.30	1.30	87	81	5.5	110				
27.0		182.170	1.3	1.54	1.54	85	80	7.0	110				
29.6		182.878	1.4	1.66	1.66	84	82	7.5	109				
31.7		183.591	1.4	1.65	1.65	88	79	8.0	109				
33.6		184.130	1.4	1.65	1.65	88	79	8.0	108				
35.0		184.784	1.4	1.67	1.67	87	81	8.0	108				
		185.459											
Net	Δ=60 min	Δ=38.309 dcf	$(\Delta P)_{Avg}$ =	$(\Delta H)_{Avg}$ =		$(T_{Meter})_{Avg}$ = 80°F			$(T_{Stack})_{Avg}$ = 111°F				
Pitot Average			1.2		1.42								
													Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

13-14-15 BATTERIES PUSHING SCHEDULE fas

TURN _____

DATE 10/20/93

A 1 /13 10:47	B 16 /13	A 2 /13	B 17 /13
B 2 /14 52	A 17 /15	B 1 /14	A 18 /15
A 3 /13 57	B 18 /13	A 4 /13	B 19 /13
B 4 /14 11:03	A 19 /15	B 3 /14	A 20 /15
A 5 /13 38	B 20 /13	A 6 /13	B 21 /13
B 6 /14 45	A 21 /15	B 5 /14	A 22 /15
A 7 /13 51	B 22 /13	A 8 /13	B 23 /13
B 8 /14 55	A 23 /15	B 7 /14	A 24 /15
	B 24 /13	A 10 /13	B 25 /13
B 10 /14 12:06	A 25 /15	B 9 /14	A 26 /15
A 11 /13 12	B 26 /13	A 12 /13	B 27 /13
B 12 /14 17	A 27 /15	B 11 /14	A 28 /15
A 13 /13 23	B 28 /13	A 14 /13	B 29 /13
B 14 /14 28	A 29 /15	B 13 /14	A 30 /15
A 15 /13 34	B 30 /13	A 16 /13	A 1 /14
B 16 /14 39	A 31 /15	B 15 /14	B 1 /15
A 17 /13 45	A 2 /14	A 18 /13	A 3 /14
B 18 /14 50	B 2 /15	B 17 /14	B 3 /15 B:10
A 19 /13 56	A 4 /14	A 20 /13	A 5 /14 B:16
B 20 /14 13:01	B 4 /15	B 19 /14	B 5 /15 B:21
A 21 /13 07	A 6 /14	A 22 /13	A 7 /14 B:27
B 22 /14 12	B 6 /15	B 21 /14	B 7 /15 33
A 23 /13 17	A 8 /14	A 24 /13	A 9 /14 38
B 24 /14 22	B 8 /15	B 23 /14	B 9 /15 43
A 25 /13 28	A 10 /14	A 26 /13	A 11 /14 50
B 26 /14 33	B 10 /15	B 25 /14	B 11 /15 55
A 27 /13 39	A 12 /14	A 28 /13	A 13 /14 9:01
B 28 /14 44	B 12 /15	B 27 /14	B 13 /15 06
A 29 /13 50	A 14 /14	A 30 /13	A 15 /14 12
B 30 /14 55	B 14 /15	B 29 /14	B 15 /15 17
A 31 /13 14:01	A 16 /14	B 1 /13	A 17 /14 23
A 1 /15 06	B 16 /15	A 2 /15	B 17 /15 28
B 2 /13 12	A 18 /14	B 3 /13	A 19 /14 34
A 3 /15	B 18 /15	A 4 /15	B 19 /15 39
B 4 /13	A 20 /14	B 5 /13	A 21 /14 45
A 5 /15	B 20 /15	A 6 /15	B 21 /15 50
B 6 /13	A 22 /14	B 7 /13	A 23 /14 56
A 7 /15	B 22 /15	A 8 /15	B 23 /15 10:02
B 8 /13	A 24 /14	B 9 /13	A 25 /14 07
A 9 /15	B 24 /15	A 10 /15	B 25 /15 13
B 10 /13	A 26 /14	B 11 /13	A 27 /14 19
A 11 /15	B 26 /15	A 12 /15	B 27 /15 24
B 12 /13	A 28 /14	B 13 /13	A 29 /14 30
A 13 /15	B 28 /15	A 14 /15	A 31 /14 36
B 14 /13	A 30 /14	B 15 /13	B 29 /15 41
A 15 /15	B 30 /15	A 16 /15	

TRACK CLEANUP

CHANGE OVER

END

TURN _____

DATE _____

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

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B 27 /13 _____
A 28 /15 _____
B 29 /13 _____
A 30 /15 _____
A 1 /14 _____
B 1 /15 _____
A 3 /14 _____
B 3 /15 _____
A 5 /14 1
B 5 /15 2
A 7 /14 4
B 7 /15 5
A 9 /14 6
B 9 /15 7
A 11 /14 8
B 11 /15 9
A 13 /14 10
B 13 /15 11
A 15 /14 12
B 15 /15 13
A 17 /14 14
B 17 /15 15
A 19 /14 16
B 19 /15 17
A 21 /14 18
B 21 /15 19
A 23 /14 20
B 23 /15 21
A 25 /14 22
B 25 /15 23
A 27 /14 24
B 27 /15 25
A 29 /14 26
A 31 /14 27
B 29 /15 28

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-20-93	ORIFICE CORRECTION (ΔH@) 1.673	HOT/COLD BOX NO. 8
TEST UNIT 13-15 Battery PEC	TEST NO. CR-2-1-2	METER CORRECTION (Y) 0.9912	PROBE NO. 5-4
PROJECT NO. 300261-01	NOZZLE (SIZE,#) 0.190"	CALIBRATION DATE 5-19-93	FILTER NO. 1110
TEST CREW	STATIC PRESSURE 1.0" H2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.40	PORT DIRECTION South	CONTROL BOX NO. 4	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0	5'	574.676	2.0	2.37	2.37	64	64	4.5	115	~250	<68	~250	1 min./point
32.6		575.582	2.1	2.49	2.49	65	65	4.5	115				
31.7		576.446	2.0	2.37	2.37	65	64	4.5	115				
29.6		577.314	2.0	2.37	2.37	65	64	4.5	116				
27.0		578.210	1.7	2.01	2.01	65	64	4.0	115				
23.2		579.023	1.7	2.01	2.01	65	63	4.0	115				
12.8		579.838	1.5	1.78	1.78	65	63	4.0	115				
9.0		580.624	1.5	1.78	1.78	65	64	4.0	116				
6.4		581.413	1.4	1.65	1.65	66	64	3.5	115				
4.3		582.113	1.5	1.78	1.78	67	65	4.0	115				
2.4		582.881	1.4	1.65	1.65	68	66	3.5	113				
1.6		583.602	1.1	1.30	1.30	68	67	3.0	113				
		584.239											
		~~584.94~~											
			(1.645)		(1.94)		(65.0)		(114.8)				Estimates:
													MW=28.8
													%H2O=1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5	.002
After	6	.002

PITOT LEAK CHECK 15 sec

	Positive	Negative
Before	OK	OK
After	OK	OK

GAS	1	2
CO2	–	
O2	20.5	Air
CO	–	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100mL DI H2O	559.6	546.3	13.3
2.	100mL DI H2O	546.3	544.1	2.2
3.	Empty	441.2	440.8	0.4
4.	Silica Gel	663.9	655.9	8.0
5.				
6.			total =	23.9g
7.				
8.				

15.9g

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 300261-41
TEST CREW
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CLR-2-1-2
NOZZLE (SIZE,#) 0.190" #2
STATIC PRESSURE 1.0 H2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.673
METER CORRECTION (Y) 0.9912
CALIBRATION DATE 5-19-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 4

HOT/COLD BOX NO. 8
PROBE NO. 5-4
FILTER NO. 1110
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		584.239	1.2	1.42	1.42	69	68	3.0	112	~250	<68	~250	1 min./point
2.4		584.948	1.3	1.54	1.54	70	68	3.0	114				
4.3		585.675	1.5	1.78	1.78	69	68	4.0	114				
6.4		586.455	1.4	1.65	1.65	71	70	3.5	118				
9.0		587.215	1.4	1.65	1.65	71	69	3.5	116				
12.8		587.967	1.4	1.65	1.65	71	70	3.5	116				
23.2		588.732	1.5	1.78	1.78	72	70	4.0	116				
27.0		589.535	1.7	2.01	2.01	72	71	4.0	116				
29.6		590.356	2.0	2.37	2.37	72	70	4.5	114				
31.7		591.244	2.0	2.37	2.37	72	70	4.5	114				
33.6		592.128	2.1	2.49	2.49	72	70	4.5	113				
35.0		593.033	2.0	2.37	2.37	72	70	4.5	114				
		593.925											
			(1.611)		(1.90)		(70.3)		(114.8)				Estimates:
													MW=28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-20-93	ORIFICE CORRECTION (ΔH@) 1.673	HOT/COLD BOX NO. 8
TEST UNIT 13-15 Battery PK	TEST NO. CLR-2-1-2	METER CORRECTION (Y) 0.9912	PROBE NO. 5-4
PROJECT NO. 30026L01	NOZZLE (SIZE,#) 0.190"	CALIBRATION DATE 5-19-93	FILTER NO. 1110
TEST CREW	STATIC PRESSURE 1.0 "H2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.40	PORT DIRECTION South	CONTROL BOX NO. 4	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		593.925	2.0	2.38	2.38	72	70	4.5	113	~250	<68	~250	1 min./point
33.6		594.808	2.1	2.50	2.50	72	69	4.5	114				
31.7		595.741	2.0	2.38	2.38	71	69	4.5	116				
29.6		596.636	1.9	2.26	2.26	71	69	4.5	115				
27.0		597.473	1.7	2.02	2.02	71	69	4.0	113				
23.2		598.246	1.6	1.90	1.90	72	70	4.0	115				
12.8		599.040	1.4	1.65	1.65	72	70	3.5	113				
9.0		599.727	1.4	1.65	1.65	72	71	3.5	115				
6.4		600.512	1.4	1.65	1.65	72	70	3.5	109				
4.3		601.282	1.6	1.90	1.90	72	70	4.0	111				
2.4		602.071	1.3	1.54	1.54	72	70	3.0	113				
1.0		602.780	1.2	1.43	1.43	72	71	3.0	112				
		603.461											
			(1.620)		(1.93)		(70.8)		(113.3)				Estimates:
													MW=28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-20-93	ORIFICE CORRECTION (ΔH@) 1.673	HOT/COLD BOX NO. 8
TEST UNIT 13-15 Battery Pkg	TEST NO. CLR-2-1-2	METER CORRECTION (Y) 0.9912	PROBE NO. 5-4
PROJECT NO. 300261-01	NOZZLE (SIZE,#) 0.190"	CALIBRATION DATE 5-15-93	FILTER NO. 0.1110
TEST CREW	STATIC PRESSURE 1.0 "H2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.40	PORT DIRECTION West	CONTROL BOX NO. 4	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		603.461	2.1	2.5	2.5	72	70	4.5	115	~250	<68	~250	1 min./point
33.6		604.362	2.0	2.37	2.37	72	70	4.5	117				
31.7		605.241	1.9	2.25	2.25	72	71	4.5	119				
29.6		606.118	1.9	2.25	2.25	73	72	4.5	118				
27.0		606.980	1.5	1.78	1.78	74	73	4.0	120				
23.2		607.781	1.5	1.78	1.78	74	73	4.0	119				
12.8		608.562	1.4	1.65	1.65	75	74	3.5	121				
9.0		609.330	1.3	1.54	1.54	76	75	3.0	121				
6.4		610.043	1.2	1.43	1.43	77	76	3.0	122				
4.3		610.729	1.2	1.43	1.43	78	76	3.0	122				
2.4		611.408	1.1	1.31	1.31	78	77	3.0	120				
1.0		612.075	1.0	1.19	1.19	78	76	3.0	118				
		612.723											
			(1.358)		(1.62)		(74.3)		(119.3)				Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Pac
PROJECT NO. 300261-61
TEST CREW
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CLR-2-1-2
NOZZLE (SIZE,#) 0.190"
STATIC PRESSURE 1.0 "H2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.673
METER CORRECTION (Y) 0.9912
CALIBRATION DATE 5-19-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 4

HOT/COLD BOX NO. 8
PROBE NO. 5-4
FILTER NO. 1110
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		612.723	1.0	1.19	1.19	78	77	3.0	115	~250	<68	~250	1 min./point
2.4		613.375	1.1	1.31	1.31	79	77	3.0	116				
4.3		614.006	1.2	1.43	1.43	78	76	3.0	119				
6.4		614.722	1.2	1.43	1.43	78	76	3.0	121				
9.0		615.432	1.4	1.65	1.65	77	75	3.5	121				
12.8		616.200	1.5	1.78	1.78	77	75	4.0	118				
23.2		616.962	1.5	1.78	1.78	76	74	4.0	120				
27.0		617.753	1.7	2.02	2.02	76	74	4.0	121				
29.6		618.579	1.9	2.26	2.26	76	74	4.5	122				
31.7		619.481	1.8	2.14	2.14	75	73	4.5	121				
33.6		620.352	2.0	2.37	2.37	75	73	4.5	120				
35.0		621.252	2.0	2.37	2.37	75	73	4.5	121				
		622.119											
Test	Δ=60	Δ=	$(\Delta P)_{Avg}$ =	$(\Delta H)_{Avg}$ = 1.89		$(T_{meter})_{Avg}$ = 71°F			$(T_{stack})_{Avg}$ = 116°F				Estimates:
Total	min	47.443											MW=28.8
Average		dcf	1.6										%H2O=1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Pot
PROJECT NO. 300261-011
TEST CREW
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CU2-2-2-2
NOZZLE (SIZE,#) 0.192"
STATIC PRESSURE 1.0" H2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.572
METER CORRECTION (Y) 1.0151
CALIBRATION DATE 7-2-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 3

HOT/COLD BOX NO. 6-6
PROBE NO. 5-3
FILTER NO. 1104
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		405.345	2.0	2.32	2.32	74	70	5.0	125	~250	<68	~250	1 min./point
33.6		406.122	2.0	2.29	2.29	72	68	5.2	125				
31.7		407.639	1.95	2.23	2.23	72	68	5.2	124				
29.6		407.918	1.90	2.18	2.18	72	68	5.2	124				
27.0		408.788	1.90	2.18	2.18	72	68	5.2	123				
23.2		409.669	1.75	2.00	2.00	74	68	5.2	123				
12.8		410.529	1.40	1.61	1.61	76	70	4.5	123				
9.0		411.295	1.40	1.61	1.61	76	70	4.4	123				
6.4		412.058	1.45	1.66	1.66	78	72	4.6	123				
4.3		412.833	1.40	1.62	1.62	78	72	4.8	123				
2.4		413.640	1.00	1.16	1.16	78	72	3.0	123				
1.0		414.335	.95	1.10	1.10	78	72	3.0	123				
		415.005											
			(1.569)	(1.80)		(75.0)	(69.8)		(123.5)				
													Estimates:
													MW=29.8
													%H2O=1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5	.002
After	7	.002

PITOT LEAK CHECK 15 sec

	Positive	Negative
Before	OK	OK
After	OK	OK

GAS	1	2
CO2	0	
O2	20.5	
CO	0	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100mL DI. H2O	556.7	544.5	12.2
2.	100mL DI. H2O	486.4	483.8	2.6
3.	Empty	464.2	463.9	0.3
4.	Silica Gel	660.0	651.2	8.8
5.				
6.			Total =	23.9g
7.				
8.				

15.1g

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Rec
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-97
TEST NO. CLR-2-2-2
NOZZLE (SIZE,#) 0.192"
STATIC PRESSURE 1.0" H_2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.572
METER CORRECTION (Y) 1.0151
CALIBRATION DATE 7-2-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 3

HOT/COLD BOX NO. 6-6
PROBE NO. 5-3
FILTER NO. 1104
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		415.005	.95	1.10	1.10	78	72	3.0	123	~250	<68	~250	1 min./point
2.4		415.654	1.00	1.16	1.16	80	74	3.2	123				
4.3		416.353	1.25	1.45	1.45	80	73	4.0	123				
6.4		417.065	1.40	1.62	1.62	80	73	4.8	123				
9.0		417.851	1.40	1.62	1.62	80	73	4.8	124				
12.8		418.656	1.60	1.86	1.86	82	74	5.0	124				
23.2		419.516	1.80	2.09	2.09	82	74	5.5	124				
27.0		420.379	1.80	2.09	2.09	84	74	5.5	124				
29.6		421.235	1.85	2.15	2.15	83	74	6.0	124				
31.7		422.081	2.00	2.32	2.32	83	74	6.1	123				
33.6		422.939	2.00	2.32	2.32	83	74	6.2	123				
35.0		423.856	2.00	2.32	2.32	83	74	5.0	123				
		424.679											
			1.564	(1.81)		81.0	73.6		123.4				
													Estimates:
													MW=28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

1.16

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PCE
PROJECT NO. 32026-01
TEST CREW
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-98
TEST NO. CLR-2-2-2
NOZZLE (SIZE,#) 0.192"
STATIC PRESSURE 1.0" H2O
PORT DIRECTION SOUTH

ORIFICE CORRECTION (ΔH@) 1.572
METER CORRECTION (Y) 1.0151
CALIBRATION DATE 7-2-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 3

HOT/COLD BOX NO. 6-6
PROBE NO. 5-3
FILTER NO. 1104
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		424.679	1.90	2.21	2.21	83	74	5.8	123	~250	<68	~250	1 min./point
33.6		425.591	2.00	2.33	2.33	83	74	6.1	123				
31.7		426.503	2.00	2.33	2.33	83	74	6.2	123				
29.6		427.452	1.85	2.15	2.15	84	75	6.0	123				
27.0		428.359	1.60	1.86	1.86	84	75	5.8	123				
23.2		429.218	1.50	1.75	1.75	84	75	4.9	123				
12.8		430.046	1.25	1.45	1.45	84	75	4.0	123				
9.0		430.879	1.30	1.51	1.51	85	76	4.1	123				
6.4		431.536	1.20	1.40	1.40	84	75	4.0	123				
4.3		432.282	1.20	1.40	1.40	84	75	4.0	123				
2.4		433.019	.90	1.05	1.05	84	75	3.0	123				
1.0		433.618	.85	.99	.99	84	75	2.9	123				
		434.225											
			(1.935)	(1.66)		83.8	74.8		123.0				
													Estimates:
													MW=28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PSC
PROJECT NO. 700261-01
TEST CREW
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CLR-2-2-2
NOZZLE (SIZE,#) 0.192"
STATIC PRESSURE 1.0" H2O
PORT DIRECTION WEST

ORIFICE CORRECTION (ΔH@) 1.572
METER CORRECTION (Y) 1.0151
CALIBRATION DATE 7-2-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 3

HOT/COLD BOX NO. 6-6
PROBE NO. 5-3
FILTER NO. 1104
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		434.225	2.0	2.33	2.33	84	76	6.0	124	~250	<68	~250	1 min./point
33.6		435.109	1.8	2.10	2.10	85	76	5.2	123				
31.7		435.961	2.0	2.33	2.33	85	76	6.0	124				
29.6		436.856	1.8	2.10	2.10	86	78	5.2	125				
27.0		437.684	1.6	1.87	1.87	86	78	5.0	125				
23.2		438.544	1.6	1.87	1.87	87	80	5.0	125				
12.8		439.404	1.5	1.76	1.76	90	80	4.7	125				
9.0		440.198	1.3	1.52	1.52	90	80	4.4	126				
6.4		441.008	1.3	1.52	1.52	90	80	4.4	125				
4.3		441.745	1.1	1.29	1.29	90	80	3.3	125				
2.4		442.439	.80	.94	.94	90	80	3.0	125				
1.0		443.173	.80	.94	.94	90	80	3.0	125				
		443.881											
			(1.436)		(1.68)	(87.7)	(78.7)		(124.7)				
													Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-20-93	ORIFICE CORRECTION (ΔH@) 1.572	HOT/COLD BOX NO. 6-6
TEST UNIT 13-15 Battery PEC	TEST NO. C12-2-2-2	METER CORRECTION (Y) 1.0151	PROBE NO. 5-3
PROJECT NO. 300264-CK	NOZZLE (SIZE,in) 0.192"	CALIBRATION DATE 7-9-93	FILTER NO. 1104
TEST CREW	STATIC PRESSURE 1.0" H2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.40	PORT DIRECTION WEST	CONTROL BOX NO. 3	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperatures In (°F)	Meter Temperatures Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		443.681	.80	.94	.94	91	81	3.0	125	~250	<68	~250	1 min./point
2.4		444.294	.80	.94	.94	92	82	3.0	125				
4.3		444.919	1.20	1.41	1.41	91	83	3.9	125				
6.4		445.644	1.20	1.41	1.41	91	83	3.9	125				
9.0		446.414	1.40	1.65	1.65	90	83	4.7	125				
12.8		447.186	1.40	1.65	1.65	89	82	4.7	126				
23.2		448.000	1.60	1.88	1.88	89	82	5.1	125				
27.0		448.851	1.80	2.11	2.11	88	81	5.7	125				
29.6		449.727	1.85	2.17	2.17	88	81	5.9	125				
31.7		450.625	1.85	2.17	2.17	88	81	6.0	126				
33.6		451.541	1.90	2.23	2.23	88	81	6.1	127				
35.0		452.445	2.00	2.35	2.35	88	81	6.2	127				
		453.354											
Total	Δ=60	Δ=48.009	$(\Delta p)_{Avg}$=	$(\Delta H)_{Avg}$=		$(T_{meter})_{Avg}$ = 80°F			$(T_{stack})_{Avg}$ = 124°F				
Total & Average	min	dcf	1.50		1.77								Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

Y1.1K

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PRZ
PROJECT NO. 3W261-4
TEST CREW
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CLR-2-3-2
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 1.0" H2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 4
PROBE NO. 5-1
FILTER NO. 1106
STACK DIA 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		796.080	1.4	1.48	1.48	72	69	5.0	115	~250	<68	~250	1 min./point
33.6		796.770	1.4	1.48	1.48	72	69	5.0	116				
31.7		797.442	1.5	1.58	1.58	72	68	5.0	115				
29.6		798.124	1.6	1.69	1.69	72	69	6.0	116				
27.0		798.818	1.4	1.48	1.48	73	68	5.0	114				
22.2		799.468	1.3	1.37	1.37	73	69	5.0	114				
12.8		800.085	1.1	1.16	1.16	74	69	4.0	114				
9.0		800.688	1.2	1.27	1.27	75	70	5.0	114				
6.4		801.300	1.3	1.37	1.37	76	70	5.0	113				
4.3		801.920	1.3	1.37	1.37	76	71	5.0	110				
2.4		802.569	1.1	1.16	1.16	77	71	4.0	108				
1.0		803.162	1.1	1.16	1.16	77	72	5.0	108				
		803.750											

Estimates:
MW= 28.8
%H2O= 1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.0	<0.020
After	4.0	0.005

PITOT LEAK CHECK 15 sec

	Positive	Negative
Before	OK	OK
After	OK	OK

GAS	1	2
CO2	0	
O2	20.5	
CO	0	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100mL DI. H2O	536.3	525.4	10.9
2.	100mL DI. H2O	483.4	482.3	1.1
3.	Empty	444.1	444.1	0.0
4.	Silica Gel	470.9	464.6	6.3
5.				
6.			total=	18.3g
7.				
8.				

