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

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Compliance Tests of the
Envirotech Hooded Quench Car No. 104
Operated on the
Number 20 Coke Battery
Located at the
United States Steel Clairton Works



APT

File No. 50.50
2/12/85

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Envirotech Hooded Quench Car No. 104
Operated on the
Number 20 Coke Battery
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VOLUME I - Test Report

Clairton, PA 15025

Project No. 50.50

February 12, 1985

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INTRODUCTION

This report covers test work performed by Air Pollution Technology, Inc. (APT) in cooperation with United States Steel Corporation (USSC) and Envirotech Corporation (EVT) on the Envirotech Hooded Quench Car No. 104 (HQC) operating on the No. 20 coke batteries located at the USSC's Clairton Cokeworks. The purposes of these tests were to measure the particulate and visible emissions from the HQC.

The EVT HQC system is designed to capture and remove particulates from the hot gases during coke-pushing operations. The basic HQC System consists of three major components.

1. A self propelled Control Car, which houses all induced draft and gas cleaning equipment. This car carries the Aeronetics Hot Water Scrubber that provides both the draft required to capture the gases at the system inlet and the fine water drops required to collect particulates in the gas stream during the scrubbing process.
2. A One-Spot Hooded Quench Car, which consists of a tilting coke box covered by a fixed hood to contain the gases so that they can be drawn into and through the control car for cleaning. The hood encloses the quench car on three sides and the top, with the side facing the ovens open to receive the coke pushed.
3. Minor modifications, as required, to the existing coke guide to prevent gases from escaping to the atmosphere during the coke push. Wings are added to the face of the coke guide on both sides of the coke discharge opening. The wings align with the open face of the quench car hood when the car is positioned for the push.

The Aeronetics hot water scrubber, considered the "heart" of the system, incorporates a two-phase adjustable jet nozzle in

which water is ejected to perform the dual functions of gas movement and gas scrubbing. The water/vapor combination in the scrubber is referred to as a two-phase phenomenon.

The Aeronetics scrubber directs pressurized hot water to provide the energy for moving large quantities of gas through the scrubbing system. The nozzle's jet ejector effect transfers momentum from the liquid to the gas. Additionally, the jet nozzle atomizes the liquid and accelerates it to velocities of more than 1,000 feet per second, thereby creating a large velocity differential between the drops and the suspended particles in the gas stream. This relative velocity causes inertial impaction between the drops and the particles. As inertial impaction occurs, the particles are deposited on the drops, which are then removed from the gas stream by means of an entrainment separator. The cleaned gas exits into the atmosphere and the particulated liquid flows into a drain.

Recently, EVT made several modifications to the basic HQC system to improve the particle collection efficiency. They are as follows:

1. The effectiveness of the quench car hood was increased by extending the transition duct into the hood so as to cause more symmetrical gas flow within the hood. This increases the efficiency of fugitive emissions capture.
2. The collection efficiency was increased by pre-conditioning the gas prior to entering the Aeronetics scrubbers by spraying water into the gas stream. This increases the liquid to gas (L/G) ratio in the scrubber throat.

The particle mass concentration was measured at the outlet of the HQC with an EPA Method 5 sampling train. The visible emissions observations were done simultaneously with the particulate mass concentration measurements at the request of the Allegheny County Health Department Bureau of Air Pollution Control (BOAPC). The compliance test results presented in this report are for tests completed on December 5, 6, 13 and 14, 1984. Pre-compliance tests completed on October 19, 21, 23 and 24 which were run under similar operating conditions are also presented in this report at the request of the BOAPC. All tests were completed while the car was receiving and transporting coke from the Number 20 coke battery.

SUMMARY

The following points summarize the results of the compliance tests completed on the EVT Hooded Quench Car No. 104. Three compliance tests were conducted during normal coking conditions.

One compliance test was completed during upset coking conditions which resulted from an outage caused by a mechanical breakdown in the coke battery.

1. The average particulate mass emission rate was 0.015 lb/ton of coke for the three tests completed during normal coking conditions. This coke battery is subject to the LAER Standard which is 0.040 lb/ton of coke.
2. As requested, (Appendix G) visible emission readings were observed simultaneous during the particulate mass emission compliance testing with the test car attached to the HQC system. The test car added additional pressure drop to the system which decreases the gas flow rate and the ability of the HQC system to capture fugitive emissions.

The approved testing protocol, Appendix F, provides for opacity observation to be made with disconnection of the test car. Such test car disconnection will improve the visible emission performance.

The visible emission results, based on the above conditions, meets the intent of the Consent Degree visible emission requirements.

3. The test completed on December 6, 1984 was conducted during upset coking conditions. The emission rate for this test was 0.032 lb/ton of coke pushed. The fugitive visible emission exceeded 20% during 18 of the 24 ovens pushed.

The following points summarize the results of the pre-compliance tests presented in this report:

1. The average particulate mass emission rate was 0.016 lb/ton of coke for these tests.
2. Visible emission observations were made on October 23, 1984 during which the opacity did not exceed 20% at any time during push or travel.
3. These tests were completed during normal coking conditions.

OBJECTIVES

The compliance tests reported here were completed under the joint USSC/EVT Compliance Test Program and were observed by the BOAPC. The test work was authorized by United States Steel Corporation and had the following objectives:

1. Measure the particulate mass emissions from the HQC according to the Compliance Test Protocol presented in Appendix F.
2. Observe the visible emissions from the HQC according to the Compliance Test Protocol presented in Appendix F.

3. Compliance test protocol presented in Appendix F complies with the USSC consent decree, as modified, for coke pushing emissions and has been approved by the Allegheny County Health Department, Bureau of Air Pollution Control, Pennsylvania Department of Environmental Resources and the Environmental Protection Agency.

Battery 20 is considered a new source and is subject to the Lowest Achievable Emission Rate (LAER) standard. Pursuant to the Consent Decree, as modified, the applicable LAER emissions standards for particulates, and as discussed with the regulatory agencies, are as follow:

1. Particulate mass emission less than or equal to 0.04 pounds per ton of coke pushed.
2. Visible emissions during push and travel less than 20 percent.
3. USSC has been informed by BOAPC, as shown in Appendix G, that opacity standards during travel should be less than 20% since USSC uses pushing emission control devices.

APPROACH

1. Carry out particulate mass and visible emission measurements on the HQC system. This involved the following:
 - a. Two of the test personnel were on the test car to operate the particulate mass emission sampling apparatus. One of the personnel operated the sampling train control module. The other person measured the gas velocity head and converted that number into a sample train flowrate for the sample train operator. This helped the sample train operator maintain isokinetic sampling conditions. The second person also signaled the start, stop and change from push to travel modes for the sample train operator.
 - b. One test person was assigned to measure the visible emissions from the HQC system during the push and travel cycles.
 - c. One test person was assigned to ride in the cab of the HQC control car to record the car operating parameters.
 - d. All process operating data were supplied by the Clairton Cokeworks Operations personnel.
2. Analyze all samples in a field lab set up in a construction trailer at the test site. The analyses were completed by the sample crew leader.
3. Reduce and analyze the test data.

4. Determine the particulate and visible emission performance of the HQC and compare these results with the LAER emission standards.

TEST PERSONNEL AND OBSERVERS

Following is a list of test personnel and observers:

Field Test Personnel:

- Dr. Ronald G. Patterson, Project Engineer
- Mr. Bruce C. DaRos, Field Test Crew Leader
- Mr. Paul Jarman, Sampling Train Operator
- Mr. Sherman Smith, Pitot Tube Operator
- Mr. Cary Milburn, Pitot Tube Operator
- Ms. Linda Lancaster, Visible Emissions Observer

Allegheny County Board of Air Pollution Control Observers:

- Mr. K. Shankar N. Bannintheya, Air Pollution Engineer
- Mr. William J. Logan, Air Pollution Control Technician
- Mr. Thomas Kelly, Coke Oven Technician
- Mr. Clarence Carey, Coke Oven Technician

USSC Personnel:

- Mr. Joseph Connelly, Project Engineer
- Mr. Larry Gainer, Division Superintendent, Gas & Coke
- Mr. Roy Weiskircher, Senior Environmental Engineer
- Mr. Randy York, Environmental Consultant
- Mr. Michael J. McKelvey, Field Construction Manager
- Mr. Robert Brown, BCM Visible Emissions Observer

EVT Personnel:

- Mr. Patrick J. Reilly, Vice President and Project Manager
- Mr. Ned H. Ford, Field Construction Manager
- Mr. Ira Lapof, Field Construction Superintendent
- Mr. Frank Kress, Control Car Operations

Consultants to EVT:

- Dr. Seymour Calvert, Environmental Engineering and Testing Consultant
- Mr. Frank Lauer, Coking Consultant

TEST SITE AND OPERATING CONDITIONS

Metallurgical grade coke is produced by USSC at the Clairton Works by heating coal in an inert atmosphere at approximately 2,600°F for a period of 18 to 21 hours to drive off volatile compounds and impurities, such as sulfur.

Each coke battery consists of a number of ovens which are charged from the top with a coal mixture. The coal mixture is heated by circulating hot gas through flues which form the

walls of the ovens. At the end of the heating cycle the coke is pushed from the oven into a coke quench car which transports the incandescent coke to the quench tower. After quenching, the coke is then transported to a wharf which acts as a surge bin for holding the coke and continuously loading it onto a belt for conveyance to the coke storage system.

The EVT HQC system is designed to capture and remove particulates from the hot gases during coke-pushing operations. The basic HQC System consists of three major components as shown in Figure 1.

1. A self propelled Control Car, which houses all induced draft and gas cleaning equipment. This car carries the Aeronetics Hot Water Scrubber that provides both the draft required to capture the gases at the system inlet and the fine water drops required to collect particulates in the gas stream during the scrubbing process.
2. A One-Spot Hooded Quench Car, which consists of a tilting coke box covered by a fixed hood to contain the gases so that they can be drawn into and through the control car for cleaning. The hood encloses the quench car on three sides and the top, with the side facing the ovens open to receive the coke pushed.
3. Minor modifications, as required, to the existing coke guide to prevent gases from escaping to the atmosphere during the coke push. Wings are added to the face of the coke guide on both sides of the coke discharge opening. The wings align with the open face of the quench car hood when the car is positioned for the push.

The Aeronetics hot water scrubber, considered the "heart" of the system, incorporates a two-phase adjustable jet nozzle in which water is ejected to perform the dual functions of gas movement and gas scrubbing. The flow of the water/vapor combination in the scrubber is referred to as a two-phase phenomenon.

The Aeronetics scrubber directs pressurized hot water to provide the energy for moving large quantities of gas through the scrubbing system. The nozzle's jet ejector effect transfers momentum from the liquid to the gas. Additionally, the jet nozzle atomizes the liquid and accelerates it to velocities of more than 1,000 feet per second, thereby creating a large velocity differential between the drops and the suspended particles in the gas stream. This relative velocity causes inertial impaction between the drops and the particles. As inertial impaction occurs, the particles are

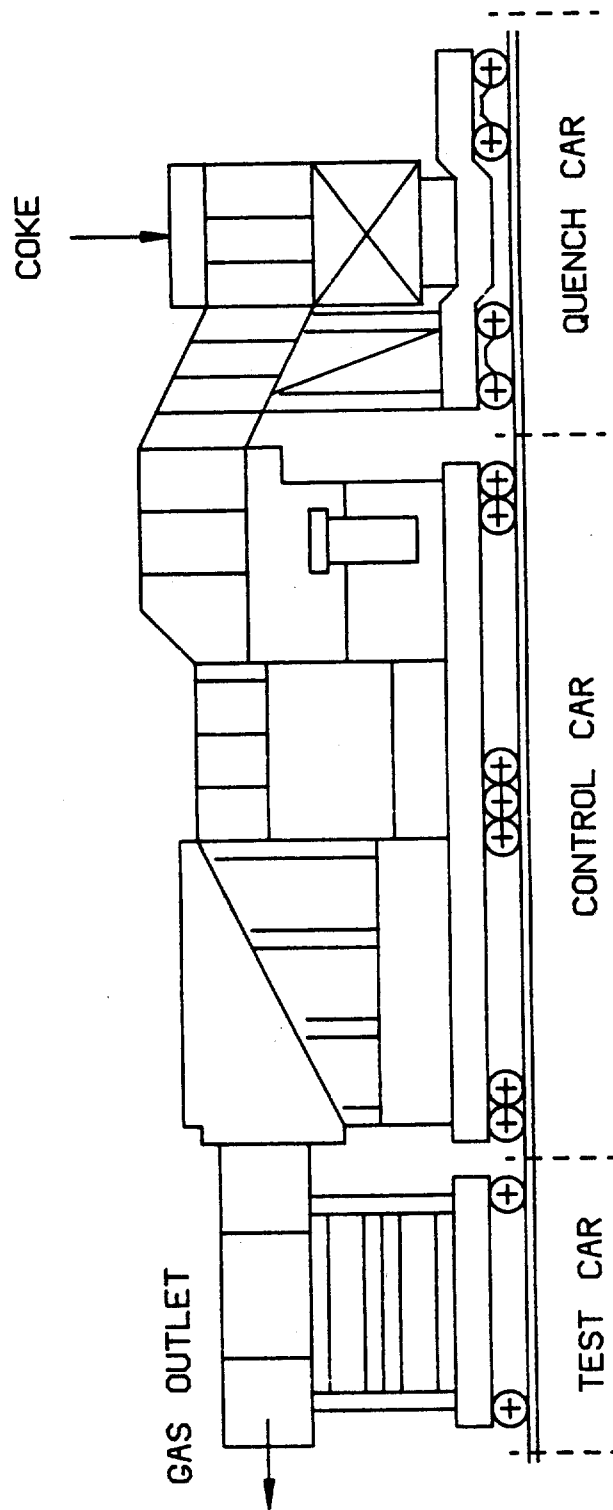


Figure 1. Envirotech Hooded Coke Quench Car System.

deposited on the drops, which are then removed from the gas stream by means of an entrainment separator. The cleaned gas exits into the atmosphere and the particulated liquid flows into a drain.

Recently, EVT made several modifications to the basic HQC system to improve the particle collection efficiency. They are as follow:

1. The effectiveness of the quench car hood was increased by extending the transition duct into the hood so as to cause more symmetrical gas flow within the hood. This increases the efficiency of fugitive emissions capture.
2. The collection efficiency was increased by pre-conditioning the gas prior to entering the Aronetics scrubbers by spraying water into the gas stream. This increases the liquid to gas (L/G) ratio in the scrubber throat.

Process condition data for the HQC System were recorded for each traverse point as shown in Appendix A. Tables 1 and 2 show the average data for the HQC system for each of the compliance and pre-compliance tests. During both of these test series the average production rate for coke battery number 20 was 14.5 tons of coke per oven.

TESTS RESULTS

A number of pre-compliance tests were run with the HQC System under different operating conditions and combinations of modifications. The results from the pre-compliance tests run on the HQC System as described on page 1, as well as the compliance tests are presented in this section:

Test Number	Date	Test Type	Coking Conditions
3.1	10/19/84	Pre-comp.	Normal
3.2	10/21/84	"	"
3.3	10/23/84	"	"
3.4	10/24/84	"	"
7.1	12/5/84	Compliance	"
7.2	12/6/84	"	Upset
7.4	12/13/84	"	Normal
7.5	12/14/84	"	"

Test number 7.2 was completed during upset operating conditions on the number 20 battery. The pusher machine was out for fourteen hours during the previous night's turn, which upset the normal pushing schedule. Test number 7.3 was started on December 7, 1984, but was aborted because of the low ambient

**TABLE 1. AVERAGE HQC SYSTEM PROCESS CONDITION DATA
COMPLIANCE TESTS**

Test Number	7.1		7.2		7.4		7.5	
	Push	Travel	Push	Travel	Push	Travel	Push	Travel
Nozzle Water Flowrate, gpm	351	115	350	115	365	115	361	119
Water Temp, deg F*	429	429	429	429	414	414	414	414
Water Press, psig	294	287	295	287	295	286	294	286
Annubar Vel Head, in. WC	3.0	1.0	3.0	1.0	3.1	1.5	3.1	1.4
Scrubber Temp In, deg F**	145	132	145	131	200	174	197	171
Scrubber Temp Out, deg F	156	158	161	164	160	161	158	159
Pre-spray H ₂ O Flowrate, gpm***	400	0	400	0	400	0	400	0

* Water temperature reported here was the tank temperature.

** The inlet scrubber gas temperature thermocouple was recalibrated prior to test number 7.4.

***The quench water flowrate was assumed to be 400 gpm from the pump specifications.

**TABLE 2. AVERAGE HQC SYSTEM PROCESS CONDITION DATA
PRE-COMPLIANCE TESTS**

Test Number	3.1		3.2		3.3		3.4	
	Push	Travel	Push	Travel	Push	Travel	Push	Travel
Nozzle Water Flowrate, gpm	401	110	397	110	382	110	373	110
Water Temp, deg F	419	418	425	423	417	417	424	424
Water Press, psig	299	288	305	296	297	287	295	286
Annubar Vel Head, in. WC	2.0	0.9	2.9	1.3	0.0	0.0	2.6	1.3
Scrubber Temp In, deg F***	142	166	142	144	148	142	165	147
Scrubber Temp Out, deg F	154	158	156	159	155	159	155	161
Pre-spray H ₂ O Flowrate, gpm*	400	0	400	0	400	0	400	0

* The quench water flowrate was assumed to be 400 gpm from the pump specifications.

** See notes regarding thermocouple calibration on Table 1.

temperature. The ambient temperature was approximately 10°F and the impinger outlet temperature was 15°F which indicated that the impinger water could have frozen during the test.

Tables 3 and 4 are summaries of the test conditions for each of the tests. Tables 5 through 7 and 8 through 10 show the particulate emission results for the compliance and the pre-compliance tests. Tables 5 and 8 compare the particulate emission rate in lb/ton of coke pushed to the EAER emission standard for each of the tests. The results of the visible emission observations are summarized in Table 11.

TEST METHODS

The tests results presented in this report were completed according to the Compliance Test Protocol shown in Appendix F. The particulate emission tests were completed with the Method 5 particulate emission sampling system modified as approved for these tests, as shown in Figure 2. The probe, cyclone and filter holder were Teflon lined or coated. Two impinger trains were used in parallel to accommodate the high sample flowrate required to collect a sample volume greater than 30 dscf.

The 24 sampling locations are shown in Figure 3. A cyclonic flow test completed on November 21, 1984 showed an average cyclonic flow angle of 1.8 degrees for all points during push and travel. The results of the cyclonic flow test are shown in Appendix I. All sample analysis was completed in a field laboratory set up in a construction trailer near the test site.

All fugitive visible emission observations were completed simultaneously with the particulate emission tests. The test car was attached during the visible emission observations. This increased the pressure drop that the Aeronetics nozzle had to overcome, which decreased the gas flowrate and the ability of the HQC System to capture fugitive emissions during these tests.

TABLE 3. SUMMARY OF COMPLIANCE TEST CONDITIONS

Test Number	7.1		7.2		7.4		7.5	
	Push	Travel	Push	Travel	Push	Travel	Push	Travel
Avg Gas Vel, fps	67.4	34.3	66.5	34.6	69.2	38.9	66.2	36.2
Avg Gas Flow rate, acfm	129968	66069	128130	66652	133306	75021	127571	69697
Avg Gas Flow rate, dscfm	76222	38653	68609	35520	74808	42034	73539	40124
Exit Gas, deg F	156	158	161	164	160	161	158	159
Exit Press, in. Hg	29.41	29.41	28.99	28.99	29.23	29.23	29.49	29.49
Samp. Vol., dscf (corr.)	22.26	11.14	19.92	11.31	21.12	13.51	20.26	12.99
% Isokinetic	109	105	103	105	101	112	101	102
	Total		Total		Total		Total	
Samp. Vol., dscf (corr.)	33.40		31.24		34.64		33.25	
Dry Gas Comp.								
CO ₂ (vol %)	2.0		2.2		2.1		2.1	
O ₂ (vol %)	18.2		17.3		18.3		18.3	
CO (vol %)	0.2		0.3		0.0		0.0	
N ₂ (vol %)	79.6		80.2		79.7		79.7	
Moisture, vol%								
M-5	30.38		37.47		32.60		33.85	
Sat. at T out	30.44		35.04		33.02		31.54	
Mol Wt,								
Dry	29.05		29.04		29.06		29.06	
Wet	25.69		25.17		25.45		25.57	
Front-half Part., mg	34.77		79.77		45.73		30.08	
Back-half Part., mg	1.40		2.09		1.69		1.46	
Total DER Part, mg	36.17		81.86		47.42		31.54	

TABLE 4. SUMMARY OF PRE-COMPLIANCE TEST CONDITIONS

Test Number	3.1		3.2		3..3		3.4	
	Push	Travel	Push	Travel	Push	Travel	Push	Travel
Avg Gas Vel, fps	74.6	41.5	68.9	40.2	66.4	35.3	62.9	36.5
Avg Gas Flow rate, acfm	143837	79949	132752	77491	127908	68038	121298	70390
Avg Gas Flow rate, dscfm	89946	49714	80884	46960	80079	42308	78584	45212
Exit Gas, deg F	154	158	156	159	155	159	155	161
Exit Gas, in. Hg	30.486	30.486	30.373	30.373	30.763	30.763	30.753	30.753
Samp. Vol., dscf (corr.)	24.33	15.36	12.72	6.60	23.40	13.92	24.57	11.46
% Isokinetic	90	107	98	99	99	112	107	91
	Total		Total		Total		Total	
Samp. Vol., dscf (corr.)	39.69		19.32		37.32		36.04	
Dry Gas Comp.								
CO ₂ (vol %)		1.8		2.7		2.0		2.2
O ₂ (vol %)		18.5		17.3		18.0		18.3
CO (vol %)		0.0		0.2		0.2		0.3
N ₂ (vol %)		79.7		79.8		79.8		79.2
Moisture, vol%								
M-5		38.94		35.79		31.62		26.53
Sat. at T out		28.61		29.97		29.09		29.87
Mol Wt,								
Dry		29.03		29.13		29.04		29.09
Wet		25.87		25.79		25.83		26.14
Front-half Part., mg		36.97		15.30		26.87		37.98
Back-half Part., mg		1.08		1.41		1.35		2.31
Total DER Part, mg		38.05		16.71		28.22		40.29

**TABLE 5. TOTAL PENNSYLVANIA DER PARTICULATES*
COMPLIANCE TESTS**

Run Number	Number of Pushes	Part. Conc. gr/dscf	Part. Rate, lbs/hr	Part. Rate, lb/ton coke	Allowable, lb/ton coke
7.1	24	0.0167	0.76	0.0144	0.0400
7.2	24	0.0404	2.24	0.0324	0.0400
7.4	24	0.0211	1.26	0.0185	0.0400
7.5	24	0.0146	0.82	0.0128	0.0400
Avg		0.023	1.27	0.020	0.040
Avg w/o No. 7.2		0.017	0.95	0.015	0.040

* Includes total front-half, plus insoluble back-half

**TABLE 6. FRONT-HALF PARTICULATES*
COMPLIANCE TESTS**

Run Number	Number of Pushes	Part. Conc. gr/dscf	Part. Rate, lbs/hr	Part. Rate, lb/ton coke
7.1	24	0.0161	0.73	0.0138
7.2	24	0.0394	2.18	0.0316
7.4	24	0.0204	1.22	0.0178
7.5	24	0.0140	0.78	0.0122
Avg		0.022	1.23	0.019
Avg w/o No. 7.2		0.017	0.91	0.015

* Includes filter and front-half acetone and water washes

**TABLE 7. BACK-HALF PARTICULATES*
COMPLIANCE TESTS**

Run Number	Number of Pushes	Part. Conc. gr/dscf	Part. Rate, lbs/hr	Part. Rate, lb/ton coke
7.1	24	0.00065	0.029	0.00056
7.2	24	0.00103	0.057	0.00083
7.4	24	0.00075	0.045	0.00066
7.5	24	0.00068	0.038	0.00059
Avg		0.00078	0.042	0.00066
Avg w/o No. 7.2		0.00069	0.037	0.00060

* Includes 0.22 micron filter catch of impinger solution

**TABLE 8. TOTAL PENNSYLVANIA DER PARTICULATES*
PRE-COMPLIANCE TESTS**

Run Number	Number of Pushes	Part. Conc. gr/dscf	Part. Rate, lbs/hr	Part. Rate, lb/ton coke	Allowable, lb/ton coke
3.1	24	0.0148	1.00	0.0163	0.0400
3.2	12	0.0133	0.81	0.0140	0.0400
3.3	24	0.0117	0.54	0.0112	0.0400
3.4	24	0.0251	1.48	0.0228	0.0400
Avg		0.016	0.96	0.016	0.040

* Includes total front-half, plus insoluble back-half

**TABLE 9. FRONT-HALF PARTICULATES*
PRE-COMPLIANCE TESTS**

Run Number	Number of Pushes	Part. Conc. gr/dscf	Part. Rate, lbs/hr	Part. Rate, lb/ton coke
3.1	24	0.0144	0.97	0.0158
3.2	12	0.0122	0.74	0.0128
3.3	24	0.0111	0.52	0.0106
3.4	24	0.0236	1.39	0.0215
Avg		0.015	0.90	0.015

* Includes filter and front-half acetone and water washes

**TABLE 10. BACK-HALF PARTICULATES*
PRE-COMPLIANCE TESTS**

Run Number	Number of Pushes	Part. Conc. gr/dscf	Part. Rate, lbs/hr	Part. Rate, lb/ton coke
3.1	24	0.00042	0.028	0.00046
3.2	12	0.00113	0.068	0.00118
3.3	24	0.00056	0.026	0.00053
3.4	24	0.00144	0.085	0.00131
Avg		0.00089	0.052	0.00087

* Includes 0.22 micron filter catch of impinger solution

TABLE 11. SUMMARY OF VISIBLE EMISSION OBSERVATIONS

Test No.	12-5-84 7.1		12-6-84 7.2		12-13-84 7.4		12-14-84 7.5		10-23-84 3.3	
Point No.	Opac >20%	Sec >20%	Opac >20%	Sec >20%	Opac >20%	Sec >20%	Opac >20%	Sec >20%	Opac >20%	Sec >20%
1.6 P	65%	10s								
T										
1.5 P	20	1	70%	3s						
T										
1.4 P			65	5						
T										
1.3 P	65	4								
T										
1.2 P			55	8	25%	1s				
T										
1.1 P					25	1				
T										
2.6 P	20	0.9					65%	1s		
T										
2.5 P			30	1						
T										
2.4 P			80	10						
T										
2.3 P	25	2								
T										
2.2 P			90	9						
T										
2.1 P			65	8						
T										
3.6 P			40	3						
T										
3.5 P			30	2						
T										
3.4 P			80	10			60	3		
T										
3.3 P			85	7						
T										
3.2 P	30	1								
T										
3.1 P			100	21	25	1				
T										
4.6 P			30	2						
T										
4.5 P			35	2	45	5				
T										
4.4 P			95	16						
T										
4.3 P			100	27						
T										
4.2 P			100	8						
T										
4.1 P			30	1						
T										
No./test	6		18		4		2		0	
Sec/test		18.9		143		17		4		0

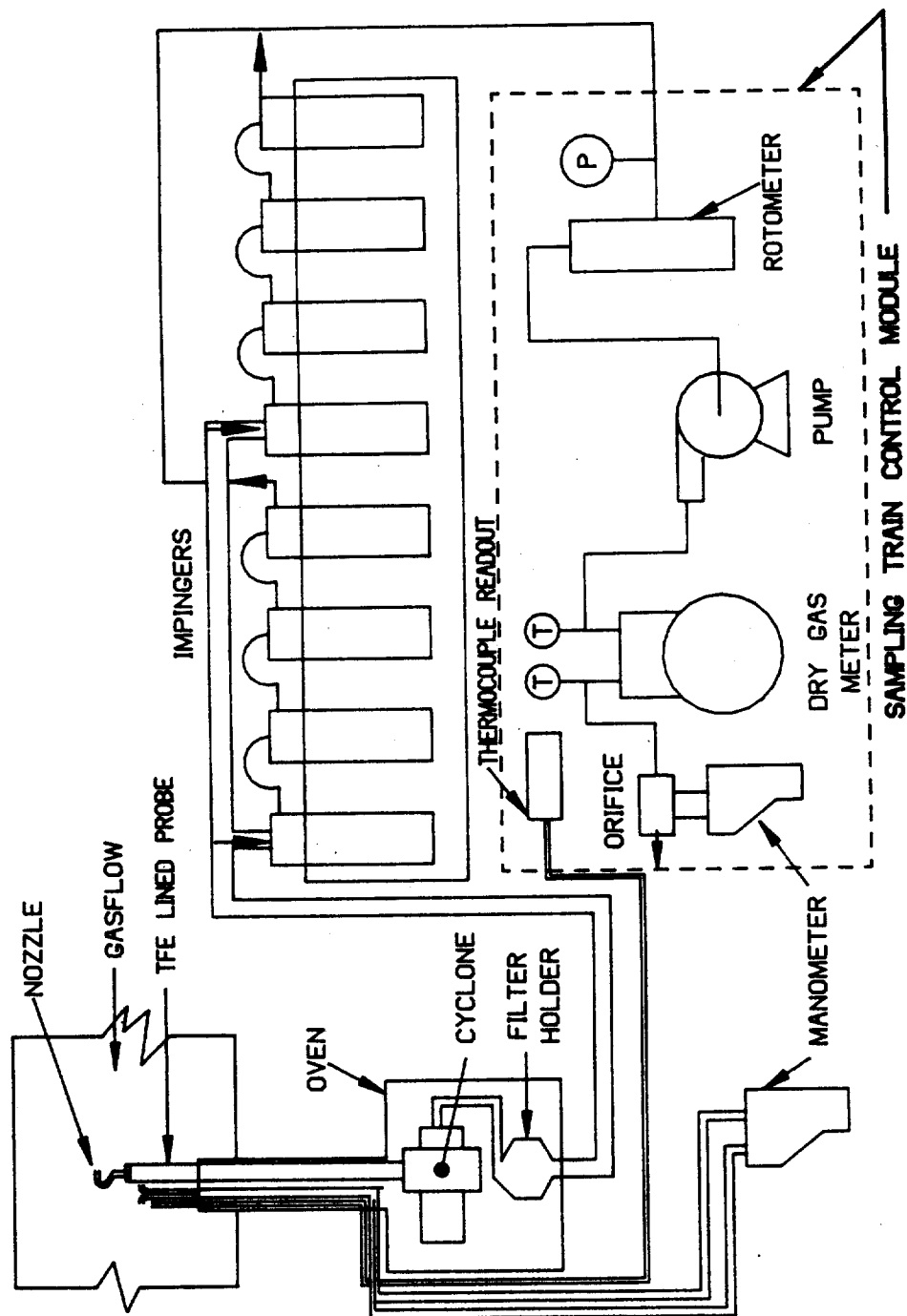


Figure 2. Method 5 Sampling Apparatus.

