

SOURCE COMPLIANCE TEST REPORT

CITGO PETROLEUM CORPORATION

Petroleum Refinery Information Collection Request (ICR)

Component 4 Emission Test Program

Fluidized Catalytic Cracking Unit (FCCU)

B-Cat Wet Gas Scrubber (EQT039) [Source ID 3(II)17]

VOLUME III OF III

Prepared for:

CITGO Petroleum Corporation

Lake Charles Manufacturing Complex

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Richard Ishikawa



Shaw® Shaw Environmental, Inc.

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Test Date: May 17, 2011 through May 27, 2011

Shaw Project No. 142733

CITGO Petroleum Corporation

Petroleum Refinery Information Collection Request (ICR)

DAT Reports

DAT Reports®

Data Analysis Technologies, Inc.

7715 Corporate Blvd.
Plain City, OH 43064
800-733-8644

Sample Analysis Certificate

Client: Shaw Environmental, Inc.
Address: 4171 Essen Lane
Baton Rouge, LA 70809

Date: 6/30/2011
DAT Project ID: 0511030
Date Received: 5/26/2011
Date Analyzed: 6/22/2011

Attn: Richard Ishikawa
Client Project: CITGO ICR
Analysis: Method 0010/Method 23

The following samples were received on 5/26/2011:

DAT Sample ID	Client Sample ID	Date Sampled	Matrix
0511030-1	1427333-052311-0010/23-1-1	5/23/2011	air filter
0511030-10	1427333-052311-0010/23-4-2	5/23/2011	air
0511030-11	1427333-052311-0010/23-5-2	5/23/2011	rinse
0511030-12	1427333-052311-0010/23-6-2	5/23/2011	rinse
0511030-13	1427333-052311-0010/23-1-3	5/24/2011	air filter
0511030-14	1427333-052311-0010/23-2-3	5/24/2011	solvents
0511030-15	1427333-052311-0010/23-3-3	5/24/2011	toluene
0511030-16	1427333-052311-0010/23-4-3	5/24/2011	air
0511030-17	1427333-052311-0010/23-5-3	5/24/2011	rinse
0511030-18	1427333-052311-0010/23-6-3	5/24/2011	rinse
0511030-19	1427333-052411-0010/23-A-BL	5/24/2011	acetone
0511030-2	1427333-052311-0010/23-2-1	5/23/2011	solvents
0511030-20	1427333-052411-0010/23-M-BL	5/24/2011	methylene
0511030-21	1427333-052411-0010/23-T-BL	5/24/2011	toluene
0511030-3	1427333-052311-0010/23-3-1	5/23/2011	toluene
0511030-4	1427333-052311-0010/23-4-1	5/23/2011	air
0511030-5	1427333-052311-0010/23-5-1	5/23/2011	rinse
0511030-6	1427333-052311-0010/23-6-1	5/23/2011	rinse
0511030-7	1427333-052311-0010/23-1-2	5/23/2011	air filter

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0511030-8	1427333-052311-0010/23-2-2	5/23/2011	solvents
0511030-9	1427333-052311-0010/23-3-2	5/23/2011	toluene

Results: See attached summary.

QC: Met the criteria for the method. See attached summary.

Reviewed and approved for release by:


Ronald K. Mitchum, Ph.D.
President, DAT

Date: 6/15/11

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EPA Method 0010/SW-8270C
MODIFIED METHOD 5 SAMPLING TRAIN

Summary:

This method is applicable to the determination of Destruction and Removal Efficiency (DRE) of semi-volatile Principal Organic Hazardous Compounds (POHCs) from incineration systems (PHS, 1967). This method also may be used to determine particulate emission rates from stationary sources as per EPA Method 5.

Scope:

Gaseous and particulate pollutants are withdrawn from an emission source at an isokinetic sampling rate and are collected in a multicomponent sampling train. Principal components of the train include a high-efficiency glass- or quartz-fiber filter and a packed bed of porous polymeric adsorbent resin. The filter is used to collect organic-laden particulate materials and the porous polymeric resin to adsorb semivolatile organic species. Semivolatile species are defined as compounds with boiling points >100°C.

EPA Method 0010/SW-8270C

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Analytical:

The base analytical method is EPA SW-846-8270C. The method is valid for a wide range of organic compounds with boiling points $>100^{\circ}\text{C}$. Method 0010 when run in conjunction with method 23 will have interfering low boiling components such as toluene and n-decane which will interfere with early eluting components. These components have not been included in the analytical list. Compound identification is based upon the chromatographic retention time and the correct mass response. The analyst checks the validity of each assignment and the data is electronically tabulated to the enclosed SVOC Sample Summary for each sample.