12.0g

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 17-15 Battery PEC
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CLR-2-3-2
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 1.0"H2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 4
PROBE NO. 5-1
FILTER NO. 1106
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (Inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		803.750	1.1	1.17	1.17	77	72	5.0	111	~250	<68	~250	1 min./point
2.4		804.309	1.1	1.17	1.17	78	73	5.0	113				
4.3		804.924	1.2	1.28	1.28	78	73	5.0	114				
6.4		805.565	1.2	1.28	1.28	78	74	5.0	117				
9.0		806.210	1.1	1.17	1.17	79	74	5.0	115				
12.8		806.818	1.1	1.17	1.17	79	75	5.0	116				
23.2		807.435	1.5	1.60	1.60	80	75	7.0	115				
27.0		808.150	1.5	1.61	1.61	80	76	7.0	116				
29.6		808.861	1.6	1.72	1.72	80	75	7.5	114				
31.7		809.581	1.7	1.83	1.83	80	76	9.0	115				
33.6		810.342	1.5	1.61	1.61	81	76	7.5	113				
35.0		811.061	1.5	1.61	1.61	81	77	7.5	115				
		811.788											

Estimates:
MW=28.8
%H2O=1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PCE
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CLR-2-3-2
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 1.0" H2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 4
PROBE NO. 5-7
FILTER NO. 1106
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		811.788	1.4	1.51	1.51	82	77	7.0	113	~250	<68	~250	2 min./point
33.6		812.500	1.6	1.72	1.72	82	78	7.5	115				
31.7		813.225	1.5	1.61	1.61	82	78	7.5	116				
29.6		813.917	1.6	1.72	1.72	83	79	8.5	114				
27.0		814.685	1.4	1.51	1.51	83	79	7.0	115				
23.2		815.320	1.4	1.51	1.51	84	79	7.0	117				
12.8		816.000	1.0	1.08	1.08	84	79	4.5	115				
9.0		816.591	1.1	1.18	1.18	84	80	5.0	117				
6.4		817.191	1.2	1.30	1.30	83	80	5.0	107				
4.3		817.838	1.3	1.40	1.40	84	81	6.0	109				
2.4		818.508	1.2	1.30	1.30	84	80	6.0	107				
1.0		819.135	1.2	1.30	1.30	85	81	6.0	105				
		819.766											

Estimates:
MW=28.8
%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CLR-2-3-2
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 10"H2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 4
PROBE NO. 5-1
FILTER NO. 1106
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
36.0		819.766	1.4	1.51	1.51	85	81	7.5	118	~250	<68	~250	1 min./point
33.6		820.432	1.4	1.51	1.51	84	81	7.5	117				
31.7		821.132	1.4	1.51	1.51	85	81	7.5	120				
29.6		821.810	1.4	1.51	1.51	85	81	7.5	119				
27.0		822.470	1.0	1.08	1.08	86	81	5.0	121				
23.2		823.052	1.1	1.19	1.19	86	82	5.0	119				
12.8		823.680	1.3	1.40	1.40	86	82	7.0	122				
9.0		824.337	1.3	1.40	1.40	86	82	7.0	121				
6.4		825.000	1.3	1.40	1.40	87	82	7.0	124				
4.3		825.638	1.2	1.29	1.29	86	83	6.5	116				
2.4		826.255	1.0	1.08	1.08	87	83	5.0	114				
1.0		826.827	1.0	1.08	1.08	87	83	5.0	113				
		827.396											

Estimates:
MW= 28.8
%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 30026-01
TEST CREW
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CER-2-3-2
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 1.0"H2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 4
PROBE NO. 5-1
FILTER NO. 1106
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		827.396	1.0	1.08	1.08	87	83	5.0	113	~250	<68	~250	1 min./point
2.4		828.000	1.0	1.08	1.08	86	83	5.0	117				
4.3		828.577	1.2	1.29	1.29	86	82	6.5	119				
6.4		829.200	1.1	1.18	1.18	86	82	5.0	123				
9.0		829.790	1.2	1.29	1.29	85	82	6.5	125				
12.8		830.410	1.2	1.29	1.29	85	82	6.5	119				
23.2		831.051	1.2	1.29	1.29	85	81	6.5	121				
27.0		831.683	1.3	1.40	1.40	85	82	7.0	122				
29.6		832.333	1.4	1.51	1.51	86	81	7.5	123				
31.7		833.022	1.5	1.62	1.62	84	81	9.0	123				
33.6		833.713	1.5	1.62	1.62	86	81	9.0	124				
35.4		834.389	1.3	1.40	1.40	84	81	7.0	122				
		835.044											
Test Averages and Totals	Δ=60 min	Δ=38.964 dcf	$(\Delta P)_{AVG}$ = 1.3	$(\Delta H)_{AVG}$ = 1.38		$(T_{meter})_{AVG}$ = 79°F			$(T_{stack})_{AVG}$ = 116°F				Estimates: MW= 28.8 %H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 300261-61
TEST CREW [illegible]
BAROMETRIC PRESSURE 29.70

TEST DATE 10-20-93
TEST NO. CLR-2-4-2
NOZZLE (SIZE,in) 0.185"
STATIC PRESSURE [illegible] 0.6"
PORT DIRECTION [illegible]

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9619
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 7

HOT/COLD BOX NO. 2
PROBE NO. 5-5
FILTER NO. 110,5
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
										~250	<68	~250	1 min./point
35.0		186.131	0.9	1.04	1.04	70	70	3.5	110				
33.6		186.679	1.1	1.28	1.28	70	70	4.0	108				
31.7		187.280	1.1	1.27	1.27	71	70	4.0	110				
29.6		187.921	1.1	1.27	1.27	71	69	4.0	111				
27.0		188.555	1.3	1.50	1.50	72	70	4.5	109				
23.2		189.210	1.1	1.28	1.28	74	69	4.0	109				
12.8		189.890	0.9	1.05	1.05	74	70	3.5	108				
9.0		190.404	1.0	1.16	1.16	76	69	3.5	108				
6.4		191.021	0.9	1.05	1.05	76	70	3.0	107				
4.3		191.610	0.9	1.05	1.05	77	70	3.0	105				
2.4		192.200	0.8	0.94	0.94	78	70	3.0	102				
1.0		192.771	1.2	1.42	1.42	80	70	4.5	100				
		193.424											

Estimates:
MW=28.8
%H2O=1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.5	0.008
After	8.5	0.004

PITOT LEAK CHECK 15 sec

	Positive	Negative
Before	ok	ok
After	ok	ok

GAS	1	2
CO2	0	
O2	20.5	
CO	0	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100 mL DI H_2O	479.1	469.5	9.6
2.	100 mL DI H_2O	556.2	554.1	2.1
3.	Empty	445.7	445.6	0.1
4.	Silica Gel	598.3	591.7	6.6
5.				
6.				
7.				
8.				

Total = 18.4 g

11.8 g

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 300261-01
TEST CREW TM
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CLR-2-4-2
NOZZLE (SIZE,#) 0.185"
STATIC PRESSURE + 0.6 "H2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9619
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 7

HOT/COLD BOX NO. 2
PROBE NO. 5-5
FILTER NO. 405
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		193.424	1.4	1.66	1.66	80	70	5.0	102	~250	<68	~250	1 min./point
2.4		194.031	1.5	1.77	1.77	80	71	6.0	100				
4.3		194.728	1.4	1.66	1.66	81	71	6.0	101				
6.4		195.430	1.4	1.66	1.66	80	72	6.0	102				
9.0		196.083	1.2	1.41	1.41	80	72	5.0	105				
12.8		196.752	1.2	1.41	1.41	80	73	5.0	105				
23.2		197.449	1.3	1.53	1.53	80	74	5.0	106				
27.0		198.110	1.4	1.64	1.64	80	75	5.0	110				
29.6		198.833	1.5	1.76	1.76	82	76	5.5	111				
31.7		199.407	1.6	1.87	1.87	84	78	6.5	111				
33.6		200.241	1.4	1.64	1.64	84	78	5.0	107				
35.0		200.960	1.4	1.64	1.64	84	78	5.0	108				
		201.615											
													Estimates:
													MW=28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 17-15 Battery PE
PROJECT NO. 300261-01
TEST CREW TM
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CLR-2-4-2
NOZZLE (SIZE,#) 0.165"
STATIC PRESSURE +0.6" H2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9619
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 2

HOT/COLD BOX NO. 2
PROBE NO. 5-3
FILTER NO. 1405
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		201.615	1.2	1.42	1.42	82	78	5.0	108	~250	<68	~250	1 min./point
33.6		202.294	1.6	1.89	1.89	84	80	6.5	107				
31.7		203.007	1.6	1.89	1.89	84	80	6.5	107				
29.6		203.770	1.5	1.77	1.77	88	80	6.0	106				
27.0		204.429	1.4	1.65	1.65	88	79	5.0	107				
23.2		205.148	1.2	1.43	1.43	88	80	5.0	107				
12.8		205.791	1.0	1.19	1.19	87	80	4.0	108				
9.0		206.498	1.1	1.31	1.31	88	80	4.5	108				
6.4		207.148	1.0	1.19	1.19	86	80	4.0	108				
4.3		207.791	1.1	1.31	1.31	85	80	4.5	107				
2.4		208.416	1.0	1.20	1.20	86	80	4.5	107				
1.0		209.052	1.1	1.31	1.31	87	81	5.0	107				
		209.678											
													Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Chicago Works
TEST UNIT 13-15 Rotary Rz
PROJECT NO. 30126-61
TEST CREW TM
BAROMETRIC PRESSURE 29.40

TEST DATE 10-20-93
TEST NO. CR-2-4-2
NOZZLE (SIZE,#) 0.185"
STATIC PRESSURE +0.6" H2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9615
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 2

HOT/COLD BOX NO. 2
PROBE NO. 5-5
FILTER NO. 1105
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		209.678	1.8	2.14	2.14	85	80	7.0	108	~250	<68	~250	1 min./point
33.6		210.439	1.7	2.02	2.02	87	81	7.0	109				
31.7		211.228	1.7	2.02	2.02	87	80	7.0	110				
29.6		212.040	1.5	1.78	1.78	87	81	5.5	111				
27.0		212.760	1.3	1.54	1.54	88	80	5.5	112				
23.2		213.485	1.1	1.30	1.30	88	82	4.5	112				
12.0		214.155	1.2	1.42	1.42	90	82	5.0	112				
9.0		214.845	1.1	1.30	1.30	90	82	5.0	113				
6.4		215.480	1.2	1.42	1.42	90	82	5.0	113				
4.3		216.085	1.0	1.18	1.18	88	83	4.0	114				
2.4		216.798	1.1	1.30	1.30	90	83	4.5	111				
1.0		217.417	0.8	0.96	0.96	90	84	3.5	105				
		218.010											

Estimates:
MW=28.8
%H2O=1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-20-93	ORIFICE CORRECTION (ΔH@) 1.802	HOT/COLD BOX NO. 2
TEST UNIT 13-15 Battery Pkg	TEST NO. CLR-2-4-2	METER CORRECTION (Y) 0.9619	PROBE NO. 5-5
PROJECT NO. 30261-61	NOZZLE (SIZE,#) 0.185"	CALIBRATION DATE 5-17-93	FILTER NO. 1105
TEST CREW TM	STATIC PRESSURE -0.6" H2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.40	PORT DIRECTION WEST	CONTROL BOX NO. 7	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		218.010	1.0	1.21	1.21	88	84	4.5	102	~250	<68	~250	1 min./point
2.4		218.708	1.0	1.21	1.21	90	84	4.5	102				
4.3		219.355	1.2	1.45	1.45	91	85	5.0	104				
6.4		220.045	1.0	1.19	1.19	90	84	4.5	110				
9.0		220.683	1.2	1.43	1.43	90	84	5.0	112				
12.8		221.378	1.0	1.18	1.18	90	84	4.5	114				
23.2		222.028	1.2	1.43	1.43	90	84	5.0	112				
27.0		222.740	1.3	1.54	1.54	90	84	5.5	113				
29.6		223.500	1.3	1.54	1.54	89	84	5.5	114				
31.7		224.202	1.4	1.66	1.66	91	85	6.0	117				
33.6		224.945	1.6	1.90	1.90	92	85	7.0	112				
35.0		225.785	1.4	1.66	1.66	90	84	5.5	115				
		226.510											
Total	Δ=60	Δ=40.379	$(\Delta P)_{avg}$ =	$(\Delta H)_{avg}$ =	1.46	$(T_{meter})_{avg}$ =		81°F	$(T_{stack})_{avg}$ =	108°F			
Total/#	min	dcf											Estimates:
Average			1.2										MW=28.8
													%H2O=1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.21

TEST DATE 10-21-93
TEST NO. CLR-2-1-3
NOZZLE (SIZE,#) 0.190"
STATIC PRESSURE 1.0
PORT DIRECTION WEST

ORIFICE CORRECTION (ΔH@) 1.673
METER CORRECTION (Y) 0.992
CALIBRATION DATE 5-19-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 4

HOT/COLD BOX NO. 8
PROBE NO. 5-4
FILTER NO. 1112
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		622.581	2.0	2.39	2.39	78	78	3.5	123	~250	<68	~250	1 min./point
33.6		623.453	2.1	2.51	2.51	78	77	3.5	127				
31.7		624.367	2.0	2.39	2.39	77	76	3.5	126				
29.6		625.246	1.9	2.27	2.27	78	78	3.5	125				
27.0		626.133	1.5	1.79	1.79	77	77	3.0	126				
23.2		626.951	1.6	1.91	1.91	77	77	3.0	126				
12.8		627.756	1.4	1.67	1.67	77	77	3.0	126				
9.0		628.518	1.4	1.67	1.67	78	78	3.0	127				
6.4		629.272	1.2	1.44	1.44	80	79	3.0	126				
4.3		630.032	1.1	1.32	1.32	81	80	3.0	125				
2.4		630.735	1.1	1.32	1.32	81	79	3.0	124				
1.0		631.431	1.0	1.20	1.20	[illegible]	79	3.0	123				
		632.108											
		~~631.932~~											
			(1.502)		(1.80)		(78.2)		(125.3)				
													Estimates:
													MW=28.8
													%H2O=1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	.5	.002
After	6	.002

PITOT LEAK CHECK 15 sec

	Positive	Negative
Before	OK	OK
After	OK	OK

GAS	1	2
CO2	—	
O2	20.5	Air
CO	—	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100mL DI H2O	554.2	543.7	10.5
2.	100mL DI H2O	541.4	539.2	2.2
3.	Empty	440.8	440.5	0.3
4.	Silica Gel	672.7	663.8	8.9
5.				
6.				
7.				
8.				

~~total~~ = 21.9 g

13.0 g

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PCC
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.21

TEST DATE 10-21-93
TEST NO. CLA-2-1-3
NOZZLE (SIZE,#) 0.190"
STATIC PRESSURE 1.0" H_2O
PORT DIRECTION WEST

ORIFICE CORRECTION (ΔH@) 1.673
METER CORRECTION (Y) 0.9912
CALIBRATION DATE 5-19-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 4

HOT/COLD BOX NO. 8
PROBE NO. 5-4
FILTER NO. 1112
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		632.108	1.0	1.19	1.19	81	80	3.0	123	~250	<68	~250	1 min./point
2.4		632.755	1.1	1.31	1.31	81	80	3.0	123				
4.3		633.460	1.1	1.31	1.31	81	79	3.0	124				
6.4		634.117	1.2	1.43	1.43	80	78	3.0	126				
9.0		634.816	1.4	1.66	1.66	79	77	3.0	124				
12.8		635.620	1.5	1.79	1.79	79	77	3.0	123				
23.2		636.438	1.6	1.90	1.90	78	76	3.0	124				
27.0		637.268	1.6	1.90	1.90	78	76	3.0	122				
29.6		638.151	1.8	2.14	2.14	78	76	3.5	122				
31.7		639.054	2.0	2.38	2.38	78	76	3.5	124				
33.6		639.967	2.2	2.62	2.62	78	77	4.0	122				
35.0		640.922	2.1	2.50	2.50	78	77	4.0	122				
		641.842											
			(1.525)		(1.81)		(78.3)		(123.3)				Estimates:
													MW=28.8
													%H2O=2

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-21-93	ORIFICE CORRECTION (ΔH@) 1.675	HOT/COLD BOX NO. 8
TEST UNIT 13-15 Battery Pre	TEST NO. CLR-2-1-3	METER CORRECTION (Y) 0.9912	PROBE NO. 5-4
PROJECT NO. 300261-01	NOZZLE (SIZE,#) 0.190"	CALIBRATION DATE 5-19-93	FILTER NO. 1112
TEST CREW	STATIC PRESSURE 1.0" H_2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.21	PORT DIRECTION West	CONTROL BOX NO. 4	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		641.842	2.2	2.61	2.61	79	77	4.0	123	~250	<68	~250	1 min./point
33.6		642.786	2.2	2.61	2.61	79	77	4.0	123				
31.7		643.741	2.1	2.50	2.50	79	78	4.0	124				
29.6		644.668	1.8	2.14	2.14	79	78	3.5	123				
27.0		645.531	1.6	1.90	1.90	80	79	3.0	125				
23.2		646.360	1.6	1.90	1.90	81	80	3.0	123				
12.8		647.188	1.4	1.66	1.66	80	79	3.0	124				
9.0		647.980	1.4	1.66	1.66	81	79	3.0	123				
6.4		648.760	1.3	1.55	1.55	81	80	3.0	124				
4.3		649.535	1.2	1.43	1.43	82	80	3.0	123				
2.4		650.275	1.1	1.31	1.31	81	80	3.0	123				
1.0		650.978	1.0	1.19	1.19	77	74	3.0	117				
		651.642											
									(122.9)				
			(1.550)		(1.84)		(79.2)						Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-21-93	ORIFICE CORRECTION (ΔH@) 1.673	HOT/COLD BOX NO. 8
TEST UNIT 13-15 Battery PEC	TEST NO. CLR-2-1-3	METER CORRECTION (Y) 0.9912	PROBE NO. 5-4
PROJECT NO. 300261-01	NOZZLE (SIZE,ϕ) 0.190"	CALIBRATION DATE 5-7-93	FILTER NO. 1112
TEST CREW	STATIC PRESSURE 110" H_2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.21	PORT DIRECTION South	CONTROL BOX NO. 4	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		651.642	2.0	2.38	2.38	75	73	3.5	115	~250	<68	~250	1 min./point
33.6		652.551	2.2	2.62	2.62	74	72	4.0	115				
31.7		653.550	2.2	2.62	2.62	73	71	4.0	115				
29.6		654.532	2.0	2.38	2.38	73	71	3.5	115				
27.0		655.425	1.8	2.14	2.14	72	71	3.5	116				
23.2		656.262	1.6	1.90	1.90	72	71	3.0	115				
12.8		657.090	1.5	1.78	1.78	72	70	3.0	115				
9.0		657.904	1.4	1.66	1.66	72	70	3.0	116				
6.4		658.705	1.5	1.78	1.78	71	69	3.0	115				
4.3		659.478	1.5	1.78	1.78	71	70	3.0	115				
2.4		660.245	1.4	1.66	1.66	72	70	3.0	114				
1.0		660.985	1.3	1.55	1.55	72	71	3.0	113				
		661.734											
			(1.686)		(2.01)		(71.6)		(114.9)				Estimates:
													MW= 28.8
													%H2O= 2

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-1

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-21-93	ORIFICE CORRECTION (ΔH@) 1.673	HOT/COLD BOX NO. 8
TEST UNIT 13-15 Battery PEC	TEST NO. CLR-2-1-3	METER CORRECTION (Y) 0.9912	PROBE NO. 5-4
PROJECT NO. 300261-01	NOZZLE (SIZE,#) 0.190"	CALIBRATION DATE 5-19-93	FILTER NO. 1112
TEST CREW	STATIC PRESSURE 1.0" H_2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.21	PORT DIRECTION South	CONTROL BOX NO. 4	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		661.734	1.4	1.66	1.66	73	71	3.0	115	~250	<68	~250	2 min./point
2.4		662.473	1.4	1.66	1.66	73	72	3.0	115				
4.3		663.263	1.5	1.78	1.78	73	72	3.0	116				
6.4		664.017	1.6	1.89	1.89	74	73	3.0	119				
9.0		664.815	1.6	1.89	1.89	74	73	3.0	118				
12.9		665.632	1.5	1.78	1.78	75	74	3.0	119				
23.2		666.368	1.6	1.89	1.89	75	74	3.0	119				
27.0		667.180	1.8	2.13	2.13	76	75	3.5	118				
29.6		668.067	2.0	2.36	2.36	75	74	3.5	119				
31.7		668.980	2.1	2.50	2.50	76	74	4.0	119				
33.6		669.860	2.3	2.71	2.71	76	75	4.0	121				
35.0		670.824	2.2	2.62	2.62	76	75	4.0	120				
		671.741											
Test	Δ=60	Δ=	$(\Delta P)_{AVG}$ =	$(\Delta H)_{AVG}$ = 1.93		$(T_{meter})_{AVG}$ = 76°F			$(T_{stack})_{AVG}$ = 121°F				
Total	min	49.154											Estimates:
Average		dcf	1.6										MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Rx
PROJECT NO. 30261-01
TEST CREW TD, MC, JM, JS, RC
BAROMETRIC PRESSURE 29.21

TEST DATE 10-21-93
TEST NO. CLR-2-2-3
NOZZLE (SIZE,#) 0.192"
STATIC PRESSURE 1.1
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.572
METER CORRECTION (Y) 1.0151
CALIBRATION DATE 7-2-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 3

HOT/COLD BOX NO. 6
PROBE NO. 5-3
FILTER NO. 1113
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		454.264	1.95	2.28	2.28	88	80	5.0	125	~250	<68	~250	1 min./point
33.6		455.154	2.00	2.35	2.35	90	86	5.1	126				
31.7		456.045	1.85	2.18	2.18	94	88	4.9	128				
29.6		456.915	1.85	2.18	2.18	94	86	4.9	127				
27.0		457.782	1.60	1.89	1.89	94	86	4.0	128				
23.2		458.575	1.50	1.77	1.77	94	86	3.9	128				
12.8		459.349	1.40	1.65	1.65	94	86	3.2	129				
9.0		460.099	1.30	1.53	1.53	94	86	3.2	129				
6.4		460.776	1.25	1.47	1.47	94	86	3.1	129				
4.3		461.525	1.10	1.30	1.30	95	87	2.8	129				
2.4		462.214	.60	0.71	0.71	95	87	2.0	129				
1.0		462.814	.60	0.71	0.71	94	86	2.0	128				
		463.384											
			1.720		(2.03)	93.3	85.8		127.9				Estimates:
													MW = 28.8
		~~500.384~~											%H2O = 1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	6.0	.003
After	7.0	.003

PITOT LEAK CHECK 15sec

	Positive	Negative
Before	OK	OK
After		

GAS	1	2
CO2	—	
O2	20.5	AIR
CO	—	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100ml D.I. H2O	553.2	544.8	8.4
2.	100ml D.I. H2O	477.9	475.4	2.5
3.	Empty	464.5	464.2	0.3
4.	Silica Gel	664.0	654.4	9.6
5.				
6.			Total =	20.8g
7.				
8.				