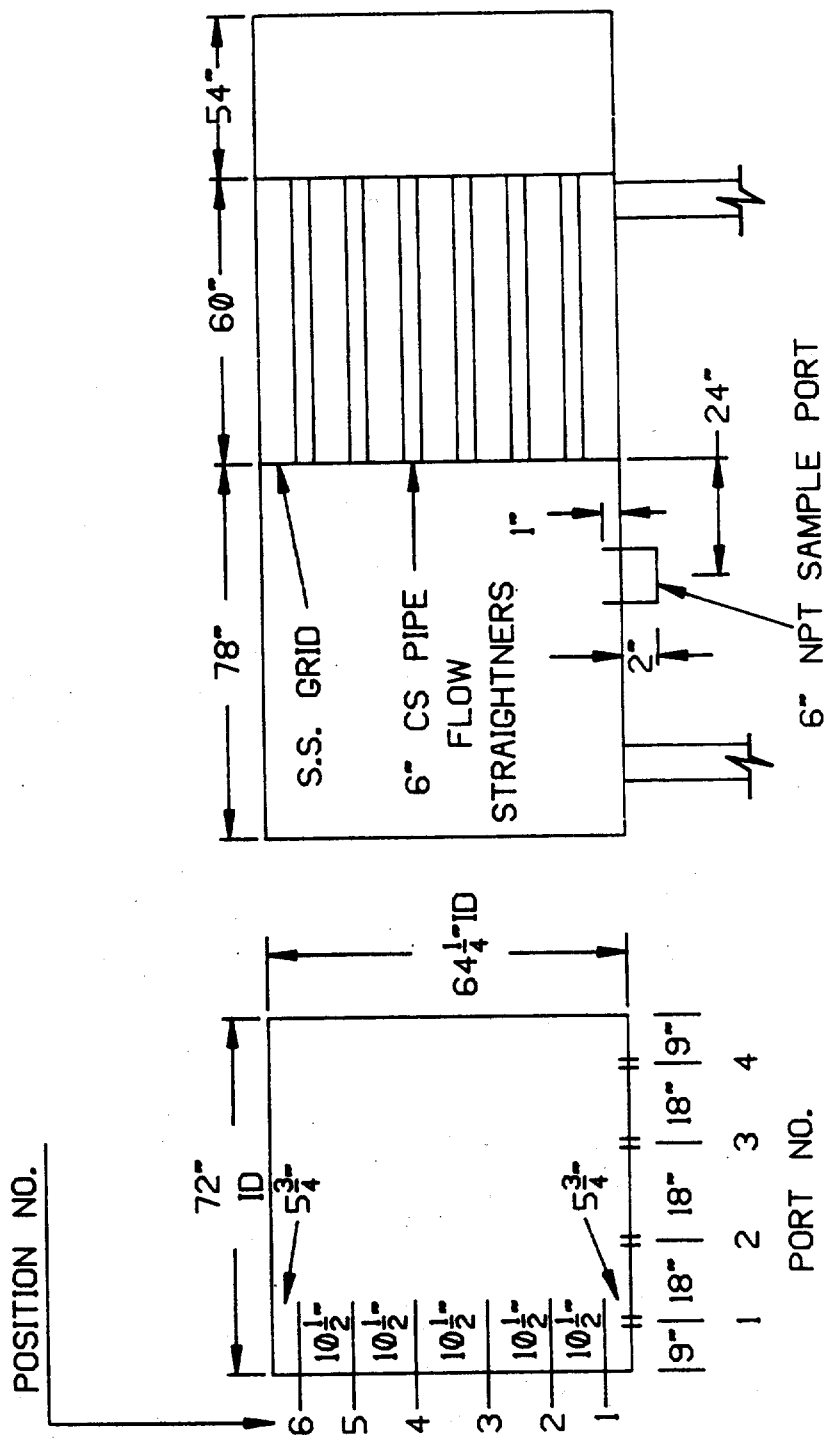


Figure 3. Test Car Duct Sampling Arrangement.

File No. 50.50
2/12/85

**Compliance Tests of the
Envirotech Hooded Quench Car No. 104
Operated on the
Number 20 Coke Battery
Located at the
United States Steel Clairton Works**

VOLUME II - Appendices

Clairton, PA 15025

Project No. 50.50

February 12, 1985

**Prepared by:
Dr. R.G. Patterson**



AIR POLLUTION
TECHNOLOGY, INC.

1000 E. 12th Street
Cleveland, OH 44115
(216) 763-1000

APPENDIX A
SCRUBBER OPERATING DATA

DATE: 12-5-84
CAP. #: 4
BAT. #: 20

TEST DESCRIPTION: CAGE #4 - TEST 7.1 - OFFICIAL L.P.A. TEST

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
OVEN NUMBER	C-26	A-28	B-28	A-1	B-1	C-1	A-3	B-3	C-3	A-5	C-5	A-7	B-7	C-7	A-1	
TIME AT START OF PUSH	10:28	10:45	11:06	11:35	12:16	12:29	12:59	12:12	12:29	14:12	14:25	2:09	2:22	2:38	2:51	2:51
OVEN SCRUBBED (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
COKING TIME (HRS.)																
LR 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	72%	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	429°	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
SEPARATOR INLET PRESSURE (IN. W.C.)	11			10.5			10.5			10.5		11.5				
FR 521 FLOW TO JETS (0-600 GPM)	355	"	"	"	"	350			"	"	"	"	"	"	"	"
PR 522 PRESS. TO JETS (0-500 PSIG)	225	"	"	"	"	"	"	292	"	"	"	225	"	"	"	"
TR 524 TEMP. TO JETS (0-600°F)	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	WORKING	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL
TR 531 COKE GAS TEMP. (0-700°F)	140°	133°	140°	154°	141°	141°	147°	117°	133°	141°	140°	147°	149°	140°	140°	140°
FR 521 FLOW TO JETS																
PR 522 PRESS. TO JETS																
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
FR 521 FLOW TO JETS	115	"	4	"	"	"	"	"	"	"	"	"	"	"	"	"
PR 522 PRESS. TO JETS	287	"	"	"	"	"	"	285	"	"	"	287	"	"	"	"
TR 524 TEMP. TO JETS	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL	TRAVEL
TR 531 COKE GAS TEMP.	133°	136°	133°	140°	136°	132°	133°	126°	119°	126°	126°	123°	133°	123°	123°	116°
ANNUBAR MANO. FULL		2.9		1.95												
ANNUBAR MANO. TRAVEL	1			105						1						
COKE GAS TEMP. AT TRAVEL	189°	161°	141°	145°	161°	168°	168°	168°	161°	151°	163°	145°	163°	175°	163°	161°

DATE: 12-5-84
CAR #: 4
BAT. #: 20

TEST DESCRIPTION: CAR #4 - TEST 7.1 - OFFICIAL E.P.A. TEST

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
OVEN NUMBER	B-9	C-9	A-11	B-11	C-11	A-13	B-13	C-13								
TIME AT START OF PUSH	3:18	3:21	3:43	3:52	4:09	4:21	4:34	4:47								
OVEN SCRUBBED (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y								
COKING TIME (HRS.)																
LR 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	72%	"	"	"	"	"	"	"								
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	429°	"	"	"	"	"	"	"								
SEPARATOR INLET PRESSURE (IN. W.C.)	10.5			10.5			10.5									
FR 521 FLOW TO JETS (0-600 GPM)	350	"	"	"	"	"	"	"								
PR 522 PRESS. TO JETS (0-500 PSIG)	295	"	"	"	"	"	"	"								
TR 524 TEMP. TO JETS (0-600°F)	147°	154°	147°	140°	154°	154°	147°	147°	WORKING							
TR 531 COKE GAS TEMP. (0-700°F)																
FR 521 FLOW TO JETS																
PR 522 PRESS. TO JETS																
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
FR 521 FLOW TO JETS	115	"	"	"	"	"	"	"								
PR 522 PRESS. TO JETS	287	"	"	"	"	"	"	"								
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
FR 521 FLOW TO JETS	133°	133°	133°	133°	133°	140°	133°	133°	WORKING							
PR 522 PRESS. TO JETS																
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
ANNUAL MANA. FUEL	3															
ANNUAL MANA. TRAVEL	1															
COKE GAS TEMP. AT TWR.	168°	175°	168°	161°	175°	173°	163°	168°								

DATE: 12-6-84
CAR #: 4
BA #: 20

TEST DESCRIPTION: CAR #4 - TEST 7.2 - OFFICIAL EPA TEST

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
OVEN NUMBER	B-19	C-19	A-21	B-21	C-21	A-23	B-23	C-23								
TIME AT START OF PUSH	102	115	129	142	154	206	218	231								
OVEN SCRUBBED (Y OR N)	Y	Y	Y	Y	Y	Y	Y	Y								
COKING TIME (HRS.)																
I.R. 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	74%	"	"	"	"	"	"	"								
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	429°	"	"	"	"	"	"	"								
SEPARATOR INLET PRESSURE (IN. W.C.)	10.5			10.5			10.5									
FR 521 FLOW TO JETS (0-600 GPM)	350	"	"	"	"	"	"	"								
PR 522 PRESS. TO JETS (0-500 PSIG)	295	"	290	295	"	"	"	"								
TR 524 TEMP. TO JETS (0-600°F)																
TR 531 COKE GAS TEMP. (0-700°F)	147°	147°	132°	140°	154°	147°	140°	147°								
FR 521 FLOW TO JETS																
PR 522 PRESS. TO JETS																
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
FR 521 FLOW TO JETS	115	"	"	"	"	"	"	"								
PR 522 PRESS. TO JETS	287	285	282	285	287	"	"	"								
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.	126°	133°	119°	140°	140°	133°	133°	136°								
ANALOGUE MANOMETER FULL	3.05			3.05			3.05									
ANALOGUE MANOMETER TRAVEL	95			95			95									
OVER CAR TEMP. TO JETS	168°	157°	161°	175°	210°	210°	119°									

INOPERABLE

INOPERABLE

TR 524 TEMP. TO JETS

DATE: 12-6-84
CAR #: 4
BAT #: 20

TEST DESCRIPTION: CAC#4 - TEST 7.2 - OFFICIAL E.P.A. TEST

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
OVEN NUMBER	A-9	B-9	C-9	A-11	B-11	C-11	A-13	B-13	C-13	A-15	B-15	C-15	A-17	B-17	C-17	A-19
TIME AT START OF PUSH	9:41	9:53	10:06	10:18	10:30	10:42	10:53	11:07	11:19	11:35	11:48	12:01	12:13	12:25	12:38	12:50
OVEN SCRUBBED (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
COKING TIME (HRS.)																
LR 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	74%	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	429°	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
SEPARATOR INLET PRESSURE (IN. W.C.)		10.5			10.5			10.5			10.5			10.5		
FR 521 FLOW TO JETS (0-600 GPM)	380	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
PR 522 PRESS. TO JETS (0-500 PSIG)	212	295	"	297	"	295	"	"	"	"	"	"	"	"	"	"
TR 524 TEMP. TO JETS (0-600°F)		295	295	297	295	295	295	295	295	295	295	295	295	295	295	295
TR 531 COKE GAS TEMP. (0-700°F)	147°	154°	147°	147°	147°	147°	147°	154°	147°	147°	140°	140°	140°	147°	140°	140°
FR 521 FLOW TO JETS																
PR 522 PRESS. TO JETS																
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
FR 521 FLOW TO JETS	115	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
PR 522 PRESS. TO JETS	285	287	"	290	"	"	"	287	"	"	"	"	"	"	"	"
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.	133°	140°	140°	133°	133°	133°	133°	126°	133°	126°	126°	126°	126°	126°	133°	126°
ANNUAL MAINT. FULL		3			3			3			3			3		
ANNUAL MAINT. TRAVEL			1		1			.95			.95			.95		
COKE GAS TEMP. FULL	162°	182°	210°	168°	187°	176°	175°	132°	175°	161°	168°	182°	161°	161°	196°	161°

TR 524

INTERMEDIATE

TR 524

DESCRIPTION: CAR#4 - TEST '14 - OFFICIAL E.P.A. TEST

420

OVEN NUMBER	TIME AT START OF PUSH	OVEN SCRUBBED (Y or N)	COKING TIME (HRS)	1 R 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	SEPARATOR INLET PRESSURE (IN. W.C.)	FR 521 FLOW TO JETS (0-600 GPM)	PR 522 PRESS. TO JETS (0-500 PSIG)	TR 524 TEMP. TO JETS (0-600°F)	TR 531 COKE GAS TEMP. (0-700°F)	FR 521 FLOW TO JETS	PR 522 PRESS. TO JETS	TR 524 TEMP. TO JETS	TR 531 COKE GAS TEMP.	THROUGH MIDD FOLL	THROUGH MIDD. TRAILER
B-1 C-1 A-3 B-3 C-3 A-5 B-5 C-5 A-7 B-7 C-7 A-9 B-9 C-9 A-11 B-11	9:30 9:42 9:57 10:09 10:21 10:35 10:47 10:59 11:11 11:24 11:36 11:49 12:02 12:14 12:29 12:41	Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y		74%	414°	11	365	295	203° 710° 139° 189° 191° 202° 202° 196° 189° 189° 210° 196° 203° 203° 196° 203°	203° 710° 139° 189° 191° 202° 202° 196° 189° 189° 210° 196° 203° 203° 196° 203°	115	287	175° 187° 175° 175° 163° 175° 168° 175° 168° 168° 189° 168° 175° 168° 175°	115	287	175° 187° 175° 175° 163° 175° 168° 175° 168° 168° 189° 168° 175° 168° 175°
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DATE: 12-13-84 CAR #: 4 BAT. #: 20 TEST DESCRIPTION: CARBY - TEST 7.4 - OFFICIAL E.P.A. TEST

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

OVEN NUMBER	2-11	A-12	B-13	C-13	A-15	B-15	C-15	A-17									
TIME AT START OF PUSH	12:53	1:09	1:21	1:33	1:45	1:58	2:10	2:23									
OVEN SCRUBBED (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y									
COKING TIME (HRS.)																	
LR 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	74%	"	"	"	"	"	"	"									
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	414°	"	"	"	"	"	"	"									
SEPARATOR INLET PRESSURE (IN. W.C.)	11			11													
FR 521 FLOW TO JETS (0-600 GPM)	365	"	"	"	"	"	"	"									
PR 522 PRESS. TO JETS (0-500 PSIG)	295	"	"	"	"	"	"	"									
TR 524 TEMP. TO JETS (0-600°F)	203°	203°	203°	203°	196°	196°	196°	203°									
TR 531 COKE GAS TEMP. (0-700°F)																	
FR 521 FLOW TO JETS																	
PR 522 PRESS. TO JETS																	
TR 524 TEMP. TO JETS																	
TR 531 COKE GAS TEMP.																	
FR 521 FLOW TO JETS	115	"	"	"	"	"	"	"									
PR 522 PRESS. TO JETS	231	"	"	"	"	"	"	"									
TR 524 TEMP. TO JETS	175°	175°	175°	175°	175°	175°	175°	175°									
TR 531 COKE GAS TEMP.	205			3.05													
MINIMUM MAINT. FULL TRAVEL	1.5			1.5													
TRAVEL	7.19°	196°	171°	219°	200°	200°	188°	196°									

IMPERABLE

IMPERABLE

PUSHING SCHEDULE FOR BATTERIES 19/20

SEQ #	PUSH	CHARGE	STATION	EARLIEST	DESIRED	LATES
1	A26/19	A24/19		7:53	8:0	8:14
2	A26/20	A24/20		7:59	8:6	8:20
3	B26/19	B24/19		8:5	8:12	8:26
4	B26/20	B24/20		8:11	8:18	8:32
5	C26/19	C24/19		8:18	8:25	8:39
6		C24/20		8:24	8:31	8:45
7		A26/19		8:30	8:37	8:51
8		A26/20		8:37	8:44	8:58
9		B26/19		8:43	8:50	9:4
10		B26/20		8:49	8:56	9:10
11		C26/19		8:56	9:3	9:17
12		C26/20		9:2	9:9	9:23
13		A28/19		9:8	9:15	9:29
14		A28/20		9:15	9:22	9:36
15		B28/19		9:21	9:28	9:42
16		B28/20		9:27	9:34	9:48
17		C28/19		9:34	9:41	9:55
18		C28/20		9:40	9:47	10:1
19		A1/19		9:46	9:53	10:7
20		A1/20		9:52	9:59	10:14
21		B1/19		9:59	10:6	10:20
22		B1/20		10:5	10:12	10:26
23		C1/19		10:11	10:18	10:32
24		C1/20		10:18	10:25	10:39
25		A3/19		10:24	10:31	10:45
26		A3/20		10:30	10:37	10:51
27		B3/19		10:37	10:44	10:58
28		B3/20		10:43	10:50	11:4
29		C3/19		10:49	10:56	11:10
30		C3/20		10:56	11:3	11:17
31		A5/19		11:2	11:9	11:23
32		A5/20		11:8	11:15	11:29
33		B5/19		11:15	11:22	11:36
34		B5/20		11:21	11:28	11:42
35		C5/19		11:27	11:34	11:48
36		C5/20		11:34	11:41	11:55
37		A7/19		11:40	11:47	12:1
38		A7/20		11:46	11:53	12:7
39		B7/19		11:52	11:59	12:13
40		B7/20		11:59	12:6	12:20
41		C7/19		12:5	12:12	12:26
42		C7/20		12:11	12:18	12:32
43		A9/19		12:18	12:25	12:38
44		A9/20		12:24	12:31	12:45
45		B9/19		12:30	12:37	12:51
46		B9/20		12:37	12:44	12:58
47		C9/19		12:43	12:50	1:4
48		C9/20		12:49	12:56	1:10
49		A11/19		12:56	1:3	1:17
50		A11/20		1:2	1:9	1:23
51		B11/19		1:8	1:15	1:29
52		B11/20		1:15	1:22	1:36
53		C11/19		1:21	1:28	1:42
54		C11/20		1:27	1:34	1:48
55		A13/19		1:34	1:41	1:55
56		A13/20		1:40	1:47	2:1
57		B13/19		1:46	1:53	2:7
58		B13/20		1:52	1:59	2:13
59		C13/19		1:59	2:6	2:20
60		C13/20		2:5	2:12	2:26
61		A15/19		2:11	2:18	2:32
62		A15/20		2:18	2:25	2:39
63		B15/19		2:24	2:31	2:45
64		B15/20		2:30	2:37	2:51
65		C15/19		2:37	2:44	2:58
66		C15/20		2:43	2:50	3:4
67		A17/19		2:49	2:56	3:10
68		A17/20		2:56	3:3	3:17
69		B17/19		3:2	3:9	3:23
70		B17/20		3:8	3:15	3:29
71		C19/19		3:15	3:22	3:36
72		C19/20		3:21	3:28	3:42
73		A21/19		3:27	3:34	3:48
74		A21/20		3:34	3:41	3:55
75		B21/19		3:40	3:47	4:1
76		B21/20		3:46	3:53	4:7

A-5-19 Batt
A-28-20 Batt > EMPTY Patches

DATE: 12-14-80 TEST DESCRIPTION: CMC #4 TEST 7.5-OFFICIAL EPA TEST

CAR # : 26
BAT # : 26

11 12 13 14 15

OVEN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C-15	A-17	B-17	C-17	A-19	B-19	C-19	A-21	B-21	C-21	A-23	B-23	C-23	A-25	B-25	C-25
856	909	923	936	948	1024	1013	1024	1032	1051	1103	1117	1129	1141	1156	1210
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
COKING TIME (HRS.)															
LR 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	74%	"	"	"	"	"	"	"	"	"	"	"	70%	"	"
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	414°	"	"	"	"	"	"	"	"	"	"	"	"	"	"
SEPARATOR INLET PRESSURE (IN. W.G.)	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
FR 521 FLOW TO JETS (0-600 GPM)	360	325	360	365	"	"	260	"	"	365	"	"	"	360	"
PR 522 PRESS. TO JETS (0-500 PSIG)	775	795	"	"	"	"	"	"	"	"	"	"	"	"	"
TR 524 TEMP. TO JETS (0-600°F)	203	210	203	203	203	203	203	203	203	203	203	203	196	189	175
TR 531 COKE GAS TEMP. (0-700°F)	203	210	203	203	203	203	203	203	203	203	203	203	196	189	175
FR 521 FLOW TO JETS															
PR 522 PRESS. TO JETS															
TR 524 TEMP. TO JETS															
TR 531 COKE GAS TEMP.															
FR 521 FLOW TO JETS	170	"	"	"	"	115	"	170	"	"	"	"	"	"	115
PR 522 PRESS. TO JETS	205	205	"	281	"	"	"	"	"	"	"	"	"	"	"
TR 524 TEMP. TO JETS															
TR 531 COKE GAS TEMP.	175	187	175	175	175	115	182	175	175	175	175	175	175	161	161
TEMPERATURE MARIO. TUBE	3.1	3.1			3.05			3.05		3.05			3.05		
TEMPERATURE MARIO. TUBE	1.35	1.35			1.35								1.35		
TEMPERATURE MARIO. TUBE	774	774	774	774	774	774	774	774	774	774	774	774	774	774	774
TEMPERATURE MARIO. TUBE	774	774	774	774	774	774	774	774	774	774	774	774	774	774	774

TR 524

INTERMEDIATE

TR 524

TEST DESCRIPTION: CAR #4 - TEST 7.5- OFFICIAL EPA TEST

DATE: 12-14-80
CAP. #: 4
BAT. #: 20

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
OVEN NUMBER	A-27	B-27	C-27	A-29	B-29	A-2	B-2	C-2	A-4							
TIME AT START OF PUSH	12:23	12:36	12:48	1:01	1:14	1:40	1:58	2:14	2:24							
OVEN SCRUBBED (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y	Y							
COOKING TIME (HRS.)																
LR 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	72%	"	"	"	"	"	64%	72%	"							
TR 509 HOT WATER TANK TEMP. BEFORE PUSH (0-600°F)	414°	"	"	"	"	"	"	"	"							
SEPARATOR INLET PRESSURE (IN. W.C.)	11			11				11								
FR 521 FLOW TO JETS (0-600 GPM)	360	"	"	"	"	355	215	360	"							
PR 522 PRESS. TO JETS (0-500 PSIG)	795	"	"	"	"	"	215	295	"							
TR 524 TEMP. TO JETS (0-600°F)		TRANSMITTER														
TR 531 COKE GAS TEMP. (0-700°F)	203°	196°	196°	203°	203°	196°	154°	196°	182°							
FR 521 FLOW TO JETS																
PR 522 PRESS. TO JETS																
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
FR 521 FLOW TO JETS	150	"	"	"	"	"	115	120	"							
PR 522 PRESS. TO JETS	237	"	"	"	"	"	110	287	"							
TR 524 TEMP. TO JETS		TRANSMITTER														
TR 531 COKE GAS TEMP.	168°	168°	168°	175°	175°	168°	140°	161°	161°							
APPROX. H2O. CONC.	3.05			3.05				3.05								
APPROX. H2O. LEVEL	1.4			1.35												
APPROX. H2O. TEMP.	317°	317°	310°	319°	319°	311°	189°	224°								

DATE: 11/84
 CAR # : 4
 BAT # : 20
 TEST DESCRIPTION: CMC - 1
 ARRIVAL: 10:11 AM
 TEST 3-1
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

OVEN NUMBER	C-71	A-23	B-23	C-23	A-15	B-25	C-25	A-17	B-27	C-27	A-29	B-29	C-29	A-2	B-2	C-2
TIME AT START OF PUSH	11:26	11:50	12:03	12:17	12:30	12:43	12:57	1:11	1:24	1:38	1:47	2:00	2:14	2:28	2:42	2:56
OVEN SCRUBBED (Y/N)	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
COKING TIME (HRS.)																
LR 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	73%	78%	73%	73%	73%	73%	73%	73%	78%	78%	78%	78%	78%	"	"	"
TR 505 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	420°	420°	426°	426°	422°	413°	413°	432°	432°	432°	432°	432°	432°	"	"	"
SEPARATOR INLET PRESSURE (IN. W.C.)		12					15	11	10	10.5			11			
FR 521 FLOW TO JETS (0-600 GPM)	100	400	400		108	453		108	400	400	400	400	400	"	"	"
PR 522 PRESS. TO JETS (0-500 PSIG)	290	290	295	295	270	295	310	305	300	300	300	300	300	"	"	"
TR 524 TEMP. TO JETS (0-600°F)	420°	420°	420°	420°	420°	420°	420°	420°	420	426	420	420	420	"	"	414
TR 531 COKE GAS TEMP. (0-700°F)	154°	154°	147°	147°	140°	140°	167°	133°	140	140	140	140	154	140	140	"
FR 521 FLOW TO JETS																
PR 522 PRESS. TO JETS																
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
FR 521 FLOW TO JETS	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
PR 522 PRESS. TO JETS	275	280	285	285	280	285	295	290	280	280	280	280	280	280	280	280
TR 524 TEMP. TO JETS	470°	470°	470°	470°	470°	470°	470°	470°	470	470	470	470	470	470	470	470
TR 531 COKE GAS TEMP.	147°	143°	143°	143°	143°	143°	143°	147°	146	154	148	154	168	210	154	168
PRODUCER MTD. FULL		4.0					4.2	2.6	2.6	2.5			2.5			
PRODUCER MTD. TRAVEL		1.6						1.2	1.2				1.2			
COKE GAS TEMP. AT JWK.	15°	273°	251°		273°	415°	291°	132°	280	187	182	174	196	244	152	224

DATE: 7-84
CAR #: 4
BAT. #: 20

TEST DESCRIPTION: CATE #4

TURBINATION SPAY 1551 #1
Test 3-1

14 17 18 19 20 21 22 23 24

10 11 12 13 14 15 16

OVEN NUMBER	A-4	B-4	C-4	A-6	B-6	C-6	A-3	B-3	A-10
TIME AT START OF PUSH	326	339	352	403	414	426	438	449	516
OVEN SCRUBBED (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y	Y
COKING TIME (HRS.)									
LR 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	78	"	"	"	"	"	"	"	"
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	426	"	"	"	"	"	"	"	"
SEPARATOR INLET PRESSURE (IN. W.C.)	10					15	12	12	12
FR 521 FLOW TO JETS (0-600 GPM)	400	"	"	"	"	"	"	"	"
PR 522 PRESS. TO JETS (0-500 PSIG)	300	"	"	"	"	"	"	"	"
TR 524 TEMP. TO JETS (0-600°F)	414	"	"	"	"	"	1108	420	"
TR 531 COKE GAS TEMP. (0-700°F)	126	142	147	140	140	133	140	133	140
FR 521 FLOW TO JETS									
PR 522 PRESS. TO JETS									
TR 524 TEMP. TO JETS									
TR 531 COKE GAS TEMP.									
FR 521 FLOW TO JETS	110	"	"	"	"	"	"	"	"
PR 522 PRESS. TO JETS	290	"	"	"	"	"	"	"	"
TR 524 TEMP. TO JETS	414	"	"	"	"	"	408	420	"
TR 531 COKE GAS TEMP.	154	154	168	154	154	154	140	140	154
HANDBACK MAND. FULL	OK								
HANDBACK MAND. TRIP 154	OK								
COKE GAS TEMP AT TUR.	175	196	224	175	196	217	133	154	161

7 CEL

INTERMEDIATE

TRAVEL

DATE: 1-21-84
 CAR #: 20
 TEST DESCRIPTION: WATER SATURATION SPRAY TEST
 10-21-84

	1	2	3	4	5	6	7	8	9	10	11	12
OVEN NUMBER	A-24	B-24	C-24	A-26	B-26	C-26	B-28	C-28	A-1	B-1	A-3	B-3
TIME AT START OF PUSH	112	124	138	151	153	155	221	258	311	329	353	404
OVEN SCRUBBED (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
COKING TIME (HRS.)												
LR 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	118%	"	"	"	"	"	"	"	"	"	"	"
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	432°	"	"	"	"	"	"	"	"	"	"	"
SEPARATOR INLET PRESSURE (IN. W.C.)	12	12			12		12	12			12	
FR 521 FLOW TO JETS (0-600 GPM)	400	"	"	"	"	"	"	"	"	360	400	
PR 522 PRESS. TO JETS (0-500 PSIG)	305	"	"	"	"	"	310	"	"	385	305	
TR 524 TEMP. TO JETS (0-600°F)	420°	"	426°	437°	"	"	444°	420°	"	"	420°	
TR 531 COKE GAS TEMP. (0-700°F)	140°	140°	133°	142°	"	137°	141°	140°	168°	40°	147°	
FR 521 FLOW TO JETS												
PR 522 PRESS. TO JETS												
TR 524 TEMP. TO JETS												
TR 531 COKE GAS TEMP.												
FR 521 FLOW TO JETS	110	"	"	"	"	"	"	"	"	"	"	"
PR 522 PRESS. TO JETS	225	"	"	"	"	"	330	"	"	215	300	225
TR 524 TEMP. TO JETS	420°	"	426°	437°	"	410°	414°	420°	"	1	"	410
TR 531 COKE GAS TEMP.	147°	140°	140°	140°	147°	140°	147°	147°	141°	147°	147°	147°
FLOWER MARK FULL	2.7	2.85			2.8		2.15	3.0			2.8	
WATER MARK FULL				1.1	1.4			1.25				
COKE GAS TEMP. AT FOUR.	182°	175°	182°	182°	182°	182°	189°	154°	182°	161°	161°	161°

DATE: 3-84
 CAR #: 4
 BAT #: 20

TEST DESCRIPTION: CARBONATION

SPRAY TEST #3

Test 3-3

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
OVEN NUMBER	A-17	B-17	C-17	A-19	B-19	C-19	A-21	B-21	C-21	A-23	B-23	C-23	A-25	B-25	C-25	A-29
TIME AT START OF PUSH	12 36	12 50	1 03	1 20	1 33	1 46	2 02	2 16	2 36	2 53	3 06	3 18	3 32	3 46	3 59	4 48
OVEN SCRUBBED (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
COKING TIME (HRS.)																
L.R 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	77%	"	"	74%	111%	"	"	"	75%	74%	111%	75%	111%	"	"	"
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	432°	"	"	"	"	"	"	"	429°	"	"	"	"	"	"	"
SEPARATOR INLET PRESSURE (IN. W.C.)		12			12			12			12			12		
FR 521 FLOW TO JETS (0-600 GPM)	408		400	276		296	"	315	375	360	375	"	"	"	"	"
PR 522 PRESS. TO JETS (0-500 PSIG)	305	"	310	295	310	295	"	300	295	285	295	"	"	"	"	"
TR 524 TEMP. TO JETS (0-600°F)	408°	476°	408°	414°	"	425°	414°	420°	476°	"	423°	420°	"	426°	420°	"
TR 531 COKE GAS TEMP. (0-700°F)	147°	140°	140°	126°	140°	141°	141°	122°	126°	133°	146°	154°	154°	147°	161°	168°
FR 521 FLOW TO JETS																
PR 522 PRESS. TO JETS																
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
FR 521 FLOW TO JETS	110	110	110	"	"	"	"	"	"	"	"	"	"	"	"	"
PR 522 PRESS. TO JETS	295	"	300	285	300	295	"	290	215	275	285	"	"	"	"	"
TR 524 TEMP. TO JETS	114°	145°	145°	145°	"	142°	141°	116°	422°	423°	"	420°	"	426°	420°	"
TR 531 COKE GAS TEMP.	149°	140°	140°	133°	140°	141°	141°	122°	133°	133°	147°	147°	147°	147°	147°	147°
ANALYST: MARIO FULL																
SUPERVISOR: MARIO FULL																
COKE GAS TEMP. TO TANK	154°	175°	182°	182°	175°	193°	183°	168°	168°	147°	163°	175°	181°	168°	182°	183°

DATE: 1-13-84
 CAR #: 7
 BAT. #: 20

TEST DESCRIPTION: CAC #4

2161-00 SPARY TEST #3 (Cont.)