The quality assurance program required for this study includes the analysis of field and method blanks, procedure validation, incorporation of stable labeled surrogate compounds, quantitation versus stable labeled internal standards, capillary column performance checks, and external performance tests. The surrogate spiking compounds selected for a particular analysis are used as primary indicators of the quality of the analytical data for a wide range of compounds and a variety of sample matrices. The assessment of combustion data, positive identification, and quantitation of the selected compounds are dependent on the integrity of the samples received and the precision and accuracy of the analytical methods employed. The quality assurance procedures for this method are designed to monitor the performance of the analytical method and to provide the required information to take corrective action if problems are observed in laboratory operations.

SVOC Sample Summary

Client ID 1427333-052311-0010/23-5-1
Lab ID 0511030-5 aq

Data File Name 06211R10.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator rkm
 Date Acquired 6/22/11
 Acq. Method File 8270.CN
 Sample Amount (kg, l) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 1.0
 Sample Type N

Name	Amount (ug)	RL (ug)	DL(ug)	Q
N-Nitrosodimethylamine	ND	2.00	0.06	
Pyridine	ND	2	0.19	
Aniline	ND	2	1.11	
Phenol	153.9	2	0.12	
Bis(2-chloroethyl)ether	ND	2	0.13	
2-Chlorophenol	ND	2	0.13	
1,3-Dichlorobenzene	ND	2	0.15	
1,4-dichlorobenzene	ND	2	0.20	
1,2-Dichlorobenzene	ND	2	0.24	
Benzyl Alcohol	ND	2	0.08	
bis(2-Chloroisopropyl)ether	ND	2	0.23	
2-Methylphenol	47.5	2	0.24	
Hexachloroethane	ND	2	0.34	
N-Nitrosodi-n-propylamine	ND	2	0.07	
3/4-Methylphenol	50.1	2	0.23	
Nitrobenzene	ND	2	0.07	
Isoproprene	ND	2	0.05	
2-Nitrophenol	ND	2	0.10	
2,4-dimethylphenol	ND	2	0.05	
bis(2-Chloroethoxy)methane	ND	2	0.07	
2,4-Dichlorophenol	ND	2	0.09	
1,2,4-Trichlorobenzene	ND	2	0.09	
Naphthalene	ND	2	0.29	
4-Chloroaniline	ND	2	0.17	
Hexachlorobutadiene	ND	2	0.22	
4-Chloro-3-methylphenol	ND	2	0.12	
2-Methylnaphthalene	ND	2	0.11	
1-Methylnaphthalene	ND	2	0.11	
Hexachlorocyclopentadiene	ND	2	0.25	
2,4,6-Trichlorophenol	ND	2	0.09	
2,4,5-Trichlorophenol	ND	2	0.15	
2-Chloronaphthalene	ND	2	0.16	
2-Nitroaniline	ND	2	0.06	
Benzene, 1,4-dinitro-	ND	2	0.05	
Benzene, 1,3-dinitro-	ND	2	0.11	
Acenaphthylene	ND	2	0.07	
Dimethyl phthalate	ND	2	0.13	
2,6-Dinitrotoluene	ND	2	0.11	
Benzene, 1,2-dinitro-	ND	2	0.18	
Acenaphthene	ND	2	0.23	

3-Nitroaniline	ND	2	0.11
2,4-Dinitrophenol	ND	2	0.18
Dibenzofuran	ND	2	0.17
4-Nitrophenol	ND	2	0.16
2,4-Dinitrotoluene	ND	2	0.17
Phenol, 2,3,5,6-tetrachloro-	ND	2	0.48
Phenol, 2,3,4,6-tetrachloro-	ND	2	0.15
Fluorene	ND	2	0.09
4-Chlorophenylphenylether	ND	2	0.21
Diethylphthalate	ND	2	0.21
4-Nitroaniline	ND	2	0.14
2-Methyl-4,6-dinitrophenol	ND	2	0.09
Diphenylamine	ND	2	0.11
Azobenzene	ND	2	0.09
4-Bromophenylphenylether	ND	2	0.08
Hexachlorobenzene	ND	2	0.11
Pentachlorophenol	ND	2	0.08
Phenanthrene	ND	2	0.26
Anthracene	ND	2	0.07
Carbazole	ND	2	0.23
Di-n-butylphthalate	ND	2	0.24
Fluoranthene	ND	2	0.10
Pyrene	ND	2	0.08
Butylbenzylphthalate	ND	2	0.05
Benz[a]anthracene	ND	2	0.33
Chrysene	ND	2	0.23
Bis(2-ethylhexyl) phthalate	ND	2	0.25
Di-n-octylphthalate	ND	2	0.15
Benzo[b]fluoranthene	ND	2	0.06
Benzo[k]fluoranthene	ND	2	0.09
Benzo[a,c]pyrene	ND	2	0.20
Indeno[1,2,3-cd]pyrene	ND	2	0.21
Dibenz[a,h]anthracene	ND	2	0.20
Benzo[ghi]perylene	ND	2	0.22
2-fluorophenol(surr)	X	2	
Phenol-d5(surr)	36.0	2	
Nitrobenzene-d5(surr)	66.2	2	
2,4,6-Tribromophenol(surr)	64.3	2	
2-Fluorobiphenyl(surr)	67.2	2	
Terphenyl-d14(surr)	74.5	2	