11.2g

CHESTER ENVIRONMENTAL

STACK 2-2 WS

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-21-93	ORIFICE CORRECTION ($\Delta H@$) 1.572	HOT/COLD BOX NO. 6
TEST UNIT 13-15 Battery Pot	TEST NO. CLR-2-2-3	METER CORRECTION (Y) 1.0451	PROBE NO. 5-3
PROJECT NO. 30026-01	NOZZLE (SIZE,#) 0.1924	CALIBRATION DATE 7-2-93	FILTER NO. 1113
TEST CREW	STATIC PRESSURE 1.1" H_2O	PITOT CORRECTION 0.84	STACK DIA. 36
BAROMETRIC PRESSURE 29.21	PORT DIRECTION WEST	CONTROL BOX NO. 3	PORT SIZE 4"

Traverse Point (Inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		463.384	.60	0.71	0.71	94	86	2.0	128	~250	<68	~250	1 min./point
2.4		463.923	.60	0.71	0.71	92	86	2.0	128				
4.7		464.505	1.00	1.18	1.18	91	85	2.5	128				
6.4		465.065	1.20	1.41	1.41	89	85	3.1	128				
9.0		465.763	1.40	1.65	1.65	88	83	3.4	128				
12.8		466.513	1.40	1.63	1.63	88	83	3.4	128				
23.2		467.215	1.60	1.87	1.87	88	82	4.0	128				
27.0		468.001	1.80	2.10	2.10	88	83	4.5	127				
29.6		468.855	1.90	2.22	2.22	88	82	4.7	127				
31.7		469.709	1.90	2.22	2.22	89	82	4.7	127				
33.6		470.545	1.95	2.28	2.28	89	82	5.0	127				
35.0		471.429	2.10	2.45	2.45	89	82	5.3	127				
		472.312											
			1.404	(1.64)		89.4	83.4		127.6				
													Estimates:
													MW = 28.8
													%H2O = 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-21-93	ORIFICE CORRECTION (ΔH@) 1.572	HOT/COLD BOX NO. 6
TEST UNIT 13-15 Battery PLC	TEST NO. CLR-2-2-3	METER CORRECTION (Y) 1.0151	PROBE NO. 5-3
PROJECT NO. 30226-01	NOZZLE (SIZE,#) 0.192"	CALIBRATION DATE 7-2-93	FILTER NO. 1113
TEST CREW	STATIC PRESSURE 1.1" H2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.21	PORT DIRECTION WEST	CONTROL BOX NO. 3	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		472.312	2.0	2.34	2.34	90	82	5.0	127	~250	<68	~250	2 min./point
33.6		473.186	2.0	2.34	2.34	90	82	5.0	127				
31.7		474.049	1.85	2.17	2.17	91	82	4.8	127				
29.6		474.918	1.85	2.17	2.17	92	83	4.8	128				
27.0		475.755	1.65	1.94	1.94	93	83	4.3	127				
23.2		476.589	1.50	1.76	1.76	93	83	3.8	128				
12.8		477.357	1.50	1.76	1.76	92	83	3.8	128				
9.0		478.168	1.40	1.64	1.64	93	84	3.5	128				
6.4		478.919	1.25	1.47	1.47	93	83	3.1	128				
4.3		479.681	1.20	1.41	1.41	92	82	3.0	127				
2.4		480.458	.80	.94	.94	92	82	2.0	127				
1.0		481.044	.80	.94	.94	90	82	2.0	127				
		481.652											
			1.453	1.70		91.7	82.6		127.4				Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PEC
PROJECT NO. 3024d-01
TEST CREW
BAROMETRIC PRESSURE 29.21

TEST DATE 10-21-93
TEST NO. CLR-2-2-3
NOZZLE (SIZE,#) 0.492"
STATIC PRESSURE 1.1" H_2O
PORT DIRECTION SOUTH

ORIFICE CORRECTION (ΔH@) 1.572
METER CORRECTION (Y) 1.0151
CALIBRATION DATE 7-2-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 3

HOT/COLD BOX NO. 6
PROBE NO. 5-3
FILTER NO. 1113
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		481.652	2.1	2.46	2.46	88	82	5.2	127	~250	<68	~250	1 min./point
33.6		482.535	2.0	2.33	2.33	86	80	5.0	127				
31.7		483.444	1.9	2.21	2.21	84	78	4.8	126				
29.6		484.314	1.8	2.10	2.10	84	78	4.7	125				
27.0		485.158	1.7	1.98	1.98	83	76	4.2	124				
23.2		485.923	1.6	1.86	1.86	83	76	4.1	124				
12.8		486.731	1.5	1.75	1.75	82	76	3.9	123				
9.0		487.548	1.4	1.63	1.63	82	76	3.8	123				
6.4		488.292	1.4	1.63	1.63	82	76	3.8	123				
4.3		489.039	1.2	1.39	1.39	82	76	3.0	122				
2.4		489.731	.95	1.10	1.10	82	76	2.5	122				
1.0		490.371	.95	1.10	1.10	82	76	2.5	122				
		491.067											
													Estimates:
			(1.518)	(1.76)		83.3	77.2		124.0				MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-2

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery PCC
PROJECT NO. 30261-01
TEST CREW
BAROMETRIC PRESSURE 29.21

TEST DATE 10-21-93
TEST NO. CLR-2-2-3
NOZZLE (SIZE,#) 0.192"
STATIC PRESSURE 1.1 "H_2O
PORT DIRECTION SOUTH

ORIFICE CORRECTION (ΔH@) 1.572
METER CORRECTION (Y) 1.0151
CALIBRATION DATE 7-2-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 3

HOT/COLD BOX NO. 6
PROBE NO. 5-3
FILTER NO. 1113
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		491.087	.95	1.80	1.10	82	76	2.1	122	~250	<68	~250	2 min./point
2.4		491.604	.95	1.11	1.11	84	76	2.2	123				
4.3		492.259	1.30	1.52	1.52	84	76	3.2	121				
6.4		492.932	1.40	1.63	1.63	84	76	3.7	122				
9.0		493.682	1.60	1.87	1.87	85	76	4.1	122				
12.8		494.486	1.55	1.82	1.82	85	76	4.0	123				
23.2		496.281	1.55	1.82	1.82	86	77	4.0	123				
27.0		496.032	1.60	1.88	1.88	86	77	4.1	124				
29.6		496.854	1.85	2.17	2.17	87	78	4.8	123				
31.7		497.712	1.95	2.29	2.29	87	78	4.9	124				
33.6		498.502	2.00	2.35	2.35	87	78	5.0	124				
35.0		499.432	1.95	2.29	2.29	87	78	4.9	124				
		500.276											
Test Totals/ Averages	Δ=60 min	Δ=4.812 dcf	$(\Delta P)_{AVG}$ = 1.45	$(dH)_{AVG}$ =	1.75	$(T_{meter})_{AVG}$ = 85°F			$(T_{stack})_{AVG}$ = 126°F				Estimates: MW=28.8 %H2O=1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

617

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Pot
PROJECT NO. 30261-01
TEST CREW
BAROMETRIC PRESSURE 29.21

TEST DATE 10-21-93
TEST NO. CLR-2-3-3
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 1.2" H2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9872
CALIBRATION DATE 5-7-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 4
PROBE NO. 5-1
FILTER NO. 1051
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		835.325	1.3	1.41	1.41	88	85	5.0	125	~250	<68	~250	1 min./point
35.6		836.000	1.5	1.61	1.61	90	85	6.0	129				
31.7		836.668	1.4	1.50	1.50	91	86	6.0	127				
29.6		837.350	1.4	1.50	1.50	92	87	6.5	123				
27.0		838.090	1.1	1.18	1.18	92	87	5.0	124				
23.2		838.655	1.3	1.40	1.40	93	88	6.0	125				
12.8		839.292	1.2	1.29	1.29	94	88	5.5	128				
9.0		839.911	1.3	1.40	1.40	94	89	6.0	128				
6.4		840.664	1.2	1.29	1.29	94	89	6.0	128				
4.3		841.165	1.2	1.29	1.29	92	89	6.0	126				
2.4		841.780	1.0	1.08	1.08	91	88	5.0	122				
1.0		842.348	1.0	1.08	1.08	90	88	5.0	121				
		842.981											
													Estimates:
													MW=28.8
													%H2O= 1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.0	<0.012 cfm
After	12.0	0.005

PITOT LEAK CHECK 15sec

	Positive	Negative
Before	15sec	15sec
After	OK	OK

GAS	1	2
CO2	0	
O2	20.5	
CO	0	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100ml D.I. H2O	554.0	545.4	8.6
2.	100ml D.I. H2O	480.6	480.1	0.5
3.	Empty	443.9	444.1	-0.2
4.	Silica Gel	680.3	670.7	9.6
5.				
6.			total =	18.5g
7.				
8.				

8.9g

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-21-93	ORIFICE CORRECTION (ΔH@) 1.734	HOT/COLD BOX NO. 4
TEST UNIT 13-15 Battery PEC	TEST NO. CLR 2-3-3	METER CORRECTION (Y) 0.9832	PROBE NO. 5-1
PROJECT NO. 300261-01	NOZZLE (SIZE,#) 0.183"	CALIBRATION DATE 5-17-93	FILTER NO. 1051
TEST CREW	STATIC PRESSURE 1.2" H2O	PITOT CORRECTION 0.84	STACK DIA. 32"
BAROMETRIC PRESSURE 29.21	PORT DIRECTION West	CONTROL BOX NO. 5	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		842.981	1.0	1.08	1.08	90	87	5.0	120	~250	<68	~250	1 min./point
2.4		843.535	1.0	1.08	1.08	89	86	5.0	121				
4.3		844.116	1.1	1.19	1.19	88	86	5.5	122				
6.4		844.725	1.3	1.40	1.40	88	85	7.0	124				
9.0		845.366	1.3	1.40	1.40	88	84	7.0	123				
12.8		846.019	1.3	1.39	1.39	87	85	7.0	123				
23.2		846.665	1.2	1.28	1.28	87	84	6.5	123				
27.0		847.312	1.3	1.39	1.39	87	84	7.0	123				
29.6		847.953	1.5	1.60	1.60	87	84	9.0	123				
31.7		848.638	1.6	1.71	1.71	87	84	10.0	123				
33.6		849.367	1.6	1.71	1.71	87	84	10.0	123				
35.0		850.090	1.5	1.60	1.60	87	84	9.0	123				
		850.820											
													Estimates:
													MW- 28.8
													%H2O- 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Pre
PROJECT NO. 300261-01
TEST CREW
BAROMETRIC PRESSURE 29.21

TEST DATE 10-21-93
TEST NO. CLP-2-3-3
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 1.2" H2O
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 4
PROBE NO. 5-7
FILTER NO. 1051
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		850.820	1.5	1.60	1.60	87	83	9.0	124	~250	<68	~250	1 min./point
33.6		851.532	1.6	1.71	1.71	87	84	10.0	123				
31.7		852.255	1.6	1.71	1.71	87	83	10.0	125				
29.6		852.985	1.5	1.60	1.60	86	84	9.0	124				
27.0		853.665	1.5	1.60	1.60	87	83	9.0	126				
23.2		854.368	1.3	1.39	1.39	86	83	7.5	124				
12.8		855.024	1.2	1.28	1.28	87	83	7.0	123				
9.0		855.643	1.3	1.39	1.39	86	83	7.5	125				
6.4		856.282	1.2	1.28	1.28	86	83	7.0	124				
4.3		856.893	1.1	1.17	1.17	86	83	6.0	121				
2.4		857.490	1.0	1.07	1.07	86	83	5.0	120				
1.0		858.058	1.0	1.07	1.07	82	81	6.0	118				
		858.618											

Estimates:
MW=28.8
%H2O=1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Pot
PROJECT NO. 30026-011
TEST CREW
BAROMETRIC PRESSURE 29.21

TEST DATE 10-4-93
TEST NO. CLR-2-3-3
NOZZLE (SIZE, in) 0.183"
STATIC PRESSURE 1.2" H2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 4
PROBE NO. 5-1
FILTER NO. 10,51
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		858.618	1.4	1.50	1.50	80	79	9.0	115	~250	<68	~250	1 min./point
33.6		859.259	1.5	1.60	1.60	80	79	10.5	115				
31.7		859.942	1.6	1.71	1.71	80	78	11.0	117				
29.6		860.625	1.5	1.60	1.60	80	78	10.5	116				
27.0		861.310	1.4	1.50	1.50	79	77	10.0	117				
23.2		861.825	1.2	1.28	1.28	80	77	8.0	116				
12.8		862.513	1.1	1.17	1.17	79	76	7.0	117				
9.0		863.127	1.3	1.39	1.39	79	77	9.0	116				
6.4		863.753	1.4	1.50	1.50	80	76	10.0	116				
4.3		864.425	1.4	1.50	1.50	79	76	10.0	110				
2.4		865.103	1.2	1.29	1.29	80	76	7.5	111				
1.0		865.734	1.2	1.29	1.29	80	76	7.5	111				
		866.356											
													Estimates:
													MW=28.8
													%H2O=1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-3

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Pac
PROJECT NO. 30061-01
TEST CREW
BAROMETRIC PRESSURE 29.21

TEST DATE 10-21-93
TEST NO. CLR-2-3-3
NOZZLE (SIZE,#) 0.183"
STATIC PRESSURE 1.2" H2O
PORT DIRECTION South

ORIFICE CORRECTION (ΔH@) 1.734
METER CORRECTION (Y) 0.9832
CALIBRATION DATE 5-7-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 5

HOT/COLD BOX NO. 4
PROBE NO. 5-1
FILTER NO. 1051
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		866.356	1.3	1.39	1.39	80	76	8.0	112	~250	<68	~250	1 min./point
2.4		866.970	1.2	1.29	1.29	80	77	7.0	113				
4.3		867.580	1.3	1.39	1.39	80	76	8.5	113				
6.4		868.213	1.3	1.39	1.39	80	77	9.0	117				
9.0		868.858	1.3	1.39	1.39	80	77	8.5	120				
12.8		869.504	1.1	1.18	1.18	80	77	7.0	119				
23.2		870.095	1.2	1.29	1.29	81	77	7.5	120				
27.0		870.710	1.4	1.50	1.50	80	77	10.0	120				
29.6		871.411	1.6	1.72	1.72	80	77	12.0	119				
31.7		872.142	1.5	1.61	1.61	81	77	10.5	120				
33.6		872.849	1.5	1.61	1.61	80	77	10.5	122				
35.0		873.527	1.3	1.39	1.39	79	77	8.0	122				
		874.176											
Tot	Δ=60	Δ=38.951	$(\Delta p)_{avg}$=	$(\Delta H)_{avg}$=		$(T_{meter})_{avg}$=83°F			$(T_{stack})_{avg}$=121°F				Estimates:
Totals +	min.	dcf			1.40								MW=28.8
Averages			1.3										%H2O=1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Tec
PROJECT NO. [redacted]
[redacted]T CREW TM
[redacted]OMETRIC PRESSURE 29.21

TEST DATE 10-21-93
TEST NO. CW-2-4-3
NOZZLE (SIZE,#) 0.185"
STATIC PRESSURE -0.6
PORT DIRECTION West

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9619
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 7

HOT/COLD BOX NO. 2
PROBE NO. 5-5
FILTER NO. 1147
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
										~250	<68	~250	1 min./point
35.0		226.740	1.4	1.63	1.63	82	81	4.0	117				
[redacted]6		227.450	1.6	1.86	1.86	86	82	4.5	120				
31.7		228.215	1.4	1.63	1.63	90	82	4.0	119				
29.6		228.889	1.4	1.64	1.63	90	84	4.5	118				
27.0		229.670	1.2	1.40	1.40	90	84	3.5	121				
23.2		230.380	1.1	1.29	1.29	94	82	3.5	119				
12.8		230.945	1.1	1.29	1.29	92	86	3.5	122				
9.0		231.591	1.2	1.40	1.40	94	86	3.5	123				
6.4		232.261	1.0	1.17	1.17	92	86	3.0	120				
4.3		232.910	0.2	0.24	0.24	88	80	0.5	112				
2.4		233.221	0.2	0.24	0.24	86	80	0.5	110				
1.0		233.479	0.2	0.24	0.24	88	80	0.5	102				
		233.810											

Estimates:
MW=28.8
%H2O=1

SYSTEM LEAK CHECK

	Vacuum (in. Hg)	DGM Rate (cfm)
Before	5.0	0.003
After	5.0	0.004

PITOT LEAK CHECK 15 sec

	Positive	Negative
Before	ok	ok
After	ok	ok

GAS	1	2
CO2	0	
O2	20.5	
CO	0	
N2	79.5	

Impinger No.	Impinger Contents	Final	Initial	Difference
1.	100 mL D.I. H_2O	474.0	468.4	5.6
2.	100 mL D.I. H_2O	554.3	555.1	-0.8
3.	Empty	445.6	445.6	0.0
4.	Silica Gel	660.2	644.0	16.3
5.				
6.			Total =	16.1 g
7.				
8.				

4.8 g

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works	TEST DATE 10-21-93	ORIFICE CORRECTION (ΔH@) 1.802	HOT/COLD BOX NO. 2
TEST UNIT 13-15 Battery PEC	TEST NO. CLR-2-4-3	METER CORRECTION (Y) 0.9619	PROBE NO. 5-5
PROJECT NO. 30026-01	NOZZLE (SIZE,#) 0.185"	CALIBRATION DATE 5-7-93	FILTER NO. 1114
TEST CREW TM	STATIC PRESSURE + 0.6" H2O	PITOT CORRECTION 0.84	STACK DIA. 36"
BAROMETRIC PRESSURE 29.81	PORT DIRECTION WEST	CONTROL BOX NO. 7	PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		233.880	0.2	0.24	0.24	88	77	0.5	100	~250	<68	~250	1 min./point
2.4		234.233	0.2	0.24	0.24	82	77	0.5	100				
4.3		234.630	0.8	0.98	0.98	86	78	1.0	95				
6.4		235.148	1.0	1.19	1.19	84	78	3.0	105				
8.0		235.771	1.1	1.31	1.31	84	78	3.5	106				
12.8		236.441	1.1	1.30	1.30	84	78	3.5	110				
22.2		237.118	1.0	1.19	1.19	86	79	3.5	112				
27.0		237.761	1.2	1.41	1.41	84	77	3.5	114				
29.6		238.450	1.3	1.53	1.53	86	80	4.0	115				
31.7		239.141	1.3	1.53	1.53	86	80	4.0	116				
33.6		239.830	1.5	1.76	1.76	88	80	4.5	114				
35.0		240.555	1.5	1.76	1.76	87	80	4.5	113				
		241.320											
													Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Bailey Rd
PROJECT NO. 30061-011
TEST CREW TM
BAROMETRIC PRESSURE 29.21

TEST DATE 10-28-93
TEST NO. CR2-4-3
NOZZLE (SIZE,#) 0.185"
STATIC PRESSURE +0.6 "H_2O
PORT DIRECTION WEST

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.969
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 7

HOT/COLD BOX NO. 2
PROBE NO. 5-5
FILTER NO. 1114
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		241.320	1.5	1.76	1.76	88	81	4.5	115	~250	<68	~250	1 min./point
33.6		242.018	1.4	1.64	1.64	90	81	4.5	116				
31.7		242.884	1.3	1.53	1.53	90	81	4.5	116				
29.6		243.585	1.2	1.41	1.41	88	81	4.0	116				
27.0		244.260	1.1	1.29	1.29	87	81	3.5	117				
23.2		244.805	1.0	1.17	1.17	86	80	3.5	116				
12.8		245.471	1.0	1.17	1.17	85	80	3.5	116				
9.0		246.060	1.0	1.17	1.17	85	80	3.5	117				
6.4		246.723	1.0	1.17	1.17	85	80	3.5	114				
4.3		247.300	0.2	0.20	0.20	80	80	0.5	110				
2.4		247.640	0.2	0.20	0.20	80	70	0.5	100				
1.0		248.880	0.2	0.20	0.20	80	70	0.5	98				
		248.119											
													Estimates:
													MW= 28.8
													%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT 13-15 Battery Pet
PROJECT NO. 70261-01
TEST CREW TM
BAROMETRIC PRESSURE 29.21

TEST DATE 10-21-93
TEST NO. CP 2-4-3
NOZZLE (SIZE,#) 0.185"
STATIC PRESSURE +0.6" H2O
PORT DIRECTION N.-TH

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9619
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 7

HOT/COLD BOX NO. 2
PROBE NO. 5-5
FILTER NO. 1114
STACK DIA. 36"
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
35.0		248.119	0.8	0.93	0.93	80	[illegible]	3.5	112	~250	<68	~250	1 min./point
33.6		248.702	1.0	1.17	1.17	80	70	3.5	111				
31.7		249.381	1.1	1.27	1.27	78	70	3.5	115				
29.6		249.770	1.3	1.50	1.50	78	70	4.5	113				
27.0		250.650	1.3	1.52	1.52	78	70	4.5	110				
23.2		251.340	1.1	1.28	1.28	77	70	3.5	109				
12.8		251.960	1.0	1.17	1.17	79	70	3.5	109				
9.0		252.580	0.9	1.05	1.05	78	70	3.5	110				
6.4		253.168	1.0	1.17	1.17	80	72	3.5	111				
4.3		253.830	0.9	1.05	1.05	80	72	3.5	109				
2.4		254.379	0.6	0.70	0.70	80	71	3.0	107				
1.0		254.894	0.5	0.59	0.59	80	70	3.0	100				
		255.376											

Estimates:
MW= 28.8
%H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

STACK 2-4

STACK SAMPLING DATA SHEET

CLIENT USS Clairton Works
TEST UNIT B-15 Battery PE
PROJECT NO. 30264-01
TEST CREW MI
BAROMETRIC PRESSURE 27.21

TEST DATE 10-21-93
TEST NO. CLR-2-4-3
NOZZLE (SIZE,#) 0.185"
STATIC PRESSURE +0.6" H2O
PORT DIRECTION North

ORIFICE CORRECTION (ΔH@) 1.802
METER CORRECTION (Y) 0.9619
CALIBRATION DATE 5-17-93
PITOT CORRECTION 0.84
CONTROL BOX NO. 2

HOT/COLD BOX NO. 2
PROBE NO. 5-5
FILTER NO. 1111
STACK DIA. 7'
PORT SIZE 4"

Traverse Point (inches)	Time	Dry Gas Meter Reading (dcf)	Pitot ΔP (in. H2O)	Orifice ΔH Required (in. H2O)	Orifice ΔH Actual (in. H2O)	Meter Temperature In (°F)	Meter Temperature Out (°F)	Vacuum (in. Hg)	Stack Temp. (°F)	Probe Temp. (°F)	Impinger Temp. (°F)	Hot Box Temp. (°F)	Comments
1.0		255.376	0.5	0.59	0.59	80	72	2.5	100	~250	<68	~250	1 min./point
2.4		255.825	0.5	0.59	0.59	80	71	2.5	99				
4.3		256.541	0.8	0.95	0.95	80	72	3.0	102				
6.4		256.916	0.9	1.05	1.05	80	72	3.5	110				
9.0		257.346	0.9	1.05	1.05	80	72	3.5	111				
12.8		258.179	0.9	1.04	1.04	80	71	3.0	115				
22.2		258.750	1.2	1.39	1.39	81	72	4.0	116				
27.0		259.420	1.2	1.39	1.39	80	73	3.5	114				
29.6		260.033	1.2	1.39	1.39	80	73	4.0	113				
31.7		260.725	1.2	1.37	1.39	80	72	4.0	115				
32.6		261.361	1.0	1.16	1.16	82	74	3.5	116				
35.0		262.009	1.0	1.16	1.16	82	73	3.5	115				
		262.642											
Test Totals + Averages	Δ=60 min	Δ=35.902 dcf	$(\Delta P)_{Avg}$ = 0.9	$(\Delta H)_{Avg}$ =	1.13	$(T_{meter})_{Avg}$ = 80°F			$(T_{stack})_{Avg}$ = 112°F				Estimates: MW= 28.8 %H2O= 1

SYSTEM LEAK CHECK

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

PITOT LEAK CHECK

	Positive	Negative
Before		
After		

GAS	1	2
CO2		
O2		
CO		
N2		

Impinger No.	Impinger Contents	Final	Initial	Difference
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

CHESTER ENVIRONMENTAL

CONTROL BOX CALIBRATION

THREE POINT CALIBRATION

BOX # 3 BP 28.9 in. Hg
DATE 07-02-93 OPERATOR RPC

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

POST TEST

BOX # 3 BP 29.20 In. Hg
DATE 10-22-93 OPERATOR RPC

	WET TEST METER				DRY TEST METER					METER COEFFICIENT	ORIFICE COEFFICIENT
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD	Y	▲H@
START			0.000	29.20				1.00	538.200		
HALF		75.0			97.0	93.0	95.0				
STOP	8.85		5.000						543.400		
CALCULATION	8.85	535.0	5.013	29.20			555.0	29.27	5.200	0.9975	1.745
START			0.000	29.20				1.00	543.600		
HALF		75.0			101.0	96.0	98.5				
STOP	8.73		5.000						548.711		
CALCULATION	8.73	535.0	5.013	29.20			558.5	29.27	5.111	1.0212	1.688
START			0.000	29.20				1.00	549.100		
HALF		75.0			103.0	96.0	99.5				
STOP	8.80		5.000						554.319		
CALCULATION	8.80	535.0	5.013	29.20			559.5	29.27	5.219	1.0019	1.712
AVERAGE										1.0069	1.715
DIFFERENCE										0.8%	-8.3%

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

0 to 10" H2O RANGE

MAGNEHELIC Δ P	MANOMETER
0.50	0.50
1.00	1.00
2.00	2.00
4.00	4.00
6.00	6.00
8.00	8.00

0 to 0.50" H2O RANGE

MAGNEHELIC Δ P	MANOMETER
0.50	0.50
0.40	0.40
0.30	0.30
0.20	0.20
0.10	0.10

0 to 5" H2O RANGE

MAGNEHELIC ΔH	MANOMETER
4.00	4.00
3.00	3.00
2.00	2.00
1.00	1.00
0.50	0.50

PRE-TEST LEAK CHECK
DATE 07-02-93
OPERATOR RPC

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

PYROMETER CALIBRATION
DATE 04-28-88
OPERATOR AGL

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

PRE-TEST PYROMETER CHECK
DATE 07-02-93
OPERATOR RPC

VOLTAGE INPUT (mV)	TARGET TEMP (°F)	TEMP READING (°F)
0.18	40	40.0
0.40	50	50.0
0.84	70	70.0
1.29	90	90.0
1.74	110	110.0
2.66	150	150.0
3.82	200	201.0
6.09	300	300.0
8.31	400	402.0
10.57	500	502.0