Test 3-3

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
OVEN NUMBER	B-29	C-29	A-2	P-2	C-2	A-4	B-4	C-4								
TIME AT START OF PUSH	5:00	5:13	5:25	5:31	5:50	6:02	6:15	6:21								
OVEN SCRUBBED (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y								
COKING TIME (HRS.)																
L.R. 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	97%	"	"	"	"	"	76%	"								
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	129°	"	"	"	"	"	"	"								
SEPARATOR INLET PRESSURE (IN. W.C.)	12		12				12									
FR 521 FLOW TO JETS (0-600 GPM)	375	"	"	"	"	"	"	"								
PR 522 PRESS. TO JETS (0-500 PSIG)	295	"	"	"	"	"	"	"								
TR 524 TEMP. TO JETS (0-600°F)	420°	"	410°	"	402°	390°	410°	"								
TR 531 COKE GAS TEMP. (0-700°F)	161°	154°	163°	154°	154°	154°	147°	154°								
FR 521 FLOW TO JETS																
PR 522 PRESS. TO JETS																
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
FR 521 FLOW TO JETS	110	"	"	"	"	"	"	"								
PR 522 PRESS. TO JETS	188	"	"	"	"	"	"	"								
TR 524 TEMP. TO JETS	160°	"	110°	"	402°	410°	"	"								
TR 531 COKE GAS TEMP.	177°	140°	147°	147°	140°	147°	140°	140°								
ANALOG METER FULL																
ANALOG METER TRAILER																
COKE GAS TEMP. AT TANK	160°	189°	161°	153°	145°	147°	143°	191°								

DATE: 10-1-84 TEST DESCRIPTION: CARBON DURATION SPRAY TEST #4

CAR #: 4
BAT. #: 20

Test # 3-14

10-24-84

OVEN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TIME AT START OF PUSH	C-25 Q 57	A-27 10 11	B-27 10 23	C-27 10 35	A-29 10 49	B-29 11 02	C-29 11 28	A-2 11 53	B-2 11 57	C-2 12 09	A-4 12 22	B-4 12 34	C-4 12 47	A-6 12 59	B-6 1 11	C-6 1 24
OVEN SCRUBBED (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
COKING TIME (HRS.)																
LR 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	16 1/2	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	426	429	"	"	"	"	426	429	"	"	"	"	"	"	"	"
SEPARATOR INLET PRESSURE (IN. W.C.)	11			11.5			10.5			11.5			11			
FR 521 FLOW TO JETS (0-600 GPM)	295	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
PR 522 PRESS. TO JETS (0-500 PSIG)	287	290	295	297	295	"	300	295	"	"	297	"	300	297	"	292
TR 524 TEMP. TO JETS (0-600°F)	408	414	417	420	423	426	426	429	420	426	429	426	429	426	429	426
TR 531 COKE GAS TEMP. (0-700°F)	147	147	147	161	161	161	"	182	175	161	168	182	175	182	182	154
FR 521 FLOW TO JETS																
PR 522 PRESS. TO JETS																
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
FR 521 FLOW TO JETS	110	"	"	"	"	"	110	"	"	"	"	"	"	"	"	"
PR 522 PRESS. TO JETS	280	"	285	287	285	"	295	285	"	"	"	287	280	282	287	285
TR 524 TEMP. TO JETS	408	414	417	420	423	426	426	429	420	426	429	426	429	426	429	426
TR 531 COKE GAS TEMP.	147	140	140	151	147	147	140	161	154	147	154	154	147	147	154	147
APPROX. MIN. FULL	2.6			2.7			2.6			2.7			2.65			
APPROX. MIN. TAIL		1.25			1.7		1.4				1.2			1.3		
COKE GAS TEMP. TAIL	196	192	182	190	169	131	210	162	163	195	161	169	192	192	192	192

DATE: 10-24-84

TEST DESCRIPTION: CAC #4

EVANSTON SPRAY TEST #4 (Con)

CAR #:

BAT. #:

10-24-84

Test # 3-4

OVEN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TIME AT START OF PUSH	A-8 131	B-8 149	C-8 202	A-10 215	B-10 229	C-10 241	A-12 253	B-12 306								
OVEN SCRUBBED (Y or N)	Y	Y	Y	Y	Y	Y	Y	Y								
COKING TIME (HRS.)																
LR 505 HOT WATER TANK LEVEL BEFORE PUSH (0-100%)	76%	"	"	"	"	"	"	"								
TR 509 HOT WATER TANK TEMP BEFORE PUSH (0-600°F)	429°	"	"	"	"	"	"	"								
SEPARATOR INLET PRESSURE (IN. W.C.)	11				11											
FR 521 FLOW TO JETS (0-600 GPM)	295	"	360	370	"	"	"	"								
PR 522 PRESS. TO JETS (0-500 PSIG)	205	"	292	299	297	"	"	"								
TR 524 TEMP. TO JETS (0-600°F)	429°	"	436°	"	"	"	"	"								
TR 531 COKE GAS TEMP. (0-700°F)	175°	154°	175°	161°	161°	175°	163°	163°								
FR 521 FLOW TO JETS																
PR 522 PRESS. TO JETS																
TR 524 TEMP. TO JETS																
TR 531 COKE GAS TEMP.																
FR 521 FLOW TO JETS	110	"	"	"	"	"	"	"								
PR 522 PRESS. TO JETS	290	287	282	287	284	"	"	"								
TR 524 TEMP. TO JETS	477°	"	476°	"	"	"	"	"								
TR 531 COKE GAS TEMP.	410°	447°	447°	441°	454°	440°	449°	440°								
ANALYST: Madio, Fule	2.6				2.1											
ANALYST: Madio, Fule	1.3					1.25										
ANALYST: Madio, Fule	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3								
ANALYST: Madio, Fule	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3								

APPENDIX B
SAMPLE TRAIN DATA SHEETS

FIL DATA

Plant USS - CLAIRBORO, PA
 Date 12-5-87
 Sample Location HCCG-TEST CAR
 Sample Type M-5
 Run Number 7.1
 Operator TREMINO/SMITH
 Ambient Temperature ~ 29°F
 Barometric Pressure 37.42 @ 4:00P
 Static Pressure, (H₂O) _____
 Filter Number(s) RA1026-045

Impinger Volumes
 Initial Final
 Train A { 100 356.0 Net Gain 256.0
100 140.0 40.0
m/I 1.0 1.0
 Train B { 100 101.0 1.0
100 100.0 0
m/I 0.0 0
 Silica Gel
682.3 691.4
736.0 743.5

Probe Length and Type S' TFE LINED
 Nozzle Size & I.D. 3/8" x .283 (302)
 Pilot Coefficient & I.D. .84
 Assumed Moisture _____
 Molecular Weight, Dry, (M_d) _____
 Meter Box Number APT 12 LG
 Meter Coefficient _____
 α Factor _____
 $K = \frac{K(M_d)^4}{(P)}$
 $K(M_d)^4 = \frac{(P)}{(P)}$
 $ΔH = K(M_d)^4 \left(\frac{I_D}{T_S} \right) (P)$

Leak Check: Initial at 16 " Hg, .004 CFM
 Final at 15 " Hg, .004 CFM
 Pilot Leak Check: OK
 SASS Condensate N/A
 Total Volume _____

P.H. - 3.5
 P.A.G.E - 4.17 → 15.00

Traverse Point Number	MIN:SEC	Gas Meter Reading (V _m), ft ³	Velocity Head (a _p), in. H ₂ O	ROTORMETER		Temperature of					Pump Vacuum in. Hg	Avq. ΔP	Δ H
				Desired	Actual	Probe	Impinger	Filter	Oven	Gas Meter			
						STACK TRAVEL	A	TEMP		In	Out		
1-6	:44	287.21	.80		18.7	164	37		270	37	37	NA	
	:55	289.737	.25		9.8	158	35		273	38	37	.09	
1-5	:45	290.31	.50		14.5	154	38		266	39	38	.28	
	:43	290.607	.20		11.4	157	38		271	39	38	.11	
1-4	:44	291.15	.45		13.7	156	38		267	40	39	.25	
	:49	291.508	.20		11.4	158	38		267	41	39	.11	
1-3	:45	292.30	.80		18.7	157	40		266	43	43	.42	
	:38	292.638	.20		.11	161	40		267	44	42	.11	
Avg.													

Comments:

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _g), ft ³ Init. 292.638	Velocity Head (V _h), in. H ₂ O	ROTCMETER		Temperature of					Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	Push Stack TRAVEL	Probe	Impingement	FILTER TEMP	Gas Meter In Out			
1-2	:45	292.638 292.638	1.0		21.1	156	265	40		267 44 43	4		.58
	:47	293.45	.25		7.8	156	269	39		265 45 43	1		.13
1-1	:47	294.92	1.7	28.1	27.0	159	265	40		266 45 44	6		.81
	:46	295.530	.40		12.8	162	263	40		267 45 43	2		.21
2-6	:44	297.657	1.3		24.0	155	268	40		265 45 44	5		.70
	:32	298.035	.35		11.7	169	270	39		268 46 44	1		NA
2-5	:46	298.92	1.2		23.2	165	268	40		263 45 45	5		.65
	:46	299.468	.30		10.9	158	270	40		266 46 44	1		.19
2-4	:47	300.43	1.4		25.2	152	268	40		260 46 45	5.5		.74
	:51	301.063	.40		12.8	160	270	39		262 46 44	1		.26
2-3	:47	302.00	1.3		24.2	154	267	40		262 46 45	5		.70
	:37	302.425	.35		11.9	159	268	39		269 46 44	1		.20
2-2	:46	303.41	1.4		25.2	156	266	40		270 46 45	6		.75
	:48	304.05	.50		14.5	157	268	40		270 46 45	2		.30
2-1	:46	305.04		305.04 305.04	27.0	156	266	40		270 46 46	6		.80
	:53	305.717			12.8	158	267	40		268 47 45	2		.28
AUG.													

Run No. 7.1

Date 12-5-84

Sampling Location HQs - TEST CAR

1) Could not pull my desired rate 4) ORSAT Back on

Comments: 2) ORSAT off for repair

3) Initial Gas meter reading for this point was 397.017 (397.66 was end of push reading)

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³ Init. 305.717	Velocity Head (ΔP _s), in. H ₂ O	ROTOMETER		Temperature of						Pump Vacuum in. Hg	Avg. ΔP	Δ H	
				Desired	Actual	Push Stack Travel	Probe	Impinger	FILTER TEMP	Oven	Gas Meter				
											In				Out
3-6	3:40 :46	306.72	1.6		27.0	154	270	40	40	266	47	46	6		83
	:38	307.159	.35		11.9	157	271	40	40	266	47	45	1		21
3-5	:45	308.17	1.6		27.0	154	268	41	40	262	47	46	6		85
	:45	308.720	.30		10.9	155	271	40	40	268	48	46	1		23
3-4	:46	309.54	.95		20.5	154	268	40	40	270	48	46	NA		54
	:59	310.051	.25		9.8	157	271	40	40	270	48	46	1		13
3-3	:46	310.84	.80		18.7	156	267	40	40	263	48	47	3		46
	:41	311.123	.20		.11	158	271	40	40	267	48	47	1		11
3-2	:44	311.93	.95		20.5	155	267	40	40	267	48	47	4		55
	:45	312.331	.25		9.8	157	270	40	40	270	48	47	1		14
3-1	:46	313.19	1.1		22.2	157	266	40	40	270	48	47	NA		62
	:54	313.674	.25		9.8	159	269	40	40	269	48	47	1		14
4-6	:43	314.37	.80		18.7	154	265	40	40	266	48	47	3		45
	:45	314.776	.25		9.8	156	270	40	40	253	49	47	1		13
4-5	:45	315.42	.55		15.3	157	268	41	41	270	49	48	2		53
	:45	315.670	.15		0804	155	271	41	41	273	47	47	NI		88
AUG.															

Run No. 7.1 Date 12-5-84 Sampling Location HCRG-TEST CAR

Comments: 1) Static taken part #3 Push = .10
travel = .03

[illegible]

Sampling Location HCRG-TEST CAR

Date 12-5-84

Run No. 71

Comments: 1) H_2O in Pitot Line - no gas meter reading taken at end of push
no time for push taken

DATE - 12-5-84

RUN # - 7.1

PLANT - USS - CLAIRTON

RAV SE POINT	OVEN NUMBER	ΔP EXPECTED	ΔP ACTUAL	ROTOMETER DESIRED	POINT SAMPLE TIME	COMMENT
1.6	C-26	.80	.25	18.7 9.8	1:41	
1.5	A-28	.50	.20	14.5 11.4H	1:28	
1.4	B-28	.45	.20	13.7 11.4H	1:33	
1.3	A-1	.80	.20	18.7 11.4H	1:23	
1.2	B-1	1.0	.25	21.1 9.8	1:32	
1.1	C-1	1.7	.40	28.6 12.8	1:33	
2.6	A-3	1.3	.35	24.2 11.9	1:18	
2.5	B-3	1.2	.30	23.2 10.9	1:32	
2.4	C-3	1.4	.40	25.2 12.8	1:38	
2.3	A-5	1.3	.35	24.2 11.9	1:24	
2.2	B-5	1.4	.50	25.2 14.5	1:34	
2.1	C-5	1.7	.40	27.9 12.8	1:39	
3.6	A-7	1.6	.35	27.0 11.9	1:24	
3.5	B-7	1.6	.30	27.0 10.9	1:30	
3.4	C-7	.95	.25	20.5 9.8	1:45	
3.3	A-9	.80	.20	18.7 11.4H	1:27	
3.2	B-9	.95	.25	20.5 9.8	1:31	
3.1	C-9	1.1	.25	22.2 9.8	1:40	
4.6	A-11	.80	.25	18.7 9.8	1:28	
4.5	B-11	.55	.15	15.3 10.8AH	1:31	
4.4	C-11	.80	.25	18.7 9.8	1:40	
4.3	A-13	1.5	.30	26.2 10.9	1:24	
4.2	B-13	1.5	.30	26.2 10.9	1:32	
4.1	C-13	1.2	.25	23.2 9.8	1:39	
Avg.					TOTAL TIME	

RAV SE POINT	OVEN NUMBER	ΔP EXPECTED	ΔP ACTUAL	ROTOMETER DESIRED	POINT SAMPLE TIME	COMMENT
1.6	C-26	.80	.25	18.7 9.8	1:41	
1.5	A-28	.50	.20	14.5 11.4H	1:28	
1.4	B-28	.45	.20	13.7 11.4H	1:33	
1.3	A-1	.80	.20	18.7 11.4H	1:23	
1.2	B-1	1.0	.25	21.1 9.8	1:32	
1.1	C-1	1.7	.40	28.6 12.8	1:33	
2.6	A-3	1.3	.35	24.2 11.9	1:18	
2.5	B-3	1.2	.30	23.2 10.9	1:32	
2.4	C-3	1.4	.40	25.2 12.8	1:38	
2.3	A-5	1.3	.35	24.2 11.9	1:24	
2.2	B-5	1.4	.50	25.2 14.5	1:34	
2.1	C-5	1.7	.40	27.9 12.8	1:39	
3.6	A-7	1.6	.35	27.0 11.9	1:24	
3.5	B-7	1.6	.30	27.0 10.9	1:30	
3.4	C-7	.95	.25	20.5 9.8	1:45	
3.3	A-9	.80	.20	18.7 11.4H	1:27	
3.2	B-9	.95	.25	20.5 9.8	1:31	
3.1	C-9	1.1	.25	22.2 9.8	1:40	
4.6	A-11	.80	.25	18.7 9.8	1:28	
4.5	B-11	.55	.15	15.3 10.8AH	1:31	
4.4	C-11	.80	.25	18.7 9.8	1:40	
4.3	A-13	1.5	.30	26.2 10.9	1:24	
4.2	B-13	1.5	.30	26.2 10.9	1:32	
4.1	C-13	1.2	.25	23.2 9.8	1:39	

DRY MOLECULAR WEIGHT DETERMINATION

COMMENTS:

PLANT USS - CLARK
 DATE 12-5-84 TEST No 7.1
 SAMPLING TIME (24 hr CLOCK) _____
 SAMPLING LOCATION HSCC - TEST CAR
 SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS GRAB) INTEGRATED
 ANALYTICAL METHOD ORSAT
 AMBIENT TEMPERATURE 25°C
 OPERATOR B. D. Ray

RUN GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M _g , lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO ₂	2.0	2.0	2.0	2.0	2.0	2.0	2.0	44/100	0.88
O ₂ (NET IS ACTUAL O ₂ READING MINUS ACTUAL CO ₂ READING)	20.2	18.2	20.2	18.2	20.2	18.2	18.2	32/100	5.824
CO (NET IS ACTUAL CO READING MINUS ACTUAL O ₂ READING)	20.4	0.2	20.4	0.2	20.4	0.2	0.2	28/100	0.056
N ₂ (NET IS 100 MINUS ACTUAL CO READING)	100	79.6		79.6		79.6	79.6	28/100	22.288
TOTAL									29.048

FIL DATA

Plant U.S.S. Clairton
 Date 12-6-84
 Sample Location MCQE - TEST CELL
 Sample Type M-5
 Run Number 7.2
 Operator JARMAN/SMITH
 Ambient Temperature -30°F
 Barometric Pressure 29.01 @ 12:25P
 Static Pressure, (H₂O) _____
 Filter Number(s) BA 1D35-046

Impinger Volumes
 Initial Final Net Gain
 A 100.0 338.0 238
 100.0 238.0 138
 0 0 0
 100.0 108.0 8
 100.0 100.0 0
 0 0 0
 Silica Gel
 69.4 696.4
 242.5 752.2
 SASS Condensate N/A
 Total Volume _____

Probe Length and Type 5' TFL
 Nozzle Size & I.D. .301"
 Pitot Coefficient & I.D. .84
 Assumed Moisture _____
 Molecular Weight, Dry, (M_D) _____
 Meter Box Number APT 12
 Meter Coefficient _____
 α Factor _____
 $K =$ _____
 $K(M_D)^4 = \frac{1}{\alpha} \times (\frac{I_D}{15})^4$
 $\Delta H = K(M_D)^4 (\frac{I_D}{15})^4 (P)$
 Purge - 8.7 to 18.7
 PH - 2.5

Leak Check: Initial at 17 Hg, .002 CFM
 Final at 16 Hg, .002 CFM
 Pitot Leak Check: OK

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³ Init. 321.875	Velocity Head (ΔP ₁), in. H ₂ O	ROTOMETER		Temperature of							Pump Vacuum in. Hg	Avg. √ΔP	Δ H	
				Desired	Actual	PUSH STACK TRAVEL	Probe	Impinger	FISTER TEMP	Oven	Gas Meter					
											In	Out				
1-4	1:43	322.355	.60	18.7	16.0	162	271	40	40		266	41	41		3	.37
	1:41	322.840	.20	9.8	.11AH	162	267	40	40		269	42	41		1	.11
1-5	1:46	323.44	.45	14.5	13.7	156	270	40	40		265	42	42		2	.30
	1:46	323.718	.15	.11AH	.08AH	163	269	40	40		262	42	71		1	.08
1-4	1:48	324.35	.50	13.7	14.5	157	266	40	40		264	43	42		3	.30
	1:58	324.60	.15	.11AH	.08AH	163	267	40	40		265	44	42		1	.08
1-3	1:45	325.37		18.7	16.7	157	265	40	40		266	44	43		3	.39
	1:41	325.674		.11AH	.11AH	165	267	40	40		264	44	43		1	.11
AVG.																

Comments: 11 Desired Roto readings are used as a reference used for today's test.

Traverse Point Number	MIN: SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³ Init. 325.694	Velocity Head (ΔP _s), in. H ₂ O	ROTAMETER		Temperature of						Pump Vacuum in. Hg	Avg. ΔP	Δ H	
				Desired	Actual	PUSH STACK TRAVEL	Probe	Impinger	FILTER TEMP.	Oven	Gas Meter				
											In				Out
1-2	:46	326.55	.95	21.1	20.5	165	264	40 40		266	45 44	5		.53	
	:49	326.969	.25	9.8	9.8	166	268	40 40		266	45 43	1		.16	
1-1	:47	328.03	1.9	29.6	27.0	166	265	40 40		268	46 44	7		.75	
	:57	328.877	.40	13.8	12.8	164	266	40 40		267	46 44	2		.27	
2-6	:45	329.63	1.4	24.2	25.2	165	267	40 40		268	46 45	7		.25	
	:41	330.145	.35	11.9	11.9	163	268	40 40		265	47 45	NA		.22	
2-5	:45	331.05	1.2	23.2	23.0	159	266	40 40		260	47 46	5		.65	
	:49	331.592	.30	10.9	10.9	164	267	40 40		263	47 46	1		.22	
2-4	:46	332.48	1.0	25.2	21.1	155	265	40 40		263	48 46	6		.50	
	:55	333.145	.40	12.8	12.8	162	265	40 40		263	48 46	1		.25	
2-3	:45	334.10	1.6	24.2	27.0	163	265	40 40		260	48 47	7		.78	
	:40	334.628	.45	11.9	13.7	162	265	40 40		260	48 47	NA		.28	
2-2	:46	335.61	1.6	25.2	27.0	158	264	40 40		264	48 47	7		.72	
	:49	336.317	.40	14.5	12.8	162	264	40 40		267	49 47	2		.26	
2-1	:46	337.27	1.3	27.9	24.2	169	264	40 40		264	48 47	6.5		.73	
	:56	338.054	.55	12.8	15.3	166	270	40 40		265	49 47	3		.36	
AUG.															

Run No. 7.2 Date 12-6-84

Sampling Location HCRS TEST CAR

Comments: " Could not pull desired rate of 29.6

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m , ft ³)	Velocity Head (H _v), in. H ₂ O	ROTCOMETER		Temperature of					Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	PUSH STACK TRAVEL	Probe	Igniter	FILTER TEMP	Gas Meter In	Gas Meter Out		
		Init. 338.054											
3-6	:47	339.05	1.6	27.0	1.6	158	270	40	267	49	48	7	.76
	:39	339.510	.35	11.9	.35	160	269	40	269	47	47	NA	.25
3-5	:44	340.42	1.1	27.0	22.2	158	268	40	262	49	48	5	.64
	:49	340.958	.35	10.9	11.9	161	270	40	261	49	48	2	.24
3-4	:46	341.74	.95	20.5	20.5	172	265	40	262	50	48	NA	.48
	:57	342.193	.25	7.8	9.8	167	266	40	265	50	48	1	.13
3-3	:46	342.45	.80	18.7	18.7	159	265	40	266	49	48	4	.45
	:45	343.28	.25	11.0H	9.8	160	268	40	269	50	48	1	.12
3-2	:44	344.06	.95	20.5	20.5	157	265	40	266	50	48	5	.55
	:49	344.480	.25	9.8	9.8	163	266	40	265	50	48	1	.15
3-1	:47	345.37	1.2	22.2	23.2	156	261	40	269	50	48	7	.57
	:57	346.030	.30	7.8	10.9	172	267	40	270	50	48	2	.20
4-6	:46	346.69	.55	18.7	15.3	154	268	40	269	50	49	4	.35
	:42	346.865	.15	9.8	.08	159	270	40	268	50	49	1	.08
4-5	:47	347.44	.40	15.3	12.8	154	266	40	263	50	49	3	.24
	:45	347.580	.10	.08AH	.08AH	159	269	40	263	50	49	1	.05
AUG.													

Run No. 7.2

Date 12-6-84

Sampling Location

HCBC test car

Comments:

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³ Init. 347.580	Velocity Head (ΔP _s), in. H ₂ O	ROTOMETER		Temperature of					Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	PUSH STACK TRAVEL	Probe	Impinger	FILTER TEMP	Oven	Gas Meter In Out		
4-4	:45	348.2	.65	18.7	16.7	157	265	40 40		261 50	48 5		.33
	:58	348.520	.15	9.8	10.8	164	270	40 40		260 50	48 1		.68
4-3	:46	349.36	1.3	26.2	24.2	169	265	40 40		264 50	48 9		.70
	:41	349.867	.30	10.9	10.9	168	269	40 40		264 50	48 NA		.23
4-2	:45	350.800	1.4	26.2	25.2	168	264	40 40		265 50	49 8		.65
	:57	351.473	.30	10.9	10.9	165	266	40 40		265 50	48 3		.17
4-1	:45	352.37	1.3	25.2	24.2	163	263	40 40		264 49	48 8		.61
	1:01	352.925	.25	9.8	9.8	164	263	40 40		260 50	48 2		.13
AUG.													

Run No. 7.2 Date 12-6-84 Sampling Location HQCC test car

Comments: High vacuum due to H₂O in 1st imp. train A Static Push -.25
Impinger is getting full, carries over travel None
carburizer shut off

DATE - 12-6-84

RUN # - 7-2

PLANT - USS - CLAIRTON

RAVAGE P. IT	OVEN NUMBER	ΔP EXPECTED	ΔP ACTUAL	ROTMETER DESIRED	POINT SAMPLE TIME	COMMENT	Vel. Head in ft	Vel. Head in ft	Rotometer Reading
1.6	A-9	.80 .25	.60 .20	16.0 .114H	1:24		2.05	2.07	2.5
1.5	B-9	.50 .20	.50(.45) .15	14.5(13.7) .084H	1:32		2.11	2.12	2.7
1.4	C-9	.45 .20	.50 .15	14.5 .084H	1:46		2.15	2.17	2.7
1.3	A-11	.80 .20	.75(.65) .20	18.0(16.7) .114H	1:26		2.22	2.11	2.5
1.2	B-11	1.0 .25	.95 .25	20.5 9.8	1:35		2.25	2.14	2.3
1.1	C-11	1.7 .40	1.9 .40	29.6 12.8	1:44		2.30	2.16	10.9
2.6	A-13	1.3 .35	1.4 .35	25.2 11.9	1:26		2.35	2.17	11.3
2.5	B-13	1.2 .30	1.2 .30	23.2 10.9	1:34		2.42	2.17	12.2
2.4	C-13	1.4 .40	1.0 .40	21.1 12.8	1:41		2.43	2.19	12.7
2.3	A-15	1.3 .35	1.6 .45	27.0 13.7	1:25		2.50	2.23	14.5
2.2	B-15	1.4 .50	1.6 .40	27.0 12.8	1:35		2.55	2.31	15.2
2.1	C-15	1.7 .40	1.3 .55	24.2 15.3	1:42		2.60	2.34	16.0
3.6	A-17	1.6 .35	1.6 .35	27.0 13.7	1:26		2.65	2.37	16.7
3.5	B-17	1.6 .30	1.1 .35	22.2 11.9	1:33		2.72	2.42	17.2
3.4	C-17	.95 .25	.95 .25	20.5 9.8	1:43		2.75	2.43	18.3
3.3	A-19	.80 .20	.80 .25	18.7 9.8	1:31		2.80	2.57	19.0
3.2	B-19	.95 .25	.95 .25	20.5 9.8	1:33		2.85	2.54	20.5
3.1	C-19	1.1 .25	1.2 .30	23.2 10.9	1:44		2.92	2.57	21.1
4.6	A-21	.80 .25	.55 .45	15.3 .084H	1:28		2.95	2.61	22.5
4.5	B-21	.55 .15	.40 .10	12.8 .054H	1:32		3.02	2.67	23.2
4.4	C-21	.80 .25	.65 .15	16.7 .084H	1:43		3.05	2.72	23.7
4.3	A-23	1.5 .30	1.3 .30	24.2 10.9	1:27		3.12	2.75	24.2
4.2	B-23	1.5 .30	1.4 .30	25.2 10.9	1:42		3.15	2.78	24.7
4.1	C-23	1.2 .25	1.3 .25	24.2 9.8	1:44		3.20	2.81	25.2
avg.				TOTAL TIME			3.25	2.85	25.7
							3.30	2.85	26.1
							3.35	2.86	26.6
							3.40	2.87	27.0
							3.45	2.88	27.5
							3.50	2.89	27.9
							3.55	2.90	28.2
							3.60	2.91	28.6
							3.65	2.92	29.1
							3.70	2.93	29.6
							3.75	2.94	30.0
							3.80	2.95	30.4
							3.85	2.96	30.7
							3.90	2.97	31.1
							3.95	2.98	31.5
							4.00	2.99	31.9
							4.05	3.00	32.3
							4.10	3.01	32.7
							4.15	3.02	33.0
							4.20	3.03	33.4

DRY MOLECULAR WEIGHT DETERMINATION

PLANT USS-CLARK
 DATE 12-6-84 TEST 7.2
 SAMPLING TIME (24 hr CLOCK) _____
 SAMPLING LOCATION HSGC - TEST CAR
 SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS GRA B) INTEGRATED
 ANALYTICAL METHOD ORSAT
 AMBIENT TEMPERATURE 23°C ~ 3:30P
 OPERATOR B. D. RAY

COMMENTS:

RUN GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M _d , lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO ₂	2.2	2.2	2.2	2.2	2.2	2.2	2.2	44/100	0.968
O ₂ (NET IS ACTUAL O ₂ READING MINUS ACTUAL CO ₂ READING)	19.6	17.4	17.4	17.2	17.4	17.2	17.266	32/100	5.525
CO (NET IS ACTUAL CO READING MINUS ACTUAL O ₂ READING)	19.8	0.2	19.8	0.4	19.8	0.2	0.33	28/100	0.093
N ₂ (NET IS 100 MINUS ACTUAL CO READING)	100	80.2	100	80.2	100	80.2	80.20	28/100	22.456
TOTAL									29.042

Probe Length and Type S' TFF
 Nozzle Size & I.D. 0.502 (302)
 Pilot Coefficient & I.D. _____
 Assumed Moisture _____
 Molecular Weight, Dry, (M_D) _____
 Meter Box Number APT 12 16
 Meter Coefficient _____
 α Factor _____
 $K =$ _____
 $K(M_D)^4 = ___ \times (___)^4 =$ _____
 $\Delta H = K(M_D)^4 \left(\frac{T_m}{T} \right) (P)$

SASS Condensate 2/A
Total Volume

Purge 5.80 to 15.8
P.H. 5.0

[illegible]

Comments:

Plant VSS Clinton PADate 12-13-84Sample Location HGCC test gasSample Type M-5Run Number 7.4Operator JARMAN/MILBURNAmbient Temperature 60°FBarometric Pressure 29.24Static Pressure, (Wp) 12.51Filter Number(s) RA 1026-048Leak Check: Initial at 16 Hg, 0.06 CFMFinal at 16 Hg, 1.00 CFMPitot Leak Check: OK

	Impinger Volumes		Net Gain
	Initial	Final	
A	<u>100.0</u>	<u>398.0</u>	<u>298</u>
	<u>100.0</u>	<u>101.0</u>	<u>1</u>
	<u>M/T</u>	<u>1.0</u>	<u>1</u>
B	<u>100.0</u>	<u>138.0</u>	<u>38</u>
	<u>100.0</u>	<u>102.0</u>	<u>2</u>
	<u>M/T</u>	<u>1.0</u>	<u>1</u>
	Silica Gel		
	<u>673.4</u>	<u>678.6</u>	
	<u>668.0</u>	<u>671.2</u>	

SASS Condensate

Total Volume NA

Probe Length and Type S' TFE
 Nozzle Size & I.D. 0.302 9302
 Pitot Coefficient & I.D. .84
 Assumed Moisture _____
 Molecular Weight, Dry, (M_d) _____
 Meter Box Number APT 12
 Meter Coefficient _____
 α Factor _____

K = _____

K (ND) = x = _____ $\Delta H = K(M_d)^4 \left(\frac{T_m}{T_s} \right) (P)$ Purge 72.1 to 82.1 CFMPH 3.0

Traverse Point Number	MIN:SEC	Gas Meter Reading (V _m), ft ³	Velocity Head (ΔP), in. H ₂ O	Rotometer		Temperature of							Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	Push Stack TRAVEL	Probe	Impinger	FILTER TEMP	Oven	Gas Meter				
											In	Out			
1-6	<u>1:45</u>	<u>356.07</u>	<u>1.0</u>	<u>18.7</u>	<u>21.1</u>	<u>NA</u>	<u>265</u>	<u>67</u>	<u>67</u>	<u>268</u>	<u>66</u>	<u>65</u>	<u>NA</u>	<u>.50</u>	
	<u>:44</u>	<u>356.675</u>	<u>.40</u>	<u>14.5</u>	<u>12.8</u>	<u>160</u>	<u>270</u>	<u>65</u>	<u>65</u>	<u>267</u>	<u>66</u>	<u>64</u>	<u>NA</u>	<u>.23</u>	
1-5	<u>1:47</u>	<u>357.29</u>	<u>.60</u>	<u>14.5</u>	<u>16.0</u>	<u>158</u>	<u>265</u>	<u>67</u>	<u>67</u>	<u>268</u>	<u>67</u>	<u>65</u>	<u>NA</u>	<u>.08</u>	
	<u>:56</u>	<u>357.716</u>	<u>.15</u>	<u>11.0H</u>	<u>.84H</u>	<u>161</u>	<u>268</u>	<u>62</u>	<u>62</u>	<u>268</u>	<u>68</u>	<u>66</u>	<u>1</u>	<u>.08</u>	
1-4	<u>1:46</u>	<u>358.32</u>	<u>.65</u>	<u>13.7</u>	<u>16.7</u>	<u>159</u>	<u>263</u>	<u>68</u>	<u>68</u>	<u>267</u>	<u>68</u>	<u>67</u>	<u>3</u>	<u>.33</u>	
	<u>:32</u>	<u>358.620</u>	<u>.20</u>	<u>11.0H</u>	<u>.110H</u>	<u>161</u>	<u>266</u>	<u>66</u>	<u>66</u>	<u>269</u>	<u>69</u>	<u>67</u>	<u>1</u>	<u>.11</u>	
1-3	<u>1:43</u>	<u>359.35</u>	<u>.95</u>	<u>10.7</u>	<u>20.5</u>	<u>159</u>	<u>264</u>	<u>68</u>	<u>68</u>	<u>267</u>	<u>69</u>	<u>68</u>	<u>3</u>	<u>.50</u>	
	<u>:43</u>	<u>359.765</u>	<u>.35</u>	<u>11.0H</u>	<u>11.9</u>	<u>161</u>	<u>268</u>	<u>64</u>	<u>63</u>	<u>264</u>	<u>68</u>	<u>68</u>	<u>1</u>	<u>.16</u>	
Avg.															