X= Interference due to 0010/0023 sampling
 BN=<5X the associated blank value

SVOC Sample Summary

Client ID 1427333-052311-0010/23-4
Lab ID 0511030-1,2,4,6 xad

Data File Name 06211R14.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator rkm
 Date Acquired 6/22/11
 Acq. Method File 827.CN
 Sample Amount (kg, L) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 5.0
 Sample Type N

Name	Amount (ug)	RL (ug)	DL(ug)	Q
N-Nitrosodimethylamine	ND	10.00	0.31	
Pyridine	ND	10	0.93	
Aniline	ND	10	5.53	
Phenol	15.9	10	0.59	
Bis(2-chloroethyl)ether	ND	10	0.67	
2-Chlorophenol	ND	10	0.66	
1,3-Dichlorobenzene	ND	10	0.77	
1,4-dichlorobenzene	ND	10	1.02	
1,2-Dichlorobenzene	ND	10	1.19	
Benzyl Alcohol	ND	10	0.39	3N
bis(2-Chloroisopropyl)ether	ND	10	1.16	
2-Methylphenol	62.1	10	1.20	
Hexachloroethane	ND	10	1.70	
N-Nitrosodi-n-propylamine	ND	10	0.35	
3/4-Methylphenol	61.9	10	1.16	
Nitrobenzene	ND	10	0.34	
Isophorone	ND	10	0.24	
2-Nitrophenol	ND	10	0.51	
2,4-dimethylphenol	ND	10	0.24	
bis(2-Chloroethoxy)methane	ND	10	0.35	
2,4-Dichlorophenol	ND	10	0.43	
1,2,4-Trichlorobenzene	ND	10	0.45	
Naphthalene	ND	10	1.45	
4-Chloroaniline	ND	10	0.84	
Hexachlorocyclopentadiene	ND	10	1.09	
4-Chloro-3-methylphenol	ND	10	0.62	
2-Methylnaphthalene	ND	10	0.55	
1-Methylnaphthalene	ND	10	0.53	
Hexachlorocyclopentadiene	ND	10	1.26	
2,4,6-Trichlorophenol	ND	10	0.43	
2,4,5-Trichlorophenol	ND	10	0.74	
2-Chloronaphthalene	ND	10	0.81	
2-Nitroaniline	ND	10	0.28	
Benzene, 1,4-dinitro-	ND	10	0.26	
Benzene, 1,3-dinitro-	ND	10	0.57	
Acenaphthylene	ND	10	0.37	
Dimethyl phthalate	ND	10	0.64	
2,6-Dinitrotoluene	ND	10	0.55	
Benzene, 1,2-dinitro-	ND	10	0.92	
Acenaphthene	ND	10	1.15	

3-Nitroaniline	ND	10	0.57
2,4-Dinitrophenol	ND	10	0.90
Dibenzofuran	ND	10	0.84
4-Nitrophenol	ND	10	0.79
2,4-Dinitrotoluene	ND	10	0.85
Phenol, 2,3,5,6-tetrachloro-	ND	10	2.42
Phenol, 2,3,4,6-tetrachloro-	ND	10	0.76
Fluorene	ND	10	0.43
4-Chlorophenylphenylether	ND	10	1.03
Diethylphthalate	ND	10	1.05
4-Nitroaniline	ND	10	0.70
2-Methyl-4,6-dinitrophenol	ND	10	0.46
Diphenylamine	ND	10	0.57
Azobenzene	ND	10	0.46
4-Bromophenylphenylether	ND	10	0.39
Hexachlorobenzene	ND	10	0.56
Pentachlorophenol	ND	10	0.42
Phenanthrene	ND	10	1.32
Anthracene	ND	10	0.37
Carbazole	ND	10	1.16
Di-n-butylphthalate	ND	10	1.20
Fluoranthene	ND	10	0.49
Pyrene	ND	10	0.40
Butylbenzylphthalate	ND	10	0.26
Benz[a]anthracene	ND	10	1.64
Chrysene	ND	10	1.16
Bis(2-ethylhexyl) phthalate	94.3	10	1.25
Di-n-octylphthalate	ND	10	0.77
Benzo[b]fluoranthene	ND	10	0.30
Benzo[k]fluoranthene	ND	10	0.45
Benzo[a/c]pyrene	ND	10	1.02
Indeno[1,2,3-cd]pyrene	ND	10	1.05
Dibenz[a,h]anthracene	ND	10	0.99
Benzo[ghi]perylene	ND	10	1.09
2-fluorophenol(surr)	X	10	
Phenol-d5(surr)	10.6	10	
Nitrobenzene-d5(surr)	32.2	10	
2,4,6-Tribromophenol(surr)	71.5	10	
2-Fluorobiphenyl(surr)	63.4	10	
Terphenyl-d14(surr)	87.8	10	