POST-TEST MAGNEHELIC CALIBRATION
BOX# 3
DATE 10-22-93
OPERATOR RPC

0 to 10" H2O RANGE

MAGNEHELIC Δ P	MANOMETER
0.50	0.50
1.00	1.00
2.00	2.00
4.00	4.00
6.00	6.00
8.00	8.00

0 to 0.50" H2O RANGE

MAGNEHELIC Δ P	MANOMETER
0.50	0.49
0.40	0.40
0.30	0.30
0.20	0.20
0.10	0.10

0 to 5" H2O RANGE

MAGNEHELIC ΔH	MANOMETER
4.00	4.00
3.00	3.00
2.00	2.00
1.00	1.00
0.50	0.50

POST-TEST LEAK CHECK
DATE 10-22-93
OPERATOR RPC

	START CF	STOP CF	VOLUME CF	TIME (min)	LEAK RATE
DRY	536.900	537.075	0.175	10.000	0.0002
WET	0.000	0.177	0.177		

PYROMETER CALIBRATION
DATE 04-28-88
OPERATOR AGL

VOLTAGE INPUT (mV)	ARGE TEMP (°F)	TEMP READING (°F)
0.18	40	40.0
0.40	50	50.0
0.84	70	70.0
1.29	90	90.0
1.74	110	110.0
2.68	150	150.0
3.82	200	200.0
6.09	300	301.0
8.31	400	400.0
10.57	500	500.0

POST-TEST PYROMETER CHECK
DATE 10-22-93
OPERATOR RPC

VOLTAGE INPUT (mV)	TARGET TEMP (°F)	TEMP READING (°F)
0.18	40	40.0
0.40	50	50.0
0.84	70	70.0
1.29	90	90.0
1.74	110	111.0
2.68	150	150.0
3.82	200	201.0
6.09	300	301.0
8.31	400	402.0
10.57	500	502.0

QA ORIFICE AUDIT

ORIFICE BAPC-3 DATE 10-22-93 B.P. 29.20
OPERATOR RPC BOX # 3

RUN	1		2		3	
INITIAL CF	513.500		521.000		528.700	
FINAL CF	520.843		528.369		536.096	
DIFFERENCE	7.343		7.369		7.396	
	IN	OUT	IN	OUT	IN	OUT
TEMP INITIAL	84	84	94	89	98	93
TEMP 5 MIN	91	87	95	90	99	94
TEMP 10 MIN	92	87	97	91	99	95
TEMP 15 MIN	94	89	98	93	99	95
		TEMP R		TEMP R		TEMP R
TEMP AVG	88.5	548.5	93.375	553.375	96.5	556.5
TIME (MIN.)	15.00		15.00		15.00	
	IN WATE	IN HG	IN WATER	IN HG	IN WATER	IN HG
ORIFICE	0.70	0.05	0.70	0.05	0.70	0.05
METER PRESSURE		29.25		29.25		29.25
	°F	°C	°F	°C	°F	°C
AMBIENT TEMP.	80.0	26.7	80.0	26.7	80.0	26.7
VACUUM IN HG	19.5		19.5		19.5	
DGM CAL Y	1.0151		1.0151		1.0151	
STD CF	7.042		7.004		6.990	
STD CUBIC METERS	0.1994		0.1984		0.1980	

CONTROL BOX CALIBRATION

THREE POINT CALIBRATION

BOX # 4 BP 28.75 in. Hg
DATE 05-19-93 OPERATOR RPC

	WET TEST METER				DRY TEST METER					METER COEFFICIENT Y	ORIFICE COEFFICIENT ΔH@
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD		
START			0.000	28.75				0.50	39.000		
HALF		61.0			72.0	71.0	71.5				
STOP	11.55		5.000						44.158		
CALCULATION	11.55	521.0	5.013	28.75			531.5	28.79	5.158	0.9901	1.495
START			0.000	28.75				1.00	44.500		
HALF		62.0			75.0	74.0	74.5				
STOP	8.92		5.000						49.650		
CALCULATION	8.92	522.0	5.013	28.75			534.5	28.82	5.150	0.9941	1.780
START			0.000	28.75				2.00	50.200		
HALF		63.0			75.0	73.0	74.0				
STOP	6.23		5.000						55.347		
CALCULATION	6.23	523.0	5.013	28.75			534.0	28.90	5.147	0.9893	1.745
AVERAGE										0.9912	1.673

POST TEST

BOX # 4 BP 29.20 In. Hg
DATE 10-22-93 OPERATOR RPC

	WET TEST METER				DRY TEST METER					METER COEFFICIENT	ORIFICE COEFFICIENT
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD	Y	ΔH@
START			0.000	29.20				1.00	681.200		
HALF		75.0			81.0	80.0	80.5				
STOP	8.70		5.000						686.325		
CALCULATION	8.70	535.0	5.013	29.20			540.5	29.27	5.125	0.9856	1.732
START			0.000	29.20				1.00	686.500		
HALF		75.0			84.0	83.0	83.5				
STOP	8.76		5.000						691.660		
CALCULATION	8.76	535.0	5.013	29.20			543.5	29.27	5.160	0.9844	1.748
START			0.000	29.20				1.00	692.000		
HALF		75.0			86.0	84.0	85.0				
STOP	8.81		5.000						697.200		
CALCULATION	8.81	535.0	5.013	29.20			545.0	29.27	5.200	0.9795	1.761
AVERAGE										0.9832	1.746
DIFFERENCE										0.8%	-4.2%

PRE-TEST MAGNEHELIC CALIBRATION
BOX# 4
DATE 05-19-93
OPERATOR RPC

0 to 10" H2O RANGE

MAGNEHELIC Δ P	MANOMETER
0.50	0.50
1.00	1.00
2.00	2.00
4.00	4.00
6.00	6.00
8.00	8.00

0 to 0.50" H2O RANGE

MAGNEHELIC Δ P	MANOMETER
0.50	0.50
0.40	0.40
0.30	0.30
0.20	0.20
0.10	0.10

0 to 5" H2O RANGE

MAGNEHELIC Δ H	MANOMETER
4.00	4.00
3.00	3.00
2.00	2.00
1.00	1.00
0.50	0.49

PRE-TEST LEAK CHECK
DATE 05-19-93
OPERATOR RPC

	START CF	STOP CF	VOLUME CF	TIME (min)	LEAK RATE
DRY	38.500	38.701	0.201	10.000	-0.002
WET	0.000	0.181	0.181		

PYROMETER CALIBRATION
DATE 04-28-88
OPERATOR AGL

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

PRE-TEST PYROMETER CHECK
DATE 05-19-93
OPERATOR RPC

VOLTAGE INPUT (mV)	TARGET TEMP (°F)	TEMP READING (°F)
0.18	40	40.0
0.40	50	51.0
0.84	70	71.0
1.29	90	91.0
1.74	110	110.0
2.66	150	151.0
3.82	200	201.0
6.09	300	302.0
8.31	400	402.0
10.57	500	502.0

POST-TEST MAGNEHELIC CALIBRATION
BOX# 4
DATE 10-22-93
OPERATOR RPC

0 to 10" H2O RANGE

MAGNEHELIC

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

0 to 0.50" H2O RANGE

MAGNEHELIC

ΔP	MANOMETER
0.50	0.50
0.40	0.40
0.30	0.30
0.20	0.20
0.10	0.10

0 to 5" H2O RANGE

MAGNEHELIC

ΔH	MANOMETER
4.00	4.00
3.00	3.00
2.00	2.00
1.00	1.00
0.50	0.50

POST-TEST LEAK CHECK
DATE 10-22-93
OPERATOR RPC

	START CF	STOP CF	VOLUME CF	TIME (min)	LEAK RATE
DRY	680.020	680.230	0.210	10.000	-0.0010
WET	0.000	0.200	0.200		

PYROMETER CALIBRATION
DATE 04-28-88
OPERATOR AGL

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

POST-TEST PYROMETER CHECK
DATE 10-22-93
OPERATOR RPC

VOLTAGE INPUT (mV)	TARGET TEMP (°F)	TEMP READING (°F)
0.18	40	40.0
0.40	50	50.0
0.84	70	70.0
1.29	90	90.0
1.74	110	110.0
2.66	150	150.0
3.82	200	200.0
6.09	300	303.0
8.31	400	403.0
10.57	500	503.0

QA ORIFICE AUDIT

ORIFICE BAPC-3 DATE 10-22-93 B.P. 29.20
OPERATOR RPC BOX # 4

RUN	1		2		3	
INITIAL CF	697.800		705.500		713.400	
FINAL CF	705.176		712.956		720.901	
DIFFERENCE	7.376		7.456		7.501	
	IN	OUT	IN	OUT	IN	OUT
TEMP INITIAL	87	87	91	89	99	94
TEMP 5 MIN	90	88	98	93	100	94
TEMP 10 MIN	90	87	98	94	100	94
TEMP 15 MIN	91	89	99	94	101	94
		TEMP R		TEMP R		TEMP R
TEMP AVG	88.625	546.625	94.5	554.5	97	557
TIME (MIN.)	15.00		15.00		15.00	
	IN WATE	IN HG	IN WATER	IN HG	IN WATER	IN HG
ORIFICE	0.75	0.06	0.75	0.06	0.75	0.06
METER PRESSURE		29.26		29.26		29.26
	°F	°C	°F	°C	°F	°C
AMBIENT TEMP.	80.0	26.7	80.0	26.7	80.0	26.7
VACUUM IN HG	18.5		18.5		18.5	
DGM CAL Y	0.9912		0.9912		0.9912	
STD CF	6.906		6.907		6.917	
STD CUBIC METERS	0.1958		0.1956		0.1959	

CONTROL BOX CALIBRATION

THREE POINT CALIBRATION

BOX # 5 BP 28.95 in. Hg
DATE 05-17-93 OPERATOR RPC

	WET TEST METER				DRY TEST METER						
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD	METER COEFFICIENT Y	ORIFICE COEFFICIENT ΔH@
START			0.000	28.95				0.50	248.800		
HALF		63.0			93.0	83.0	88.0				
STOP	12.75		5.000						254.195		
CALCULATION	12.75	523.0	5.013	28.95			548.0	28.99	5.395	0.9723	1.768
START			0.000	28.95				1.00	254.700		
HALF		64.0			96.0	84.0	90.0				
STOP	8.90		5.000						259.988		
CALCULATION	8.90	524.0	5.013	28.95			550.0	29.02	5.288	0.9924	1.723
START			0.000	28.95				2.00	261.600		
HALF		68.0			96.0	85.0	90.5				
STOP	6.25		5.000						266.900		
CALCULATION	6.25	526.0	5.013	28.95			550.5	29.10	5.300	0.9848	1.711
AVERAGE										0.9832	1.734

POST TEST

BOX # 5 BP 29.05 In. Hg
DATE 10-22-93 OPERATOR RPC

	WET TEST METER				DRY TEST METER					METER COEFFICIENT Y	ORIFICE COEFFICIENT ΔH@
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD		
START			0.000	29.05				1.45	930.300		
HALF		75.0			100.0	86.0	93.0				
STOP	7.50		5.000						935.630		
CALCULATION	7.50	535.0	5.013	29.05			553.0	29.16	5.330	0.9685	1.833
START			0.000	29.05				1.45	937.800		
HALF		75.0			104.0	89.0	96.5				
STOP	7.42		5.000						943.102		
CALCULATION	7.42	535.0	5.013	29.05			556.5	29.16	5.302	0.9798	1.763
START			0.000	29.05				1.45	943.600		
HALF		75.0			102.0	93.0	97.5				
STOP	7.35		5.000						949.001		
CALCULATION	7.36	535.0	5.013	29.05			557.5	29.16	5.401	0.9636	1.747
AVERAGE										0.9706	1.788
DIFFERENCE										1.3%	-3.0%

PRE-TEST MAGNEHELIC CALIBRATION
BOX# 5
DATE 05-17-93
OPERATOR RPC

0 to 10" H2O RANGE

MAGNEHELIC

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

0 to 0.50" H2O RANGE

MAGNEHELIC

ΔP	MANOMETER
0.50	---
0.40	---
0.30	---
0.20	---
0.10	---

Calibration not necessary.
Primary standard on control box.

0 to 5" H2O RANGE

MAGNEHELIC

ΔH	MANOMETER
4.00	4.01
3.00	3.01
2.00	2.00
1.00	1.00
0.50	0.50

PRE-TEST LEAK CHECK
DATE 05-17-93
OPERATOR RPC

	START CF	STOP CF	VOLUME CF	TIME (min)	LEAK RATE
DRY	248.305	248.500	0.195	10.000	0.001
WET	0.000	0.200	0.200		

PYROMETER CALIBRATION
DATE 04-28-88
OPERATOR AGL

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

PRE-TEST PYROMETER CHECK
DATE 05-17-93
OPERATOR RPC

VOLTAGE INPUT (mV)	TARGET TEMP (°F)	TEMP READING (°F)
0.18	40	40.0
0.40	50	50.0
0.84	70	70.0
1.29	90	90.0
1.74	110	110.0
2.66	150	150.0
3.82	200	201.0
6.09	300	301.0
8.31	400	403.0
10.57	500	503.0

POST-TEST MAGNEHELIC CALIBRATION
BOX# 5
DATE 10-25-93
OPERATOR RPC

0 to 10" H2O RANGE

MAGNEHELIC

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

0 to 0.50" H2O RANGE

MAGNEHELIC

ΔP	MANOMETER
0.50	---
0.40	---
0.30	---
0.20	---
0.10	---

Calibration not necessary.
Primary standard on control box.

0 to 5" H2O RANGE

MAGNEHELIC

ΔH	MANOMETER
4.00	4.00
3.00	3.00
2.00	2.00
1.00	1.00
0.50	0.50

POST-TEST LEAK CHECK
DATE 10-25-93
OPERATOR RPC

	START CF	STOP CF	VOLUME CF	TIME (min)	LEAK RATE
DRY	929.281	929.500	0.219	10.000	0.0011
WET	0.000	0.230	0.230		

PYROMETER CALIBRATION
DATE 04-28-88
OPERATOR AGL

VOLTAGE INPUT (mV)	ARGE TEMP (°F)	TEMP READING (°F)
0.18	40	40.0
0.40	50	50.0
0.84	70	70.0
1.29	90	90.0
1.74	110	110.0
2.68	150	150.0
3.82	200	200.0
6.09	300	301.0
8.31	400	400.0
10.57	500	500.0

POST-TEST PYROMETER CHECK
DATE 10-25-93
OPERATOR RPC

VOLTAGE INPUT (mV)	TARGET TEMP (°F)	TEMP READING (°F)
0.18	40	40.0
0.40	50	50.0
0.84	70	70.0
1.29	90	90.0
1.74	110	111.0
2.68	150	151.0
3.82	200	201.0
6.09	300	302.0
8.31	400	402.0
10.57	500	502.0

QA ORIFICE AUDIT

ORIFICE BAPC-3 DATE 10-25-93 B.P. 29.05
OPERATOR RPC BOX # 5

RUN	1		2		3	
INITIAL CF	949.300		957.200		965.100	
FINAL CF	957.000		964.900		972.790	
DIFFERENCE	7.700		7.700		7.690	
	IN	OUT	IN	OUT	IN	OUT
TEMP INITIAL	97	94	93	92	93	91
TEMP 5 MIN	94	93	93	91	93	91
TEMP 10 MIN	94	93	93	91	93	91
TEMP 15 MIN	92	92	93	91	95	91
		TEMP R		TEMP R		TEMP R
TEMP AVG	93.625	553.625	92.125	552.125	92.25	552.25
TIME (MIN.)	15.00		15.00		15.00	
	IN WATE	IN HG	IN WATER	IN HG	IN WATER	IN HG
ORIFICE	0.75	0.06	0.75	0.06	0.75	0.06
METER PRESSURE		29.11		29.11		29.11
	°F	°C	°F	°C	°F	°C
AMBIENT TEMP.	80.0	26.7	80.0	26.7	80.0	26.7
VACUUM IN HG	19.5		19.5		19.5	
DGM CAL Y	0.9832		0.9832		0.9832	
STD CF	7.050		7.069		7.059	
STD CUBIC METERS	0.1997		0.2002		0.1999	

CONTROL BOX CALIBRATION

THREE POINT CALIBRATION

BOX # 7 BP 28.95 in. Hg
DATE 05-17-93 OPERATOR RPC

	WET TEST METER				DRY TEST METER					
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD	METE COEFFIC Y
START			0.000	28.95				0.50	39.300	
HALF		72			104	78	91			
STOP	12.70		5.000						44.700	
CALCULATION	12.70	532	5.013	28.95			551	28.99	5.400	0.
START			0.000	28.95				1.00	45.200	
HALF		73			107	81	94			
STOP	9.00		5.000						50.606	
CALCULATION	9.00	533	5.013	28.95			554	29.02	5.406	0.
START			0.000	28.95				2.00	51.800	
HALF		74			110	83	97			
STOP	6.33		5.000						57.190	
CALCULATION	6.33	534	5.013	28.95			557	29.10	5.390	0
AVERAGE										0

POST TEST

BOX # 7 BP 29.20 In. Hg
DATE 10-22-93 OPERATOR RPC

	WET TEST METER				DRY TEST METER					METER COEFFICIENT Y	ORIFICE COEFFICIENT ΔH@
	TIME (min)	TEMP TW	VOLUME VM	PRESSURE PW	TEMP IN TI	TEMP OUT TO	TEMP AVG TA	ORIFICE PD	VOLUME VD		
START			0.000	29.20				1.25	339.800		
HALF		75			100	83	92				
STOP	8.00		5.000						345.090		
CALCULATION	8.00	535	5.013	29.20			552	29.29	5.290	0.9737	1.794
START			0.000	29.20				1.25	345.300		
HALF		75			101	84	93				
STOP	8.10		5.000						350.600		
CALCULATION	8.10	535	5.013	29.20			553	29.29	5.300	0.9736	1.836
START			0.000	29.20				1.25	350.900		
HALF		75			110	85	98				
STOP	8.13		5.000						356.203		
CALCULATION	8.13	535	5.013	29.20			558	29.29	5.303	0.9819	1.833
AVERAGE										0.9764	1.821
DIFFERENCE										-1.5%	-1.1%

PRE-TEST MAGNEHELIC CALIBRATION
BOX# 7
DATE 05-17-93
OPERATOR RPC

0 to 10" H2O RANGE

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

0 to 0.50" H2O RANGE

MAGNEHELIC ΔP	MANOMETER
0.50	---
0.40	---
0.30	---
0.20	---
0.10	---

Calibration not necessary.
Primary standard on control box.

0 to 3" H2O RANGE

MAGNEHELIC ΔH	MANOMETER
3.00	3.00
2.00	2.00
1.00	1.00
0.50	0.50

PRE-TEST LEAK CHECK
DATE 05-17-93
OPERATOR RPC

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

PYROMETER CALIBRATION
DATE 04-28-88
OPERATOR AGL

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

PRE-TEST PYROMETER CHECK
DATE 05-17-93
OPERATOR RPC

VOLTAGE INPUT (mV)	TARGET TEMP (°F)	TEMP READING (°F)
0.18	40	41.0
0.40	50	50.0
0.84	70	70.0
1.29	90	90.0
1.74	110	110.0
2.66	150	150.0
3.82	200	200.0
6.09	300	299.0
8.31	400	399.0
10.57	500	498.0

POST-TEST MAGNEHELIC CALIBRATION
BOX# 7
DATE 10-22-93
OPERATOR RPC

0 to 10" H2O RANGE

MAGNEHELIC

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

0 to 0.50" H2O RANGE

MAGNEHELIC

ΔP	MANOMETER
0.50	---
0.40	---
0.30	---
0.20	---
0.10	---

Calibration not necessary.
Primary standard on control box.

0 to 3" H2O RANGE

MAGNEHELIC

ΔH	MANOMETER
3.00	3.00
2.00	2.00
1.00	1.00
0.50	0.50

POST-TEST LEAK CHECK
DATE 10-22-93
OPERATOR RPC

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

PYROMETER CALIBRATION
DATE 04-28-88
OPERATOR AGL

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

POST-TEST PYROMETER CHECK
DATE 10-22-93
OPERATOR RPC

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

QA ORIFICE AUDIT

ORIFICE BAPC-3 DATE 11-22-93 B.P. 29.20
OPERATOR RPC BOX # 7

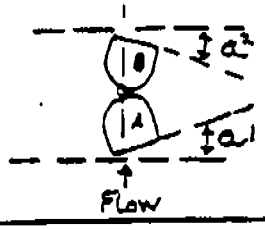
RUN	1		2		3	
INITIAL CF	445.800		453.700		461.600	
FINAL CF	453.420		461.370		469.224	
DIFFERENCE	7.620		7.670		7.624	
	IN	OUT	IN	OUT	IN	OUT
TEMP INITIAL	60	70	61	71	82	73
TEMP 5 MIN	60	70	62	73	83	75
TEMP 10 MIN	61	71	62	73	84	75
TEMP 15 MIN	61	71	62	73	84	75
		TEMP R		TEMP R		TEMP R
TEMP AVG	76	536	77	537	79	539
TIME (MIN.)	15.00		15.00		15.00	
	IN WATE	IN HG	IN WATER	IN HG	IN WATER	IN HG
ORIFICE	0.70	0.05	0.70	0.05	0.70	0.05
METER PRESSURE		29.25		29.25		29.25
	°F	°C	°F	°C	°F	°C
AMBIENT TEMP.	75	24	75	24	75	24
VACUUM IN HG	21.0		21.0		21.0	
DGM CAL Y	0.9619		0.9619		0.9619	
STD CF	7.092		7.117		7.052	
STD CUBIC METERS	0.2009		0.2016		0.1997	

GEOMETRIC PITOT CALIBRATION

Caliper # XEF-59
Precheck
Post Check

Probe #: 5.5
Date: 7-12-93
Initials: [illegible]

①

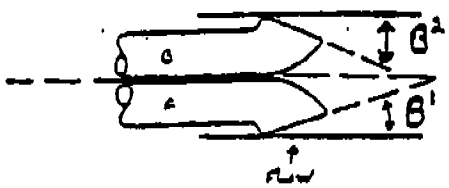


a¹ = 0°
a² = 3.0° a¹, a² = <10°

B¹ = 0°
B² = 1.0° B¹, B² = <5°

F = 0.985"

②



μ = 0 μ = ≤ 0.1250" (μ = F tan a)

V = 0.0174 V = ≤0.03125" (V = F tan θ)

W = 0.826 W ≥ 0"

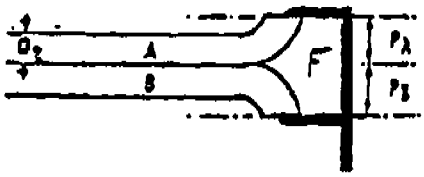
X = 0.718 X ≥ 0.750" (3/4" using 1/2" nozzle)

Y = 5.589 Y ≥ 3.0"

Z = 2.069 Z > 2.0"

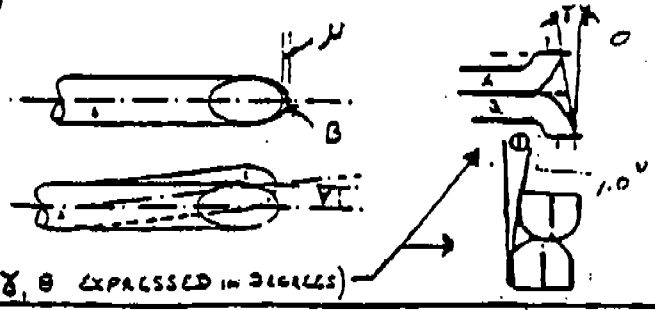
D_t = 0.375 D_t > .1875"

③



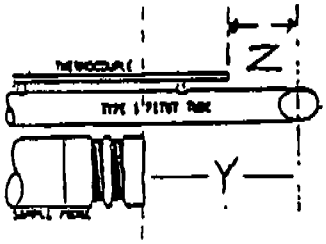
1.05 D_t < A < 1.50 D_t
P_A = P_B
2.10 D_t < A < 3.00 D_t

④



(γ, θ EXPRESSED IN DEGREES)

⑥



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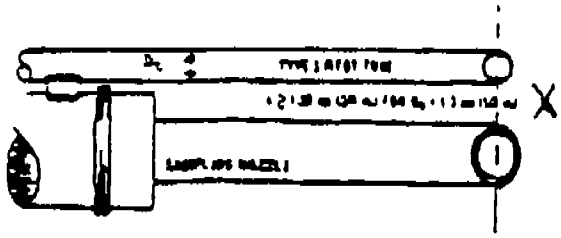

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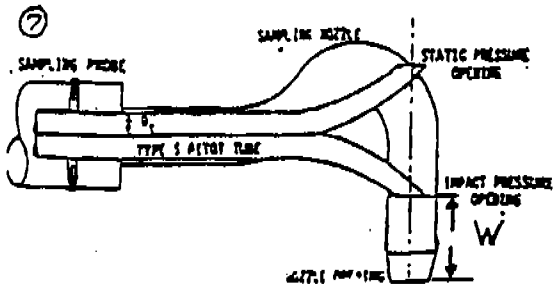

2

VISIBLE EMISSIONS OBSERVATION FORM

13-15 Baghouse

ERVER: Mark Zaleski

E: 10-19-93

ILITY: USC - Clairton

ERVATION START TIME: 9:55

END TIME: 10:55

ERVATION POINT:
Between 19 & 13 Batt.