Desired Rotometer reading is used as a reference

Comments:

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³	ROTORMETER		Temperature of						Pump Vacuum in. Hg	Avg. ΔP	Δ H
			Desired	Actual	PUSH STACK TRAVEL	Probe	Impinger	FILTER TEMP	Oven	Gas Meter In Out			
		Init. 371.065											
3-6	:46	372.104	27.0	23.2	163	263	65		269	73 71	5		.64
	:46	372.587	11.9	12.8	163	267	59		268	73 71	1		.20
3-5	:44	373.47	27.0	22.2	161	264	66		261	73 72	5		.60
	:55	374.124	11.9	11.8	160	267	60		262	73 72	1		.20
3-4	:44	374.95	20.5	21.1	158	263	67		260	73 72	3.5		.54
	:38	375.365	9.8	10.9	157	269	60		262	73 71	1		.16
3-3	:44	376.23	18.7	20.0	164	263	67		260	74 73	NA		.65
	:49	376.262	11.0H	10.5	161	267	60		259	74 72	1		.26
3-2	:44	377.74	20.5	21.1	162	263	67		262	74 73	4		.65
	:56	378.486	9.8	11.9	162	264	60		263	74 73	2		.26
3-1	:44	379.47	22.2	25.7	158	262	67		266	74 73	5		.78
	:41	380.157	4.8	13.7	160	266	60		268	75 73	2		.35
4-6	:43	381.05	18.7	18.0	158	265	66		269	74 73	4		.61
	:47	381.679	9.8	9.8	160	269	59		269	74 73	1		.24
4-5	:44	382.46	15.3	14.4	171	264	67		264	74 73	3		.42
	:58	383.140	.08ΔH	.08ΔH	163	265	61		263	75 73	1		.08
AUG.													

Run No. 2574

Date 12-12-84

12-13-84

Sampling Location HQDC - TEST LAB

Comments:

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³ Init. 383.140	Velocity Head (h _p), in. H ₂ O	MANOMETER		Temperature of					Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	Push Stack Travel	Probe	Impinger	FILTER TEMP	Oven	Gas Meter In	Gas Meter Out	
4-4	:46	384.482	.95	18.7	20.5	159	264	68	68	254	74	73	.59
	:38	384.482	.25	9.8	9.8	159	267	60	60	258	75	73	NA
4-3	:45	385.50	1.5	26.2	26.2	156	261	68	68	254	75	74	.78
	:53	386.383	.45	10.9	13.7	160	264	60	60	257	78	74	.40
4-2	:45	387.45	1.95	26.2	26.0	150	261	68	68	258	75	74	.77
	:54	388.301	.40	10.9	12.8	161	263	60	60	259	75	74	.35
4-1	:45	389.30	1.5	23.2	26.2	157	264	68	68	264	75	74	.79
	:40	389.45	.35	9.8	11.9	160	260	60	60	263	75	74	.32
AUG.													

Run No. 7.4

Date 12-12-84

Sampling Location MCQC - TEST COTE

1 mis-read meter reading

Comments:

Static - .07
Push - .07
Travel - .05

DATE - 10/15/54

RUN # - 7.4

PLANT - USS - CLAIRTON

RAFFINER PIT	OVEN NUMBER	ΔP EXPECTED	ΔP ACTUAL	ROTMETER DESIRED	POINT SAMPLE TIME	COMMENT
1.6	B-1		1.8	21.1	1:29	
1.5	C-1		1.6	16.0	1:43	
1.4	A-3		1.65	16.7	1:18	
1.3	B-3		1.95	20.5	1:26	
1.2	C-3		1.0	22.2	1:36	
1.1	A-5		2.0	30.4	1:25	
2.6	B-5		1.45	25.7	1:29	
2.5	C-5		1.65	16.7	1:42	
2.4	A-7		1.6	16.0	1:26	
2.3	B-7		1.5	26.2	1:28	
2.2	C-7		1.55	15.3	1:40	
2.1	A-9		2.10	31.1	1:23	
3.6	B-9		1.2	23.2	1:32	
3.5	C-9		1.10	22.2	1:41	
3.4	A-11		1.0	21.1	1:22	
3.3	B-11		1.0	20.0	1:33	
3.2	C-11		1.0	21.1	1:40	
3.1	A-13		1.45	25.7	1:25	
4.6	B-13		1.75	14.0	1:30	
4.5	C-13		1.5	14.6	1:42	
4.4	A-15		1.95	20.5	1:24	
4.3	B-15		1.5	26.2	1:38	
4.2	C-15		1.95	30.0	1:40	
4.1	A-17		1.5	14.0	1:25	
TOTAL TIME						

0.05	0.05	0.05
0.10	0.10	0.10
0.15	0.15	0.15
0.20	0.20	0.20
0.25	0.25	0.25
0.30	0.30	0.30
0.35	0.35	0.35
0.40	0.40	0.40
0.45	0.45	0.45
0.50	0.50	0.50
0.55	0.55	0.55
0.60	0.60	0.60
0.65	0.65	0.65
0.70	0.70	0.70
0.75	0.75	0.75
0.80	0.80	0.80
0.85	0.85	0.85
0.90	0.90	0.90
0.95	0.95	0.95
1.00	1.00	1.00
1.05	1.05	1.05
1.10	1.10	1.10
1.15	1.15	1.15
1.20	1.20	1.20
1.25	1.25	1.25
1.30	1.30	1.30
1.35	1.35	1.35
1.40	1.40	1.40
1.45	1.45	1.45
1.50	1.50	1.50
1.55	1.55	1.55
1.60	1.60	1.60
1.65	1.65	1.65
1.70	1.70	1.70
1.75	1.75	1.75
1.80	1.80	1.80
1.85	1.85	1.85
1.90	1.90	1.90
1.95	1.95	1.95
2.00	2.00	2.00
2.05	2.05	2.05
2.10	2.10	2.10
2.15	2.15	2.15
2.20	2.20	2.20
2.25	2.25	2.25
2.30	2.30	2.30
2.35	2.35	2.35
2.40	2.40	2.40

DRY MOLECULAR WEIGHT DETERMINATION

PLANT USS-CALVERT
 DATE 12-13-84
 SAMPLING TIME (24 hr CLOCK) _____
 SAMPLING LOCATION H.S.C. - TEST CAR
 SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS GRAB) INTEGRATED BAGS
 ANALYTICAL METHOD ORSH
 AMBIENT TEMPERATURE 25.0C
 OPERATOR B. D. Ray

COMMENTS:

RUN GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M _d , lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO ₂	1.8		2.2		2.2			44/100	
O ₂ (NET IS ACTUAL O ₂ READING MINUS ACTUAL CO ₂ READING)	20.2		20.4		20.4			32/100	
CO (NET IS ACTUAL CO READING MINUS ACTUAL O ₂ READING)	20.2		20.4		20.4			28/100	
N ₂ (NET IS 100 MINUS ACTUAL CO READING)	100		100		100			28/100	
TOTAL									

Plant USS - CLAIRTON PA
 Date 12-14-84
 Sample Location HCQS-TEST CMB
 Sample Type M-5
 Run Number 2.5
 Operator JARMAN/MILBURN
 Ambient Temperature 35.0 F
 Barometric Pressure 27.50 (11.25 Hg)
 Static Pressure, (H₂O) _____
 Filter Number(s) RA1026-049

Leak Check: Initial at 18 Hg. 01 CFM
 Final at 14 Hg. 02 CFM
 Pilot Leak Check: OK

Impinger Volumes
 Initial Final Net Gain
 TRAIN A 100 412 312
 100 114 14
 M/T M/T
 TRAIN B 100 120 20
 100 100 0
 M/T M/T
 A 64.0g 64.65g 5.5g
 654.0g 664.0g 10.0g

Silica Gel

SASS Condensate N/A
 Total Volume

Probe Length and Type 5' TFE LINED
 Nozzle Size & I.D. 302 (302)
 Pitot Coefficient & I.D. .84
 Assumed Moisture _____
 Molecular Weight, Dry, (M_D) _____
 Meter Box Number APT 12 LG
 Meter Coefficient _____
 α Factor _____
 K = _____
 K (ND) = _____
 ΔH = K (M_D)⁴ (T_M/T_S) (P)

Purge - 82.5-92.5 CFM
 pH = 2.5

Traverse Point Number	MIN:SEC		Gas Meter Reading (V _m), ft ³	Velocity head (ΔP), in. H ₂ O	Rotameter		Temperature of							Pump Vacuum In. Hg	Avg. ΔP	H	
					Desired	Actual	Probe	Impinger A	Impinger B	Actual Temp ROTO	Oven	Gas Meter					
												In	Out				
1-6	1:42	1:45	393.97	.90	20.5	20.5	157	259	54	55	20.5	267	53	52	NA		.57
	1:51		394.674	.35	25	11.9	160	263	50	50	11.9	268	54	52	1		.25
1-5	1:44	1:44	395.36	.60	16.0	16.0	163	261	55	55	16.0	260	54	54	NA		.42
	1:44		395.564	.20	.084H	.084H	163	265	51	51	11.0H	261	55	53	1		.11
1-4	1:46	1:46	396.37	.70	16.7	16.7	157	260	55	55	17.4	261	56	54	4		.54
	1:53		396.800	.15	.112H	.112H	162	263	50	50	.084H	261	54	54	1		.08
1-3	1:45	1:45	397.64	.90	20.5	20.5	157	261	55	55	20.0	263	56	55	4		.55
	1:54		398.216	.25	11.9	11.9	162	263	50	50	9.8	259	57	55	1		.17
Avg.																	

Comments:

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _g), ft ³	Velocity Head (AP ₁), in. H ₂ O	ROTOMETER			Temperature of					Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	PUSH STACK TRAVEL	Probe	Impinger	FILTER TEMP	Oven	Gas Meter In Out			
1-2	:44	Init. 378.216 399.02	1.2	22.2	23.2	159	260	55	54	259	57 56	5		.10
	:44	399.610	.40	11.8	12.8	162	263	50	50	259	58 56	1		.29
1-1	:46	400.61	2.10	31.1	27.0	160	260	37	37	259	58 57	7		.82
	:48	401.403	.55	16.7	15.3	161	261	50	50	264	59 57	2		.34
2-6	:46	402.36	1.25	25.7	23.7	173	264	56	56	263	59 58	6		.69
	:57	403.112	.40	14.5	12.8	167	265	50	50	260	60 58	2		.29
2-5	:46	404.03	1.10	16.7	22.2	157	262	56	56	259	59 58	5		.69
	:38	404.495	.40	11.4	12.8	158	261	50	50	259	60 60	2		.22
2-4	:46	405.42	1.25	16.0	23.7	159	262	57	56	256	60 59	5		.73
	:53	406.158	.50	12.8	14.5	159	261	50	50	257	60 59	3		.36
2-3	:45	406.900	.60		16.0	159	261	67	57	260	61 60	NA		.38
	:56	407.410	.15	16.7	28.4	160	260	50	50	259	61 60	1		.08
2-2	:44	408.37	1.6	28.6	27.0	160	260	57	57	258	62 60	6.5		.81
	:53	409.079	.40	15.3	12.8	157	260	51	51	262	62 60	2		.24
2-1	:43	409.96	.90		20.0	160	259	58	58	267	63 61	0.3		.51
	:57	410.657	.35	17.4	11.9	160	259	50	50	258	63 61	1		.21
AUG.														

Run No.

7.51

Date 12-14-84

Sampling Location HCRC - TEST CAR

I could not pull actual desired rate of 31.1

Comments:

Traverse Point Number	MIN: SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³ Init. 410.657	Velocity Head (ΔP _s), in. H ₂ O	ROTOMETER		Temperature of							Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	PUSH STACK TRAVEL	Probe	Impinger	FILTER TEMP	Oven	Gas Meter				
											In	Out			
3-4	:45	411.55	1.40	23.2	25.2	155	264	58	58	268	63	62	5		.79
	:45	412.047	.40	12.8	12.8	152	265	50	50	267	64	62	1		.22
3-5	:43	412.90	1.3	22.2	24.2	163	263	58	58	259	64	62	5		.74
	:56	413.625	.45	11.8	13.7	157	265	50	50	262	64	62	2		.26
3-4	:44	414.43	.95	21.1	20.5	156	262	59	59	259	64	63	4		.53
	1:00	415.043	.30	10.9	10.9	155	264	50	50	260	64	63	1		.20
3-3	:44	415.80	.80	20.0	18.7	157	261	59	59	259	65	64	NA		.51
	:50	416.300	.25	10.5	9.8	162	264	51	51	259	65	64	1		.17
3-2	:44	417.05	.96	21.1	20.5	152	261	60	60	256	65	64	4		.55
	:56	417.653	.13	10.9	10.9	158	262	52	52	257	66	64	1		.22
3-1	:43	418.49	1.3		24.2	157	260	60	60	262	65	66	5		.73
	:59	419.232	.39		14.8 15.8	158	261	52	52	263	66	65	2		.24
4-6	:45	419.99	.75	18.0	18.0	152	264	61	61	266	66	65	3		.49
	:46	420.369	.25	9.8	9.8	156	266	54	54	268	67	66	1		.15
4-5	:44	420.97	.40	14.6	12.8	150	262	61	61	258	67	66	2		.27
	:56	421.325	.15	.08ΔH	.08ΔH	155	263	54	54	261	67	66	1		.08
AUG.															

Run No. 765

Date 12-14-84

Sampling Location HCRG - TEST CASE

11 Lower stack temp than ~~upper~~ norm

Comments:

DATE - 12-14-64

RUN # - 7.5

PLANT - USS - CLAIRTON

RAVERSE PO	OVEN NUMBER	ΔP EXPECTED	ΔP ACTUAL	ROTOMETER DESIRED	POINT SAMPLE TIME	COMMENT
1.6			6.9	20.8	1:46	
1.5	A-17		6.0	10.0	1:28	
1.4	B-17		17.0	17.4	1:34	
1.3	C-17		9.0	20.0	1:44	
1.2	A-17		1.2	23.2	1:28	
1.1	B-17		2.1	31.1	1:34	
2.6	C-19		1.25	23.7	1:43	
2.5	A-21		1.4	22.2	1:24	
2.4	B-21		1.25	23.7	1:39	
2.3	C-21		6.0	16.0	1:41	
2.2	MISSING A-23		1.6	27.0	1:37	WATER in pit A-23
2.1	C-23		1.7	20.0	1:40	
3.6	A-25		1.4	25.2	1:30	
3.5	C-25		1.3	24.2	1:39	
3.4	C-25		1.95	20.5	1:46	
3.3	A-27		1.8	18.7	1:34	
3.2	B-27		1.45	20.5	1:40	
3.1	C-27		1.3	24.2	1:42	
4.6	A-29		1.75	18.0	1:31	
4.5	B-29		1.4	12.8	1:40	
4.4	A-2		1.45	20.5	1:24	
4.3	B-2		1.1	23.2	1:32	
4	C-2		1.45	23.7	1:39	
4.1			1.4	23.2	1:27	
				TOTAL TIME		

① No reading taken on
A-23

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³	Velocity Head (ΔP _s), in. H ₂ O	ROTAMETER		Temperature of					Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	PUSH STACK TRAVEL	Probe	Impinger	FILTER TEMP	Oven			
		Init. 421.325											
4-4	:42	422.06	.95	20.5	20.5	158	262	62		259	4		.52
	:40	422.238	.30	9.8	10.9	157	266	54		260	1		N/A
4-3	:43	422.98	1.1	26.2	23.2	154	261	62		257	6		.79
	:49	423.280	.30	13.7	10.9	154	265	60		262	2		.16
4-2	:44	424.11	1.45	38.7	25.7	159	260	62		264	6		.76
	:54	424.470	.35	12.8	11.9	159	261	60		264	1		.18
4-1	:44	425.31	1.4	25.2	25.2	160	262	62		263	6		.74
	:43	425.610	.45	11.9	13.7	159	263	60		264	2		.25
Avg.													

Run No. 75 Date 12-14-84 Sampling Location H.C. Q.C. - TEST CAR

Static taken point 3-1
push (-, 0.8)
Low level (-, .05)

Comments:

DATE - 2-7-54

RUN # - 7.5

PLANT - USS - CLAIRTON

RAVERSE PO. #	OVEN NUMBER	ΔP EXPECTED	ΔP ACTUAL	ROTOMETER DESIRED	POINT SAMPLE TIME	COMMENT
1.6			69.0	20.5	11.4	1:46
1.5	A-17		60.0	10.0	11.1AH	1:28
1.4	B-17		170.0	17.4	10.8AH	1:34
1.3	C-17		90.0	20.0	9.8	1:44
1.2	A-17		1.2	23.2	12.8	1:28
1.1	B-17		2.10	31.1	15.3	1:34
2.6	C-19		1.25	23.7	12.8	1:43
2.5	A-21		1.10	22.2	12.8	1:24
2.4	B-21		1.25	23.7	14.5	1:39
2.3	C-21		60.0	16.0	10.8AH	1:41
2.2	MISSING A-23		1.60	27.0	12.5	1:37
2.1	C-23		1.40	20.0	11.9	1:40
3.6	A-25		1.4	25.2	12.8	1:30
3.5	B-25		1.3	24.2	13.7	1:39
3.4	C-25		1.95	20.5	10.9	1:46
3.3	A-27		1.80	18.7	9.8	1:34
3.2	B-27		1.45	20.5	10.9	1:40
3.1	C-27		1.30	24.2	12.6	1:42
4.6	A-29		1.75	18.0	9.8	1:31
4.5	B-29		1.40	12.8	10.8AH	1:40
4.4	A-2		1.45	20.5	10.9	1:24
4.3	B-2		1.1	23.2	10.9	1:32
4	C-2		1.45	25.7	11.4	1:39
4.1			1.4	25.2	13.7	1:27
10.						
				TOTAL TIME		

RAVERSE PO. #	OVEN NUMBER	ΔP EXPECTED	ΔP ACTUAL	ROTOMETER DESIRED	POINT SAMPLE TIME	COMMENT
1.6			69.0	20.5	11.4	1:46
1.5	A-17		60.0	10.0	11.1AH	1:28
1.4	B-17		170.0	17.4	10.8AH	1:34
1.3	C-17		90.0	20.0	9.8	1:44
1.2	A-17		1.2	23.2	12.8	1:28
1.1	B-17		2.10	31.1	15.3	1:34
2.6	C-19		1.25	23.7	12.8	1:43
2.5	A-21		1.10	22.2	12.8	1:24
2.4	B-21		1.25	23.7	14.5	1:39
2.3	C-21		60.0	16.0	10.8AH	1:41
2.2	MISSING A-23		1.60	27.0	12.5	1:37
2.1	C-23		1.40	20.0	11.9	1:40
3.6	A-25		1.4	25.2	12.8	1:30
3.5	B-25		1.3	24.2	13.7	1:39
3.4	C-25		1.95	20.5	10.9	1:46
3.3	A-27		1.80	18.7	9.8	1:34
3.2	B-27		1.45	20.5	10.9	1:40
3.1	C-27		1.30	24.2	12.6	1:42
4.6	A-29		1.75	18.0	9.8	1:31
4.5	B-29		1.40	12.8	10.8AH	1:40
4.4	A-2		1.45	20.5	10.9	1:24
4.3	B-2		1.1	23.2	10.9	1:32
4	C-2		1.45	25.7	11.4	1:39
4.1			1.4	25.2	13.7	1:27
10.						
				TOTAL TIME		

① No reading taken at A-23

DRY MOLECULAR WEIGHT DETERMINATION

PLANT USS - CLARK
 DATE 12-14-84
 SAMPLING TIME (24-hr CLOCK) _____
 SAMPLING LOCATION HSGC - TEST CAR
 SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS GRAB) INTEGRATED BAG
 ANALYTICAL METHOD ORSM
 AMBIENT TEMPERATURE 25°C
 OPERATOR B. DeRuy

COMMENTS:

RUN GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M _d , lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO ₂	2.0	2.0	2.0	2.0	2.0	2.0		44/100	
O ₂ (NET IS ACTUAL O ₂ READING MINUS ACTUAL CO ₂ READING)	20.0	18.0	20.0	18.0	20.0	18.0		32/100	
CO (NET IS ACTUAL CO READING MINUS ACTUAL O ₂ READING)	20.0	0	20.0	0	20.0	0		28/100	
N ₂ (NET IS 100 MINUS ACTUAL CO READING)	100	80.0	100	80.0	100	80.0		28/100	
TOTAL									

FILE DATA

Plant ISS-CCAIRTRW, PA
 Date 10-15-84
 Sample Location HQRC-TESTCAR
 Sample Type M-5
 Run Number 3.1
 Operator JARMAN/SMITH
 Ambient Temperature 78°F
 Barometric Pressure 30.75 1145 hPa
 Static Pressure, (H₂O) 2 -75 T -20
 Filter Number(s) BA1026-017
BA1026-022

Impinger Volumes

Imp A1 Initial 100 Final 284.0 Net Gain 184.0
 2 100 300 200.0
 3 0 0 0
 Imp B1 Initial 100 Final 236.0 Net Gain 136.0
 2 100 102.2 2.2
 3 0 0 0
 Silica Gel
658.7 666.5 7.8
659.2 666.9 7.7

Leak Check: Initial at 16 " Hg. 0.00 CFM
 Final at 15 " Hg. 0.01 CFM
 Pitot Leak Check: OK

SASS Condensate
 Total Volume 537.7

Probe Length and Type 5' TFE LIND
 Nozzle Size & I.D. 1.302 in
 Pitot Coefficient & I.D. 1.84
 Assumed Moisture ~ 31 1/2
 Molecular Weight, Dry, (M_D)
 Meter Box Number APT 12 LG 1100
 Meter Coefficient
 α Factor
 $K = \frac{K(M_D)^4}{K(M_D)^4} \times (\frac{T_m}{T_s})^4$
 $\Delta H = K(M_D)^4 (\frac{T_m}{T_s}) (P)$

pt - 3.5

Traverse Point Number	MIN:SEC	Gas Meter Reading (V _m), ft ³	Velocity Head (h _v), in. H ₂ O	ROTOMETER		Probe	Temperature of				Pump Vacuum in. Hg	Avg. √ΔP	ΔH
				Desired	Actual		Impinger	Filter Temp	Oven	Gas Meter In Out			
1-6	<u>:49</u>	<u>753.34</u>	<u>.83</u>		<u>19.3</u>	<u>276</u>	<u>68</u>	<u>247</u>	<u>244</u>	<u>72</u> <u>72</u>	<u>3</u>		<u>.43</u>
	<u>1:02</u>	<u>753.927</u>	<u>.20</u>		<u>11.4H</u>	<u>275</u>	<u>68</u>	<u>290</u>	<u>248</u>	<u>72</u> <u>71</u>	<u>1</u>		<u>.11</u>
1-5	<u>:52</u>	<u>754.61</u>			<u>14.5</u>	<u>274</u>	<u>80</u>	<u>298</u>	<u>245</u>	<u>75</u> <u>73</u>	<u>2</u>		<u>.30</u>
	<u>:43</u>	<u>754.879</u>			<u>.08AH</u>	<u>273</u>	<u>64</u>	<u>296</u>	<u>256</u>	<u>75</u> <u>73</u>	<u>1</u>	<u>.84</u>	<u>NA</u>
1-4	<u>:51</u>	<u>765.58</u>		<u>15.3</u>	<u>15.3</u>	<u>274</u>	<u>80</u>	<u>305</u>	<u>249</u>	<u>77</u> <u>75</u>	<u>NA</u>		<u>.32</u>
	<u>:49</u>	<u>755.923</u>		<u>14.5</u>	<u>.08AH</u>	<u>276</u>	<u>68</u>	<u>299</u>	<u>258</u>	<u>78</u> <u>76</u>	<u>NA</u>		<u>.84</u>
1-3	<u>:49</u>	<u>756.74</u>	<u>.95</u>		<u>20.5</u>	<u>273</u>	<u>80</u>	<u>303</u>	<u>246</u>	<u>77</u> <u>77</u>	<u>NA</u>		<u>NA</u>
	<u>:43</u>	<u>757.171</u>	<u>.25</u>		<u>9.8</u>	<u>276</u>	<u>68</u>	<u>299</u>	<u>253</u>	<u>81</u> <u>80</u>	<u>1</u>		<u>NA</u>
Avg.													

Comments:

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³ Init. 757.171	Velocity Head (ΔP _s), in. H ₂ O	ROTOMETER		Temperature of							Pump Vacuum in. Hg	Avg. ΔP	Δ H	
				Desired	Actual	Push Stack Travel	Probe	Impinger	FILTER TEMP	Oven	Gas Meter					
											In	Out				
1-2	:52	758.03	1.01		23.2	156	273	82	80	309	252	83	82	5		NA
	:52	758.719	.35		11.9	159	274	64	62	292	252	85	82	2		.25
1-1	:50	759.920	2.2		31.9	150	272	84	82	308	254	86	81	2		1.1
	:56	760.810	.65		16.7	157	272	60	60	293	257	87	84	2		NA
2-6	:49	761.850	1.7		27.9	157	274	84	82	310	254	87	85	NA		.86
	:35	762.403	.60		16.0	156	272	62	60	293	261	88	85	NA		.39
2-5	:50	763.41	1.4		25.2	158	274	84	82	311	256	88	86	5		.73
	:51	764.108	.45		13.7	158	274	64	62	289	254	88	86	3		.27
2-4	:50	765.10	1.4		25.2	153	274	84	82	311	254	89	87	5		.71
	1:06	766.796*	.55		15.3	160	270	62	62	287	287	89	87	3		.34
2-3	:49	767.08	1.7		827.9	162	273	83	81	328	253	90	88	7		.88
	:49	767.848	.60		16.0	159	270	62	61	285	252	91	88	3		.38
2-2	:50	769.00	1.8		28.6	157	273	84	82	308	252	91	90	7		.95
	:54	769.840	.60		16.0	159	272	62	61	286	252	91	89	3		.39
2-1	:50	771.10	2.4		1833.4	156	273	84	82	310	253	91	90	9.5		1.1
	1:00	772.095	.75		18.0	159	269	61	60	284	252	92	89	NA		.40
AUG.																

Run No. 2.1 Date 10-19-84 Sampling Location NCRC - test car

Comments: * Assumed vol reading was 765.996

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³ Int. 772.095	Velocity Head (ΔP ₁), in. H ₂ O	ROTOMETER		Temperature of								Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	PUSH TACK TRAVEL	Probe	Impinger	FILTER TEMP	Oven	Gas Meter					
											In	Out				
3-6	:47	773.16	1.9		29.6	151	274	84	82	252	91	90	7		.97	
	:34	773.640	.55		15.3	157	274	62	60	260	92	90	2.5		.35	
3-5	:48	774.69	1.7		27.9	151	274	84	82	252	92	90	7		.91	
	:44	775.363	.55		15.3	154	274	64	62	256	92	90	2.5		.37	
3-4	:48	776.33	1.4		25.2	150	273	84	82	254	92	91	5		.15	
	:48	776.945	.40		12.8	154	274	64	64	259	92	90	2		.26	
3-3	:48	777.82	1.0		21.1	153	273	84	82	255	92	91	4.5		.57	
	:34	778.253	.33		11.9	157	273	66	64	253	92	90	2		.23	
3-2	:48	779.12	1.2		23.2	152	273	84	82	254	93	91	4.5		.60	
	:42	779.609	.31		10.7	157	274	64	62	253	92	90	NA		.21	
3-1	:50	780.68	1.8		28.6	154	273	84	82	254	92	92	6.5		.87	
	:53	781.475	5.0		14.5	157	272	62	60	259	92	90	2.5		.50	
4-6	:44	782.443	1.6		27.0	153	273	84	82	253	92	91	6		.85	
	:37	782.935	.50		14.5	156	270	64	62	254	95	95	NA		.29	
4-5	:44	783.54	1.6		16.0	155	274	82	80	254	92	91	NA		NA	
	:48	783.928	12.15		28.04	154	271	62	60	256	93	91	NA		NA	
AUG.																

Run No. 2,1 Date 10-15-84 Sampling Location HCR C Test Car

Comments: Static 17 20 4-5
- .50 P - .75
- .20 + - .20

Traverse Point Number	MIN: SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³ Init. 783.928	Velocity Head (ΔP _h), in. H ₂ O	ROTOMETER		Temperature of						Pump Vacuum in. Hg	Avg. ΔP	Δ H	
				Desired	Actual	PUSH STACK TRAVEL	Probe	Impinger	FILTER TEMP	Oven	Gas Meter				
4-4	:49	784.80	1.3		24.2	154	273	82	80	310	254	93	92	5	.67
	:51	785.490	.40		12.8	155	273	62	60	294	253	93	91	2	.24
4-3	:47	786.53	1.9		29.6	153	272	78	78	310	255	92	91	7	NA
	:33	787.046	.50		14.5	158	270	60	60	273	257	92	90	2	.33
4-2	:49	788.15	2.0		30.4	156	272	78	76	310	253	92	90	7	.97
	:42	788.725	.50		14.5	158	273	62	58	292	258	91	90	3	.30
4-1	:49	789.615 NA	1.7		27.7	157	269	80	78	306	248	90	89	7	.83
	:37	790.151	.75		18.0	159	268	60	58	292 289	251	89	88	NA	NA
Push		23.031													
Travel		14.550													

Run No. 2.1 Date 10-19-84 Sampling Location HCCO test car

Comments: * Assumed vol reading was 789.70 (calculated from previous readings)

DRY MOLECULAR WEIGHT DETERMINATION

PLANT USS-CLAIRTON
 DATE 10-19-84
 SAMPLING TIME (24-hr CLOCK) _____
 SAMPLING LOCATION HSCC-TEST CAR 3.1
 SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS GRAB) INTEGRATED BAGS
 ANALYTICAL METHOD ORSAT
 AMBIENT TEMPERATURE _____
 OPERATOR B.C. Dabos

COMMENTS:

RUN GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M_d , lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO ₂	1.8		1.8		1.8			44/100	
O ₂ (NET IS ACTUAL O ₂ READING MINUS ACTUAL CO ₂ READING)	17.6		21.0		20.4 18.8			32/100	
CO (NET IS ACTUAL CO READING MINUS ACTUAL O ₂ READING)	17.6		21.0		20.4 18.8			28/100	
N ₂ (NET IS 100 MINUS ACTUAL CO READING)	1.0		1.0		1.0			28/100	
TOTAL									

RUN # - 3.1

PLANT - USS - CLAIRTON

AVERAGE POINT	OVEN NUMBER	ΔP EXPECTED	ΔP ACTUAL	ROTOMETER DESIRED	POINT SAMPLE TIME	COMMENT
1.6	A-21	.75 .20	.83 .20	19.3 SEE COMMENT	1:51	.11 ΔH
1.5	A-23	.52 .15	.50 (40) .15	14.5 (12.8) SEE COMMENT	1:35	.08 ΔH
1.4	B-23	.53 .15	.55 (50) .15	15.3 (14.5) SEE COMMENT	1:40	.08 ΔH
1.3	A-25	1.2 .25	.95 .25	20.5 9.8	1:32	
1.2	B-25	1.6 .35	1.1 (1.2) .35	22.2 (21.2) 11.9	1:44	
1.1	C-25	2.6 .60	2.2 .65	31.9 16.7	1:46	
2.6	A-27	1.2 .40	1.7 .60	27.9 16.0	1:24	
2.5	B-27	1.2 .35	1.4 .45	25.2 13.7	1:41	
2.4	C-27	1.7 .60	1.4 .55	25.2 15.3	1:51	
2.3	A-29	2.2 .60	1.7 .60	27.9 16.0	1:38	
2.2	B-29	2.1 .50	1.8 .60	28.6 16.0	1:44	
2.1	C-29	2.8 .65	2.4 .75	32.7 (32.4) 18.0	1:50	
3.6	A-2	1.7 .35	1.9 .55	29.6 15.3	1:21	
3.5	B-2	1.7 .40	1.7 .55	27.9 15.3	1:32	
3.4	C-2	1.1 .30	1.4 .40	25.2 12.8	1:36	
3.3	A-4	1.5 .35	1.0 .33	21.1 11.9	1:22	
3.2	B-4	1.2 .30	1.2 .31	23.2 10.9	1:30	
3.1	C-4	1.5 .35	1.8 .50	28.6 14.5	1:43	
4.6	A-6	1.1 .25	1.6 .50	27.0 14.5	1:21	
4.5	B-6	.43 .12	.60 .15	16.0 SEE COMMENT	1:31	.08 ΔH
4.4	C-6	1.1 .30	1.3 .40	24.2 12.8	1:40	
4.3	A-8	1.7 .40	1.9 .50	29.6 14.5	1:22	
4.2	B-8	2.1 .40	2.0 .50	30.4 14.5	1:31	
4.1	A-8	1.8 .45	1.7 .75	27.9 18.0	1:26	
1.0				TOTAL TIME		

ROTOMETER READING	POINT SAMPLE TIME	COMMENT
1.0	1:00	10.0
1.1	1:01	10.1
1.2	1:02	10.2
1.3	1:03	10.3
1.4	1:04	10.4
1.5	1:05	10.5
1.6	1:06	10.6
1.7	1:07	10.7
1.8	1:08	10.8
1.9	1:09	10.9
2.0	1:10	11.0
2.1	1:11	11.1
2.2	1:12	11.2
2.3	1:13	11.3
2.4	1:14	11.4
2.5	1:15	11.5
2.6	1:16	11.6
2.7	1:17	11.7
2.8	1:18	11.8
2.9	1:19	11.9
3.0	1:20	12.0
3.1	1:21	12.1
3.2	1:22	12.2
3.3	1:23	12.3
3.4	1:24	12.4
3.5	1:25	12.5
3.6	1:26	12.6
3.7	1:27	12.7
3.8	1:28	12.8
3.9	1:29	12.9
4.0	1:30	13.0
4.1	1:31	13.1
4.2	1:32	13.2
4.3	1:33	13.3
4.4	1:34	13.4
4.5	1:35	13.5
4.6	1:36	13.6
4.7	1:37	13.7
4.8	1:38	13.8
4.9	1:39	13.9
5.0	1:40	14.0
5.1	1:41	14.1
5.2	1:42	14.2
5.3	1:43	14.3
5.4	1:44	14.4
5.5	1:45	14.5
5.6	1:46	14.6
5.7	1:47	14.7
5.8	1:48	14.8
5.9	1:49	14.9
6.0	1:50	15.0
6.1	1:51	15.1
6.2	1:52	15.2
6.3	1:53	15.3
6.4	1:54	15.4
6.5	1:55	15.5
6.6	1:56	15.6
6.7	1:57	15.7
6.8	1:58	15.8
6.9	1:59	15.9
7.0	2:00	16.0
7.1	2:01	16.1
7.2	2:02	16.2
7.3	2:03	16.3
7.4	2:04	16.4
7.5	2:05	16.5
7.6	2:06	16.6
7.7	2:07	16.7
7.8	2:08	16.8
7.9	2:09	16.9
8.0	2:10	17.0
8.1	2:11	17.1
8.2	2:12	17.2
8.3	2:13	17.3
8.4	2:14	17.4
8.5	2:15	17.5
8.6	2:16	17.6
8.7	2:17	17.7
8.8	2:18	17.8
8.9	2:19	17.9
9.0	2:20	18.0
9.1	2:21	18.1
9.2	2:22	18.2
9.3	2:23	18.3
9.4	2:24	18.4
9.5	2:25	18.5
9.6	2:26	18.6
9.7	2:27	18.7
9.8	2:28	18.8
9.9	2:29	18.9
10.0	2:30	19.0
10.1	2:31	19.1
10.2	2:32	19.2
10.3	2:33	19.3
10.4	2:34	19.4
10.5	2:35	19.5
10.6	2:36	19.6
10.7	2:37	19.7
10.8	2:38	19.8
10.9	2:39	19.9
11.0	2:40	20.0
11.1	2:41	20.1
11.2	2:42	20.2
11.3	2:43	20.3
11.4	2:44	20.4
11.5	2:45	20.5
11.6	2:46	20.6
11.7	2:47	20.7
11.8	2:48	20.8
11.9	2:49	20.9
12.0	2:50	21.0
12.1	2:51	21.1
12.2	2:52	21.2
12.3	2:53	21.3
12.4	2:54	21.4
12.5	2:55	21.5
12.6	2:56	21.6
12.7	2:57	21.7
12.8	2:58	21.8
12.9	2:59	21.9
13.0	3:00	22.0
13.1	3:01	22.1
13.2	3:02	22.2
13.3	3:03	22.3
13.4	3:04	22.4
13.5	3:05	22.5
13.6	3:06	22.6
13.7	3:07	22.7
13.8	3:08	22.8
13.9	3:09	22.9
14.0	3:10	23.0
14.1	3:11	23.1
14.2	3:12	23.2
14.3	3:13	23.3
14.4	3:14	23.4
14.5	3:15	23.5
14.6	3:16	23.6
14.7	3:17	23.7
14.8	3:18	23.8
14.9	3:19	23.9
15.0	3:20	24.0
15.1	3:21	24.1
15.2	3:22	24.2
15.3	3:23	24.3
15.4	3:24	24.4
15.5	3:25	24.5
15.6	3:26	24.6
15.7	3:27	24.7
15.8	3:28	24.8
15.9	3:29	24.9
16.0	3:30	25.0
16.1	3:31	25.1
16.2	3:32	25.2
16.3	3:33	25.3
16.4	3:34	25.4
16.5	3:35	25.5
16.6	3:36	25.6
16.7	3:37	25.7
16.8	3:38	25.8
16.9	3:39	25.9
17.0	3:40	26.0
17.1	3:41	26.1
17.2	3:42	26.2
17.3	3:43	26.3
17.4	3:44	26.4
17.5	3:45	26.5
17.6	3:46	26.6
17.7	3:47	26.7
17.8	3:48	26.8
17.9	3:49	26.9
18.0	3:50	27.0
18.1	3:51	27.1
18.2	3:52	27.2
18.3	3:53	27.3
18.4	3:54	27.4
18.5	3:55	27.5
18.6	3:56	27.6
18.7	3:57	27.7
18.8	3:58	27.8
18.9	3:59	27.9
19.0	4:00	28.0
19.1	4:01	28.1
19.2	4:02	28.2
19.3	4:03	28.3
19.4	4:04	28.4
19.5	4:05	28.5
19.6	4:06	28.6
19.7	4:07	28.7
19.8	4:08	28.8
19.9	4:09	28.9
20.0	4:10	29.0
20.1	4:11	29.1
20.2	4:12	29.2
20.3	4:13	29.3
20.4	4:14	29.4
20.5	4:15	29.5
20.6	4:16	29.6
20.7	4:17	29.7
20.8	4:18	29.8
20.9	4:19	29.9
21.0	4:20	30.0
21.1	4:21	30.1
21.2	4:22	30.2
21.3	4:23	30.3
21.4	4:24	30.4
21.5	4:25	30.5
21.6	4:26	30.6
21.7	4:27	30.7
21.8	4:28	30.8
21.9	4:29	30.9
22.0	4:30	31.0
22.1	4:31	31.1
22.2	4:32	31.2
22.3	4:33	31.3
22.4	4:34	31.4
22.5	4:35	31.5
22.6	4:36	31.6
22.7	4:37	31.7
22.8	4:38	31.8
22.9	4:39	31.9
23.0	4:40	32.0
23.1	4:41	32.1
23.2	4:42	32.2
23.3	4:43	32.3
23.4	4:44	32.4
23.5	4:45	32.5
23.6	4:46	32.6
23.7	4:47	32.7
23.8	4:48	32.8
23.9	4:49	32.9
24.0	4:50	33.0
24.1	4:51	33.1
24.2	4:52	33.2
24.3	4:53	33.3
24.4	4:54	33.4
24.5	4:55	33.5
24.6	4:56	33.6
24.7	4:57	33.7
24.8	4:58	33.8
24.9	4:59	33.9
25.0	5:00	34.0

Plant USS - Clinton
 Date 10-21-84
 Sample Location HCCS - test cor
 Sample Type m-5
 Run Number 3.2
 Operator JARMAN/Smith
 Ambient Temperature 50°F
 Barometric Pressure 30.41
 Static Pressure, (H₂O)
 Filter Number(s) RA102G-021
RA102G-020

Leak Check: Initial at 15 Hg. 0.06 CFM
 Final at 15 Hg. 0.010 CFM
 Pilot Leak Check: OK

Impinger Volumes
 Initial Final
 A 100.0 184
200.0 -47
 B 100.0 38
200.0 1
 C 0 0
 Silica Gel
669 4.9
665 4.9

Probe Length and Type 5' TFE
 Nozzle Size & I.D. -302"
 Pitot Coefficient & I.D. .84
 Assumed Moisture 31%
 Molecular Weight, Dry, (M_d)
 Meter Box Number APT 12
 Meter Coefficient
 α Factor
 K =
 $K(M_d)^4 = \text{---} \times (\text{---})^4 = \text{---}$
 $4H = K(M_d)^4 \left(\frac{T_m}{T_s}\right) (P)$

PH 3.5

SASS Condensate NA
 Total Volume

Traverse Point Number	MIN:SEC	Gas Meter Reading (V _m), ft ³	Velocity Head (AP), in. H ₂ O	ROTOMETER		Temperature of					Pump Vacuum in. Hg	AVG. $\sqrt{\Delta P}$	ΔH
				Desired	Actual	Probe	Impinger A	Impinger B	Filter Temp	Oven	Gas Meter In	Gas Meter Out	
1-6	:49	815.15	.64	19.3	16.7	273	75	72	304	252	75	74	.38
	:41	815.344	.20	11.4H	11.4H	274	62	62	304	265	75	74	.11
1-5	:53	816.04	.40	14.5	14.5	271	75	74	316	250	76	75	.30
	:45	816.283	.15	0.84H	0.84H	272	64	64	299	271	76	75	.08
1-4	:50	816.92	.50	15.3	15.3	269	76	75	323	267	77	76	.25
	:55	816.817.194	.15	0.84H	0.84H	275	65	64	315	269	77	76	.08
1-3	:49	817.98	.75	20.5	18.0	271	76	76	324	262	77	76	.43
	:40	818.375	.27	9.8	9.8	274	64	63	306	270	78	77	.15
Avg.													

Comments:

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³	Velocity Head (ΔP _s), in. H ₂ O	ROTOMETER		Temperature of					Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	Push Stack Travel	Probe	Impinger	FILTER TEMP	Oven	Gas Meter In	Gas Meter Out	
		Init. 818.375											
1-2	:49	819.30	1.2	23.2	23.2	170	270	78	317	269	78	77	.61
	:54	819.963	.40	11.9	12.8	160	274	60	303	268	79	78	.26
1-1	:51	821.27	2.1	31.9	31.1	154	269	78	324	265	79	78	1.0
	:53	824.991	.60	16.7	16.0	159	272	60	299	271	79	77	.36
2-6	:47	822.412	1.2	27.9	23.2	153	271	78	319	270	80	79	.65
	:51	824.075	.50	16.0	14.5	154	273	60	302	273	81	80	.31
2-5	:48	824.91	.80	25.2	24.1	157	272	78	325	269	81	80	.41
	:60	825.602	.40	13.7	12.8	165	271	60	299	268	82	80	.22
2-4	:50	826.182	1.4	25.2	23.2	154	269	78	320	266	82	81	.67
	:42	827.75	.55	13.7	13.7	138	270	60	299	267	82	80	.28
2-3	:50	828.80	1.7	27.9	25.2	157	267	78	315	263	82	81	.83
	:32	829.297	.55	16.0	15.3	162	270	60	294	269	81	80	NA
2-2	:49	830.44	1.8	28.6	28.6	157	267	78	315	263	82	81	.89
	:47	831.149	.58	16.0	16.0	159	270	60	292	262	82	81	.37
2-1	:51	832.17	2.4	33.4	26.0	165	266	78	316	259	82	81	NA
	:33	832.705	.85	18.0	17.3	163	269	62	298	266	82	81	.40
AUG.													

Purge 407.900 to 417.900

Run No. 3-2

Date 10-21-84

Sampling Location

HCQC test car

Comments: 1 Generator died @ 822.417 Repeat Point 2-6
 2 Run 29 to 826.182 Repeat point 2-4
 13 (could not see 20.0 in 4. driver problems)

DRY MOLECULAR WEIGHT DETERMINATION

PLANT USS - CLAIRTON, PA
 DATE 10-22-84
 SAMPLING TIME (24-HR CLOCK) _____
 SAMPLING LOCATION H.C. QC - TEST CAR
 SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS GRAB) INTEGRATED BAG
 ANALYTICAL METHOD DRY SET
 AMBIENT TEMPERATURE _____
 OPERATOR B.C. DeLoe

COMMENTS:

RUN GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M _d , lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO ₂	2.75	2.75	2.7	2.7	2.7	2.7	2.716	44/100	1.195
O ₂ (NET IS ACTUAL O ₂ READING MINUS ACTUAL CO ₂ READING)	20.0	17.25	20.0	17.3	20.0	17.3	17.28	32/100	5.529
CO (NET IS ACTUAL CO READING MINUS ACTUAL O ₂ READING)	20.2	0.2	20.2	0.2	20.1	0.1	0.166	28/100	0.046
N ₂ (NET IS 100 MINUS ACTUAL CO READING)	100	79.8	100	79.8	100	79.9	79.833	28/100	22.353
TOTAL									29.12

RUN # - 3.2

PLANT - USS - CLAIRTON

POIN T	OVEN NUMBER	Δ P EXPECTED	Δ P ACTUAL	ROTOMETER DESIRE	POINT SAMPLE TIME	COM MENT
1.6	A-24	.83 .20	.64 .20	16.7 SEE COMMENT	1:30	.11 Δ H
1.5	B-24	.40 .15	.60 (.50) .15	(14.5) SEE COMMENT	1:38	.08 Δ H
1.4	C-24	.50 .15	.50 (.45) .15	(13.7) 14.5	1:45	.08 Δ H
1.3	A-26	.95 .25	.95 (.75) .27	19.3 (18.0) 9.8	1:29	
1.2	B-26	1.2 .35	1.2 .40	23.2 12.8	1:43	
1.1	C-26	2.2 .65	2.1 .60	31.1 16.0	1:44	
2.6	A-28	1.7 .60	1.2 .50	23.2 14.5	1:38	
2.5	C-28	1.4 .45	1.0 (.80) .40	21.1 (18.7) 12.8	1:48	
2.4	B-1	1.4 .55	1.2 .45	23.2 13.7	1:32	
2.3	A-3	1.7 .60	1.7 .55	27.9 15.3	1:22	
2.2	B-3	1.8 .60	1.8 .58	28.6 16.0	1:36	
2.1		2.4 .75	2.4 .85	33.4 (26.0) 19.3	1:24	26.0 BEST
3.6		1.9 .55				
3.5		1.7 .55				
3.4		1.4 .40				
3.3		1.0 .33				
3.2		1.2 .31				
3.1		1.8 .50				
4.6		1.6 .50				
4.5		.60 .15				
4.4		1.3 .40				
4.3		1.9 .50				
4.2		2.0 .50				
4.1		1.7 .75				
Avg.					TOTAL TIME	

ROTOMETER READING	ROTOMETER READING	ROTOMETER READING
1.15	2.15	21.5
1.20	2.20	22.0
1.25	2.25	22.5
1.30	2.30	23.0
1.35	2.35	23.5
1.40	2.40	24.0
1.45	2.45	24.5
1.50	2.50	25.0
1.55	2.55	25.5
1.60	2.60	26.0
1.65	2.65	26.5
1.70	2.70	27.0
1.75	2.75	27.5
1.80	2.80	28.0
1.85	2.85	28.5
1.90	2.90	29.0
1.95	2.95	29.5
2.00	3.00	30.0
2.05	3.05	30.5
2.10	3.10	31.0
2.15	3.15	31.5
2.20	3.20	32.0
2.25	3.25	32.5
2.30	3.30	33.0
2.35	3.35	33.5
2.40	3.40	34.0

FIL DATA

Plant VSS - Clairton
Date 10-23-84
Sample Location H2O - test ear
Sample Type M-S
Run Number 303
Operator JARMAN/Smith
Ambient Temperature 50°F
Barometric Pressure 30.80 @ 1140P
Static Pressure, (H₂O) _____
Filter Number(s) RA1025-025
RA1026-026

Impinger Volumes
Initial Final
A { 100.0 399.0 299 Met Gain
100.0 100.0 0
B { 100.0 152.0 52
100.0 101.0 1
0 0
Silica Gel
A 670.6 676.4 5.8
B 666.8 668.3 4.5

Probe Length and Type 5' TFE
Nozzle Size & I.D. .302"
Pilot Coefficient & I.D. .84
Assumed Moisture 31%
Molecular Weight, Dry, (M_D) _____
Meter Box Number APT 12
Meter Coefficient _____
α Factor _____
K = _____
K(M_D)⁴ = _____ x ()⁴ = _____
ΔH = K(M_D)⁴ (T_m / T_s) (P)

Leak Check: Initial at 16 " Hg, 004 CFM
Final at 10 " Hg, 005 CFM
Pilot Leak Check: AK

SASS Condensate NA
Total Volume _____

Purge - 96.900 to 106.900

Traverse Point Number	MIN:SEC	Gas Meter Reading (V _m), ft ³	Velocity Head (AP), in. H ₂ O	ROTOMETER		PUSH STACK TRAVEL	Probe	Impinger		Filter Temp	Oven	Gas Meter		Pump Vacuum In. Hg	Avg. √ΔP	Δ H
				Desired	Actual			A	B			In	Out			
1-6	:50	Init. 834.663 835.43	.65	19.3	K.7	153	271	60	60	331	256	63	62	3		38
1-5	:35	835.711 836.35	.20	.114H	.114H	160	274	56	56	326	257	63	61	1		.11
1-4	:47	836.720 837.44	.55	14.5	15.3	157	270	60	60	333	259	63	62	0	NA	.31
1-3	:57	837.896 838.69	.15	.084H	.084H	165	272	56	56	321	259	63	62	0		.05
1-2	:46	839.112	.25	20.5	18.0	154	270	60	60	331	259	63	62	3		.36
AVG.				9.8	4.8	163	274	56	56	318	257	65	63	NA		.42

Static reading taken on Battery 19, Point 1-3 post-travel per Rich: -.26 Travel: -.0.8

Comments: 1) We noticed 2 differences from 3-2 & 3-1; Scrubber H₂O is a rusty color now compared to clear before and scrubber H₂O is like warm compared to very hot before.
2) Static pressure inaccurate, nozzle interference on Point 1-3

2084

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³	Velocity Head (ΔP _s), in. H ₂ O	ROTOMETER		Temperature of							Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	Push STACK TRAVEL	Probe	Impinger	FILTER TEMP	Gas Meter		Oven			
										In	Out				
1-2	:46	839.17	1.2	23.2	23.2	152	270	60	330	64	63	4.5		.65	
	:52	840.610	.35	11.9	11.9	160	271	55	319	65	63	1		.19	
1-1	:48	841.70	1.8	31.9	28.6	140	270	60	329	65	64	7		.92	
	:55	842.448	.52	16.7	14.5	164	272	54	314	65	64	2.5		.31	
2-6	:45	843.48	.90	27.9	20.0	155	270	60	331	65	64	4		.56	
	:38	843.863	.35	16.0	11.9	168	272	54	318	65	63	NA		.23	
2-5	:48	844.80	.35	25.0	22.2	152	271	60	257	65	64	4.5		.62	
	:50	845.415	.35	13.7	11.9	157	272	54	262	65	63	1		.23	
2-4	:47	846.30	1.1	25.2	22.2	151	270	60	258	65	64	4		.62	
	:53	846.995	.35	13.7	12.9	157	272	54	291	66	65	2		.26	
2-3	:46	847.97	1.4	25.2	25.2	151	271	62	300	66	65	5		.28	
	:42	848.535	.45	15.3	13.7	157	274	55	297	66	64	2		.24	
2-2	:47	849.54	1.5	28.6	26.2	159	271	62	247	67	65	6		.85	
	:49	850.176	.45	16.0	13.7	160	272	54	261	67	65	NA		.26	
2-1	:48	851.37	2.3	33.4	32.7	155	269	62	291	67	65	7		1.1	
	:57	852.258	.55	18.0	15.3	159	272	54	289	67	65	3		.35	
AUG.															

Date 10-23-84

Run No. 3-3

Sampling Location

HCAC test car

4 Temp. of scrubber H₂O has now gotten back to temp. of previous tests. Color is still Rusty. (2) Unexplainable why filter temp drop - oven temp stayed the same.

3) Static taken Point 2-3, Battery 19; Push -.84 travel -.27

Comments:

3084

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³ Init. 852.258	Velocity Head (h _v), in. H ₂ O	ROTOMETER		Temperature of					Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	Probe	Impinger	FILTER TEMP	Oven	Gas Meter In Out			
3-6	:48	853.29	1.3	29.6	24.2	153	60	239	255	67 66	NA		.74
	:39	853.837	.38	15.3	12.8	157	54	238	254	67 65	2		.29
3-5	:48	854.90	1.5	27.9	26.2	155	60	228	250	67 66	NA		.81
	:49	855.522	.35	15.3	11.9	158	54	240	248	67 65	2		.24
3-4	:49	856.33	1.0 1.0	25.2	19.3	159	60	241	240	67 66	NA		.48
	:56	856.871	1.0 1.0	12.8	11.04	158	54	247	238	67 66	0		.11
3-3	:49	857.720	1.0 1.0	21.1	20.0	152	60	224	261	67 65	3.5		.52
	:44	858.228	.28	11.9	10.9	159	54	246	266	67 65	NA		.22
3-2	:47	859.03	.85	23.2	19.3	154	60	262	216	67 65	3.5		.48
	:47	859.485	.26	10.9	9.8	158	56	262	209	67 65	1		.15
3-1	:46	860.47	1.3	28.6	24.2	154	60	296	213	66 66	5		.78
	1:01	861.221	.35	14.5	11.9	158	52	290	222	67 65	2		.23
4-6	:47	862.12	.96	27.0	20.5	157	60	297	234	67 65	NA		.53
	:37	862.482	.27	14.5	9.8	155	54	308	242	67 65	1		.16
4-5	:45	863.15	.50	16.0	14.5	154	60	358	254	67 66	3		.30
	:47	863.355	.15	0.044	0.044	157	56	353	255	67 65	0		
AUG.													

3-3

Run No.

Date 10-23-84

Sampling Location

HCC Test Car

U Replaced 1 or 2 Heat tapes on Filter - heating ok

Comments: 2) Static measured at Point 3-3; 19 battery; Pish - 48 Travel - .13

3) H₂O inside oven during maintenance of heater; should dry out and give accurate temp

4) Oven temp back to normal reading

[illegible]

10-23-84

[illegible]

33

3.3 Date 10-2-75 Push 19 travel - .20

Comments:

RUN # - 3.3

PLANT - USS - CLAIRTON

VERSE NT	OVEN NUMBER	Δ P EXPECTED	Δ P ACTUAL	ROTOMETER DESIRED	POINT SAMPLE TIME	COMMENT	rometer Reading
1.6	A-17	.83	.20	.75(.65)	18.0(16.7)	1:25	11ΔH
1.5	B-17	.40	.15	.55	15.3	1:35	.05ΔH
1.4	C-17	.50	.15	.55	15.3	1:46	.11ΔH
1.3	A-19	.95	.25	.85(.75)	19.3(18.0)	1:33	
1.2	B-19	1.2	.35	1.2	23.2	1:38	
1.1	C-19	2.2	.65	1.8	28.6	1:43	
2.6	A-21	1.7	.60	1.0(.90)	21.1(20.0)	1:27	
2.5	B-21	1.4	.45	1.1	22.2	1:38	
2.4	C-21	1.4	.55	1.1	22.2	1:40	
2.3	A-23	1.7	.60	1.4	25.2	1:28	
2.2	B-23	1.8	.60	1.5	26.2	1:36	
2.1	C-23	2.4	.75	2.3	32.7	1:45	
3.6	A-25	1.9	.55	1.3	24.2	1:27	
3.5	B-25	1.7	.55	1.5	26.2	1:37	
3.4	C-25	1.4	.40	1.0(.85)	21.1(19.3)	1:45	.11ΔH
3.3	A-29	1.0	.33	.90	20.0	1:33	
3.2	B-29	1.2	.31	.85	19.3	1:34	
3.1	C-29	1.8	.50	1.3	24.2	1:47	
4.6	A-2	1.6	.50	.96	20.5	1:24	
4.5	B-2	.60	.15	.65(.50)	16.7(15.5)	1:32	.08ΔH
4.4	C-2	1.3	.40	1.0	21.1	1:37	
4.3	A-4	1.9	.50	1.4	25.2	1:20	
4.2	B-4	2.0	.50	1.6	27.0	1:32	
4.1	C-4	1.7	.75	1.3	24.2	1:41	
1.0					TOTAL TIME		

water from duct
rusty looking & cooler
* = #20 Battery

DRY MOLECULAR WEIGHT DETERMINATION

COMMENTS:

PLANT USS-CLAIRTON, PA
 DATE 10-23-84
 SAMPLING TIME (24 hr CLOCK) _____
 SAMPLING LOCATION HQCC - TEST CAR 3.3
 SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS GRAB) INTEGRATED BAG
 ANALYTICAL METHOD ORSAT
 AMBIENT TEMPERATURE _____
 OPERATOR CC. Dr. Res

RUN GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M _d , lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO ₂	2.0	2.0	2.0	2.0	2.0	2.0	2.0	44/100	0.88
O ₂ (NET IS ACTUAL O ₂ READING MINUS ACTUAL CO ₂ READING)	21.0	19.0	20.0	18.0	20.0	18.0	18.0	32/100	5.76
CO (NET IS ACTUAL CO READING MINUS ACTUAL O ₂ READING)	21.0	0	20.2	0.2	20.2	0.2	0.2	28/100	0.056
N ₂ (NET IS 100 MINUS ACTUAL CO READING)	100	79	100	79.8	100	79.8	79.8	28/100	22.344
TOTAL									39.04

4
 $\frac{2.0}{2.0}$
 $\frac{20.0}{18.0}$
 $\frac{20.2}{0.2}$
 $\frac{100}{79.8}$

FIL DATA

Plant USS Claxton
 Date 10-24-84
 Sample Location HSCC test car
 Sample Type M-5
 Run Number 3-4
 Operator JARMAN/SMITH
 Ambient Temperature 30.79 @ 2:00P
 Barometric Pressure 30.79 @ 2:00P
 Static Pressure, (H₂O) RAID26-030
 Filter Number(s) RAID26-031

Impinger Volumes
 Initial Final
 A { 100.0 381.0
100.0 102.0
 B { 0 0
100.0 178.0
100.0 101.0
0 0
 Silica Gel
676.4 682.0
663.3 672.2

Probe Length and Type 5' TFE
 Nozzle Size & I.D. .302"
 Pitot Coefficient & I.D. .87
 Assumed Moisture 3%
 Molecular Weight, Dry, (M_d) AP7
 Meter Box Number 12
 Meter Coefficient 1
 α Factor 0
 $K = \frac{K(M_d)^4}{\alpha^4} \times ()^4 =$
 $\Delta H = K(M_d)^4 \left(\frac{Im}{Ts} \right) (P)$

Purge - 419.00 to 429.00 CFM
 P.H. - 3.6

SASS Condensate NA
 Total Volume 376.5

Leak Check: Initial at 17 " Hg, 0.06 CFM
 Final at 15 " Hg, 0.00 CFM
 Pitot Leak Check: OK

Temperature of	PUSH	STUCK TRAVEL	Probe	Impinger	FILTER	Oven	Gas Meter	Avg. ΔP	ΔH
Traverse Point Number	Desired	Actual	Velocity Head (AP), in. H ₂ O	Rotometer	Temp		In	Out	
1-6	16.7	16.7	.65	881.240	321	241	56	55	NA
				882.09	276	247	56	55	.16
1-5	15.3	14.5	.52	883.12	262	250	57	56	.29
				883.431	231	249	57	56	.28
1-4	15.3	14.5	.50	884.08	231	245	58	57	.27
				884.458	240	249	58	58	.11
1-3	18.0	18.0	.75	885.23	290	252	59	58	.39
				885.781	277	254	62	58	.13
Avg.	13.7	9.8	.75						

Comments:

Traverse Point Number	MIN:SEC		Gas Meter Reading (V _m), ft ³	Velocity Head (ΔP _s), in. H ₂ O	ROTOMETER		Temperature of							Pump Vacuum in. Hg	Avg. ΔP	Δ H
	Sampling Time, min	Desired			Actual	Push Stack TRAOEL	Probe	Impinger	FILTER TEMP	Oven	Gas Meter					
											In	Out				
1-2	:49	23.2	21.1	157	265	60	332	254	61	59	4.5			.57		
1-1	:38	11.9	10.9	151	271	54	282	251	61	59	NA			.22		
1-1	:48	28.6	30.4	154	270	60	343	252	61	60	7			.97		
1-1	:53	14.5	14.5	161	269	54	282	252	62	60	NA			.31		
2-6	:47	20.0	21.1	155	272	62	269	261	63	62	5			.55		
2-6	1:02	14.5	11.9	162	276	54	267	260	64	62	2			.24		
2-5	:47	22.2	22.2	155	270	63	257	256	64	63	5			.61		
2-5	:32	16.0	12.8	163	271	56	244	258	65	63	NA			.25		
2-4	:47		22.2	157	270	64	333	260	65	64	6			.66		
2-4	:41		11.9	163	270	58	274	258	66	64	NA			.31		
2-3	:48		25.2	157	268	65	246	253	66	65	NA			.77		
2-3	:48		13.7	160	269	58	235	250	67	65	2			.27		
2-2	:48		26.2	155	267	65	250	254	67	66	6			.78		
2-2	:33		13.7	160	269	58	244	253	68	65	2			.28		
2-1	:47		32.7	158	269	65	300	257	68	66	8			1.0		
2-1	:41		15.3	162	268	58	266	254	69	67	3.5			.42		
AUG.																