ACE: 13-15 Baghouse

DISTANCE: ~200'

DIRECTION FROM: South

HEIGHT: ~100'

ND:

SPEED: 5 mph

DIRECTION: East →

MPERATURE: 49°

Y CONDITION: Overcast

OUNDGROUND: Sky

ADING CONDITIONS: fair

LOR OF EMISSIONS: —

OTAL # OF READINGS: 240

). READINGS 0 - 15% 240

). READINGS 20% 0

). READINGS 25 - 55% 0

). READINGS 60 - 100% 0

). READINGS >= 20% 0

REATEST OPACITY: 0

OMMENTS:

		:00	:15	:30	:45
	00	0	0	0	0
	01	0	0	0	0
	02	0	0	0	0
	03	0	0	0	0
13 A28 →	04	0	0	0	0
	05	0	0	0	0
	06	0	0	0	0
	07	0	0	0	0
	08	0	0	0	0
14 B27 →	09	0	0	0	0
	10	0	0	0	0
	11	0	0	0	0
	12	0	0	0	0
	13	0	0	0	0
	14	0	0	0	0
13 A30 →	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
14 B29	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
13 B1 →	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

		:00	:15	:30	:45
14 A2 →	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
15 A4 →	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
14 A4 →	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
13 B3 →	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
13 B5 →	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
13 B7	59	0	0	0	0

Name Terry Rodenberg
Date 10-20-83
Foreman D. Crouch Crew B

BATTERY 13-14-15 Pre Test

	Oven	Time	I. PUSH Seconds Max. ≥ 20% Opac.	II. TRAVEL* Seconds Max. > 10% Opac.	III. SCRUBBER Seconds Max. ≥ 20% Opac.	Comments:
39	B-12-14	12:17	0-5%	0	—	CFNV
40	A-13-13	12:23	0-5%	0-5%	—	Good Face Top Hook
41	B-14-14	12:28	0-5%	0	—	CFNV
42	A-15-13	12:34	0-5%	0-5%	—	Slight Green Face Top Latch
43	B-16-14	12:39	0	0-5%	—	CFNV
44	A-17-13	12:45	0-10%	0	—	Slight Green Face Top Latch
45	B-18-14	12:50	0	0-10%	—	Good Face
46	A-19-13	12:56	0-10%	0-5%	—	Slight Green Face Top Latch
47	B-20-14	13:01	0	0	—	Good Face
48	A-21-13	13:07	0-10%	0-5%	—	Slight Green Face Top Hook
49	B-22-14	13:12	0	0	—	Good Face Top Hook
50	A-23-13	13:17	0	0-10%	—	Good Face Top Hook
51	B-24-14	13:22	0	0	—	Good Face Top Latch
52	A-25-13	13:28	:09 = 100%	15-30%	OUT	Good Face Top Latch
53	B-26-14	13:33	0-10%	0-10%	—	Slight Green Face
54	A-27-13	13:39	0-15%	0-10%	—	Slight Green Face Top Hook
55	B-28-14	13:44	0-10%	0-10%	—	Slight Green Face Top Hook
56	A-29-13	13:50	0-5%	0-5%	—	Good Face Top Hook
57	B-30-14	13:55	0	0	—	Good Coke Face

Note: Column #I represents fugitive emissions from the coke collecting car, coke guide, and area between the coke guide and jamb, and emissions from the by-pass duct during the push.

Column #II represents emissions from the coke collecting car and by-pass duct during travel.

Column #III represents emissions from the gas cleaning car outlet during the push and travel.

* 13-15 Travel > 10% Opacity

VISIBLE EMISSIONS OBSERVATIONS FORM

Bag House
___ STACK

OBSERVER: Charles Davis

DATE: 10-20-93

FACILITY: USA Bag House

OBSERVATION: START TIME: 1340
END TIME: 1440

OBSERVATION POINT:
South of Bag House

SOURCE:

DISTANCE: 350'
DIRECTION FROM: South
HEIGHT: 30'

WIND:

SPEED: 9 m.P.H.
DIRECTION: South East
TEMPERATURE: 55° - 59°
SKY CONDITION: Overcast - Rain
BACKGROUND: Sky

READING CONDITIONS: Poor
COLOR OF EMISSION:

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

COMMENTS:

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

30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36				
37				
38				
39				
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42				
43				
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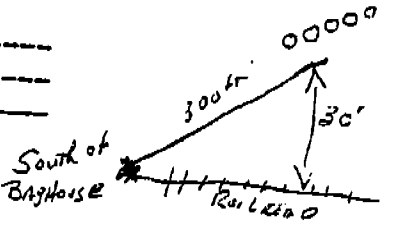
58				
59				



BAG HOUSE
VISIBLE EMISSIONS OBSERVATIONS FORM

OBSERVER: CHARLES DAVIS

DATE: 10-21-93

FACILITY: USA CLAIRTON

OBSERVATION: START TIME: 9:58

END TIME: 1058

OBSERVATION POINT:
SOUTH of BAG HOUSE

SOURCE:

DISTANCE: 350'

DIRECTION FROM: SOUTH

HEIGHT: 30'

WIND:

SPEED: 15 m.P.H

DIRECTION: WEST

TEMPERATURE: 60°

SKY CONDITION: OVERCAST

BACKGROUND: SKY

READING CONDITIONS: POOR

COLOR OF EMISSION:

TOTAL No. OF READINGS: 240

No. READINGS > 20%

No. READINGS > 60%

GREATEST OPACITY:

CREW: FOREMAN:

COMMENTS:

____ 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
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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

CC-10205 REV. 1181
03.001.0020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 5

12 Hrs. Beginning 12:00 AM

Date 10-19-93

BATTERY NO. 14-B

OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1	7	15	8	15	
3	7	55	8	26	
5	8	05	8	36	
7	8	17	8	46	
9	8	28	8	56	
11	8	38	9	08	
13	8	48	9	18	
15	8	58	9	28	
17	9	10	9	38	
19	9	20	9	48	
21	9	30	10	03	
23	9	40	10	18	
25	9	50	10	28	
27	10	05	10	38	
29	10	20	10	48	
31	=	=	=	=	
2			11	11	
4			11	23	
6	11	02	11	34	
8	11	13	11	44	
10	11	25	11	54	
12	11	36	12	04	
14	11	46	12	14	
16	11	56	12	24	
18	12	06	12	35	
20	12	16	12	46	
22	12	26	12	56	
24	12	37	1	07	
26	12	48	1	17	
28	12	58	1	27	
30	1	09	1	37	
1					
2					

BATTERY NO. 15-A

OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1	1	19	1	42	
3	1	29	2	—	
5	1	39	2	10	
7	1	49	2	20	
9	2	02	2	30	
11	2	12	2	40	
13	2	22	2	51	
15	2	32	3	27	
17	2	42	3	37	
19	2	52	3	47	
21	3	09	3	57	
23	3	19	4	12	
25	3	49	4	22	
27	3	59	4	32	
29	4	14	4	42	
31	4	24	4	52	
2	10	36			
4	10	46			
6	10	56			
8					
10					
12					
14					
16					
18					
20					
22					
24					
26					
28					
30					
1					
2					

BATTERY NO. 15-B

OVEN NO.	TIME PUSHED		TIME CHARGED		NOTES
1					
3					
5					
7					
9					
11					
13					
15					
17					
19					
21					
23					
25					
27					
29			11	—	
31	=	=	=	=	
2	4	34	5	02	
4	4	44	5	12	
6	4	54	5	22	
8	5	04	5	32	
10	5	14	5	42	
12	5	24	5	52	
14	5	34	6	02	
16	5	44	6	14	
18	5	54	7	00	
20	6	04	7	10	
22	6	16	7	20	
24	7	02	7	33	
26	7	12	7	43	
28	7	22	7	53	
30	7	35	8	03	
1					
2					

REMARKS: 14 | 32
18 | 30
12 | 62

19 | 16

15 | 16

Condition Of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
11-12	6	6	11-12	5-6	6	6	11-11
12-1	6	6	12-13	6-7	2	2	5-5
1-2	5	5	11-10	7-8	6	6	11-11
2-3	6	6	12-11	8-9	6	6	12-12
3-4	4	4	7-7	9-10	5	5	10-10
4-5	5	5	11-11	10-11	5	5	11-11
	32	32			30	30	

Total Ovens Pushed 62

Total Ovens Charged 62

Pusherman

Battery Foreman C.M. Jones

CG-10206 (REV. 1181)
03.001.0020

UNITED STATES STEEL CORPORATION
CLAIRTON COKE AND COAL CHEMICAL WORKS

PUSHING AND CHARGING REPORT

UNIT NO. 5
12 Hrs. Beginning 12:00 AM
Date 10-21-93

BATTERY NO. 13-A

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	4 59	5 29	
3	5 10	5 40	
5	5 20	5 51	
7	5 31	6 02	
9	5 42	6 13	
11	5 53	7 01	
13	6 04	7 12	
15	6 15	7 23	
17	7 03	7 34	
19	7 14	7 45	
21	7 25	7 56	
23	7 36	8 07	
25	7 47	8 18	
27	7 58	8 29	
29	8 09	8 40	
31	8 20	8 51	
2			
4			
6			
8			
10			
12			
14			
16			
18			
20			
22			
24		11 03	
26		11 13	
28		11 23	
30	11 05	11 33	
1			
3			

BATTERY NO. 13-B

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	11 15	11 43	
3	11 25	11 53	
5	11 35	12 05	
7	11 45	12 15	
9	11 55	12 25	
11	12 07	12 36	
13	12 17	12 46	
15	12 27	12 57	
17	12 38	1 08	
19	12 48	1 18	
21	12 59	1 28	
23	1 10	1 39	
25	1 20	1 49	
27	1 30	2 00	
29	1 41	2 10	
31			
2	8 31	9 02	
4	8 42	9 13	
6	8 53	9 24	
8	9 04	9 35	
10	9 15	9 46	
12	9 26	9 57	
14	9 37	10 08	
16	9 48	10 19	
18	9 59	10 30	
20	10 10	10 41	
22	10 21	10 52	
24	10 32		
26	10 43		
28	10 54		
30			
1			
3			

BATTERY NO. 14-A

OVEN NO.	TIME PUSHED	TIME CHARGED	NOTES
1	1 51	2 21	
3	2 02	2 31	
5	2 12	2 41	
7	2 23	2 52	
9	2 33	3 04	
11	2 43	3 35	
13	2 54	3 46	
15	3 06	3 56	
17	3 17	4 07	
19	3 28	4 18	
21	3 38	4 29	
23	4 09	4 40	
25	4 20	4 46	
27	4 31	4 57	
29	4 42	5 08	
31	4 48	5 18	
2			
4			
6			
8			
10			
12			
14			
16			
18			
20			
22			
24			
26			
28			
[redacted]		12 00	*
1			
3			

REMARKS:

17/20

33/37
19/24
52/61

16/17

Condition of Signals

Condition of Pusher

HOURLY REPORT OF OPERATION

TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED	TIME	OVENS PUSHED	OVENS CHARGED	OVENS SCHEDULED
1/4	6	6		05	5	5	
12	6	7		06	2	2	
1/3	5	5		07	6	6	
2/4	6	6		08	5	5	
3/4	4	4		10/09	6	6	
4/4	6	6		11/10	5	5	
	33	34			29	29	

Total Ovens Pushed 62
Total Ovens Charged 63

Pusherman

Battery Foreman C.M. Gruen

[illegible]

Wednesday, October 20, 1997 Turn 1
Battery: [illegible]

Det #	Over	Last Range	Per Test	Inspect	Latest
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ABB KENT-TAYLOR
6 PM
MIDNIGHT
NOON
6 AM

NOON
MIDNIGHT
6 AM
6 PM

NOON
MIDNIGHT
6 AM
6 PM

ARCO Chemical Co.
John Evans
Environmental Manager
2502 Sheldon Rd
Channel View, TX 77530
Phone: 713-860-4054

ID/Status : High

Cabot Industries
Tony James
V.P. S.H. & E.
75 State St
Boston, MA 02109-1806
Phone: 617

ID/Status : High

Fieldcrest Cannon
Barbara Siffard
Env. Manager
P.O.Box 107
Kannapolis, NC 28081
Phone: 704-939-2654
Fax: 704-939-2714

ID/Status : High

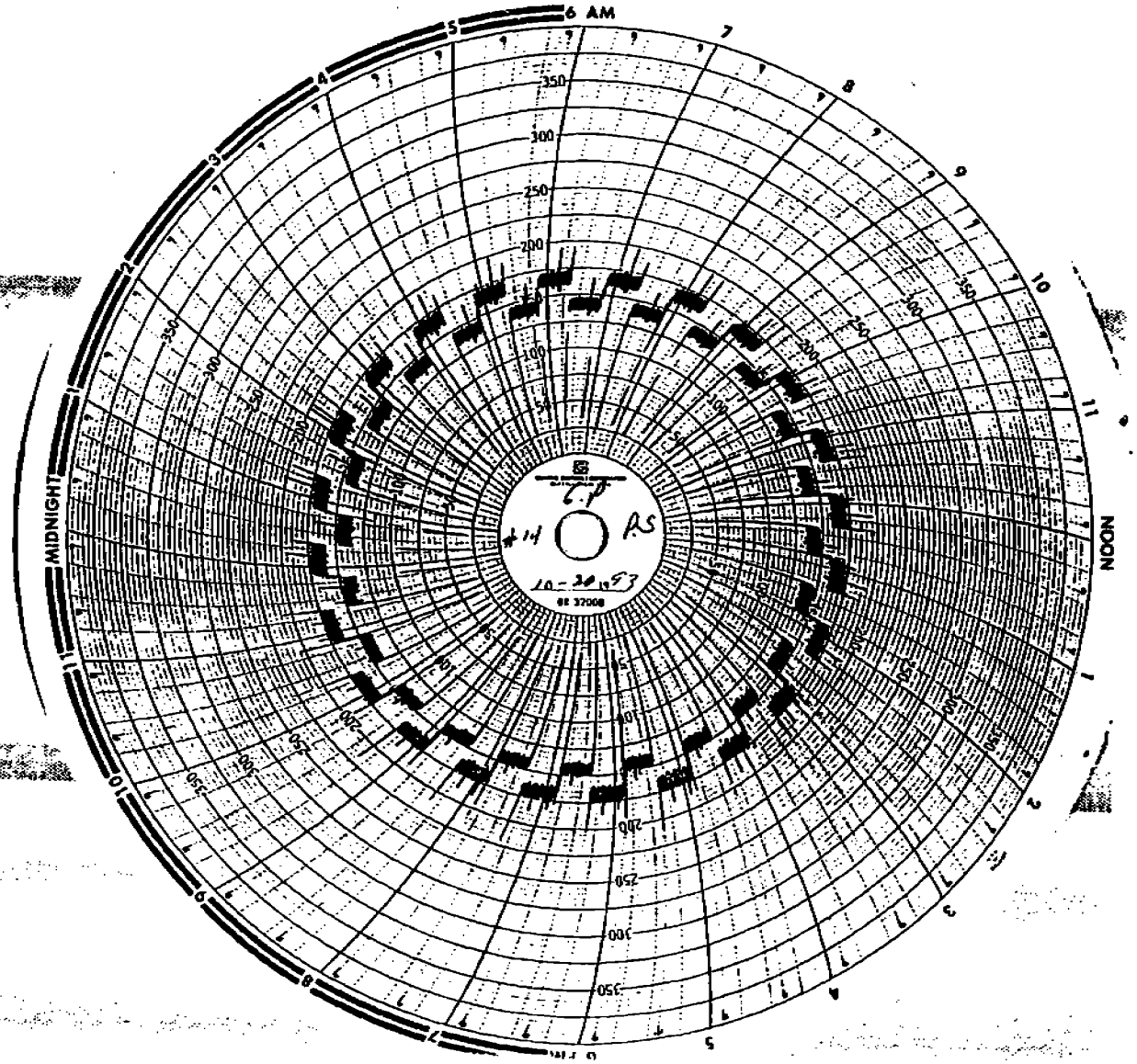
Pacific Environmental Services
Richard E Wilkins
5001 S Miami Blvd, Ste 300
PO Box 12077
RTP, NC 27709-2077
Phone: 919 941-0333

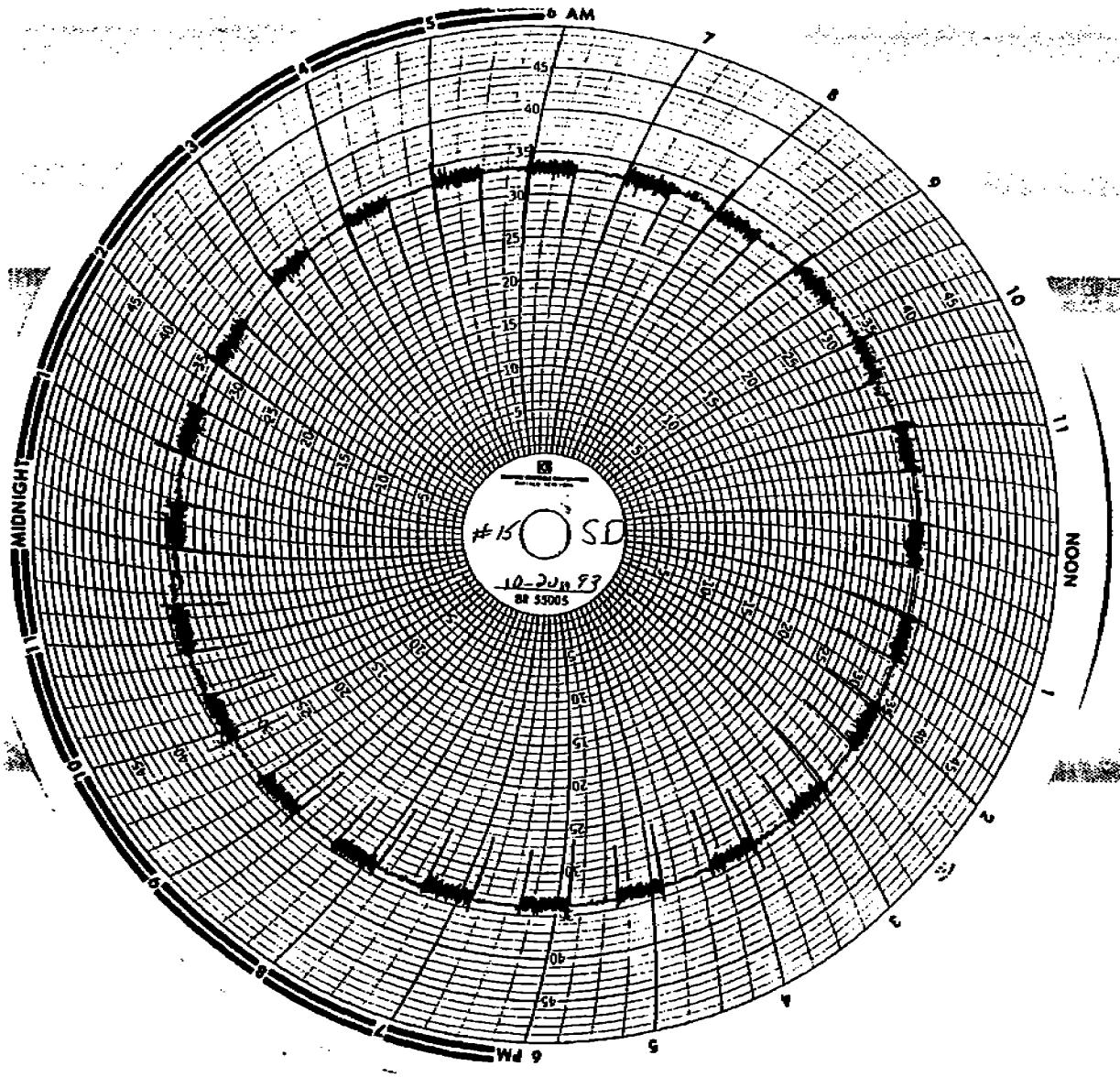
U S Steel
Luigi DiLanni
600 Grant St
Pittsburgh, PA 15219-2749
Phone: 412-433-5922

ID/Status : Medium

United Technology-Automotive
Paul Dinardo
Env. Manager
1641 Porter St
Detroit, MI 48216
Phone: 313-237-4992