Sampling Location H.C.D.C. - TEST CASE

Date 10-24-84

Run No. 3.4

Comments: 11 Charged filter heater controller

Comments:

Traverse Point Number	MIN:SEC Sampling Time, min	Gas Meter Reading (V _m), ft ³	Velocity Head (h _p), in. H ₂ O	ROTAMETER		Temperature of							Pump Vacuum in. Hg	Avg. ΔP	Δ H
				Desired	Actual	Push Stack Travel	Probe	Impinger	FILTER TEMP	Oven	Gas Meter				
											In	Out			
3-6	:48	899.32	1.2	24.2	23.2	153	268	65 63	250	255	68	67	5		.66
	:53	899.953	.40	11.9	12.8	160	268	59 57	258	255	69	67	NA		.23
3-5	:48	900.99	1.6	26.2	27.0	155	271	65 63	320	255	69	68	6.5		.82
	:35	901.467	.45	11.9	13.7	158	270	59 58	253	256	69	67	2		.29
3-4	:47	902.29	.95	19.3	20.5	156	270	64 62	262	264	70	68	4		.55
	:44	902.720	.25	8.6	9.8	160	270	58 58	243	260	70	67	NA		.15
3-3	:48	903.55	.90	20.0	20.0	157	271	65 63	241	270	71	69	4		.50
	:56	904.158	.30	10.9	10.9	158	271	60 58	230	265	70	69	1		.26
3-2	:46	904.92	.85	19.3	19.3	154	270	65 63	278	260	71	69	4		.48
	:30	905.298	.30	9.8	10.9	160	270	60 58	269	258	71	69	NA		NA
3-1	:47	906.19	1.1	24.2	22.2	157	269	65 63	308	252	71	70	5		.62
	:43	906.733	.40	11.9	12.8	160	270	58 57	279	247	71	70	NA		NA
4-6	:49	907.48	.65	20.5	16.7	154	269	65 63	320	252	72	70	3		.38
	:52	907.940	.25	9.8	9.8	156	272	58 56	303	254	71	70	1		.13
4-5	:46	908.59	.60	14.5	16.0	156	270	65 63	320	260	72	70	3		.35
	:38	908.766	.15	.084H	.084H	159	272	60 58	308	262	71	70	NA		.09
AUG.															

Run No. 34

Date 10-24-84

Sampling Location HCRS-TEST CAR

LL Scrubber H₂O is cleaner compared to test 3.4

Comments:

+

[illegible]

Sampling Location ACQUA-TESTING

Date 10-24-84

Run No. 3.4

Comments:

224

DRY MOLECULAR WEIGHT DETERMINATION

COMMENTS:

PLANT USS - CLAIRTON, PA
 DATE 10-24-84
 SAMPLING TIME (24-HR CLOCK) _____
 SAMPLING LOCATION HSCS - TEST CAR 3.4
 SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS GRA B) INTEGRATED BAGS
 ANALYTICAL METHOD ORSAT
 AMBIENT TEMPERATURE _____
 OPERATOR B.C. DeRos

RUN GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGHT OF STACK GAS (DRY BASIS) M _d , lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
CO ₂	2.2	2.2	2.2	2.2	2.2	2.2	2.2	44/100	0.968
O ₂ (NET IS ACTUAL O ₂ READING MINUS ACTUAL CO ₂ READING)	20.6	18.4	20.4	18.2	20.6	18.4	18.33	32/100	5.8656
CO (NET IS ACTUAL CO READING MINUS ACTUAL O ₂ READING)	20.9	0.3	20.6	0.4	20.9	0.3	0.333	28/100	0.093
N ₂ (NET IS 100 MINUS ACTUAL CO READING)	100	79.1	100	79.4	100	79.1	79.200	28/100	22.176
TOTAL									29.10

APPENDIX E
DATA REDUCTION

FIELD DATA

Plant
 Date 12/5/84
 Car No. 104
 Battery No. 20
 Sample Location HCOC - Test Car
 Sample Type M-5
 Run Number 7.1
 Operator Smith/Jarman
 No. of Ovens Tested 24
 No. of Ovens Tested/hr 3.6
 Coke Prd'n Rate, tons/oven 14.5
 Ambient Temp, deg F 29
 Barometric Pressure, in Hg 29.42
 Static Pressure, in H2O -0.1
 Stack Area, ft2 32.125
 Filter Type RA 934ah
 Top Filter Number RA102G-045
 Bottom Filter Number None
 Probe Length & Type 5 ft - TFE Lined
 Nozzle Size 0.296
 Pitot Coefficient 0.84
 Meter Box Number APT 12 LG Mod
 DGM Coeff's A1 0.0012
 A2 1.0171
 A3 0.0037
 Office Coeff's B 0.4821
 A 0.391
 Cal Press, in Hg 29.65
 Leak Check Initial 0.004
 Final 0.004
 in Hg 16
 15
 Water Volume: Initial 100
 Final 356
 Final Net Gain 256
 Imp A1 100
 Imp A2 100
 Imp A3 0
 S11 Gel A 687.3
 Imp B1 100
 Imp B2 100
 Imp B3 0
 S11 Gel B 736
 Total Volume 743.5
 Combined Impinger pH 3.5

Point No. Oven No. Start Time Sample Time sec DGM Start Gas Metr Rotometer Office del p In. WC

Point No.	Oven No.	Start Time	Sample Time sec	DGM Start	Gas Metr	Rotometer	Office del p	In. WC
1.6 C-26		10:28	99	44	289.210	289.737	9.8	0.09
1.5 A-28		10:45	88	45	290.310	290.607	14.5	0.28
1.4 B-28		11:06	93	44	291.150	291.508	13.7	0.25
1.3 A-1		11:55	83	45	292.300	292.638	18.7	0.42
1.2 B-1		12:16	92	45	293.313	293.450	21.1	0.58
1.1 C-1		12:29	93	47	294.920	294.920	29	0.81
2.6 A-3		12:59	76	44	297.651	298.035	24	0.70
2.5 B-3		13:12	92	46	298.920	299.468	23.2	0.65
2.4 C-3		13:23	98	47	300.430	300.468	25.2	0.74
2.3 A-5		13:42	84	47	302.000	302.425	24.2	0.70
2.2 B-5		13:55	94	46	303.410	304.050	25.2	0.75
2.1 C-5		14:09	99	46	305.040	305.717	27	0.80
3.6 A-7		14:22	84	46	306.720	307.159	27	0.83
3.5 B-7		14:38	90	45	308.170	308.720	27	0.85
3.4 C-7		14:51	105	46	309.540	310.051	20.5	0.54
3.3 A-9		15:05	87	46	310.840	311.123	18.7	0.46
3.2 B-9		15:18	89	44	311.930	312.331	20.5	0.55
3.1 C-9		15:31	100	46	313.190	313.674	22.2	0.62
4.6 A-11		15:43	88	43	314.370	314.776	18.7	0.45
4.5 B-11		15:56	90	45	315.420	315.670	15.3	0.33
4.4 C-11		16:09	100	43	316.400	316.907	18.7	0.47
4.3 A-13		16:21	84	46	317.890	318.344	26.2	0.82
4.2 B-13		16:34	92	45	319.270	319.782	26.2	0.77
4.1 C-13		16:47	99	45	320.645	321.203	23.2	0.67
Total		(Time in minutes)		36.65	32.729	32.729	9.8	0.15
Push				18.10	21.800	21.800		
Travel				18.55	10.929	10.929		

Point No.	Stack	Probe	Temperature, deg F	GM In	GM Out
P	1.6	164	271	37	37
T		158	272	38	37
P	1.5	154	266	38	38
T		157	269	39	38
P	1.4	156	266	40	39
T		158	269	41	39
P	1.3	157	266	40	43
T		161	269	44	43
P	1.2	156	265	40	43
T		156	265	40	43
P	1.1	159	265	40	44
T		162	263	45	43
P	2.6	155	268	45	44
T		159	270	46	44
P	2.5	155	268	45	45
T		158	270	46	44
P	2.4	152	268	46	45
T		160	270	46	44
P	2.3	154	267	46	45
T		159	268	46	44
P	2.2	156	266	46	45
T		159	268	46	45
P	2.1	156	266	46	46
T		158	267	47	46
P	3.6	154	270	47	46
T		157	271	47	46
P	3.5	154	268	48	46
T		155	271	48	46
P	3.4	154	268	48	46
T		157	271	48	46
P	3.3	156	167	48	47
T		158	271	48	47
P	3.2	155	267	48	47
T		157	270	48	47
P	3.1	159	266	48	47
T		159	269	48	47
P	4.6	154	265	48	47
T		156	270	49	47
P	4.5	157	268	49	48
T		155	271	49	47
P	4.4	157	268	49	48
T		157	269	49	48
P	4.3	156	267	49	48
T		156	270	49	48
P	4.2	157	266	50	48
T		156	270	50	48
P	4.1	162	266	50	49
T		157	264	50	48

Point No.	Pump Vac	Vel Head	Sqrt del P	Duct Vel	Sep P	In Opacity	Seconds
1.6	P	0.80	0.89	58.09	65	10	1
1.5	P	0.25	0.50	32.32	20	1	1
1.4	P	0.45	0.67	43.29	65	4	1
1.3	P	0.80	0.89	57.76	65	4	1
1.2	P	1.00	1.00	64.53	65	4	1
1.1	P	1.70	1.30	84.34	65	4	1
2.6	P	1.30	1.14	73.51	20	0.9	1
2.5	P	1.20	1.10	70.63	20	0.9	1
2.4	P	1.40	1.18	76.10	25	2	1
2.3	P	1.30	1.14	73.45	25	2	1
2.2	P	1.40	1.18	76.35	25	2	1
2.1	P	1.70	1.30	84.13	25	2	1
3.6	P	1.60	1.26	81.49	30	1	1
3.5	P	1.60	1.26	81.49	30	1	1
3.4	P	0.95	0.97	62.79	30	1	1
3.3	P	0.80	0.89	57.72	30	1	1
3.2	P	0.95	0.97	62.84	30	1	1
3.1	P	1.10	1.05	67.84	30	1	1
4.6	P	0.80	0.89	57.62	30	1	1
4.5	P	0.55	0.74	47.89	30	1	1
4.4	P	0.80	0.89	57.76	30	1	1
4.3	P	1.50	1.22	79.03	30	1	1
4.2	P	1.50	1.22	79.09	30	1	1
4.1	P	1.20	1.10	71.03	30	1	1
	P	0.25	0.50	32.29	30	1	1
	P	0.80	0.89	57.76	30	1	1
	P	0.15	0.39	24.97	30	1	1
	P	0.55	0.74	47.89	30	1	1
	P	0.25	0.50	32.26	30	1	1
	P	0.80	0.89	57.62	30	1	1
	P	0.25	0.50	32.34	30	1	1
	P	1.10	1.05	67.84	30	1	1
	P	0.25	0.50	32.29	30	1	1
	P	0.95	0.97	62.84	30	1	1
	P	0.20	0.45	28.90	30	1	1
	P	0.80	0.89	57.72	30	1	1
	P	0.25	0.50	32.29	30	1	1
	P	0.95	0.97	62.79	30	1	1
	P	0.30	0.55	35.31	30	1	1
	P	1.60	1.26	81.49	30	1	1
	P	0.35	0.59	38.21	30	1	1
	P	1.60	1.26	81.49	30	1	1
	P	0.40	0.63	40.88	30	1	1
	P	0.50	0.71	45.74	30	1	1
	P	1.40	1.18	76.35	30	1	1
	P	0.35	0.59	38.27	30	1	1
	P	1.30	1.14	73.45	30	1	1
	P	0.40	0.63	40.94	30	1	1
	P	1.40	1.18	76.10	30	1	1
	P	0.30	0.55	35.40	30	1	1
	P	1.20	1.10	70.63	30	1	1
	P	0.35	0.59	38.27	30	1	1
	P	1.30	1.14	73.51	30	1	1
	P	0.40	0.63	41.01	30	1	1
	P	1.70	1.30	84.34	30	1	1
	P	0.25	0.50	32.26	30	1	1
	P	1.00	1.00	64.53	30	1	1
	P	0.20	0.45	28.97	30	1	1
	P	0.80	0.89	57.76	30	1	1
	P	0.20	0.45	28.90	30	1	1
	P	0.45	0.67	43.29	30	1	1
	P	0.20	0.45	28.88	30	1	1
	P	0.50	0.71	45.55	30	1	1
	P	0.25	0.50	32.32	30	1	1
	P	0.80	0.89	58.09	30	1	1

Point	No.	Separator	Annubar	Tank T	Jet Flow	Jet P	Jet Temp	Gas T	In
P	1.6	11	2.9	429	355	295	140	133	133
P	1.5		2.9	429	355	295	126	140	140
P	1.4		2.9	429	355	295	153	154	140
P	1.3	10.5	2.95	429	355	295	140	147	147
P	1.2		2.95	429	355	295	147	126	126
P	1.1		2.95	429	350	295	147	133	133
P	2.6	10.5	3	429	350	295	147	133	133
P	2.5		0.95	429	350	292	140	126	126
P	2.4		0.95	429	350	292	133	119	119
P	2.3	10.5	3	429	350	292	147	126	126
P	2.2		3	429	350	292	140	126	126
P	2.1		3	429	350	292	147	133	133
P	3.6	10.5	3	429	350	295	147	133	133
P	3.5		0.95	429	350	295	140	133	133
P	3.4		0.95	429	350	295	147	126	126
P	3.3		3	429	350	295	140	126	126
P	3.2	10.5	3	429	350	295	147	133	133
P	3.1		3	429	350	295	147	133	133
P	4.6		3	429	350	295	147	133	133
P	4.5	10.5	2.95	429	350	295	140	133	133
P	4.4		2.95	429	350	295	154	154	133
P	4.3		2.95	429	350	295	154	140	140
P	4.2	10.5	2.95	429	350	295	147	133	133
P	4.1		2.95	429	350	295	147	133	133
T			1	429	115	287	145	132	701

Orsat Analysis
Operator

Run

825

CO2

02

CO

N2

Molecular Weight, Dry

29.05

Act 8

2

Net

6

Act 8

38

Net 3

8

0 2
8 12N

8

БЛУ

Front-half Filter Dry Catch, mg

Blank Filter Catch, mg

Front-half Aqueous Wash, mg

Filterable

Non-filterable

Front-half Acetone Wash, mg

Impinger Catch, mg

Filterable

Non-filterable

Total Front-half Filterable, mg

Total Front-half Noniterable, mg
 Total Front-half Iterable, mg

Total Front-half, mg

Total Front-half, mg	
Total Back-half Filterable, mg	

Total Pennsylvania DER Mass, mg

36.17

1.40

34.77

16.71

18-06

06.7

Not Applicable

1.40

3.02

69-81
10-6

9-07

66.8

None used

CALCULATIONS

68	Standard Temp, deg F	29.92	
29.42	Standard Press, in Hg	29.42	
29.41	Barometric Press, in Hg	29.41	
14.573	Stack Press, in Hg	14.573	
30.38	Vol of H2O Std, dscf	30.38	
30.38	M-5 Stack Moist. Content, %	30.38	
30.44	Sat Stack Moist. Content, %	30.44	
30.38	Stack Moist. Cont. Used, %	30.38	
29.05	Molecular Weight, Dry	29.05	
25.69	Molecular Weight, Wet	25.69	
0.296	Nozzle Dia, in	0.296	
32.125	X-Area of Stack, ft2	32.125	
156	Push	156	
158	Time-avg Stack Temp, deg F	158	
22.292	Meter Volume Corr, ft3	22.292	
22.256	Meter Volume Std, dscf	22.256	
9.711	Vol of H2O Std, dscf	9.711	
18.10	Sample Time, min	18.10	
67.43	Stack Vel, fps	67.43	
109	Percent Isokinetic, %	109	
129968	Stack Gas Vol, acfm	129968	
76222	Stack Gas Vol, dscfm	76222	
0.0562	Stack Gas Density, lb/ft3	0.0562	
0.0167	DER Part. Emission Conc., gr/dscf	0.0167	
0.0144	DER Part. Emission Rate, lb/ton coke	0.0144	
0.76	DER Part. Emission Rate, lb/hr	0.76	
0.0161	Front-half Part. Conc., gr/dscf	0.0161	
0.0138	Front-half Part. Rate, lb/ton coke	0.0138	
0.73	Front-half Part. Rate, lb/hr	0.73	
0.0006	Back-half Part. Conc., gr/dscf	0.0006	
0.0006	Back-half Part. Rate, lb/ton coke	0.0006	
0.03	Back-half Part. Rate, lb/hr	0.03	
157	Travel	157	
33.454	Total	33.454	
33.401		33.401	
14.573		14.573	
36.65		36.65	

DUCT VELOCITIES AT SAMPLING PLANE

Push

Position	Position			
	1	2	3	4
1	84	84	68	71
2	65	76	63	79
3	58	73	58	79
4	43	76	63	58
5	46	71	81	48
6	58	74	81	58

Travel

Position	Position			
	1	2	3	4
1	41	41	32	32
2	32	46	32	35
3	29	38	29	35
4	29	41	32	32
5	29	35	35	25
6	32	38	38	32

FIELD DATA

Plant
 Date 12/06/84
 Car No. 104
 Battery No. 20
 Sample Location HCQC - Test Car
 Sample Type M-5
 Run Number 7.2
 Operator Smith/Jarman
 No. of Ovens Tested 24
 No. of Ovens Tested/hr 4.8
 Coke Prod'n Rate, tons/oven 14.5
 Ambient Temp, deg F 30
 Barometric Pressure, in Hg 29.01
 Static Pressure, in H2O -0.25
 Stack Area, ft2 32.125
 Filter Type RA 934ah
 Top Filter Number RA102G-046
 Bottom Filter Number None
 Probe Length & Type 5 ft - TFE Lined
 Nozzle Size 0.301
 Pilot Coefficient 0.84
 Meter Box Number APT 12 LG Mod
 DGM Coeff's A1 0.0012
 A2 1.0171
 A3 0.0037
 Office Coeff's B 0.4821
 A 0.391
 Cal Press, in Hg 29.65
 Leak Check Initial 17
 Final 16
 in Hg
 CFM 0.002
 0.002
 Water Volume:
 Location Initial 100
 Final 338
 Net Gain 238
 Imp A1 100
 Imp A2 100
 Imp A3 0
 S11 Gel A 691.4
 Imp B1 100
 Imp B2 100
 Imp B3 0
 S11 Gel B 743.5
 Total Volume 752.2
 8.7
 397.7
 Combined Impinger PH 2.5

Point No.	Oven No.	Start Time	Sample Time	Gas Meter	Rotometer	Office del P	In. WC
1.6 A-9		9:41	84	322.550	321.875	0.37	
1.5 B-9		9:53	92	323.440	323.718	0.30	13.7
1.4 C-9		10:06	106	324.350	324.600	0.08	14.5
1.3 A-11		10:18	86	325.370	325.674	0.39	16.7
1.2 B-11		10:30	95	326.550	326.674	0.53	20.5
1.1 C-11		10:42	104	328.030	328.770	0.75	12.8
2.6 A-13		10:55	86	329.630	329.630	0.75	25.2
2.5 B-13		11:07	94	331.050	331.592	0.65	23
2.4 C-13		11:19	101	332.480	332.480	0.50	21.1
2.3 A-15		11:35	85	334.100	334.628	0.78	27
2.2 B-15		11:48	95	335.610	336.317	0.77	27
2.1 C-15		12:01	102	337.270	338.054	0.73	24.2
3.6 A-17		12:13	86	339.050	339.510	0.76	15.3
3.5 B-17		12:25	93	340.420	340.958	0.64	22.2
3.4 C-17		12:38	103	341.740	342.193	0.48	11.9
3.3 A-19		12:50	91	342.950	343.280	0.45	18.7
3.2 B-19		13:02	93	344.060	344.480	0.55	20.5
3.1 C-19		13:15	104	345.370	346.030	0.57	23.2
4.6 A-21		13:29	88	346.690	346.865	0.35	15.2
4.5 B-21		13:42	92	347.440	347.580	0.24	12.8
4.4 C-21		13:54	103	348.200	348.520	0.33	16.7
4.3 A-23		14:06	87	349.360	349.867	0.70	24.2
4.2 B-23		14:18	102	350.800	351.473	0.65	10.9
4.1 C-23		14:31	106	352.370	352.925	0.61	24.2
Total				31.05	11.253	702	

Point No.	Stack	Probe	Temperature, deg F				GM In		GM Out		
			Oven Imping	A Imping	B						
1.6	162	271	266	40	40	41	41	41	41	41	
	162	269	269	40	40	42	42	42	42	41	
1.5	156	270	265	40	40	42	42	42	42	42	
	163	266	264	40	40	43	43	43	43	42	
1.4	157	269	265	40	40	44	44	44	44	43	
	163	266	264	40	40	44	44	44	44	43	
1.3	157	265	266	40	40	45	45	45	45	43	
	165	269	264	40	40	45	45	45	45	44	
1.2	165	264	266	40	40	46	46	46	46	44	
	166	268	266	40	40	46	46	46	46	44	
1.1	166	266	267	40	40	46	46	46	46	44	
	166	266	266	40	40	46	46	46	46	44	
2.6	165	267	268	40	40	46	46	46	46	45	
	163	268	265	40	40	47	47	47	47	45	
2.5	159	266	260	40	40	47	47	47	47	46	
	164	267	263	40	40	48	48	48	48	46	
2.4	155	265	263	40	40	48	48	48	48	46	
	162	265	263	40	40	48	48	48	48	46	
2.3	163	265	260	40	40	48	48	48	48	47	
	162	265	260	40	40	48	48	48	48	47	
2.2	158	264	264	40	40	48	48	48	48	47	
	162	264	267	40	40	49	49	49	49	47	
2.1	169	264	264	40	40	48	48	48	48	47	
	166	270	265	40	40	49	49	49	49	47	
3.6	158	270	267	40	40	49	49	49	49	48	
	160	269	269	40	40	49	49	49	49	48	
3.5	158	268	262	40	40	49	49	49	49	48	
	161	270	261	40	40	49	49	49	49	48	
3.4	172	265	262	40	40	50	50	50	50	48	
	167	266	265	40	40	50	50	50	50	48	
3.3	159	265	266	40	40	50	50	50	50	48	
	160	268	269	40	40	50	50	50	50	48	
3.2	157	265	266	40	40	50	50	50	50	48	
	163	266	266	40	40	50	50	50	50	48	
3.1	156	264	269	40	40	50	50	50	50	48	
	172	267	270	40	40	50	50	50	50	48	
4.6	154	268	269	40	40	50	50	50	50	48	
	159	270	268	40	40	50	50	50	50	48	
4.5	154	266	263	40	40	50	50	50	50	48	
	159	266	263	40	40	50	50	50	50	48	
4.4	157	265	261	40	40	50	50	50	50	48	
	164	270	260	40	40	50	50	50	50	48	
4.3	169	265	264	40	40	50	50	50	50	48	
	168	269	264	40	40	50	50	50	50	48	
4.2	168	264	265	40	40	50	50	50	50	48	
	165	266	265	40	40	49	49	49	49	48	
4.1	163	263	266	40	40	49	49	49	49	48	
	164	263	266	40	40	50	50	50	50	48	

Point No.	Pump Vac in Hg	Head in H2O	Sqft del P	Duct Vel Sep P In	Opacty Seconds
P	1.6	0.60	0.77	51.11	
P	1.5	0.48	0.69	29.51	3
P	1.4	0.50	0.71	46.47	5
P	1.3	0.70	0.84	54.98	
P	1.2	0.95	0.97	64.46	8
P	1.1	1.90	1.38	91.24	
P	2.6	1.40	1.18	78.26	
P	2.5	1.20	1.10	72.10	1
P	2.4	1.00	1.00	65.61	10
P	2.3	1.60	1.26	83.52	
P	2.2	1.60	1.26	83.19	9
P	2.1	1.30	1.14	75.65	8
P	3.6	1.60	1.26	83.19	3
P	3.5	1.10	1.05	68.98	2
P	3.4	0.95	0.97	64.82	10
P	3.3	0.80	0.89	58.87	85
P	3.2	0.95	0.97	64.05	
P	3.1	1.20	1.10	71.93	21
P	4.6	0.55	0.74	48.62	30
P	4.5	0.40	0.63	41.46	35
P	4.4	0.65	0.81	52.98	95
P	4.3	1.30	1.14	75.65	100
P	4.2	1.40	1.18	78.44	100
P	4.1	1.30	1.14	75.29	30
P		0.25	0.50	33.04	1
P TW Avg			1.01		
T TW Avg			0.52		

Point	No.	Separator	P, in. WC	Annubar	Tank T	deg F	Jet Flow	gpm	Jet P	psig	Jet Temp	deg F	Gas T	In	deg F
P	1.6			3	429		350		292				147		
P				1	429		115		285				133		
P	1.5		10.5	3	429		350		295				154		
P				1	429		115		287				140		
P	1.4			3	429		350		295				147		
P				1	429		115		287				140		
P	1.3			3	429		350		297				147		
P				1	429		115		290				133		
P	1.2		10.5	3	429		350		297				147		
P				1	429		115		290				133		
P	1.1			3	429		350		295				147		
P				1	429		115		290				133		
P	2.6			3	429		350		295				147		
P				1	429		115		290				133		
P	2.5		10.5	3	429		350		295				154		
P				1	429		115		287				126		
P	2.4			3	429		350		295				147		
P				1	429		115		287				133		
P	2.3			3	429		350		295				147		
P				1	429		115		287				126		
P	2.2		10.5	3	429		350		295				140		
P				1	429		115		287				126		
P	2.1			3	429		350		295				140		
P				1	429		115		287				126		
P	3.6			3	429		350		295				140		
P				1	429		115		287				126		
P	3.5		10.5	3	429		350		295				147		
P				1	429		115		287				126		
P	3.4			3	429		350		295				140		
P				1	429		115		287				133		
P	3.3			3	429		350		295				140		
P				1	429		115		287				126		
P	3.2		10.5	3.05	429		350		295				147		
P				0.95	429		115		287				126		
P	3.1			3.05	429		350		295				147		
P				0.95	429		115		285				133		
P	4.6			3.05	429		350		290				133		
P				0.95	429		115		282				119		
P	4.5		10.5	3.05	429		350		295				140		
P				0.95	429		115		285				140		
P	4.4			3.05	429		350		295				154		
P				0.95	429		115		287				140		
P	4.3			3.05	429		350		295				147		
P				0.95	429		115		287				133		
P	4.2		10.5	3.05	429		350		295				140		
P				0.95	429		115		287				133		
P	4.1			3.05	429		350		295				147		
P				0.95	429		115		287				126		
P	1 TW Avg			3.02	429		350		295				145		
P	1 TW Avg			0.96			115		287				131		
													702		
	</														

LABORATORY DATA

Orsat Analysis

Operator

1

Act %

Net %

17.4

0.2

80.2

Molecular Weight, Dry

2

Act %

Net %

19.4

19.8

29.04

3

Act %

Net %

19.4

19.8

Net %

Net %

17.2

0.4

80.2

Net %

Net %

17.3

0.3

80.2

Avg

Particulate Analysis

Front-half Filter Dry Catch, mg

43.67

None used

Blank Filter Catch, mg

9.67

Filterable

Non-filterable

Front-half Acetone Wash, mg

22.44

3.99

Impinger Catch, mg

2.09

Filterable

Non-filterable

Back-half Acetone Rinse, mg

5.97

Not Applicable

Total Front-half Filterable, mg

53.34

26.43

Total Front-half Nonfilterable, mg

79.77

2.09

Total Back-half Filterable, mg

Total Pennsylvania DER Mass, mg

81.86

CALCULATIONS

Standard Temp, deg F	68		
Standard Press, in Hg	29.92		
Barometric Press, in Hg	29.01		
Stack Press, in Hg	28.99		
Vol of H2O Std, dscf	18.720		
M-5 Stack Moist. Content, %	37.47		
Sat Stack Moist. Content, %	35.04		
Stack Moist. Cont. Used, %	35.04		
Molecular Weight, DRY	29.04		
Molecular Weight, Wet	25.17		
Nozzle Dia, in	0.301		
X-Area of Stack, ft2	32.125		
Time-avg Stack Temp, deg F	161	Travel	Total
Meter Volume Corr, ft3	20.237	164	162
Meter Volume Std, dscf	19.923	11.315	31.730
Vol of H2O Std, dscf	10.745	6.102	31.238
Sample Time, min	18.27	19.70	16.848
Stack Vel, fps	66.47	34.58	37.97
Percent Isokinetic, %	103	105	
Stack Gas Vol, acfm	128130	66652	
Stack Gas Vol, dscfm	68609	35520	
Stack Gas Density, lb/ft3	0.0539	0.0536	
DER Part. Emission Conc., gr/dscf		0.0404	
DER Part. Emission Rate, lb/ton coke		0.0324	
DER Part. Emission Rate, lb/hr		2.24	
Front-half Part. Conc., gr/dscf		0.0394	
Front-half Part. Rate, lb/ton coke		0.0316	
Front-half Part. Rate, lb/hr		2.18	
Back-half Filt. Conc., gr/dscf		0.0010	
Back-half Filt. Rate, lb/ton coke		0.0008	
Back-half Filt. Rate, lb/hr		0.06	

DUCT VELOCITIES
AT SAMPLING PLANE

Push

	1	2	3	4
Position	51	78	83	49
	45	72	69	41
	46	66	65	53
	55	84	59	76
	64	83	64	78
	91	76	72	75

Position

Travel

	1	2	3	4
Position	30	39	39	25
	26	36	39	21
	26	42	33	26
	30	44	33	36
	33	42	33	36
	42	49	36	33

Position

FIELD DATA

Plant
 Date 12/13/84
 Car No. 104
 Battery No. 20
 Sample Location HCQC - Test Car
 Sample Type M-5
 Run Number 7.4
 Operator Jarman/Milburn
 No. of Ovens Tested 24
 No. of Ovens Tested/hr 4.7
 Coke Pld'n Rate, tons/oven 14.5
 Ambient Temp, deg F 60
 Barometric Pressure, in Hg 29.24
 Static Pressure, in H2O -0.07
 Stack Area, ft2 32.125
 Filter Type RA 934ah
 Top Filter Number RA102G-048
 Bottom Filter Number None
 Probe Length & Type 5 ft - TFE Lined
 Nozzle Size 0.302
 Pitot Coefficient 0.84
 Meter Box Number APT 12 LG Mod
 DGM Coeff's A1 0.0012
 A2 1.0171
 A3 0.0037
 Office Coeff's B 0.4821
 A 0.391
 Cal Press, in Hg 29.65
 Leak Check Initial 0.006
 Final 0.007
 in Hg 16
 CFM 0.007
 Water Volume:
 Location Initial 100
 Imp A1 100
 Imp A2 100
 Imp A3 0
 SII Gel A 673.4
 678.6
 138
 102
 1
 1
 1
 298
 Final Net Gain
 SII Gel B 662
 671.8
 1
 1
 2
 38
 5.2
 1
 1
 1
 356
 Total Volume
 Combined Impinger pH 3.0

Point No. Oven No. Start Time Sample Time sec DGM Start Gas Metr Rotometer Office del P in. WC

Point No.		Oven No.	Start Time	Sample Time	sec	DGM Start	Gas Metr	Rotometer	Office	del P	in. WC
1.6	B-1		9:30	89	45	356.070	21.1	0.50	0.23	0.50	
1.5	C-1		9:42	103	47	357.290	16	0.08	0.33	0.11	
1.4	A-3		9:57	78	46	358.320	16.7	0.33	0.11	0.50	
1.3	B-3		10:09	86	43	359.350	20.5	0.50	0.16	0.56	
1.2	C-3		10:21	96	45	360.550	22.2	0.56	0.20	0.75	
1.1	A-5		10:35	85	47	362.150	26	0.75	0.34	0.61	
2.6	B-5		10:47	89	46	363.560	25.7	0.61	0.29	0.37	
2.5	C-5		10:59	102	45	364.800	16.7	0.37	0.11	0.32	
2.4	A-7		11:11	86	48	365.800	16	0.32	0.77	0.36	
2.3	B-7		11:24	86	44	367.090	28.6	0.77	0.78	0.37	
2.2	C-7		11:36	100	45	368.730	26.2	0.78	0.37	0.75	
2.1	A-9		11:49	83	46	370.470	25	0.75	0.64	0.20	
3.6	B-9		12:02	92	46	372.040	23.2	0.64	0.20	0.60	
3.5	C-9		12:17	99	44	373.470	22.2	0.60	0.20	0.54	
3.4	A-11		12:29	82	44	374.950	21.1	0.54	0.16	0.26	
3.3	B-11		12:41	93	44	376.862	10.5	0.26	0.65	0.65	
3.2	C-11		12:53	100	44	377.740	21.1	0.65	0.26	0.65	
3.1	A-13		13:09	85	44	379.470	25.7	0.78	0.35	0.61	
4.6	B-13		13:21	90	43	381.050	18	0.61	0.21	0.42	
4.5	C-13		13:33	102	44	382.460	14.6	0.42	0.08	0.08	
4.4	A-15		13:45	84	46	384.040	20.5	0.59	0.78	0.40	
4.3	B-15		13:58	98	45	385.500	26.2	0.78	0.40	0.77	
4.2	C-15		14:10	102	46	387.450	26	0.77	0.35	0.79	
4.1	A-17		14:23	85	45	389.300	26.2	0.79	0.32	0.32	
Total					36.58	34.153					
Push					18.03	20.822					
Travel					18.55	13.331					

Point No.	Stack	Probe	Temperature, deg F	Oven Imping A	Imping B	GM In	GM Out
P	1.6	265	268	67	67	66	65
P	1.5	160	265	67	67	66	65
T	1.5	158	268	62	62	68	66
T	1.4	159	263	68	68	68	67
T	1.4	161	266	66	66	69	67
P	1.3	159	264	68	68	69	68
T	1.3	161	268	64	63	68	68
T	1.2	158	263	66	66	70	69
T	1.2	162	266	61	61	71	69
P	1.1	157	262	66	66	72	70
T	1.1	155	264	58	58	72	70
P	2.6	157	262	65	65	72	70
T	2.6	159	267	60	60	72	70
P	2.5	158	265	65	65	72	71
T	2.5	160	266	60	60	72	70
T	2.4	161	264	65	65	72	71
T	2.4	160	264	60	60	72	70
P	2.3	161	263	65	65	72	71
T	2.3	162	262	59	59	72	72
T	2.2	157	262	65	65	72	71
P	2.1	159	262	65	65	73	71
T	2.1	160	261	59	58	73	71
P	3.6	163	263	65	65	73	71
T	3.6	163	267	69	59	73	71
P	3.5	161	264	66	66	73	72
T	3.5	160	267	60	60	73	72
P	3.4	158	263	67	66	73	72
T	3.4	157	269	60	60	73	71
P	3.3	164	263	67	67	74	73
T	3.3	161	267	60	60	74	72
P	3.2	162	263	67	67	74	73
T	3.2	162	264	60	60	74	73
P	3.1	158	262	67	67	74	73
T	3.1	160	266	60	60	74	73
P	4.6	158	265	66	66	74	73
T	4.6	160	269	59	59	74	73
P	4.5	171	264	67	67	74	73
T	4.5	163	265	61	61	74	73
P	4.4	159	264	68	68	75	73
T	4.4	159	267	60	60	75	73
P	4.3	156	261	68	68	75	74
T	4.3	160	264	60	60	75	74
P	4.2	160	261	68	68	75	74
T	4.2	161	263	60	60	75	74
P	4.1	157	264	68	68	75	74
T	4.1	160	260	60	60	75	74

Point No. Pump Vac Vel Head Sqrt P Duct Vel Sep P In Opacity Seconds

P	TW Avg	P	TW Avg	1.00	0.60
1.6	1.00	1.00	0.40	0.63	41.26
1.5	0.60	0.60	0.77	50.45	25.29
1.4	0.65	0.81	52.55	29.20	63.53
1.3	0.95	0.97	38.62	65.13	38.66
1.2	1.00	1.00	0.59	1.00	65.13
1.1	2.00	1.41	92.03	52.38	77.00
2.6	1.40	1.18	77.00	46.09	52.51
2.5	0.65	0.81	52.51	29.17	50.57
2.4	0.60	0.77	41.26	87.59	52.68
2.3	1.80	1.34	87.59	79.70	48.50
2.2	1.50	1.22	79.70	94.46	54.58
2.1	2.10	1.45	94.46	71.63	41.36
3.6	1.20	1.10	68.47	38.59	65.13
3.5	1.10	0.63	41.36	68.47	38.59
3.4	1.00	1.00	65.13	35.64	62.09
3.3	0.90	0.95	62.09	33.92	65.34
3.2	1.00	1.00	65.34	38.66	78.43
3.1	1.45	1.20	78.43	43.76	56.40
4.6	0.75	0.87	56.40	32.62	46.54
4.5	0.50	0.71	46.54	25.33	63.53
4.4	0.95	0.97	63.53	32.59	79.64
4.3	1.50	1.22	79.64	43.76	91.10
4.2	0.45	0.67	43.76	41.29	79.70
4.1	1.50	1.22	79.70	0.59	38.59
1	0.35	0.35	0.35	0.59	38.59

45 5

25 1

25 1

25 1

Point	Separator Annubar	Tank T	Jet Flow	Jet P	Jet Temp Gas T In
1.6	3.1	414	365	295	203
1.5	3.1	414	115	287	175
1.4	3.1	414	365	295	189
1.3	3.1	414	365	295	189
1.2	3.1	414	360	285	196
1.1	3.1	414	115	295	203
2.6	3.1	414	360	285	203
2.5	3.05	414	365	285	203
2.4	3.05	414	365	295	196
2.3	3.05	414	115	287	168
2.2	3.05	414	365	295	210
2.1	3.05	414	115	287	196
3.6	3.05	414	370	295	203
3.5	3.05	414	115	287	203
3.4	3.05	414	365	295	196
3.3	3.05	414	115	285	203
3.2	3.05	414	365	295	203
3.1	3.05	414	115	287	175
4.6	3.05	414	115	287	203
4.5	3.05	414	365	295	203
4.4	3.05	414	115	287	175
4.3	3.05	414	365	295	196
4.2	3.05	414	115	287	175
4.1	3.05	414	365	295	203
1.5	1.5	414	115	287	175
3.06	3.06	414	365	295	200
1.49	1.49	115	115	286	174
P TW Avg					704

LABORATORY DATA

Orsat Analysis

Operator

Run

Gas

CO2

O2

CO

N2

Molecular Weight, Dry

29.06

AVG
Net %
18.3
2.1
0.0
79.7

Net %
18.2
2.2
0.0
79.6

Act %
20.4
2.2
20.4

Net %
18.2
2.2
0.0
79.6

Act %
20.4
2.2

Net %
18.4
1.8
0.0
79.8

Act %
20.2
1.8
20.2

Particulate Analysis

Front-half Filter Dry Catch, mg

8.27

None Used

Blank Filter Catch, mg

5.57

Filterable

Non-filterable

26.07

Front-half Acetone Wash, mg

5.82

Impinger Catch, mg

1.69

Filterable

Non-filterable

Not Applicable

Back-half Acetone Rinse, mg

6.63

Total Front-half Filterable, mg

13.84

Total Front-half Nonfilterable, mg

31.89

Total Front-half, mg

45.73

Total Back-half Filterable, mg

1.69

Total Pennsylvania DER Mass, mg

47.42

CALCULATIONS

Standard Temp, deg F 68
 Standard Press, in Hg 29.92
 Barometric Press, in Hg 29.24
 Stack Press, in Hg 29.23
 Vol of H2O Std, dscf 16.757
 M-5 Stack Moist. Content, % 32.60
 Sat Stack Moist. Content, % 33.02
 Stack Moist. Cont. Used, % 32.60
 Molecular Weight, Dry 29.06
 Molecular Weight, Wet 25.45
 Nozzle Dia, in 0.302
 X-Area of Stack, ft2 32.125

Push
 Time-avg Stack Temp, deg F 160
 Meter Volume Corr, ft3 21.289
 Meter Volume Std, dscf 21.125
 Vol of H2O Std, dscf 10.220
 Sample Time, min 18.03
 Stack Vel, fps 69.16
 Percent Isokinetic, % 101
 Stack Gas Vol, acfm 133306
 Stack Gas Vol, dscfm 74808
 Stack Gas Density, lb/ft3 0.0551
 DER Part. Emission Conc., gr/dscf 0.0211
 DER Part. Emission Rate, lb/ton coke 0.0185
 DER Part. Emission Rate, lb/hr 1.26
 Front-half Part. Conc., gr/dscf 0.0204
 Front-half Part. Rate, lb/ton coke 0.0178
 Front-half Part. Rate, lb/hr 1.22
 Back-half Part. Conc., gr/dscf 0.0008
 Back-half Part. Rate, lb/ton coke 0.0007
 Back-half Part. Rate, lb/hr 0.04

Travel
 Total 160
 34.905
 34.637
 16.757
 36.58

DUCT VELOCITIES
AT SAMPLING PLANE

Push

Position	Position			
	1	2	3	4
1	92	94	78	80
2	65	80	65	91
3	64	88	62	80
4	53	51	65	64
5	50	53	68	47
6	56	77	72	56

Travel

Position	Position			
	1	2	3	4
1	52	55	44	39
2	39	48	39	41
3	39	53	34	44
4	29	41	36	33
5	25	29	39	25
6	41	46	41	33

FIELD DATA

Plant
 Date 12/14/84
 Car No. 104
 Battery No. 20
 Sample Location HCC - Test Car
 Sample Type M-5
 Run Number 7.5
 Operator Jarman/Milburn
 No. of Ovens Tested 24
 No. of Ovens Tested/hr 4.4
 Coke P'd'n Rate, tons/oven 14.5
 Ambient Temp, deg F 60
 Barometric Pressure, in Hg 29.5
 Static Pressure, in H₂O -0.1
 Stack Area, ft² 32.125
 Filter Type RA 9344h
 Top Filter Number RA102G-049
 Bottom Filter Number None
 Probe Length & Type 5 ft - TFE Lined
 Nozzle Size 0.301
 Pitot Coefficient 0.84
 APT 12 LG Mod 0.0012
 DGM Coeff's A1 1.0171
 A2 0.0037
 A3 0.4821
 Office Coeff's B 0.391
 Cal Press, in Hg 29.65
 Leak Check Initial 18
 Final 19
 in Hg
 CFM 0.001
 Water Volume:
 Location Initial 412
 Final Net Gain 312
 Imp A1 100
 Imp A2 100
 Imp A3 0
 Sil Gel A 641
 Imp B1 100
 Imp B2 100
 Imp B3 0
 Sil Gel B 654
 Total Volume 664
 10
 361.5
 Combined Impinger pH 3.5

Point No. Oven No. Start Time Sample Time sec Total DGM Start- in. WC
Gas Metr Rotometer Office del P

Point No.	Oven No.	Start Time	Sample Time sec	Total	DGM Start-	in. WC
1.6 C-15	8:56	106	45	393.970	20.5	0.57
1.5 A-17	9:09	88	44	395.360	16	0.42
1.4 B-17	9:23	99	46	396.370	17.4	0.54
1.3 C-17	9:36	104	45	397.640	20	0.55
1.2 A-19	9:48	88	44	399.020	23.2	0.70
1.1 B-19	10:01	94	46	400.610	27	0.82
2.6 C-19	10:13	103	46	402.360	23.7	0.69
2.5 A-21	10:26	84	46	404.050	22.2	0.69
2.4 B-21	10:38	99	46	405.420	23.7	0.73
2.3 C-21	10:51	101	45	406.900	14.5	0.36
2.2 B-23	11:17	97	44	408.370	27	0.81
2.1 C-23	11:29	100	43	409.960	12.8	0.24
3.6 A-25	11:41	90	45	411.550	25.2	0.79
3.5 B-25	11:56	99	43	412.900	24.2	0.74
3.4 C-25	12:10	104	44	414.430	13.7	0.26
3.3 A-27	12:23	94	44	415.800	18.7	0.51
3.2 B-27	12:36	100	44	417.050	20.5	0.55
3.1 C-27	12:48	102	43	418.490	24.2	0.73
4.6 A-29	13:01	91	45	419.990	18	0.49
4.5 B-29	13:14	100	44	420.970	9.8	0.15
4.4 A-2	13:40	84	44	422.238	20.5	0.52
4.3 B-2	13:58	92	43	422.980	23.2	0.79
4.2 C-2	14:11	98	44	424.110	25.7	0.76
4.1 A-4	14:24	87	44	425.310	25.2	0.18
			43	425.610	13.7	0.25
Total			38.40	32.499		
Push			17.78	19.799		
Travel			20.62	12.700		

Point No.	Stack	Probe	Temperature, deg F	Oven Imping A	Imping B	GM In	GM Out
P	1.6	157	259	267	54	55	52
T		160	263	268	50	50	52
P	1.5	163	261	260	55	54	54
T		163	265	261	51	55	53
P	1.4	157	260	261	55	56	54
T		162	263	261	50	56	54
P	1.3	157	261	263	55	56	55
T		162	263	259	50	57	55
P	1.2	159	260	259	55	57	56
T		162	263	259	50	58	56
P	1.1	160	260	259	57	58	57
T		161	261	264	50	59	57
P	2.6	173	264	263	56	59	58
T		167	265	260	50	60	58
P	2.5	157	262	259	56	59	59
T		158	261	259	50	60	60
P	2.4	159	262	256	57	60	59
T		159	261	257	50	60	59
P	2.3	159	261	260	57	61	60
T		160	260	259	50	61	60
P	2.2	160	260	262	51	62	60
T		160	259	267	58	63	61
P	2.1	160	259	258	50	63	61
T		155	264	268	58	63	62
P	3.6	152	265	267	50	64	62
T		163	263	268	58	64	62
P	3.5	157	265	259	50	64	62
T		156	262	262	59	64	62
P	3.4	156	262	259	59	64	63
T		155	264	260	50	64	63
P	3.3	157	261	259	59	65	64
T		162	264	259	51	65	64
P	3.2	152	261	256	60	65	64
T		158	262	257	52	66	64
P	3.1	157	260	262	60	66	66
T		158	261	266	52	66	65
P	4.6	152	264	266	61	66	65
T		156	266	268	54	67	66
P	4.5	150	262	258	61	67	66
T		155	263	261	54	67	66
P	4.4	158	262	259	62	68	67
T		157	266	260	54	68	67
P	4.3	154	261	257	62	68	67
T		154	265	262	60	69	68
P	4.2	159	260	264	62	69	68
T		159	261	264	60	69	68
P	4.1	160	262	263	62	69	68
T		159	262	264	60	69	68
P		158	263	264	60	69	68

Point No.	Pump Vac	in Hg	Head	Sqft	del P	Duct Vel	in H2O	Opacit	Seconds
1.6	P	1	0.90	0.95	61.33	0.67	43.43	65	1
1.5	P	1	0.60	0.77	50.31	0.59	38.34	60	3
1.4	P	4	0.70	0.84	54.08	0.45	29.05		
1.3	P	4	0.90	0.95	61.33	0.39	25.14		
1.2	P	5	1.20	1.10	70.93	0.50	32.45		
1.1	P	7	2.10	1.45	93.90	0.74	48.10		
2.6	P	6	1.25	1.12	73.20	0.63	41.21		
2.5	P	5	1.10	1.05	67.80	0.63	41.21		
2.4	P	5	1.25	1.12	72.39	0.71	45.78		
2.3	P	1	0.60	0.77	50.15	0.39	25.10		
2.2	P	6.5	1.60	1.26	81.97	0.63	40.88		
2.1	P	3	0.90	0.95	61.47	0.59	38.34		
3.6	P	5	1.40	1.18	76.36	0.63	40.72		
3.5	P	5	1.30	1.14	74.06	0.67	43.36		
3.4	P	4	0.95	0.97	62.95	0.55	35.35		
3.3	P	1	0.80	0.89	57.82	0.50	32.45		
3.2	P	4	0.95	0.97	62.75	0.36	23.33		
3.1	P	5	1.30	1.14	73.70	0.62	40.40		
4.6	P	3	0.75	0.87	55.75	0.50	32.30		
4.5	P	2	0.40	0.63	40.65	0.39	25.00		
4.4	P	4	0.95	0.97	63.06	0.55	35.41		
4.3	P	6	1.10	1.05	67.63	0.55	35.32		
4.2	P	6	1.45	1.20	77.97	0.59	38.31		
4.1	P	6	1.40	1.18	76.67	0.67	43.43		
P TW Avg			0.90	0.95	61.33	0.67	43.43		
T TW Avg			0.56	1.02					

Point	Separator	Annubar	Tank T	Jet Flow	Jet P	Jet Temp Gas T In
No.	P, in. WC	in. WC	deg F	gpm	psig	deg F
1.6	11	3.1	414	360	295	203
1.5	11	3.1	414	365	295	210
1.4		3.1	414	360	295	203
1.3	11	3.1	414	365	295	203
1.2	11	3.05	414	365	287	175
1.1		3.05	414	365	295	203
2.6		3.05	414	360	295	203
2.5	11	3.05	414	360	295	203
2.4		3.05	414	360	295	203
2.3		3.05	414	360	295	203
2.2		3.05	414	365	295	196
2.1		3.05	414	365	295	203
3.6	11	3.05	414	365	295	189
3.5		3.05	414	360	295	189
3.4		3.05	414	360	295	175
3.3	11	3.05	414	360	295	203
3.2		3.05	414	360	295	196
3.1		3.05	414	360	295	196
4.6	11	3.05	414	360	295	203
4.5		3.05	414	360	295	203
4.4		3.05	414	355	295	196
4.3		3.05	414	345	295	154
4.2	11	3.05	414	360	275	196
4.1		3.05	414	360	295	182
		1.35	414	120	287	161
		3.06	414	361	294	197
		1.36		119	286	171
						705

LABORATORY DATA

Orsat Analysis

Operator

Run

Gas

CO2

O2

CO

N2

Molecular Weight, Dry

29.06

1

Act %

1.8

20.2

20.2

0.0

79.8

Net %

1.8

18.4

20.4

0.0

79.8

Act %

2.2

20.4

20.4

0.0

79.6

Net %

2.2

18.2

20.4

0.0

79.6

Act %

2.2

20.4

20.4

0.0

79.6

Net %

2.2

18.2

20.4

0.0

79.6

Net %

2.1

18.3

0.0

79.7

AVG

Particulate Analysis

Front-half Filter Dry Catch, mg

9.98

None used

Blank Filter Catch, mg

2.35

Filterable

Front-half Acetone Wash, mg

15.58

Non-filterable

Front-half Acetone Wash, mg

2.17

Impinger Catch, mg

1.46

Filterable

Back-half Acetone Rinse, mg

3.55

Not Applicable

Total Front-half Filterable, mg

12.33

Total Front-half Nonfilterable, mg

17.75

Total Front-half, mg

30.08

Total Back-half Filterable, mg

1.46

Total Pennsylvania DER Mass, mg

31.54

DUCT VELOCITIES AT SAMPLING PLANE

Push

	1	2	3	4
Position	61	73	76	56
5	50	68	74	41
4	54	72	63	63
3	61	50	58	68
2	71	82	63	78
1	94	61	74	77

Travel

	1	2	3	4
Position	38	41	41	32
5	29	41	43	25
4	25	46	35	35
3	32	25	32	35
2	41	41	23	38
1	48	38	40	43

FIELD DATA

Plant
 Date
 10/19/84
 104
 20
 HCOC - Test Car
 M-5
 3.1
 Operator
 Jarman/Smith
 24
 4.2
 14.5
 78
 30.45
 0.5
 32.125
 RA 934 AH
 RA102G-017
 RA102G-022
 5 ft - TFE lined
 0.302
 0.84
 APT 12 LG Mod
 0.0012
 1.0171
 0.0037
 0.4821
 0.391
 29.65
 Cal Press, in Hg
 A
 Office Coeff's B
 A3
 A2
 A1
 DGM Coeff's
 Meter Box Number
 Pitot Coefficient
 Nozzle Size
 Probe Length & Type
 Bottom Filter Number
 Top Filter Number
 Filter Type
 Stack Area, ft²
 Static Pressure, in H₂O
 Barometric Pressure, in Hg
 Ambient Temp, deg F
 Coke Pld'n Rate, tons/oven
 No. of Ovens Tested/hr
 No. of Ovens Tested
 24
 Car No.
 Battery No.
 Sample Location
 Sample Type
 Run Number
 Leak Check Initial
 Final
 in Hg
 16
 15
 CFM
 0.000
 0.001
 Water Volume:
 Location Initial
 100
 Imp A1
 100
 Imp A2
 100
 Imp A3
 658.7
 S11 Gel A
 100
 Imp B1
 100
 Imp B2
 100
 Imp B3
 0
 S11 Gel B
 659.2
 Total Volume
 666.9
 102.2
 236
 666.5
 7.8
 136
 2.2
 0
 7.7
 537.7
 Combined Impinger pH
 3.5

	Point No.	Oven No.	Start Time	Sample Time		Gas Metr ft3	Rotometer	Orifice del P in. WC
				Total	sec DGM Start			
						752.570		
P	1.6	C-21		111	49	753.360		0.43
T					62	753.929		0.11
P	1.5	A-23		95	52	754.610		0.30
T					43	754.879		0.08
P	1.4	B-23		100	51	755.580		0.32
T					49	755.923		0.08
P	1.3	A-25		92	49	756.740		
T					43	757.171		
P	1.2	B-25		104	52	758.050		
T					52	758.719		0.25
P	1.1	C-25		106	50	759.900		1.10
T					56	760.810		
P	2.6	A-27		84	49	761.850		0.86
T					35	762.403		0.39
P	2.5	B-27		101	50	763.410		0.73
T					51	764.108		0.27
P	2.4	C-27		111	50	765.100		0.71
T					61	765.996		0.34
P	2.3	A-29		98	49	767.080		0.88
T					49	767.848		0.38
P	2.2	B-29		104	50	769.000		0.95
T					54	769.840		0.39
P	2.1	C-29		110	50	771.100		1.10
T					60	772.095		0.40
P	3.6	A-2		81	47	773.160		0.97
T					34	773.640		0.35
P	3.5	B-2		92	48	774.690		0.91
T					44	775.363		0.37
P	3.4	C-2		96	48	776.330		0.75
T					48	776.945		0.26
P	3.3	A-4		82	48	777.820		0.57
T					34	778.253		0.23
P	3.2	B-4		90	48	779.120		0.60
T					42	779.609		0.21
P	3.1	C-4		103	50	780.680		0.87
T					53	781.475		0.30
P	4.6	A-6		81	44	782.430		0.85
T					37	782.935		0.28
P	4.5	B-6		92	44	783.540		
T					48	783.928		0.08
P	4.4	C-6		100	49	784.800		0.67
T					51	785.490		0.24
P	4.3	A-8		80	47	786.530		
T					33	787.046		0.33
P	4.2	B-8		91	49	788.150		0.97
T					42	788.725		0.30
P	4.1	A-10		86	49	789.701		0.83
T					37	790.151		
Total (Time in minutes)					38.17	37.581		
Push					19.53	23.031	File: DAT	301
Travel					18.63	14.550	Page 2 of 8	

	Point No.	Temperature, deg F					
		Stack	Probe	Oven	Imping A	Imping B	GM In GM Out
P	1.6	157	276	244	79		72 72
T		163	275	248	67		72 71
P	1.5	155	274	243	79		75 73
T		159	273	256	65		75 73
P	1.4	153	274	249	80		77 75
T		157	276	258	67		78 76
P	1.3	155	273	246	80		79 77
T		158	276	253	67		81 80
P	1.2	156	273	252	81		83 82
T		159	274	252	63		85 82
P	1.1	150	272	254	83		86 84
T		157	272	257	60		87 84
P	2.6	157	274	258	83		87 85
T		156	272	261	61		88 85
P	2.5	150	274	256	83		88 86
T		158	274	254	63		88 86
P	2.4	153	274	254	83		89 87
T		160	270	287	62		89 87
P	2.3	162	273	253	82		90 88
T		159	270	252	61.5		91 88
P	2.2	157	273	252	83		91 90
T		159	272	252	61.5		91 89
P	2.1	156	273	253	83		91 90
T		159	269	252	61.5		92 89
P	3.6	151	274	252	83		91 90
T		157	274	260	61		92 90
P	3.5	151	274	252	83		92 90
T		154	274	256	63		92 90
P	3.4	150	273	234	83		92 91
T		154	274	259	64		92 90
P	3.3	153	273	255	83		92 91
T		157	273	253	65		92 90
P	3.2	152	273	254	83		93 91
T		157	274	253	63		92 90
P	3.1	154	273	254	83		92 92
T		157	272	259	61		92 90
P	4.6	153	273	253	83		92 91
T		156	270	254	63		95 95
P	4.5	155	274	254	81		92 91
T		154	271	256	61		93 91
P	4.4	154	273	254	81		93 92
T		155	273	253	61		93 91
P	4.3	153	272	255	78		92 91
T		158	272	257	60		92 90
P	4.2	156	272	253	77		92 90
T		158	273	258	59		91 90
P	4.1	157	269	248	79		90 89
T		159	268	251	59		89 98
P TW Avg		154					
T TW Avg		158					

	Point No.	Pump Vac in Hg	Vel Head in H2O	Sqrt del P	Duct Vel fps	Sep P In in H2O	Opacity > 20%	Seconds > 20%
P	1.6	3	0.83	0.91	57.86			
T		1	0.20	0.45	28.54			
P	1.5	2	0.45	0.67	42.54			
T		1	0.15	0.39	24.64			
P	1.4		0.53	0.72	45.87			
T			0.15	0.39	24.60			
P	1.3		0.95	0.97	61.80			
T		1	0.25	0.50	31.78			
P	1.2	5	1.15	1.07	68.05			
T		2	0.35	0.59	37.63			
P	1.1		2.20	1.48	93.67			
T		2	0.65	0.81	51.20			
P	2.6		1.70	1.30	82.81			
T			0.60	0.77	49.16			
P	2.5	5	1.40	1.18	74.72			
T		3	0.45	0.67	42.64			
P	2.4	5	1.40	1.18	74.90			
T		3	0.55	0.74	47.22			
P	2.3	7	1.70	1.30	83.14			
T		3	0.60	0.77	49.28			
P	2.2	7	1.80	1.34	85.21			
T		3	0.60	0.77	49.28			
P	2.1	9.5	2.40	1.55	98.31			
T			0.75	0.87	55.09			
P	3.6	7	1.90	1.38	87.12			
T		2.5	0.55	0.74	47.10			
P	3.5	7	1.70	1.30	82.41			
T		2.5	0.55	0.74	46.99			
P	3.4	5	1.40	1.18	74.72			
T		2	0.40	0.63	40.07			
P	3.3	4.5	1.00	1.00	63.31			
T		2	0.33	0.57	36.48			
P	3.2	4.5	1.20	1.10	69.29			
T			0.31	0.56	35.36			
P	3.1	6.5	1.80	1.34	85.00			
T		2.5	0.50	0.71	44.91			
P	4.6	6	1.60	1.26	80.08			
T			0.50	0.71	44.87			
P	4.5		0.60	0.77	49.12			
T			0.15	0.39	24.54			
P	4.4	5	1.30	1.14	72.24			
T		2	0.40	0.63	40.10			
P	4.3	7	1.90	1.38	87.26			
T		2	0.50	0.71	44.95			
P	4.2	7	2.00	1.41	89.75			
T		3	0.50	0.71	44.95			
P	4.1	7	1.70	1.30	82.81			
T			0.75	0.87	55.09			
P TW Avg				1.18				
T TW Avg				0.65				

	Point No.	Separator P, in. WC	Annubar in. WC	Tank T deg F	Jet Flow gpm	Jet P psig	Jet Temp deg F	Gas T In deg F
P	1.6		4	420	400	290	420	154
T			1.6	420	110	275	420	147
P	1.5		4	420	400	290	420	154
T			1.6	420	110	280	420	168
P	1.4		4	426	400	295	420	147
T			1.6	426	110	285	420	168
P	1.3		4	432	408	290	430	140
T			1.6	432	110	280	430	168
P	1.2		4	432	408	295	420	154
T			1.6	432	110	285	420	252
P	1.1		4.4	432	408	310	426	147
T			1.6	432	110	295	426	168
P	2.6		2.6	432	400	305	426	133
T			1.2	432	110	290	426	147
P	2.5		2.6	432	400	300	420	140
T			1.2	432	110	290	420	196
P	2.4		2.5	432	400	300	426	140
T			1.2	432	110	290	420	154
P	2.3		2.5	432	400	300	420	140
T			1.2	432	110	290	414	168
P	2.2		2.5	432	400	300	420	140
T			1.2	432	110	290	414	154
P	2.1		2.5	432	400	300	420	154
T			1.2	432	110	290	420	168
P	3.6		2.5	432	400	300	420	140
T			1.2	432	110	290	414	210
P	3.5		2.5	432	400	300	420	140
T			1.2	432	110	290	414	154
P	3.4		2.5	432	400	300	414	140
T			1.2	432	110	290	414	168
P	3.3			426	400	300	414	126
T				426	110	290	414	154
P	3.2			426	400	300	414	140
T				426	110	290	414	154
P	3.1			426	400	300	414	147
T				426	110	290	414	168
P	4.6			426	400	300	414	140
T				426	110	290	414	154
P	4.5			426	400	300	414	140
T				426	110	290	414	154
P	4.4			426	400	300	414	133
T				426	110	290	414	154
P	4.3			426	400	300	408	140
T				426	110	290	408	140
P	4.2			426	400	300	420	133
T				426	110	290	420	140
P	4.1			426	400	300	420	140
T				426	110	290	420	154
P TW Avg			2.00	429	401	299	419	142
T TW Avg			0.90		110	288	418	166

LABORATORY DATA

Orsat Analysis

Operator - DaRos

Run	1		2		3		Avg
Gas	Act %	Net %	Act %	Net %	Act %	Net %	Net %
CO2	1.8	1.8	1.8	1.8	1.8	1.8	1.8
O2	19.6	17.8	21.0	19.2	20.4	18.6	18.5
CO	19.6	0.0	21.0	0.0	20.4	0.0	0.0
N2		80.4		79.0		79.6	79.7
Molecular Weight, Dry			29.03				

Particulate Analysis

Front-half Filter Dry Catch, mg	11.81
Blank Filter Catch, mg	-0.33
Front-half Aqueous Wash, mg	
Filterable	5.19
Non-filterable	17.15
Front-half Acetone Wash, mg	3.15
Impinger Catch, mg	
Filterable	1.08
Non-filterable	Not Applicable
Back-half Acetone rinse, mg	7.18
Total Front-half Filterable, mg	16.67
Total Front-half Nonfilterable, mg	20.30

Total Front-half, mg	36.97
Total Back-half Filterable, mg	1.08

Total Pennsylvania DER Mass, mg	38.05

CALCULATIONS

Standard Temp, deg F	68
Standard Press, in Hg	29.92
Barometric Press, in Hg	30.45
Stack Press, in Hg	30.49
Vol of H2O Std, dscf	25.310
M-5 Stack Moist. Content, %	38.94
Sat Stack Moist. Content, %	28.61
Stack Moist. Cont. Used, %	28.61
Molecular Weight, Dry	29.03
Molecular Weight, Wet	25.87
Nozzle Dia, in	0.302
X-Area of Stack, ft2	32.125