ID/Status : Medium
Last Contact : 1/26


NOON
MIDNIGHT
6 AM
#14
AS
10-30-1993


6 AM
NOON
6 PM
MIDNIGHT
#15 SD
10-Jun 93
BR 55005

MIDNIGHT
6 AM
NOON
6 PM

ABB KENT-TAYLOR
#15 Vol
OPER
DATE 10-20-83
MIDNIGHT
6 AM
NOON
6 PM

6 AM
NOON
6 PM
MIDNIGHT
10-26-63
88 55172

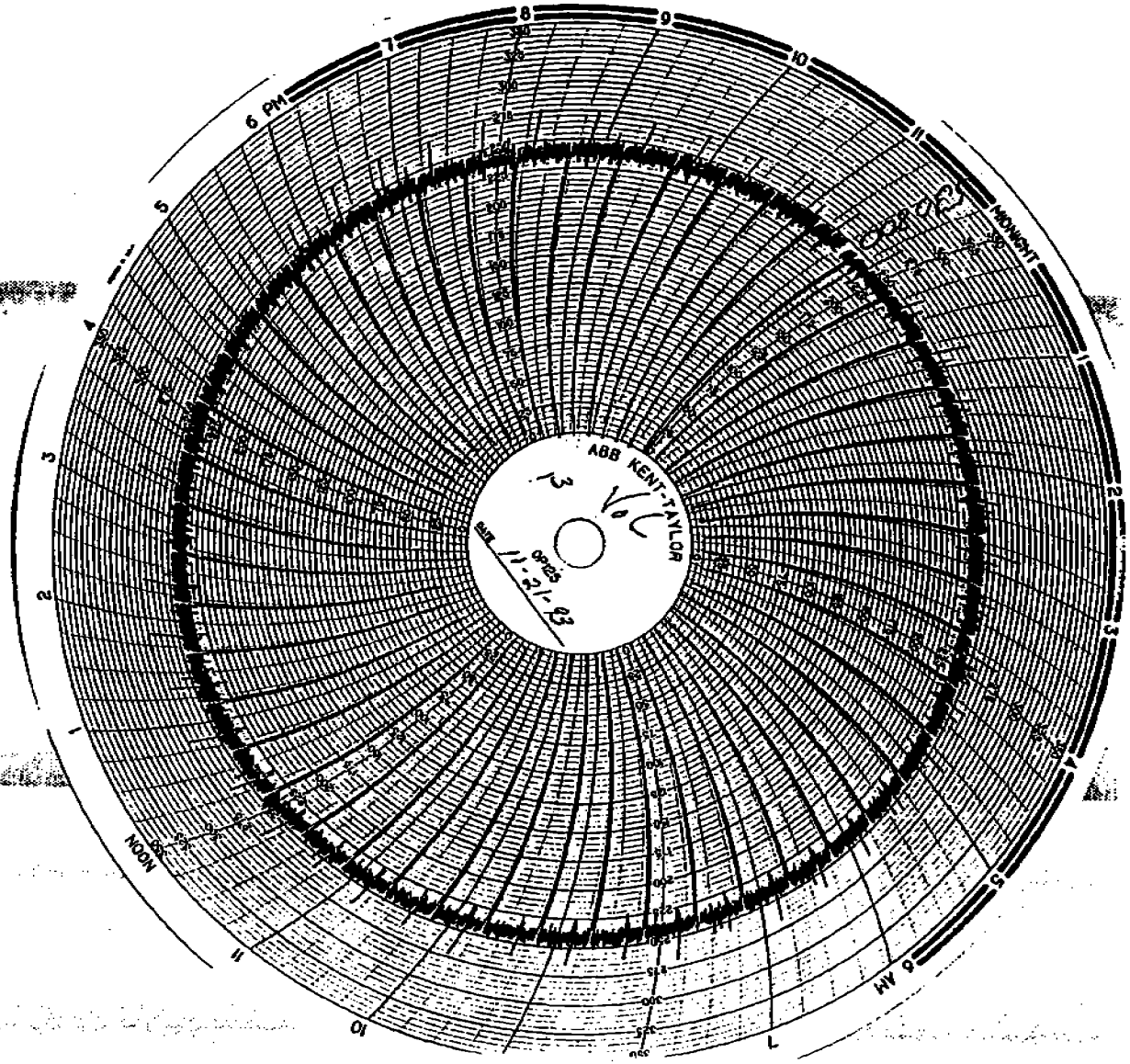


ABB KENT-TAYLOR
6 PM
MIDNIGHT
6 AM
NOON
1
2
3
4
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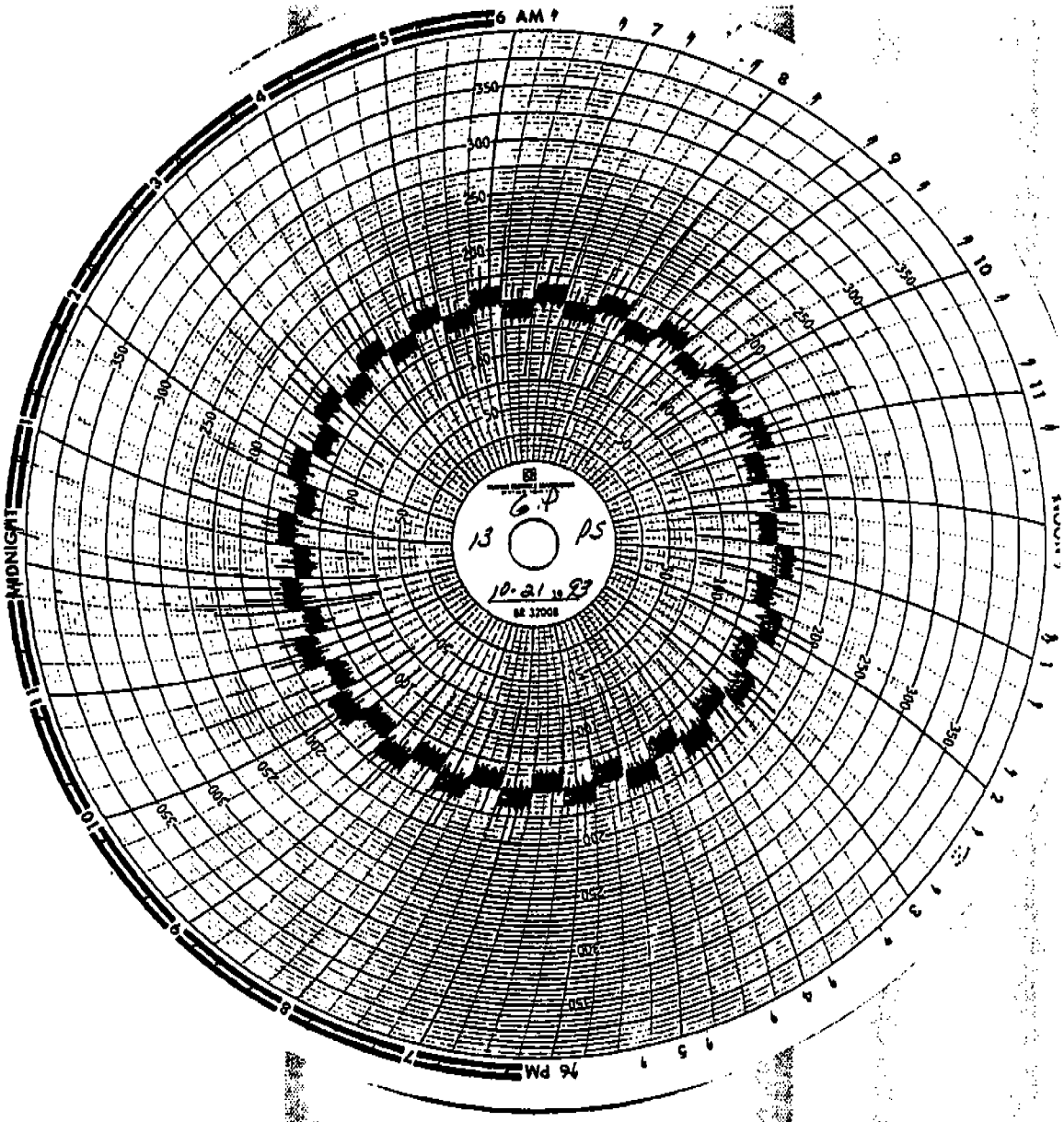
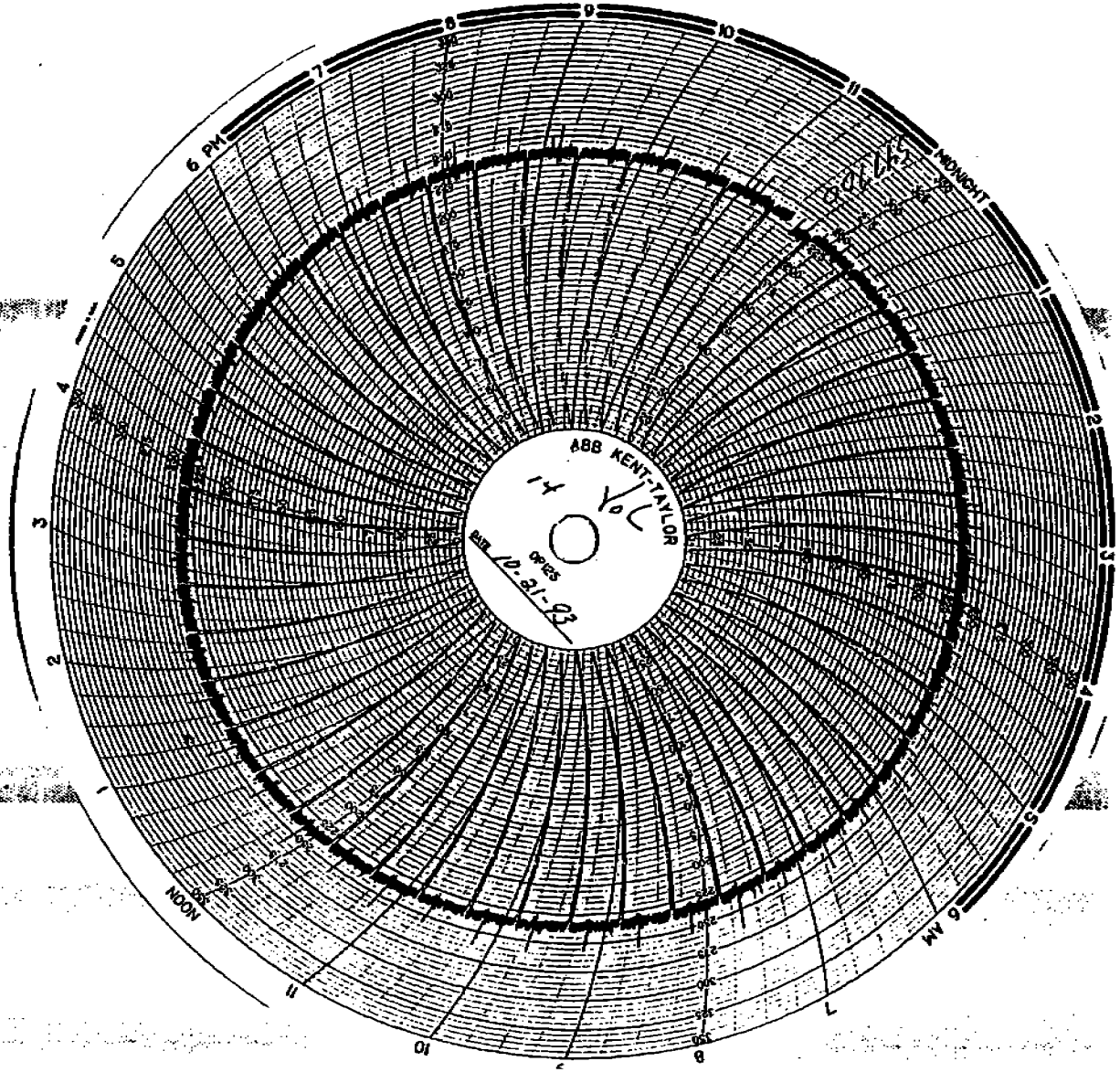
6
7
8
9
10
11
L

6 PM
6 AM
NOON
BR 35005


6 AM
6 PM
MIDNIGHT
13
P5
10-21 1983

MIDNIGHT
6 AM
NOON
6 PM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6 PM
MIDNIGHT
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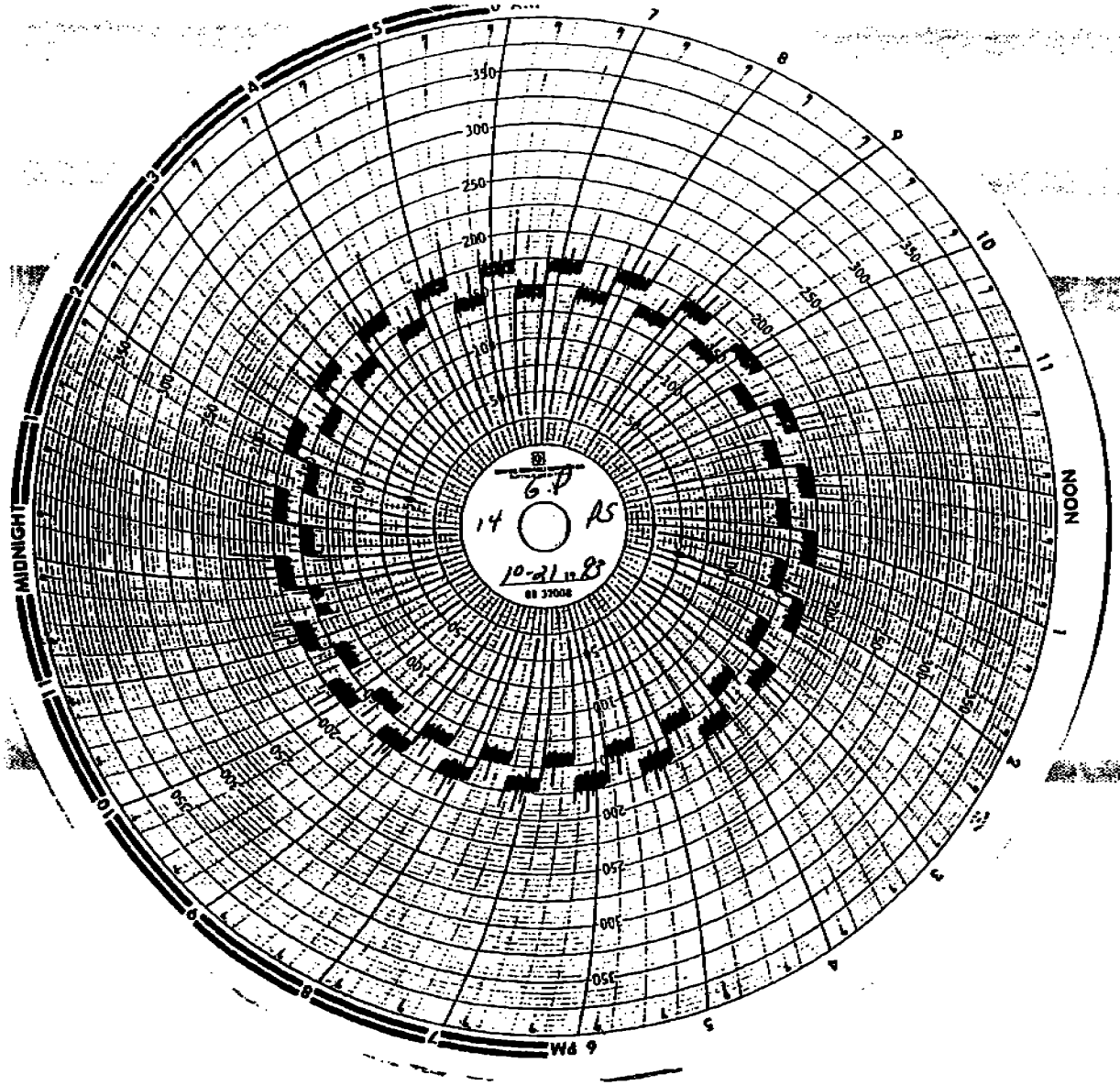
ABB KENT-TAYLOR
14
DATE 10-31-93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MIDNIGHT
NOON
14
AS
10-21-88
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NOON
MIDNIGHT
6 AM
6 PM
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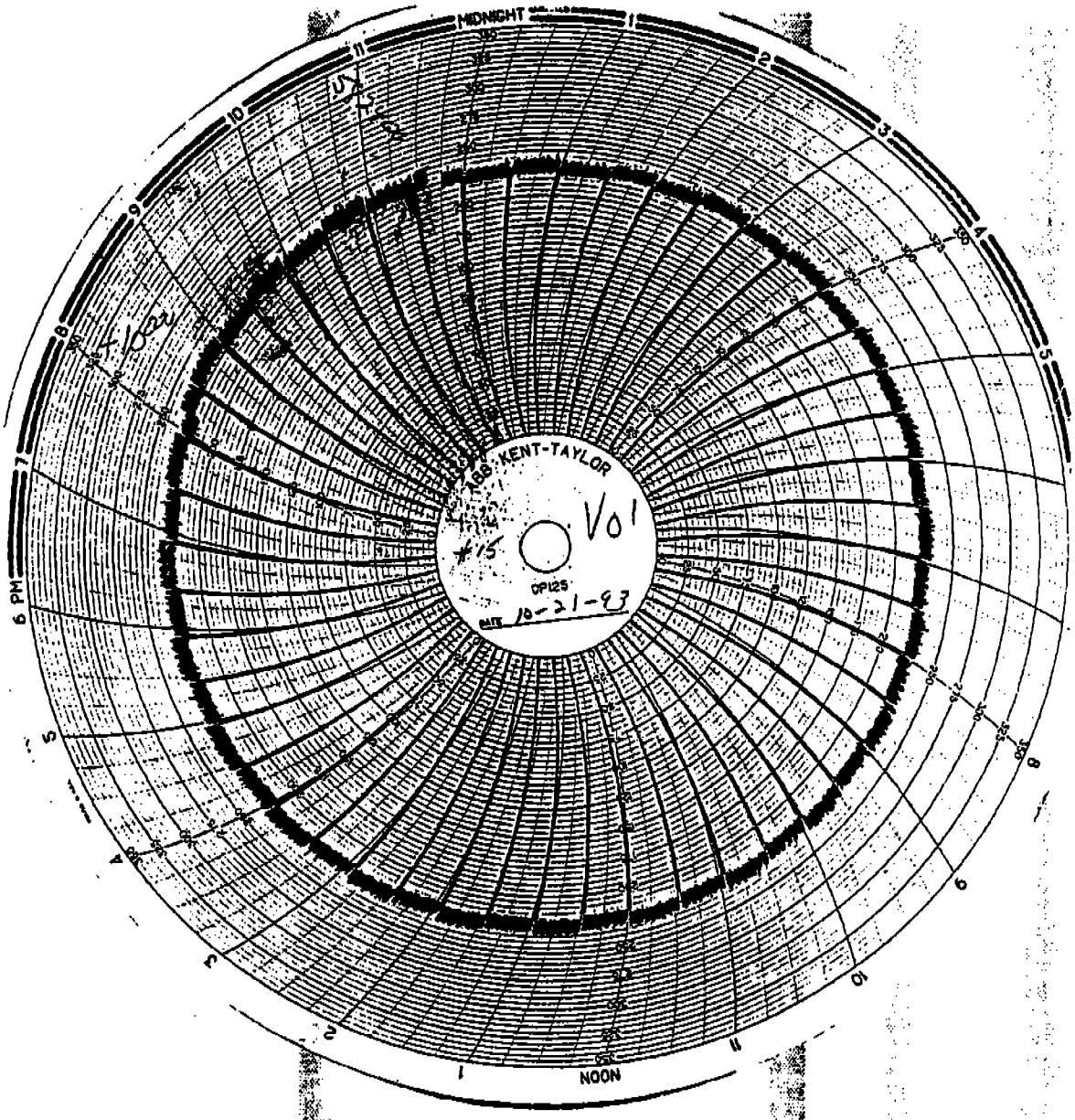
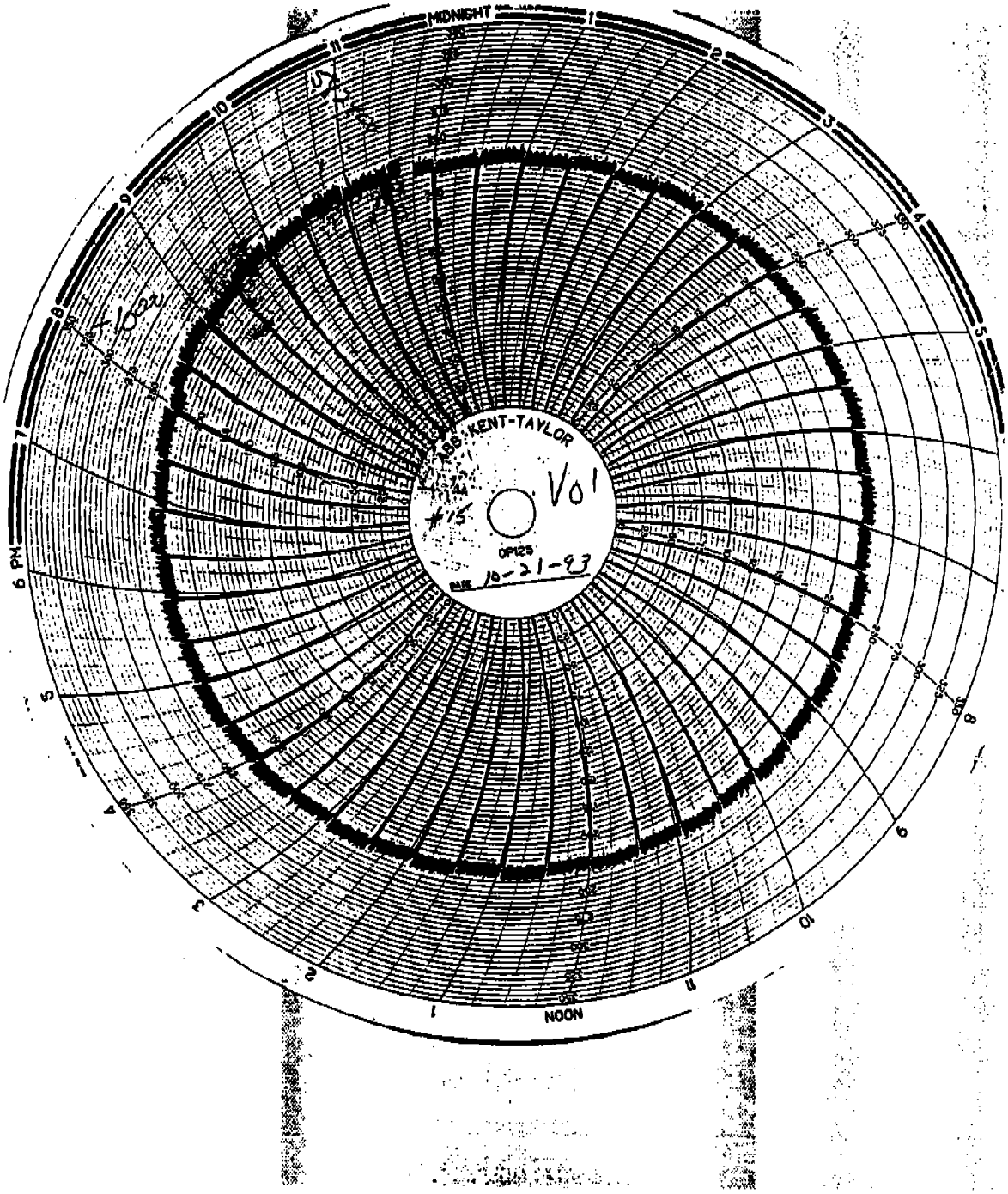
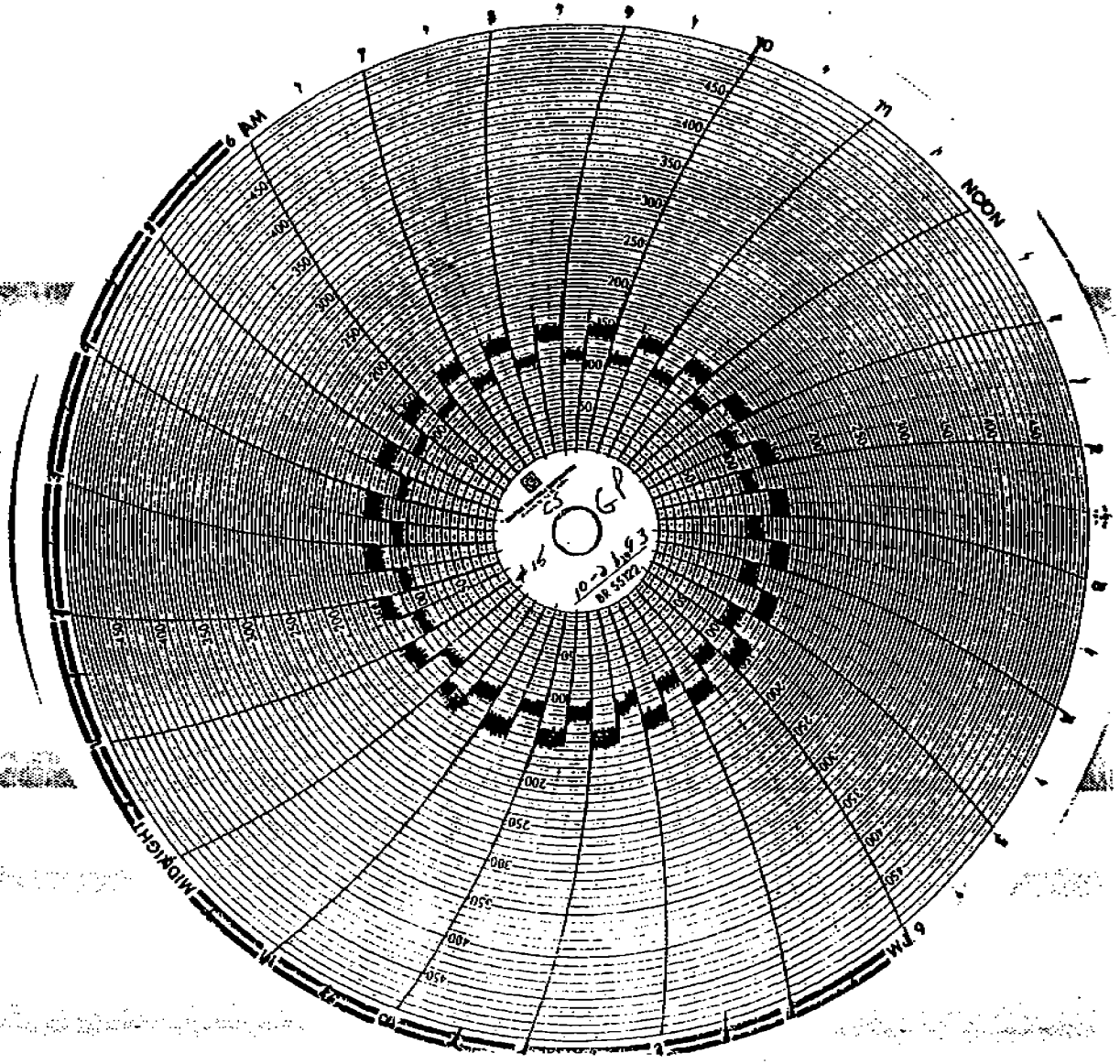
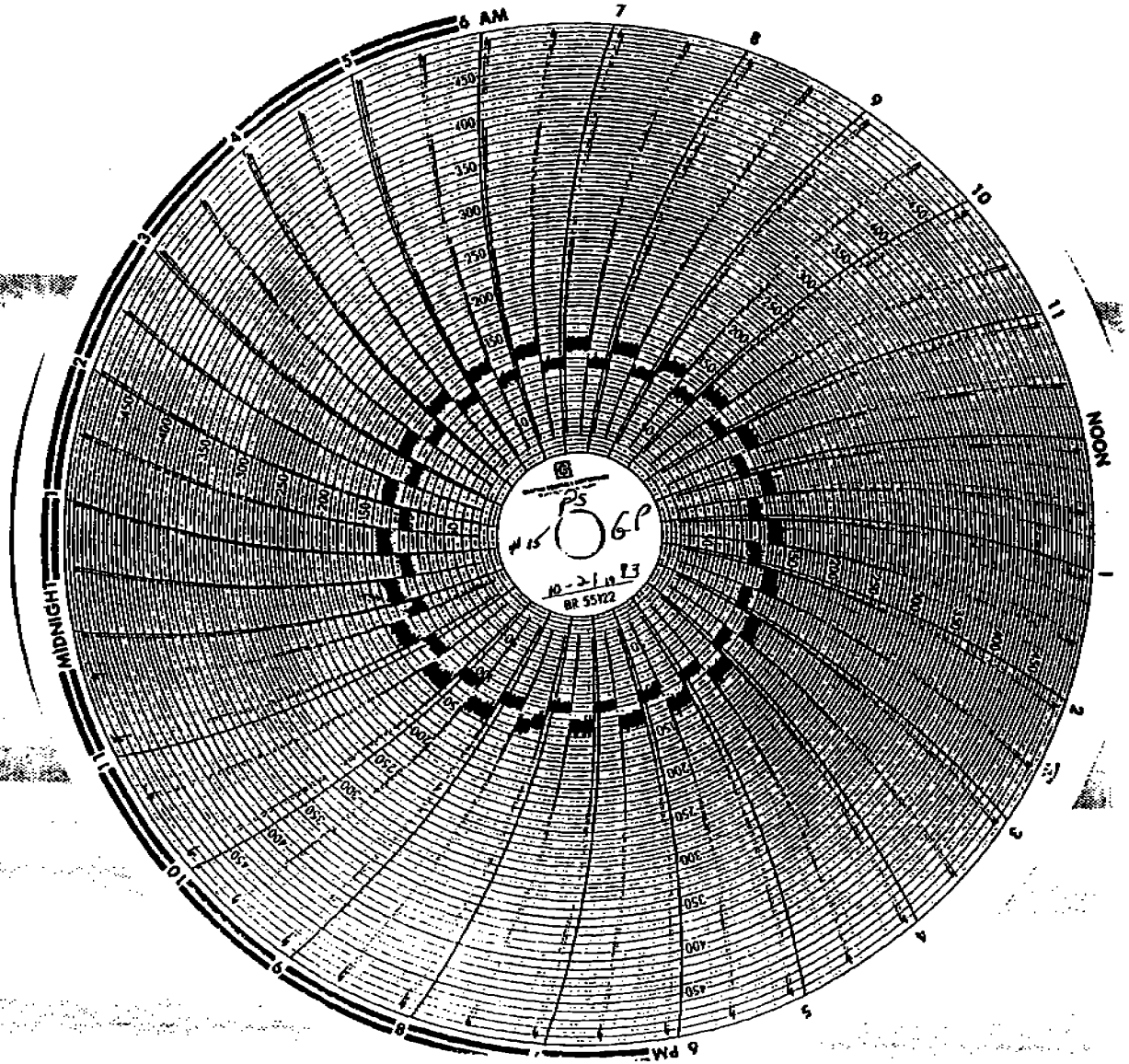
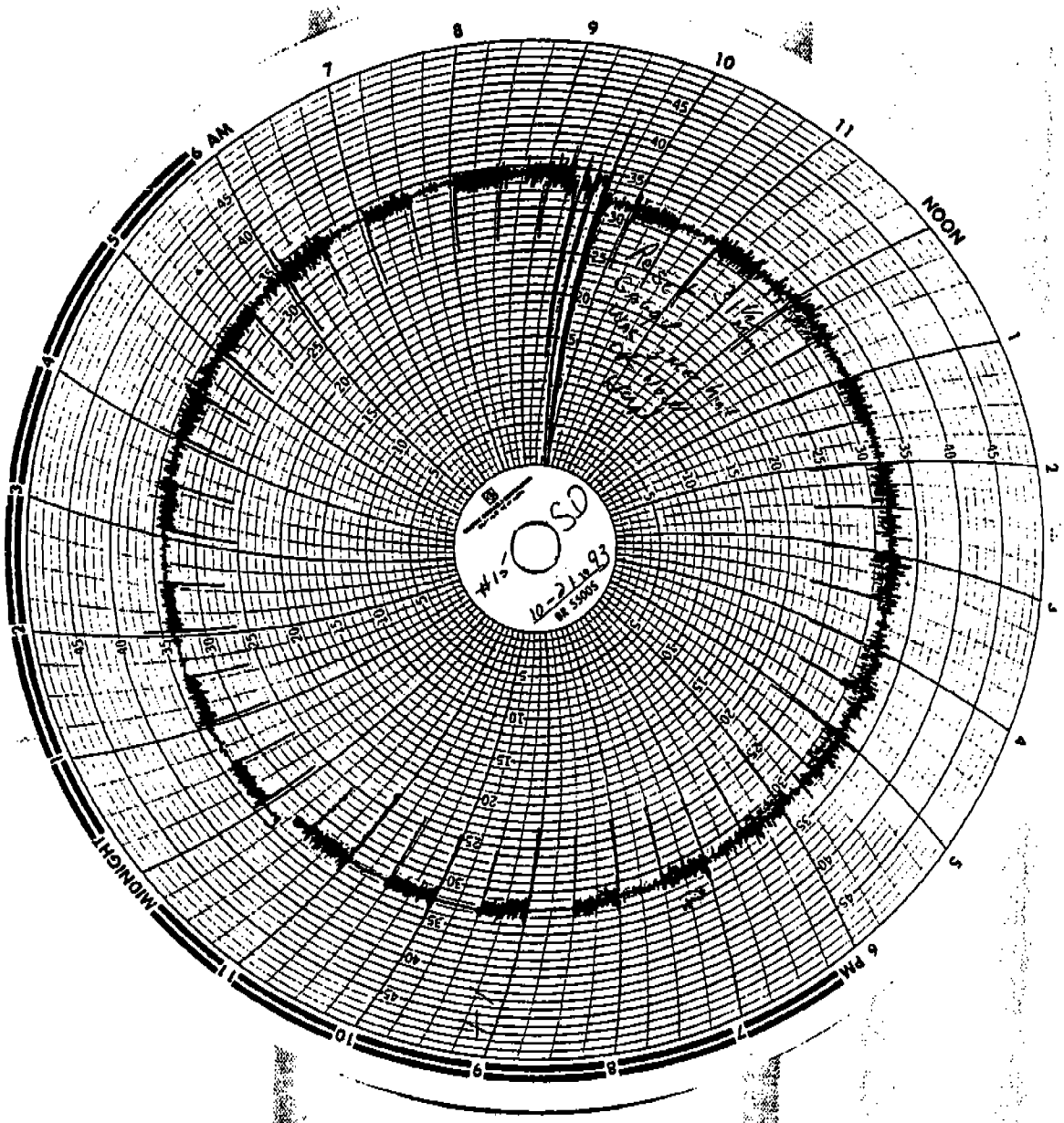
6 AM
NOON
6 PM
MIDNIGHT
RS 54005