	Push	Travel	Total
Time-avg Stack Temp, deg F	154	158	156
Meter Volume Corr, ft3	23.549	14.863	38.412
Meter Volume Std, dscf	24.335	15.359	39.694
Vol of H2O Std, dscf	9.753	6.156	15.909
Sample Time, min	19.53	18.63	38.17
Stack Vel, fps	74.62	41.48	
Percent Isokinetic, %	90	107	
Stack Gas Vol, acfm	143837	79949	
Stack Gas Vol, dscfm	89946	49714	
Stack Gas Density, lb/ft3	0.0589	0.0585	
DER Part. Emission Conc., gr/dscf		0.0148	
DER Part. Emission Rate, lb/ton coke		0.0163	
DER Part. Emission Rate, lb/hr		1.00	
Front-half Part. Conc., gr/dscf		0.0144	
Front-half Part. Rate, lb/ton coke		0.0158	
Front-half Part. Rate, lb/hr		0.97	
Back-half Filt. Conc., gr/dscf		0.0004	
Back-half Filt. Rate, lb/ton coke		0.0005	
Back-half Filt. Rate, lb/hr		0.03	

**DUCT VELOCITIES
AT SAMPLING PLANE**

Push

Position	6	58	83	87	80
	5	43	75	82	49
	4	46	75	75	72
	3	62	83	63	87
	2	68	85	69	90
	1	94	98	85	83
		1	2	3	4
		Position			

Travel

Position	6	29	49	47	45
	5	25	43	47	25
	4	25	47	40	40
	3	32	49	36	45
	2	38	49	35	45
	1	51	55	45	55
		1	2	3	4
		Position			

FIELD DATA

Plant	USS - Clairton, PA
Date	10-21-84
Car No.	104
Battery No.	20
Sample Location	HCQC - Test Car
Sample Type	M-5
Run Number	3.2
Operator	Jarman/Smith
No. of Ovens Tested	12
No. of Ovens Tested/hr	4.0
Coke Prd'n Rate, tons/oven	14.5
Ambient Temp, deg F	~50
Barometric Pressure, in Hg	30.41
Static Pressure, in H ₂ O	-0.5
Stack Area, ft ²	32.125
Filter Type	RA 934 AH
Top Filter Number	RA102G-021
Bottom Filter Number	RA102G-020
Probe Length & Type	5 ft - TFE Lined
Nozzle Size	0.302
Pitot Coefficient	0.84
Meter Box Number	APT 12 LG Mod
DGM Coeff's A1	0.0012
A2	1.0171
A3	0.0037
Orifice Coeff's B	0.4821
A	0.391
Cal Press, in Hg	29.65

	in Hg	CFM
Leak Check Initial	15	0.006
Final	15	0.010

Water Volume:			
Location	Initial	Final	Net Gain
Imp A1	100	284	184
Imp A2	100	96	-4
Imp A3	0	0	0
Sil Gel A	666.9	671.8	4.9
Imp B1	100	138	38
Imp B2	100	101	1
Imp B3	0	0	0
Sil Gel B	666.5	671.4	4.9
Total Volume			228.8

Combined Impinger pH	3.5
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[illegible]

Point No.	-----		Temperature, deg F		Imping B	GM In	GM Out
	Stack	Probe	Oven	Imping A			
P 1.6	156	273	252	73.5		75	74
	158	274	265	62		75	74
P 1.5	153	271	250	74.5		76	75
	159	272	271	64		76	75
P 1.4	151	269	267	75.5		77	76
	159	275	269	64.5		77	76
P 1.3	152	271	262	76		77	76
	157	274	270	63.5		78	77
P 1.2	170	270	259	78		78	77
	160	274	268	60		79	78
P 1.1	154	269	265	78		79	78
	159	272	271	59		79	77
P 2.6	153	271	270	78		80	79
	154	273	273	60		81	80
P 2.5	157	272	269	78		81	80
	165	271	268	60		82	80
P 2.4	151	269	266	78		82	81
	158	270	267	60		82	80
P 2.3	157	267	263	78		82	81
	162	270	269	60		81	80
P 2.2	157	267	263	77		82	81
	159	270	262	59		82	81
P 2.1	165	266	259	78		82	81
	163	269	266	61		82	81

P TW Avg	156						
T TW Avg	159						
						File: DAT	30

	Point No.	Pump Vac in Hg	Vel Head in H ₂ O	Sqrt del P	Duct Vel fps	Sep P In in H ₂ O	Opacity > 20%	Seconds > 20%
P	1.6	2	0.64	0.80	50.94			
T			0.20	0.45	28.52			
P	1.5	2	0.40	0.63	40.18			
T		1	0.15	0.39	24.72			
P	1.4	2	0.50	0.71	44.85			
T		1	0.15	0.39	24.72			
P	1.3	3.5	0.75	0.87	54.97			
T		1	0.27	0.52	33.12			
P	1.2		1.20	1.10	70.55			
T		2	0.40	0.63	40.40			
P	1.1		2.10	1.45	92.13			
T			0.60	0.77	49.45			
P	2.6	5	1.20	1.10	69.59			
T		2	0.50	0.71	44.96			
P	2.5	4	0.80	0.89	57.00			
T		2	0.40	0.63	40.57			
P	2.4	5	1.40	1.18	75.04			
T		2	0.55	0.74	47.30			
P	2.3	6	1.70	1.30	83.10			
T			0.55	0.74	47.46			
P	2.2	7	1.80	1.34	85.50			
T		3	0.58	0.76	48.61			
P	2.1		2.40	1.55	99.37			
T			0.85	0.92	59.04			
P TW Avg				1.08				
T TW Avg				0.63				

[illegible]

LABORATORY DATA

Orsat Analysis

Operator - DaRos

Run	1		2		3		Avg
Gas	Act %	Net %	Act %	Net %	Act %	Net %	Net %
CO2	2.8	2.8	2.7	2.7	2.7	2.7	2.7
O2	20.0	17.3	20.0	17.3	20.0	17.3	17.3
CO	20.2	0.2	20.2	0.2	20.1	0.1	0.2
N2		79.8		79.8		79.9	79.8
Molecular Weight, Dry			29.13				

Particulate Analysis

Front-half Filter Dry Catch, mg	7.76
Blank Filter Catch, mg	-0.23
Front-half Aqueous Wash, mg	
Filterable	1.31
Non-filterable	3.66
Front-half Acetone Wash, mg	2.80
Impinger Catch, mg	
Filterable	1.41
Non-filterable	Not Applicable
Back-half Acetone rinse, mg	5.85
Total Front-half Filterable, mg	8.84
Total Front-half Nonfilterable, mg	6.46

Total Front-half, mg	15.30
Total Back-half Filterable, mg	1.41

Total Pennsylvania DER Mass, mg	16.71

CALCULATIONS

Standard Temp, deg F	68
Standard Press, in Hg	29.92
Barometric Press, in Hg	30.41
Stack Press, in Hg	30.37
Vol of H2O Std, dscf	10.770
M-5 Stack Moist. Content, %	35.79
Sat Stack Moist. Content, %	29.97
Stack Moist. Cont. Used, %	29.97
Molecular Weight, Dry	29.13
Molecular Weight, Wet	25.79
Nozzle Dia, in	0.302
X-Area of Stack, ft2	32.125

	Push	Travel	Total
Time-avg Stack Temp, deg F	156	159	158
Meter Volume Corr, ft3	12.328	6.393	18.721
Meter Volume Std, dscf	12.723	6.597	19.320
Vol of H2O Std, dscf	5.445	2.823	8.268
Sample Time, min	10.42	9.22	19.63
Stack Vel, fps	68.87	40.20	
Percent Isokinetic, %	98	99	
Stack Gas Vol, acfm	132752	77491	
Stack Gas Vol, dscfm	80884	46960	
Stack Gas Density, lb/ft3	0.0583	0.0580	
DER Part. Emission Conc., gr/dscf		0.0133	
DER Part. Emission Rate, lb/ton coke		0.0140	
DER Part. Emission Rate, lb/hr		0.81	
Front-half Part. Conc., gr/dscf		0.0122	
Front-half Part. Rate, lb/ton coke		0.0128	
Front-half Part. Rate, lb/hr		0.74	
Back-half Filt. Conc., gr/dscf		0.0011	
Back-half Filt. Rate, lb/ton coke		0.0012	
Back-half Filt. Rate, lb/hr		0.07	

**DUCT VELOCITIES
AT SAMPLING PLANE**

Push

Position	6	51	70	0	0
	5	40	57	0	0
	4	45	75	0	0
	3	55	83	0	0
	2	71	86	0	0
	1	92	99	0	0
		1	2	3	4

Position

Travel

Position	6	29	45	0	0
	5	25	41	0	0
	4	25	47	0	0
	3	33	47	0	0
	2	40	49	0	0
	1	49	59	0	0
		1	2	3	4

Position

FIELD DATA

Plant	USS - Clairton, PA
Date	10-23-84
Car No.	104
Battery No.	20
Sample Location	HCQC - Test Car
Sample Type	M-5
Run Number	3.3
Operator	Jarman/Smith
No. of Ovens Tested	24
No. of Ovens Tested/hr	3.4
Coke Prd'n Rate, tons/oven	14.5
Ambient Temp, deg F	50
Barometric Pressure, in Hg	30.8
Static Pressure, in H2O	-0.5
Stack Area, ft ²	32.125
Filter Type	RA 934 AH
Top Filter Number	RA102G-025
Bottom Filter Number	RA102G-026
Probe Length & Type	5 ft - TFE Lined
Nozzle Size	0.302
Pitot Coefficient	0.84
Meter Box Number	APT 12 LG Mod
DGM Coeff's A1	0.0012
A2	1.0171
A3	0.0037
Orifice Coeff's B	0.4821
A	0.391
Cal Press, in Hg	29.65

	in Hg	CFM
Leak Check Initial	16	0.006
Final	10	0.005

Water Volume:			
Location	Initial	Final	Net Gain
Imp A1	100	399	299
Imp A2	100	100	0
Imp A3	0	0	0
Sil Gel A	670.6	676.4	5.8
Imp B1	100	152	52
Imp B2	100	101	1
Imp B3	0	0	0
Sil Gel B	658.5	667.3	8.8
Total Volume			366.6

Combined Impinger pH	3.0
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	Point No.	Oven No.	Start Time	Sample Time		Gas Metr ft3	Rotometer	Orifice del P in. WC
				Total	sec DGM Start			
						834.663		
P	1.6	A-17		85	50	835.430		0.38
T					35	835.711		0.11
P	1.5	B-17		95	48	836.350		0.31
T					47	836.720		0.05
P	1.4	C-17		106	49	837.440		0.36
T					57	837.896		0.11
P	1.3	A-19		93	47	838.690		0.42
T					46	839.112		
P	1.2	B-19		98	46	839.970		0.65
T					52	840.610		0.19
P	1.1	C-19		103	48	841.700		0.92
T					55	842.448		0.31
P	2.6	A-21		87	49	843.400		0.56
T					38	843.863		0.23
P	2.5	B-21		98	48	844.800		0.62
T					50	845.415		0.23
P	2.4	C-21		100	47	846.300		0.62
T					53	846.995		0.26
P	2.3	A-23		88	46	847.970		0.78
T					42	848.535		0.24
P	2.2	B-23		96	47	849.540		0.80
T					49	850.176		0.20
P	2.1	C-23		105	48	851.370		1.10
T					57	852.258		0.35
P	3.6	A-25		87	48	853.290		0.74
T					39	853.837		0.29
P	3.5	B-25		97	48	854.900		0.81
T					49	855.522		0.24
P	3.4	C-25		105	49	856.330		0.48
T					56	856.871		0.11
P	3.3	A-29		93	49	857.700		0.52
T					44	858.228		0.22
P	3.2	B-29		94	47	859.030		0.48
T					47	859.485		0.15
P	3.1	C-29		107	46	860.470		0.78
T					61	861.221		0.23
P	4.6	A-2		84	47	862.120		0.53
T					37	862.482		0.16
P	4.5	B-2		92	45	863.150		0.30
T					47	863.355		
P	4.4	C-2		97	48	864.240		0.56
T					49	864.829		0.23
P	4.3	A-4		80	47	865.840		0.80
T					33	866.253		0.22
P	4.2	B-4		92	50	867.370		0.84
T					42	867.903		0.21
P	4.1	C-4		101	47	868.880		0.73
T					54	869.595		0.25
Total (Time in minutes)						38.05	34.932	
Push						19.07	21.892	File: DAT 303
Travel						18.98	13.040	Page 2 of 8

Point No.		Temperature, deg F -----						
		Stack	Probe	Oven	Imping A	Imping B	GM In	GM Out
P	1.6	153	271					
T		160	274					
P	1.5	157	270					
T		162	273					
P	1.4	159	271					
T		165	272					
P	1.3	154	270					
T		163	274					
P	1.2	152	270					
T		160	271					
P	1.1	160	270					
T		164	272					
P	2.6	155	270					
T		163	272					
P	2.5	152	271					
T		157	272					
P	2.4	151	270					
T		157	272					
P	2.3	151	271					
T		157	274					
P	2.2	159	271					
T		160	272					
P	2.1	159	269					
T		159	272					
P	3.6	153	271					
T		157	273					
P	3.5	155	270					
T		158	272					
P	3.4	159	269					
T		158	272					
P	3.3	152	272					
T		159	273					
P	3.2	154	273					
T		158	273					
P	3.1	154	272					
T		158	273					
P	4.6	157	273					
T		155	274					
P	4.5	154	272					
T		157	272					
P	4.4	153	271					
T		156	272					
P	4.3	155	271					
T		157	271					
P	4.2	154	270					
T		158	271					
P	4.1	154	270					
T		157	269					
P TW Avg		155						
T TW Avg		159						

	Point No.	Pump Vac in Hg	Vel Head in H2O	Sqrt del P	Duct Vel fps	Sep P In in H2O	Opacity > 20%	Seconds > 20%
P	1.6	3	0.65	0.81	50.85			
T		1	0.20	0.45	28.37			
P	1.5		0.55	0.74	46.93			
T		0	0.10	0.32	20.09			
P	1.4	3	0.55	0.74	47.01			
T		0	0.15	0.39	24.67			
P	1.3	3.5	0.75	0.87	54.67			
T			0.25	0.50	31.79			
P	1.2	4.5	1.20	1.10	69.04			
T		1	0.35	0.59	37.53			
P	1.1	7	1.80	1.34	85.11			
T		2.5	0.52	0.72	45.89			
P	2.6	4	0.90	0.95	59.94			
T			0.35	0.59	37.62			
P	2.5	4.5	1.10	1.05	66.10			
T		1	0.35	0.59	37.44			
P	2.4	4	1.10	1.05	66.05			
T		2	0.35	0.59	37.44			
P	2.3	5	1.40	1.18	74.51			
T		2	0.45	0.67	42.45			
P	2.2	6	1.50	1.22	77.63			
T			0.45	0.67	42.55			
P	2.1	7	2.30	1.52	96.13			
T		3	0.55	0.74	47.01			
P	3.6		1.30	1.14	71.92			
T		2	0.38	0.62	39.01			
P	3.5		1.50	1.22	77.38			
T		2	0.35	0.59	37.47			
P	3.4	4	1.00	1.00	63.38			
T		0	0.20	0.45	28.32			
P	3.3	3.5	0.90	0.95	59.79			
T			0.28	0.53	33.54			
P	3.2	3.5	0.85	0.92	58.20			
T		1	0.26	0.51	32.29			
P	3.1	5	1.30	1.14	71.98			
T		2	0.35	0.59	37.47			
P	4.6		0.96	0.98	62.00			
T		1	0.27	0.52	32.83			
P	4.5	3	0.50	0.71	44.64			
T		0	0.15	0.39	24.51			
P	4.4	4	1.00	1.00	63.08			
T		2	0.29	0.54	34.05			
P	4.3	6	1.40	1.18	74.75			
T		2	0.35	0.59	37.44			
P	4.2	7	1.60	1.26	79.85			
T			0.35	0.59	37.47			
P	4.1	6	1.30	1.14	71.98			
T		2	0.35	0.59	37.44			
P TW Avg				1.05				
T TW Avg				0.56				

	Point No.	Separator P, in. WC	Annubar in. WC	Tank T deg F	Jet Flow gpm	Jet P psig	Jet Temp deg F	Gas T In deg F
P	1.6			432	408	305	408	147
T				432	110	295	414	140
P	1.5			432	408	305	426	140
T				432	110	295	426	140
P	1.4			432	400	310	408	140
T				432	110	300	408	140
P	1.3			432	396	295	414	126
T				432	110	285	414	133
P	1.2			432	396	310	414	140
T				432	110	300	414	140
P	1.1			432	396	305	426	147
T				432	110	295	426	147
P	2.6			432	396	305	414	147
T				432	110	295	414	147
P	2.5			432	375	300	420	133
T				432	110	290	420	133
P	2.4			429	375	285	426	126
T				429	110	275	426	133
P	2.3			429	360	285	426	133
T				429	110	275	423	133
P	2.2			429	375	295	423	140
T				429	110	285	423	147
P	2.1			429	375	295	420	154
T				429	110	285	420	140
P	3.6			429	375	295	420	154
T				429	110	285	420	147
P	3.5			429	375	295	426	147
T				429	110	285	426	147
P	3.4			429	375	295	420	161
T				429	110	285	420	147
P	3.3			429	375	295	420	168
T				429	110	285	420	147
P	3.2			429	375	295	420	161
T				429	110	285	420	140
P	3.1			429	375	295	420	154
T				429	110	285	420	140
P	4.6			429	375	295	410	168
T				429	110	285	410	147
P	4.5			429	375	295	410	154
T				429	110	285	410	147
P	4.4			429	375	295	402	154
T				429	110	285	402	140
P	4.3			429	375	295	410	154
T				429	110	285	410	147
P	4.2			429	375	295	410	147
T				429	110	285	410	140
P	4.1			429	375	295	410	154
T				429	110	285	410	140
P	TW Avg		0.00	430	382	297	417	148
T	TW Avg		0.00		110	287	417	142

LABORATORY DATA

Orsat Analysis

Operator - DaRos

Run	1		2		3		Avg
Gas	Act %	Net %	Act %	Net %	Act %	Net %	Net %
CO2	2.0	2.0	2.0	2.0	2.0	2.0	2.0
O2	20.0	18.0	20.0	18.0	20.0	18.0	18.0
CO	20.2	0.2	20.2	0.2	20.2	0.2	0.2
N2		79.8		79.8		79.8	79.8
Molecular Weight, Dry			29.04				

Particulate Analysis

Front-half Filter Dry Catch, mg	4.97
Blank Filter Catch, mg	0.10
Front-half Aqueous Wash, mg	
Filterable	3.70
Non-filterable	12.94
Front-half Acetone Wash, mg	5.16
Impinger Catch, mg	
Filterable	1.35
Non-filterable	Not Applicable
Back-half Acetone rinse, mg	7.55
Total Front-half Filterable, mg	8.77
Total Front-half Nonfilterable, mg	18.10

Total Front-half, mg	26.87
Total Back-half Filterable, mg	1.35

Total Pennsylvania DER Mass, mg	28.22

CALCULATIONS

Standard Temp, deg F	68
Standard Press, in Hg	29.92
Barometric Press, in Hg	30.80
Stack Press, in Hg	30.76
Vol of H2O Std, dscf	17.256
M-5 Stack Moist. Content, %	31.62
Sat Stack Moist. Content, %	29.09
Stack Moist. Cont. Used, %	29.09
Molecular Weight, Dry	29.04
Molecular Weight, Wet	25.83
Nozzle Dia, in	0.302
X-Area of Stack, ft2	32.125

	Push	Travel	Total
Time-avg Stack Temp, deg F	155	159	157
Meter Volume Corr, ft3	22.382	13.319	35.701
Meter Volume Std, dscf	23.395	13.922	37.317
Vol of H2O Std, dscf	9.599	5.712	15.311
Sample Time, min	19.07	18.98	38.05
Stack Vel, fps	66.36	35.30	
Percent Isokinetic, %	99	112	
Stack Gas Vol, acfm	127908	68038	
Stack Gas Vol, dscfm	80079	42308	
Stack Gas Density, lb/ft3	0.0592	0.0588	
DER Part. Emission Conc., gr/dscf		0.0117	
DER Part. Emission Rate, lb/ton coke		0.0112	
DER Part. Emission Rate, lb/hr		0.54	
Front-half Part. Conc., gr/dscf		0.0111	
Front-half Part. Rate, lb/ton coke		0.0106	
Front-half Part. Rate, lb/hr		0.52	
Back-half Filt. Conc., gr/dscf		0.0006	
Back-half Filt. Rate, lb/ton coke		0.0005	
Back-half Filt. Rate, lb/hr		0.03	

**DUCT VELOCITIES
AT SAMPLING PLANE**

Push

Position	6	51	60	72	62
	5	47	66	77	45
	4	47	66	63	63
	3	55	75	60	75
	2	69	78	58	80
	1	85	96	72	72
		1	2	3	4
		Position			

Travel

Position	6	28	38	39	33
	5	20	37	37	25
	4	25	37	28	34
	3	32	42	34	37
	2	38	43	32	37
	1	46	47	37	37
		1	2	3	4
		Position			

FIELD DATA

Plant	USS - Clairton, PA
Date	10-24-84
Car No.	104
Battery No.	20
Sample Location	HCQC - Test Car
Sample Type	M-5
Run Number	3.4
Operator	Jarman/Smith
No. of Ovens Tested	24
No. of Ovens Tested/hr	4.5
Coke Prd'n Rate, tons/oven	14.5
Ambient Temp, deg F	~60
Barometric Pressure, in Hg	30.79
Static Pressure, in H2O	-0.5
Stack Area, ft ²	32.125
Filter Type	RA 934 AH
Top Filter Number	RA102G-030
Bottom Filter Number	RA102G-031
Probe Length & Type	5 ft - TFE Lined
Nozzle Size	0.302
Pitot Coefficient	0.84
Meter Box Number	APT 12 LG Mod
DGM Coeff's A1	0.0012
A2	1.0171
A3	0.0037
Orifice Coeff's B	0.4821
A	0.391
Cal Press, in Hg	29.65

	in Hg	CFM
Leak Check Initial	17	0.006
Final	15	0.000

Water Volume:

Location	Initial	Final	Net Gain
Imp A1	100	381	281
Imp A2	100	102	2
Imp A3	0	0	0
Sil Gel A	676.4	682	5.6
Imp B1	100	78	-22
Imp B2	100	101	1
Imp B3	0	0	0
Sil Gel B	663.3	672.2	8.9
Total Volume			276.5

Combined Impinger pH	3.0
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	Point No.	-----		Temperature, deg F -----			
		Stack	Probe	Oven	Imping A	Imping B	GM In GM Out
P	1.6	154	271	241	59		
T		162	272	247	50		
P	1.5	157	269	250	59		
T		161	272	249	55		
P	1.4	157	271	245	59		
T		161	273	249	54.5		
P	1.3	156	270	252	60		
T		170	271	254	50		
P	1.2	157	269	254	60		
T		161	271	251	55		
P	1.1	154	270		60		
T		161	269	252	53		
P	2.6	155	272	261	62		
T		162	276	260	53		
P	2.5	155	270	256	62		
T		163	271	258	56		
P	2.4	157	270	260	63		
T		163	270	258	57		
P	2.3	157	268	253	64		
T		160	269	250	57		
P	2.2	155	269	254	64		
T		160	269	253	57		
P	2.1	158	269	257	64		
T		162	268	254	57		
P	3.6	153	268	255	64		
T		160	268	255	58		
P	3.5	155	271	255	64		
T		158	270	256	58.5		
P	3.4	156	270	264	63		
T		160	270	267	58		
P	3.3	157	271	270	64		
T		158	271	265	59		
P	3.2	154	270	260	64		
T		160	270	258	59		
P	3.1	157	268	252	64		
T		160	270	247	57.5		
P	4.6	154	269	252	64		
T		156	272	254	57		
P	4.5	156	270	260	64		
T		159	272	262	59		
P	4.4	155	270	260	64		
T		160	272	260	57		
P	4.3	153	270	261	64		
T		159	272	260	58.5		
P	4.2	154	268	255	64		
T		160	271	253	59		
P	4.1	154	268	249	64		
T		159	268	249	57		

P TW Avg		155					
T TW Avg		161					

	Point No.	Pump Vac in Hg	Vel Head in H2O	Sqrt del P	Duct Vel fps	Sep P In in H2O	Opacity > 20%	Seconds > 20%
P	1.6	3	0.65	0.81	50.96			
T			0.25	0.50	31.81			
P	1.5	2	0.52	0.72	45.69			
T			0.15	0.39	24.62			
P	1.4	2	0.50	0.71	44.80			
T		1	0.20	0.45	28.43			
P	1.3	4	0.75	0.87	54.83			
T		1	0.25	0.50	32.01			
P	1.2	4.5	1.00	1.00	63.36			
T			0.30	0.55	34.81			
P	1.1	7	0.20	0.45	28.27			
T			0.50	0.71	44.95			
P	2.6	5	1.20	1.10	69.29			
T		2	0.35	0.59	37.63			
P	2.5	5	1.10	1.05	66.34			
T			0.40	0.63	40.27			
P	2.4	6	1.30	1.14	72.24			
T			0.50	0.71	45.02			
P	2.3		1.50	1.22	77.60			
T		2	0.45	0.67	42.60			
P	2.2	6	1.50	1.22	77.47			
T		2	0.45	0.67	42.60			
P	2.1	8	2.00	1.41	89.67			
T		3.5	0.70	0.84	53.22			
P	3.6	5	1.20	1.10	69.18			
T			0.40	0.63	40.17			
P	3.5	6.5	1.60	1.26	80.01			
T		2	0.45	0.67	42.54			
P	3.4	4	0.95	0.97	61.70			
T			0.25	0.50	31.76			
P	3.3	4	0.90	0.95	60.11			
T		1	0.30	0.55	34.73			
P	3.2	4	0.85	0.92	58.27			
T			0.30	0.55	34.79			
P	3.1	5	1.10	1.05	66.45			
T			0.40	0.63	40.17			
P	4.6	3	0.65	0.81	50.96			
T		1	0.25	0.50	31.65			
P	4.5	3	0.60	0.77	49.04			
T			0.15	0.39	24.58			
P	4.4	4.5	1.00	1.00	63.26			
T		2	0.30	0.55	34.79			
P	4.3	6	1.30	1.14	72.00			
T		2	0.35	0.59	37.54			
P	4.2	7	1.60	1.26	79.95			
T			0.40	0.63	40.17			
P	4.1	6	1.30	1.14	72.06			
T			0.32	0.57	35.90			

P TW Avg
T TW Avg

1.00
0.58

	Point No.	Separator P, in. WC	Annubar in. WC	Tank T deg F	Jet Flow gpm	Jet P psig	Jet Temp deg F	Gas T In deg F
P	1.6		2.6	426	375	287	408	147
T			1.25	426	110	280	408	154
P	1.5		2.6	429	375	290	414	147
T			1.25	429	110	280	414	140
P	1.4		2.6	429	375	295	417	147
T			1.25	429	110	285	417	140
P	1.3		2.7	429	375	297	420	161
T			1.25	429	110	287	420	154
P	1.2		2.7	429	375	295	423	161
T			1.2	429	110	285	423	147
P	1.1		2.7	429	375	295	426	161
T			1.2	429	110	285	426	147
P	2.6		2.6	426	375	300	426	161
T			1.2	426	110	295	420	140
P	2.5		2.6	429	375	295	429	182
T			1.4	429	110	285	429	161
P	2.4		2.6	429	375	295	420	175
T			1.4	429	110	285	420	154
P	2.3		2.7	429	375	295	426	161
T			1.4	429	110	285	426	147
P	2.2		2.7	429	375	297	429	168
T			1.3	429	110	285	429	154
P	2.1		2.7	429	375	297	426	182
T			1.3	429	110	287	426	147
P	3.6		2.65	429	375	300	429	182
T			1.3	429	110	290	429	147
P	3.5		2.65	429	375	297	426	168
T			1.3	429	110	290	426	154
P	3.4		2.65	429	375	297	429	154
T			1.3	429	110	287	429	147
P	3.3		2.65	429	375	292	426	175
T			1.3	429	110	285	426	140
P	3.2		2.6	429	375	295	429	154
T			1.3	429	110	290	429	147
P	3.1		2.6	429	375	295	429	175
T			1.3	429	110	287	429	147
P	4.6		2.6	429	360	292	426	161
T			1.3	429	110	282	426	147
P	4.5		2.6	429	370	297	426	161
T			1.3	429	110	287	426	154
P	4.4		2.7	429	370	297	426	175
T			1.3	429	110	287	426	140
P	4.3		2.7	429	370	297	426	168
T			1.25	429	110	287	426	147
P	4.2		2.7	429	370	297	426	168
T			1.25	429	110	287	426	140
P	4.1		2.7	429	370	297	426	168
T			1.25	429	110	287	426	140
P	TW Avg		2.65	429	373	295	424	165
T	TW Avg		1.28		110	286	424	147

LABORATORY DATA

Orsat Analysis

Operator - DaRos

Run	1		2		3		Avg
Gas	Act %	Net %	Act %	Net %	Act %	Net %	Net %
CO2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
O2	20.6	18.4	20.4	18.2	20.6	18.4	18.3
CO	20.9	0.3	20.6	0.2	20.9	0.3	0.3
N2		79.1		79.4		79.1	79.2
Molecular Weight, Dry			29.09				

Particulate Analysis

Front-half Filter Dry Catch, mg	14.00
Blank Filter Catch, mg	-0.05
Front-half Aqueous Wash, mg	
Filterable	4.00
Non-filterable	19.56
Front-half Acetone Wash, mg	0.47
Impinger Catch, mg	
Filterable	2.31
Non-filterable	Not Applicable
Back-half Acetone rinse, mg	5.24
Total Front-half Filterable, mg	17.95
Total Front-half Nonfilterable, mg	20.03

Total Front-half, mg	37.98
Total Back-half Filterable, mg	2.31

Total Pennsylvania DER Mass, mg	40.29

CALCULATIONS

Standard Temp, deg F	68
Standard Press, in Hg	29.92
Barometric Press, in Hg	30.79
Stack Press, in Hg	30.75
Vol of H2O Std, dscf	13.015
M-5 Stack Moist. Content, %	34.43
Sat Stack Moist. Content, %	29.87
Stack Moist. Cont. Used, %	29.87
Molecular Weight, Dry	29.09
Molecular Weight, Wet	25.77
Nozzle Dia, in	0.302
X-Area of Stack, ft2	32.125

	Push	Travel	Total
Time-avg Stack Temp, deg F	155	161	158
Meter Volume Corr, ft3	23.696	0.022	23.718
Meter Volume Std, dscf	24.760	0.023	24.783
Vol of H2O Std, dscf	10.546	0.010	10.556
Sample Time, min	18.92	18.05	36.97
Stack Vel, fps	63.38	36.78	
Percent Isokinetic, %	112	0	
Stack Gas Vol, acfm	122166	70893	
Stack Gas Vol, dscfm	75550	43467	
Stack Gas Density, lb/ft3	0.0590	0.0585	
DER Part. Emission Conc., gr/dscf		0.0251	
DER Part. Emission Rate, lb/ton coke		0.0228	
DER Part. Emission Rate, lb/hr		1.48	
Front-half Part. Conc., gr/dscf		0.0236	
Front-half Part. Rate, lb/ton coke		0.0215	
Front-half Part. Rate, lb/hr		1.39	
Back-half Filt. Conc., gr/dscf		0.0014	
Back-half Filt. Rate, lb/ton coke		0.0013	
Back-half Filt. Rate, lb/hr		0.08	

**DUCT VELOCITIES
AT SAMPLING PLANE**

Push

Position	6	51	69	69	51
	5	46	66	80	49
	4	45	72	62	63
	3	55	78	60	72
	2	63	77	58	80
	1	28	90	66	72
		1	2	3	4

Position

Travel

Position	6	32	38	40	32
	5	25	40	43	25
	4	28	45	32	35
	3	32	43	35	38
	2	35	43	35	40
	1	45	53	40	36
		1	2	3	4

Position