MIDNIGHT
NOON
6 PM
KENT-TAYLOR
#15
V01
OP125
DATE 10-21-83


MIDNIGHT
NOON
6 PM
ABE KENT-TAYLOR
#15
Vol
OP125
DATE 10-21-93


6 AM
NOON
6 PM
MIDNIGHT


6 PM
5
4
3
2
1
NOON
11
10
9
8
7
6 AM
5
4
3
2
1
MIDNIGHT
11
10
9
8
BR 55122


6 AM
7
8
9
10
11
NOON
1
2
3
4
5
6 PM
7
8
9
10
11
MIDNIGHT
#15
10-21-93

COMPLIANCE DEMONSTRATION
NO. 13, 14, 15 BATTERY
PUSHING EMISSIONS CONTROL

USS CLAIRTON WORKS
CLAIRTON, PENNSYLVANIA

APPENDIX C

GRAVIMETRIC AND ANALYTICAL RESULTS, EMISSIONS CALCULATIONS

10-19-23

1551 CLARION WORKS

13-15 AC

	OVEN #	BATT #	TIME
	~~B-17~~ ~~B-18~~	~~14~~	
1	A-18	13	9:05 AM
2	B-17	14	9:11
3	A-20	13	9:16
4	B-19	14	9:21
5	A-22	13	9:27
6	B-21	14	9:32
7	A-24	13	9:38
8	B-23	14	9:43
9	A-26	13	9:48
10	B-25	14	9:53
11	A-28	13	9:59
12	B-27	14	10:04
13	A-30	13	10:10
14	B-29	14	10:15
15	B-1	13	10:21
16	A-2	15	10:27
17	A-4	15	10:32
18	A-6	15	10:37
19	B-3	13	10:43
20	B-5	13	10:48
21	B-7	13	10:54 *
22	A-8	15	11:33
23	B-9	13	11:39
24	A-10	15	11:45
25	B-11	13	11:51
26	A-12	15	11:57
27	B-13	13	12:03
28	A-14	15	12:07
29	B-15	13	12:15
30	A-16	15	12:18

* 13-15 BATTERIES DOWN FOR TRACK CLEANUP FROM 11:00 - 11:30

* SHIFT CHANGE AT 14:45 - 15:06

60 OVENS PUSHED IN 374 min ⇒ 9.63 OVENS/hr

	OVEN	BATT	TIME
31	B-17	13	12:24
32	A-18	15	12:28
33	B-19	13	12:34
34	A-20	15	12:39
35	B-21	13	12:45
36	A-22	15	12:49
37	A-24	15	13:00
38	B-25	13	13:06
39	A-26	15	13:11
40	B-27	13	13:17
41	A-28	15	13:21
42	B-29	13	13:27
43	A-30	15	13:32
44	A-1	14	1358
45	B-1	15	13:43
46	A-3	14	1349
47	B-3	15	1354
48	A-5	14	1400
49	B-5	15	1405
50	A-7	14	14:10
51	B-7	15	14:15
52	A-9	14	14:21
53	B-9	15	14:26
54	A-11	14	14:33
55	B-11	15	14:38
* 56	A-13	14	14:44
57	B-13	15	15:03
58	A-15	14	15:08
59	B-15	15	15:13
60	A-17	14	15:19

10-20-93

USS-CLAIRTON WORKS

13-15 ISC

	OVEN #	BATT #	TIME
1	B3	15	0810
2	A5	14	0816
3	B5	15	0821
4	A7	14	0827
5	B7	15	0833
6	A9	14	0838
7	B9	15	0843
8	A11	14	0850
9	B11	15	0855
10	A13	14	0901
11	B13	15	0906
12	A15	14	0912
13	B15	15	0917
14	A17	14	0923
15	B17	15	0928
16	A19	14	0934
17	B19	15	0939
18	A21	14	0945
19	B21	15	0950
20	A23	14	0956
21	B23	15	1002
22	A25	14	1007
23	B25	15	1013
24	A27	14	1019
25	B27	15	1024
26	A29	14	1030
27	A31	14	1036
28	B29	15	1041
29	A1	13	1047
30	B2	14	1052
31	A3	13	1057
32	B4	14	1103 TRACK [illegible]
33	B5	13	1138
34	B6	14	1145
35	A7	13	1151
36	B8	14	1155
37	B10	14	1206
38	A11	13	1212
39	B12	14	1217
40	A13	13	1223
41	B14	14	1228
42	A15	13	1234
43	B16	14	1239
44	A17	13	1245
45	B18	14	1250
46	A19	13	1256
47	B20	14	1301
48	A21	13	1307
49	B22	14	1312
50	A23	13	1317
51	B24	14	1322
52	A25	13	1328
53	B26	14	1333
54	A27	13	1339
55	B28	14	1344
56	A29	13	1350
57	B30	14	1355
58	A31	13	1401
59	A1	15	1406
60	B2	13	1412

A9-13 missed because of port change

60 ovens pushed in 362 min ⇒ 9.94 ovens/hr

USS CLAINTON WORKS
PCC 13-15
10/21/93.

	OVEN #	BATT #	TIME
1	A-27	13	7:58 AM
2	B-28	14	8:03
3	A-29	13	8:10
4	B-30	14	8:15
5	A-31	13	8:21
6	A-1	15	8:25
7	B-2	13	8:32
8	A-3	15	8:37
9	B-4	13	8:43
10	A-5	15	8:48
11	B-6	13	8:54
12	A-7	15	8:59
13	B-8	13	9:05
14	A-9	15	9:10
15	B-10	13	9:17
16	A-11	15	9:22
17	B-12	13	9:28
18	A-13	15	9:33
19	B-14	13	9:40
20	A-15	15	9:45
21	B-16	13	9:51
22	A-17	15	9:56
23	B-18	13	10:02
24	A-19	15	10:06
25	B-20	13	10:12
26	A-21	15	10:17
27	B-22	13	10:23
28	A-23	15	10:29
29	B-24	13	10:35
30	A-25	15	10:40

TRACK CLEAN UP FROM
11:10 - 11:40

	OVEN #	BATT #	TIME
31	B-26	13	10:45
32	A-27	15	10:50
33	B-28	13	10:57
34	A-29	15	11:02
* 35	B-30	13	11:08
36	A-31	15	11:16
37	A-2	14	11:22
38	B-2	15	11:[illegible]
39	A-4	14	12:[illegible]
40	B-4	15	[illegible]
41	A-6	14	12:16
42	B-6	15	12:20
43	A-8	14	12:26
44	B-8	15	12:31
45	A-10	14	12:37
46	B-10	15	12:42
47	A-12	14	12:47
48	B-12	15	12:53
49	A-14	14	12:58
50	B-14	15	13:03
51	A-16	14	13:09
52	B-16	15	13:15
53	A-18	14	13:21
54	B-18	15	13:26
55	A-20	14	13:32
56	B-20	15	13:37
57	A-22	14	13:43
58	B-22	15	13:49
59	A-24	14	13:55
60	B-24	15	14:00
61	A-26	14	14:06
62	B-26	15	14:11

62 ovens pushed
in 373 min => 9.97 ovens/hr

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS

TEST SITE 13,14,15 BATTERY PEC - STACK 2-1

TEST DATE: 10-19-93

TEST NUMBER: CLR-2-1-1

A.	Barometric Pressure	29.45	in. Hg	
B.	Static Pressure	0.90	in. H2O	
C.	Stack Pressure	29.52	in. Hg	[A+(B/13.6)]
D.	Average ΔH	1.86	in. H2O	
E.	Meter Pressure	29.59	in. Hg	[A+(D/13.6)]
F.	Average ΔP	1.60	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	0.9912		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft²	(0.00545*I²)
K.	Nozzle Diameter	0.190	in.	
L.	Nozzle Area	1.97E-04	ft²	(0.00545*K²)
M.	Average Stack Temperature	118	°F	
N.	Average Stack Temperature	578	°R	(460+M)
O.	Average Meter Temperature	70	°F	
P.	Average Meter Temperature	530	°R	(460+O)
Q.	Condensate Volume	11.8	mL	
R.	Absorbed H2O	7.7	mL	
S.	Total H2O	19.5	mL	(Q+R)
T.	Filter Weight	0.0017	g	
U.	Probe Weight	0.0034	g	
V.	Impinger Weight	0.0001	g	
W.	Total Weight	0.0052	g	(T+U+V)
X.	Metered Gas Volume	46.978	dcf	
Y.	Corrected Metered Gas Volume	46.565	dcf	(X*H)
Z.	H2O Gas Volume	0.937	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	47.502	cf	(Y+Z)
BB.	Percent H2O	2.0	%	(100*Z/AA)
CC.	Gas Volume Sampled	45.872	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0017	gr/dscf	(15.43*W/CC)
EE.	Average Molecular Weight:			

Component	% Volume ÷100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.020		18	0.355
CO2	0.000	0.980	44	0.000
CO	0.000	0.980	28	0.000
O2	0.205	0.980	32	6.431
N2	0.795	0.980	28	21.821

Average Molecular Weight 28.61 lb./lb. mol

FF.	Average Stack Velocity	75.2	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG.	Averge Flow Rate	31900	scfm	(60*FF*J)
HH.	Standard Flow Rate	28700	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	97.6	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	0.42	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS
TEST SITE 13,14,15 BATTERY PEC - STACK 2-2

TEST DATE: 10-19-93
TEST NUMBER: CLR-2-2-1

A.	Barometric Pressure	29.45	in. Hg	
B.	Static Pressure	0.20	in. H2O	
C.	Stack Pressure	29.46	in. Hg	[A+(B/13.6)]
D.	Average ▲H	1.76	in. H2O	
E.	Meter Pressure	29.58	in. Hg	[A+(D/13.6)]
F.	Average ▲P	1.50	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	1.0151		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft^2	$(0.00545*I^2)$
K.	Nozzle Diameter	0.192	in.	
L.	Nozzle Area	2.01E-04	ft^2	$(0.00545*K^2)$
M.	Average Stack Temperature	122	°F	
N.	Average Stack Temperature	582	°R	(460+M)
O.	Average Meter Temperature	78	°F	
P.	Average Meter Temperature	538	°R	(460+O)
Q.	Condensate Volume	11.1	mL	
R.	Absorbed H2O	8.4	mL	
S.	Total H2O	19.5	mL	(Q+R)
T.	Filter Weight	0.0033	g	
U.	Probe Weight	0.0074	g	
V.	Impinger Weight	0.0003	g	
W.	Total Weight	0.0110	g	(T+U+V)
X.	Metered Gas Volume	47.497	dcf	
Y.	Corrected Metered Gas Volume	48.214	dcf	(X*H)
Z.	H2O Gas Volume	0.951	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	49.165	cf	(Y+Z)
BB.	Percent H2O	1.9	%	(100*Z/AA)
CC.	Gas Volume Sampled	46.779	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0036	gr/dscf	(15.43*W/CC)

EE. Average Molecular Weight:

Component	% Volume ÷100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.019		18	0.348
CO2	0.000	0.981	44	0.000
CO	0.000	0.981	28	0.000
O2	0.205	0.981	32	6.433
N2	0.795	0.981	28	21.829

Average Molecular Weight 28.61 lb./lb. mol

FF.	Average Stack Velocity	73.1	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG.	Avergo Flow Rate	31000	acfm	(60*FF*J)
HH.	Standard Flow Rate	27700	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	100.9	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	0.84	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS
TEST SITE 13,14,15 BATTERY PEC - STACK 2-3

TEST DATE: 10-19-93
TEST NUMBER: CLR-2-3-1

A.	Barometric Pressure	29.45	in. Hg	
B.	Static Pressure	1.00	in. H2O	
C.	Stack Pressure	29.52	in. Hg	[A+(B/13.6)]
D.	Average ▲H	1.40	in. H2O	
E.	Meter Pressure	29.55	in. Hg	[A+(D/13.6)]
F.	Average ▲P	1.3	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	0.9832		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft^2	$(0.00545*I^2)$
K.	Nozzle Diameter	0.183	in.	
L.	Nozzle Area	1.83E-04	ft^2	$(0.00545*K^2)$
M.	Average Stack Temperature	117	°F	
N.	Average Stack Temperature	577	°R	(460+M)
O.	Average Meter Temperature	76	°F	
P.	Average Meter Temperature	536	°R	(460+O)
Q.	Condensate Volume	9.8	mL	
R.	Absorbed H2O	6.0	mL	
S.	Total H2O	15.8	mL	(Q+R)
T.	Filter Weight	0.0020	g	
U.	Probe Weight	0.0091	g	
V.	Impinger Weight	0.0001	g	
W.	Total Weight	0.0112	g	(T+U+V)
X.	Metered Gas Volume	39.206	dcf	
Y.	Corrected Metered Gas Volume	38.547	dcf	(X*H)
Z.	H2O Gas Volume	0.768	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	39.315	cf	(Y+Z)
BB.	Percent H2O	2.0	%	(100*Z/AA)
CC.	Gas Volume Sampled	37.506	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0046	gr/dscf	(15.43*W/CC)
EE.	Average Molecular Weight:			

Component	% Volume ÷100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.020		18	0.352
CO2	0.000	0.980	44	0.000
CO	0.000	0.980	28	0.000
O2	0.205	0.980	32	6.432
N2	0.795	0.980	28	21.825

Average Molecular Weight 28.61 lb./lb. mol

FF.	Average Stack Velocity	67.7	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG.	Averge Flow Rate	28700	acfm	(60*FF*J)
HH.	Standard Flow Rate	25900	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	95.3	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	1.00	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS
TEST SITE 13,14,15 BATTERY PEC - STACK 2-4

TEST DATE: 10-19-93
TEST NUMBER: CLR-2-4-1

A.	Barometric Pressure	29.45	in. Hg	
B.	Static Pressure	0.60	in. H2O	
C.	Stack Pressure	29.49	in. Hg	[A+(B/13.6)]
D.	Average ΔH	1.42	in. H2O	
E.	Meter Pressure	29.55	in. Hg	[A+(D/13.6)]
F.	Average ΔP	1.2	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	0.9619		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft²	(0.00545*I²)
K.	Nozzle Diameter	0.185	in.	
L.	Nozzle Area	1.87E-04	ft²	(0.00545*K²)
M.	Average Stack Temperature	111	°F	
N.	Average Stack Temperature	571	°R	(460+M)
O.	Average Meter Temperature	80	°F	
P.	Average Meter Temperature	540	°R	(460+O)
Q.	Condensate Volume	8.1	mL	
R.	Absorbed H2O	6.8	mL	
S.	Total H2O	14.9	mL	(Q+R)
T.	Filter Weight	0.0032	g	
U.	Probe Weight	0.0147	g	
V.	Impinger Weight	0.0001	g	
W.	Total Weight	0.0180	g	(T+U+V)
X.	Metered Gas Volume	38.309	dcf	
Y.	Corrected Metered Gas Volume	36.849	dcf	(X*H)
Z.	H2O Gas Volume	0.729	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	37.579	cf	(Y+Z)
BB.	Percent H2O	1.9	%	(100*Z/AA)
CC.	Gas Volume Sampled	35.590	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0078	gr/dscf	(15.43*W/CC)

EE. Average Molecular Weight:

Component	% Volume ÷100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.019		18	0.349
CO2	0.000	0.981	44	0.000
CO	0.000	0.981	28	0.000
O2	0.205	0.981	32	6.433
N2	0.795	0.981	28	21.828

Average Molecular Weight 28.61 lb./lb. mol

FF.	Average Stack Velocity	64.7	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG.	Averge Flow Rate	27400	acfm	(60*FF*I)
HH.	Standard Flow Rate	25000	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	91.6	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	1.64	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS
TEST SITE 13,14,15 BATTERY PEC - STACK 2-1

TEST DATE: 10-20-93
TEST NUMBER: CLR-2-1-2

A.	Barometric Pressure	29.40	in. Hg	
B.	Static Pressure	1.00	in. H2O	
C.	Stack Pressure	29.47	in. Hg	[A+(B/13.6)]
D.	Average ▲H	1.89	in. H2O	
E.	Meter Pressure	29.54	in. Hg	[A+(D/13.6)]
F.	Average ▲P	1.6	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	0.9912		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft²	(0.00545*I²)
K.	Nozzle Diameter	0.190	in.	
L.	Nozzle Area	1.97E-04	ft²	(0.00545*K²)
M.	Average Stack Temperature	116	°F	
N.	Average Stack Temperature	576	°R	(460+M)
O.	Average Meter Temperature	71	°F	
P.	Average Meter Temperature	531	°R	(460+O)
Q.	Condensate Volume	15.9	mL	
R.	Absorbed H2O	8.0	mL	
S.	Total H2O	23.9	mL	(Q+R)
T.	Filter Weight	0.0015	g	
U.	Probe Weight	0.0022	g	
V.	Impinger Weight	0.0001	g	
W.	Total Weight	0.0038	g	(T+U+V)
X.	Metered Gas Volume	47.443	dcf	
Y.	Corrected Metered Gas Volume	47.026	dcf	(X*H)
Z.	H2O Gas Volume	1.153	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	48.178	cf	(Y+Z)
BB.	Percent H2O	2.4	%	(100*Z/AA)
CC.	Gas Volume Sampled	46.164	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0013	gr/dscf	(15.43*W/CC)

EE. Average Molecular Weight:

Component	% Volume ÷100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.024		18	0.431
CO2	0.000	0.976	44	0.000
CO	0.000	0.976	28	0.000
O2	0.205	0.976	32	6.403
N2	0.795	0.976	28	21.727

Average Molecular Weight 28.56 lb./lb. mol

FF.	Average Stack Velocity	75.1	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG.	Averge Flow Rate	31900	acfm	(60*FF*J)
HH.	Standard Flow Rate	28800	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	98.3	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	0.31	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS
TEST SITE 13,14,15 BATTERY PEC. - STACK 2-2

TEST DATE: 10-20-93
TEST NUMBER: CLR-2-2-2

A.	Barometric Pressure	29.40	in. Hg	
B.	Static Pressure	1.00	in. H2O	
C.	Stack Pressure	29.47	in. Hg	[A+(B/13.6)]
D.	Average ΔH	1.77	in. H2O	
E.	Meter Pressure	29.53	in. Hg	[A+(D/13.6)]
F.	Average ΔP	1.50	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	1.0151		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft^2	$(0.00545*I^2)$
K.	Nozzle Diameter	0.192	in.	
L.	Nozzle Area	2.01E-04	ft^2	$(0.00545*K^2)$
M.	Average Stack Temperature	124	°F	
N.	Average Stack Temperature	584	°R	(460+M)
O.	Average Meter Temperature	80	°F	
P.	Average Meter Temperature	540	°R	(460+O)
Q.	Condensate Volume	15.1	mL	
R.	Absorbed H2O	8.8	mL	
S.	Total H2O	23.9	mL	(Q+R)
T.	Filter Weight	0.0032	g	
U.	Probe Weight	0.0029	g	
V.	Impinger Weight	0.0002	g	
W.	Total Weight	0.0063	g	(T+U+V)
X.	Metered Gas Volume	48.009	dcf	
Y.	Corrected Metered Gas Volume	48.734	dcf	(X*H)
Z.	H2O Gas Volume	1.172	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	49.906	cf	(Y+Z)
BB.	Percent H2O	2.3	%	(100*Z/AA)
CC.	Gas Volume Sampled	47.030	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0021	gr/dscf	(15.43*W/CC)

EE. Average Molecular Weight:

Component	% Volume ÷100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.023	[illegible]	18	0.423
CO2	0.000	0.977	44	0.000
CO	0.000	0.977	28	0.000
O2	0.205	0.977	32	6.406
N2	0.795	0.977	28	21.737
Average Molecular Weight				28.57 lb./lb. mol

FF.	Average Stack Velocity	73.2	fps	{85.49*G*[(F*N)/(C*EE)]*0.5}
GG.	Averge Flow Rate	31100	acfm	(60*FF*J)
HH.	Standard Flow Rate	27700	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	101.9	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	0.48	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS
TEST SITE 13,14,15 BATTERY FEC - STACK 2-3

TEST DATE: 10-20-93
TEST NUMBER: CLR-2-3-2

A.	Barometric Pressure	29.40	in. Hg	
B.	Static Pressure	1.00	in. H2O	
C.	Stack Pressure	29.47	in. Hg	[A+(B/13.6)]
D.	Average ΔH	1.38	in. H2O	
E.	Meter Pressure	29.50	in. Hg	[A+(D/13.6)]
F.	Average ΔP	1.3	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	0.9832		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft²	(0.00545*I²)
K.	Nozzle Diameter	0.183	in.	
L.	Nozzle Area	1.83E-04	ft²	(0.00545*K²)
M.	Average Stack Temperature	116	°F	
N.	Average Stack Temperature	576	°R	(460+M)
O.	Average Meter Temperature	79	°F	
P.	Average Meter Temperature	539	°R	(460+O)
Q.	Condensate Volume	12.0	mL	
R.	Absorbed H2O	6.3	mL	
S.	Total H2O	18.3	mL	(Q+R)
T.	Filter Weight	0.0018	g	
U.	Probe Weight	0.0054	g	
V.	Impinger Weight	0.0001	g	
W.	Total Weight	0.0073	g	(T+U+V)
X.	Metered Gas Volume	38.964	dcf	
Y.	Corrected Metered Gas Volume	38.309	dcf	(X*H)
Z.	H2O Gas Volume	0.896	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	39.205	cf	(Y+Z)
BB.	Percent H2O	2.3	%	(100*Z/AA)
CC.	Gas Volume Sampled	37.003	dscf	[Y*(528/F)*(E/29.92)]
DD.	Grain Loading	0.0030	gr/dscf	(15.43*W/CC)

EE. Average Molecular Weight:

Component	% Volume ÷100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.023	[illegible]	18	0.411
CO2	0.000	0.977	44	0.000
CO	0.000	0.977	28	0.000
O2	0.205	0.977	32	6.410
N2	0.795	0.977	28	21.751
Average Molecular Weight				28.57 lb./lb. mol

FF.	Average Stack Velocity	67.7	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG.	Averge Flow Rate	28700	acfm	(60*FF*J)
HH.	Standard Flow Rate	25900	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	94.3	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	0.66	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS
TEST SITE 13,14,15 BATTERY PEC - STACK 2-4

TEST DATE: 10-20-93
TEST NUMBER: CLR-2-4-2

A.	Barometric Pressure	29.40	in. Hg	
B.	Static Pressure	0.60	in. H2O	
C.	Stack Pressure	29.44	in. Hg	[A+(B/13.6)]
D.	Average ΔH	1.46	in. H2O	
E.	Meter Pressure	29.51	in. Hg	[A+(D/13.6)]
F.	Average ΔP	1.2	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	0.9619		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft²	(0.00545*I²)
K.	Nozzle Diameter	0.185	in.	
L.	Nozzle Area	1.87E-04	ft²	(0.00545*K²)
M.	Average Stack Temperature	108	°F	
N.	Average Stack Temperature	568	°R	(460+M)
O.	Average Meter Temperature	81	°F	
P.	Average Meter Temperature	541	°R	(460+O)
Q.	Condensate Volume	11.8	mL	
R.	Absorbed H2O	6.6	mL	
S.	Total H2O	18.4	mL	(Q+R)
T.	Filter Weight	0.0018	g	
U.	Probe Weight	0.0056	g	
V.	Impinger Weight	0.0001	g	
W.	Total Weight	0.0075	g	(T+U+V)
X.	Metered Gas Volume	40.379	dcf	
Y.	Corrected Metered Gas Volume	38.841	dcf	(X*H)
Z.	H2O Gas Volume	0.904	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	39.745	cf	(Y+Z)
BB.	Percent H2O	2.3	%	(100*Z/AA)
CC.	Gas Volume Sampled	37.384	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0031	gr/dscf	(15.43*W/CC)

EE. Average Molecular Weight:

Component	% Volume ÷ 100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.023		18	0.409
CO2	0.000	0.977	44	0.000
CO	0.000	0.977	28	0.000
O2	0.205	0.977	32	6.411
N2	0.795	0.977	28	21.754

Average Molecular Weight 28.57 lb./lb. mol

FF.	Average Stack Velocity	64.6	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG.	Averge Flow Rate	27400	acfm	[60*FF*J]
HH.	Standard Flow Rate	25100	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	96.2	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	0.65	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS

TEST SITE 13,14,15 BATTERY PEC - STACK 2-1

TEST DATE: 10-21-93

TEST NUMBER: CLR-2-1-3

A.	Barometric Pressure	29.21	in. Hg	
B.	Static Pressure	1.00	in. H2O	
C.	Stack Pressure	29.28	in. Hg	(A+(B/13.6))
D.	Average ΔH	1.93	in. H2O	
E.	Meter Pressure	29.35	in. Hg	(A+(D/13.6))
F.	Average ΔP	1.6	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	0.9912		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft²	(0.00545*I²)
K.	Nozzle Diameter	0.190	in.	
L.	Nozzle Area	1.97E-04	ft²	(0.00545*K²)
M.	Average Stack Temperature	121	°F	
N.	Average Stack Temperature	581	°R	(460+M)
O.	Average Meter Temperature	76	°F	
P.	Average Meter Temperature	536	°R	(460+O)
Q.	Condensate Volume	13.0	mL	
R.	Absorbed H2O	8.9	mL	
S.	Total H2O	21.9	mL	(Q+R)
T.	Filter Weight	0.0016	g	
U.	Probe Weight	0.0029	g	
V.	Impinger Weight	0.0002	g	
W.	Total Weight	0.0047	g	(T+U+V)
X.	Metered Gas Volume	49.154	dcf	
Y.	Corrected Metered Gas Volume	48.721	dcf	(X*H)
Z.	H2O Gas Volume	1.073	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	49.794	cf	(Y+Z)
BB.	Percent H2O	2.2	%	(100*Z/AA)
CC.	Gas Volume Sampled	47.083	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0015	gr/dscf	(15.43*W/CC)
EE.	Average Molecular Weight:			

Component	% Volume ÷100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.022		18	0.388
CO2	0.000	0.978	44	0.000
CO	0.000	0.978	28	0.000
O2	0.205	0.978	32	6.419
N2	0.795	0.978	28	21.780
Average Molecular Weight				28.59 lb./lb. mol

FF.	Average Stack Velocity	75.7	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG.	Averge Flow Rate	32100	acfm	(60*FF*J)
HH.	Standard Flow Rate	28600	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	100.7	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	0.37	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS
TEST SITE 13,14,15 BATTERY PEC - STACK 2-2

TEST DATE: 10-21-93
TEST NUMBER: CLR-2-2-3

A.	Barometric Pressure	29.21	in. Hg	
B.	Static Pressure	1.10	in. H2O	
C.	Stack Pressure	29.29	in. Hg	[A+(B/13.6)]
D.	Average ΔH	1.75	in. H2O	
E.	Meter Pressure	29.34	in. Hg	[A+(D/13.6)]
F.	Average ΔP	1.45	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	1.0151		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft^2	$(0.00545*I^2)$
K.	Nozzle Diameter	0.192	in.	
L.	Nozzle Area	2.01E-04	ft^2	$(0.00545*K^2)$
M.	Average Stack Temperature	126	°F	
N.	Average Stack Temperature	586	°R	(460+M)
O.	Average Meter Temperature	85	°F	
P.	Average Meter Temperature	545	°R	(460+O)
Q.	Condensate Volume	11.2	mL	
R.	Absorbed H2O	9.6	mL	
S.	Total H2O	20.8	mL	(Q+R)
T.	Filter Weight	0.0032	g	
U.	Probe Weight	0.0027	g	
V.	Impinger Weight	0.0001	g	
W.	Total Weight	0.0060	g	(T+U+V)
X.	Metered Gas Volume	46.012	dcf	
Y.	Corrected Metered Gas Volume	46.707	dcf	(X*H)
Z.	H2O Gas Volume	1.036	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	47.743	cf	(Y+Z)
BB.	Percent H2O	2.2	%	(100*Z/AA)
CC.	Gas Volume Sampled	44.371	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0021	gr/dscf	(15.43*W/CC)

EE. Average Molecular Weight:

Component	% Volume ÷100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.022	[illegible]	18	0.391
CO2	0.000	0.978	44	0.000
CO	0.000	0.978	28	0.000
O2	0.205	0.978	32	6.418
N2	0.795	0.978	28	21.777
Average Molecular Weight				28.59 lb./lb. mol

FF.	Average Stack Velocity	72.3	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG.	Averge Flow Rate	30700	acfm	(60*FF*J)
HH.	Standard Flow Rate	27100	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	98.1	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	0.47	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS
TEST SITE 13,14,15 BATTERY PEC - STACK 2-3

TEST DATE: 10-21-93
TEST NUMBER: CLR-2-3-3

A.	Barometric Pressure	29.21	in. Hg	
B.	Static Pressure	1.20	in. H2O	
C.	Stack Pressure	29.30	in. Hg	[A+(B/13.6)]
D.	Average ΔH	1.40	in. H2O	
E.	Meter Pressure	29.31	in. Hg	[A+(D/13.6)]
F.	Average ΔP	1.3	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	0.9832		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft²	(0.00545*I²)
K.	Nozzle Diameter	0.183	in.	
L.	Nozzle Area	1.83E-04	ft²	(0.00545*K²)
M.	Average Stack Temperature	121	°F	
N.	Average Stack Temperature	581	°R	(460+M)
O.	Average Meter Temperature	83	°F	
P.	Average Meter Temperature	543	°R	(460+O)
Q.	Condensate Volume	8.9	mL	
R.	Absorbed H2O	9.6	mL	
S.	Total H2O	18.5	mL	(Q+R)
T.	Filter Weight	0.0018	g	
U.	Probe Weight	0.0059	g	
V.	Impinger Weight	0.0002	g	
W.	Total Weight	0.0079	g	(T+U+V)
X.	Metered Gas Volume	38.851	dcf	
Y.	Corrected Metered Gas Volume	38.198	dcf	(X*H)
Z.	H2O Gas Volume	0.918	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	39.117	cf	(Y+Z)
BB.	Percent H2O	2.3	%	(100*Z/AA)
CC.	Gas Volume Sampled	36.389	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0033	gr/dscf	(15.43*W/CC)
EE.	Average Molecular Weight:			

Component	% Volume ÷100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.023	[illegible]	18	0.423
CO2	0.000	0.977	44	0.000
CO	0.000	0.977	28	0.000
O2	0.205	0.977	32	6.406
N2	0.795	0.977	28	21.737

Average Molecular Weight 28.57 lb./lb. mol

FF.	Average Stack Velocity	68.2	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG.	Averge Flow Rate	28900	acfm	(60*FF*J)
HH.	Standard Flow Rate	25700	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	93.5	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	0.72	lb/hr	[DD*HH*(1-BB/100)*60/7000]

STACK SAMPLING CALCULATIONS

CLIENT: USS CLAIRTON WORKS
TEST SITE 13,14,15 BATTERY PEC - STACK 2-4

TEST DATE: 10-21-93
TEST NUMBER: CLR-2-4-3

A.	Barometric Pressure	29.21	in. Hg	
B.	Static Pressure	0.60	in. H2O	
C.	Stack Pressure	29.25	in. Hg	[A+(B/13.6)]
D.	Average ΔH	1.13	in. H2O	
E.	Meter Pressure	29.29	in. Hg	[A+(D/13.6)]
F.	Average ΔP	0.9	in. H2O	
G.	Pitot Coefficient	0.84		
H.	Gas Meter Coefficient	0.9619		
I.	Stack Diameter	36	in.	
J.	Stack Area	7.07	ft^2	$(0.00545*I^2)$
K.	Nozzle Diameter	0.185	in.	
L.	Nozzle Area	1.87E-04	ft^2	$(0.00545*K^2)$
M.	Average Stack Temperature	112	°F	
N.	Average Stack Temperature	572	°R	(460+M)
O.	Average Meter Temperature	80	°F	
P.	Average Meter Temperature	540	°R	(460+O)
Q.	Condensate Volume	4.8	mL	
R.	Absorbed H2O	11.3	mL	
S.	Total H2O	16.1	mL	(Q+R)
T.	Filter Weight	0.0017	g	
U.	Probe Weight	0.0077	g	
V.	Impinger Weight	0.0001	g	
W.	Total Weight	0.0095	g	(T+U+V)
X.	Metered Gas Volume	35.902	dcf	
Y.	Corrected Metered Gas Volume	34.534	dcf	(X*H)
Z.	H2O Gas Volume	0.795	cf	(0.00267*S*P/A)
AA.	Total Sample Volume	35.329	cf	(Y+Z)
BB.	Percent H2O	2.2	%	(100*Z/AA)
CC.	Gas Volume Sampled	33.059	dscf	[Y*(528/P)*(E/29.92)]
DD.	Grain Loading	0.0044	gr/dscf	(15.43*W/CC)

EE. Average Molecular Weight:

Component	% Volume ÷ 100	*(1-BB/100)	* Mol. Weight	= Weight/Mol
H2O	0.022		18	0.405
CO2	0.000	0.978	44	0.000
CO	0.000	0.978	28	0.000
O2	0.205	0.978	32	6.412
N2	0.795	0.978	28	21.759

Average Molecular Weight 28.58 lb./lb. mol

FF.	Average Stack Velocity	56.4	fps	{85.49*G*[(F*N)/(C*EE)]^0.5}
GG.	Averge Flow Rate	23900	acfm	(60*FF*J)
HH.	Standard Flow Rate	21600	scfm	[GG*(528/N)*(C/29.92)]
II.	Sample Time	3600	sec	
JJ.	Percent Isokinetic	98.8	%	{[100*CC*60*J]/[HH*L*II*(1-BB/100)]}
KK.	Mass Flow Rate	0.80	lb/hr	[DD*HH*(1-BB/100)*60/7000]

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RJ Lee *Group*, Inc.

350 Hochberg Road • Monroeville, PA 15146
412/325-1776 • FAX 412/733-1799

December 13, 1993

Mr. Patrick Stockton
Air and Hazardous Waste Management
Chester Environmental, Inc.
3000 Tech Center Drive
Monroeville, PA 15146

RE: RJ Lee Group Project No. INH312590
Chester Environmental Project/Account No. 300261-01
Chester Environmental Purchase Order No. B-7185

Dear Mr. Stockton:

At your request, we examined samples, provided by you, for total sulfate (SO_4) content. The solutions were analyzed by direct injection of suitable dilutions, along with standard sulfate solutions, on a Dionex 2120i ion chromatography unit. Results are calculated as milligrams per liter (ppm) and then converted to total milligrams using the volumes of the solutions that you provided.

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. 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 thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any samples.

If you have any questions about this report, or if I can be of further assistance, please let me know.

Sincerely,

Jeffrey A. Fumea

Jeffrey A. Fumea
Shift Supervisor

JAF/dcd
Enclosure

KEYSTONE ENVIRONMENTAL RESOURCES
AIR QUALITY ENGINEERING

ANALYTICAL REPORTING FORM

CLIENT: USS-Clairton Steel
PLANT LOCATION: #13, 14 + 15 Battery PEC
PROJECT NUMBER: 300261-01
UNIT TESTED: 13-15 PEC

TEST DATE: 10/19, 10/20 + 10/21/93
DATE RECEIVED: 10/22/93
DATE ANALYZED: 11/17/93
ANALYTICAL METHOD:

Test Number	Filter ID Number	Component	Chloroform/ Ethyl Ether Extract Units (grams)	Filter Weight Units (grams)	Soluble Portion of Front Half H2O Rinse Units (grams)	Soluble Portion of Front Half Acetone Rinse Units (grams)	Soluble Portion of Back Half H2O Rinse Units (grams)	Soluble Portion of Back Half Acetone Rinse Units (grams)	0.22μm Filter Insoluble Portion of Back Half H2O Rinse Units (grams)
CLR-2-1-1	1109	Particulate	0.0016	0.0019	0.0030	0.0005	0.0048	0.0031	0.0001
CLR-2-2-1	1111	Particulate	0.0037	0.0035	0.0065	0.0010	0.0072	0.0039	0.0003
CLR-2-3-1	1107	Particulate	0.0037	0.0022	0.0055	0.0037	0.0098	0.0027	0.0001
CLR-2-4-1	1108	Particulate	0.0017	0.0034	0.0093	0.0055	0.0097	0.0055	0.0001
CLR-2-1-2	1110	Particulate	0.0007	0.0017	0.0014	0.0009	0.0117	0.0027	0.0001
CLR-2-2-2	1104	Particulate	0.0027	0.0034	0.0013	0.0017	0.0104	0.0011	0.0002
CLR-2-3-2	1106	Particulate	0.0002	0.0020	0.0033	0.0022	0.0106	0.0014	0.0001
CLR-2-4-2	1105	Particulate	0.0003	0.0020	0.0015	0.0042	0.0097	0.0013	0.0001
CLR-2-1-3	1112	Particulate	0.0003	0.0018	0.0021	0.0009	0.0063	0.0036	0.0002
CLR-2-2-3	1113	Particulate	0.0002	0.0034	0.0018	0.0010	0.0046	0.0022	0.0001
CLR-2-3-3	1051	Particulate	0.0007	0.0020	0.0008	0.0052	0.0097	0.0023	0.0002
CLR-2-4-3	1114	Particulate	0.0012	0.0019	0.0024	0.0054	0.0137	0.0021	0.0001
CLR-PEC-BLANK	1151	Particulate		0.0002	0.0001	0.0000			

Analyst's Signature: Patricia J. Houston
Date: 12/7/93

Comments

AQE 10/92

KEYSTONE ENVIRONMENTAL RESOURCES, INC.
AIR QUALITY ENGINEERING

CHAIN OF CUSTODY RECORD

PROJECT NUMBER: 300261-01
PROJECT NAME: CLR
ANALYTICAL LAB: R.J. LEE GROUP, INC.
DELIVER TO: JEFF FUMEA
COMMENTS:

SAMPLE IDENTIFICATION NUMBER	SAMPLE COLLECTION DATE	SAMPLE COLLECTION TIME	COMP	GRAB	NO. OF CONTAINERS	SO4 by Ion Chromatography								REMARKS OR OBSERVATIONS	Total Vol
CLR-2-1-1	10/19/93		✓		1	✓								Impinger-H2O	100ml
CLR-2-2-1	10/19/93		✓		1	✓								Impinger-H2O	100ml
CLR-2-3-1	10/19/93		✓		1	✓								Impinger-H2O	100ml
CLR-2-4-1	10/19/93		✓		1	✓								Impinger-H2O	100ml
CLR-2-1-2	10/20/93		✓		1	✓								Impinger-H2O	100ml
CLR-2-2-2	10/20/93		✓		1	✓								Impinger-H2O	100ml
CLR-2-3-2	10/20/93		✓		1	✓								Impinger-H2O	100ml
CLR-2-4-2	10/20/93		✓		1	✓								Impinger-H2O	100ml
CLR-2-1-3	10/21/93		✓		1	✓								Impinger-H2O	100ml
CLR-2-2-3	10/21/93		✓		1	✓								Impinger-H2O	100ml
CLR-2-3-3	10/21/93		✓		1	✓								Impinger-H2O	100ml
CLR-2-4-3	10/21/93		✓		1	✓								Impinger-H2O	100ml
CLR-SO4-BLANK	11/30/93			✓	1	✓								Blank	100ml

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time
Patrick J. Hudson	12/6/93				

COMP = Composite Sample
GRAB = Grab Sample

AQE 7/92

Table I

RJ Lee Group Project #: INH312590

For: Chester Environmental, Inc.

Client Sample Number	Element	mg/L	Total Volume (Liters)	Total mg Sulfate	Analytical Method
CLR-2-1-1	SO4	37.7	0.1	3.77	IC
CLR-2-2-1	SO4	35.6	0.1	3.56	IC
CLR-2-3-1	SO4	70.5	0.1	7.05	IC
CLR-2-4-1	SO4	75.3	0.1	7.53	IC
CLR-2-1-2	SO4	80.5	0.1	8.05	IC
CLR-2-2-2	SO4	74.8	0.1	7.48	IC
CLR-2-3-2	SO4	75.3	0.1	7.53	IC
CLR-2-4-2	SO4	109	0.1	10.9	IC
CLR-2-1-3	SO4	51.5	0.1	5.15	IC
CLR-2-2-3	SO4	55.3	0.1	5.53	IC
CLR-2-3-3	SO4	88.1	0.1	8.81	IC
CLR-2-4-3	SO4	89.6	0.1	8.96	IC
CLR-SO4-BLANK	SO4	1.58	0.1	0.158	IC

Authorized Signature Jeffrey A. Thomas

Date 12/19/95

RJ Lee Group, Inc.
Headquarters

350 Hochberg Road
Monroeville, PA 15146

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