X= Interference due to 0010.0023 sampling
 BN<=5X the associated blank value

SVOC Sample Summary

Client ID 1427333-052311-0010/23-5-2
Lab ID 0511030-11aq

Data File Name 06211X11.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator
 Date Acquired 6/22/11
 Acq. Method File 8270CN
 Sample Amount (kg, L) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 1.0
 Sample Type N

Name	Amount (ug)	RL (ug)	DL(ug)	Q
N-Nitrosodimethylamine	ND	2.00	0.06	
Pyridine	ND	2	0.19	
Aniline	ND	2	1.11	
Phenol	127.6	2	0.12	
Bis(2-chloroethyl)ether	ND	2	0.13	
2-Chlorophenol	ND	2	0.13	
1,3-Dichlorobenzene	ND	2	0.15	
1,4-dichlorobenzene	ND	2	0.20	
1,2-Dichlorobenzene	ND	2	0.24	
Benzyl Alcohol	ND	2	0.08	
bis(2-Chloroisopropyl)ether	ND	2	0.23	
2-Methylphenol	21.9	2	0.24	
Hexachloroethane	ND	2	0.34	
N-Nitrosod-n-propylamine	ND	2	0.07	
3/4-Methylphenol	20.1	2	0.23	
Nitrobenzene	ND	2	0.07	
Isopropene	ND	2	0.05	
2-Nitrophenol	ND	2	0.10	
2,4-dimethylphenol	ND	2	0.05	
bis(2-Chloroethoxy)methane	ND	2	0.07	
2,4-Dichlorophenol	ND	2	0.09	
1,2,4-Trichlorobenzene	ND	2	0.09	
Naphthalene	ND	2	0.20	
4-Chloroaniline	ND	2	0.17	
Hexachlorobutadiene	ND	2	0.22	
4-Chloro-3-methylphenol	ND	2	0.12	
2-Methylnaphthalene	ND	2	0.11	
1-Methylnaphthalene	ND	2	0.11	
Hexachlorocyclopentadiene	ND	2	0.25	
2,4,6-Trichlorophenol	ND	2	0.09	
2,4,6-Trichlorophenol	ND	2	0.15	
2-Chloronaphthalene	ND	2	0.16	
2-Nitroaniline	ND	2	0.06	
Benzene, 1,4-dinitro-	ND	2	0.05	
Benzene, 1,3-dinitro-	ND	2	0.11	
Acenaphthylene	ND	2	0.07	
Dimethyl phthalate	ND	2	0.13	
2,6-Dinitrotoluene	ND	2	0.11	
Benzene, 1,2-dinitro-	ND	2	0.18	
Acenaphthene	ND	2	0.23	

3-Nitroaniline	ND	2	0.11
2,4-Dinitrophenol	ND	2	0.18
Dibenzofuran	ND	2	0.17
4-Nitrophenol	ND	2	0.16
2,4-Dinitrotoluene	ND	2	0.17
Phenol, 2,3,5,6-tetrachloro-	ND	2	0.48
Phenol, 2,3,4,6-tetrachloro-	ND	2	0.15
Fluorene	ND	2	0.09
4-Chlorophenylphenylether	ND	2	0.21
Diethylphthalate	ND	2	0.21
4-Nitroaniline	ND	2	0.14
2-Methyl-4,6-dinitrophenol	ND	2	0.09
Diphenylamine	ND	2	0.11
Azobenzene	ND	2	0.09
4-Bromophenylphenylether	ND	2	0.08
Hexachlorobenzene	ND	2	0.11
Pentachlorophenol	NU	2	0.08
Phenanthrene	ND	2	0.26
Anthracene	ND	2	0.07
Carbazole	ND	2	0.23
Di-n-butylphthalate	ND	2	0.24
Fluoranthene	ND	2	0.10
Pyrene	ND	2	0.08
Butylbenzylphthalate	ND	2	0.05
Benz[a]anthracene	ND	2	0.33
Chrysene	ND	2	0.23
Bis(2-ethylhexyl) phthalate	ND	2	0.25
Di-n-octylphthalate	ND	2	0.15
Benzo(b)fluoranthene	ND	2	0.06
Benzo(k)fluoranthene	ND	2	0.09
Benzo(a/c)pyrene	ND	2	0.20
Indeno[1,2,3-cd]pyrene	ND	2	0.21
Dibenz[a,h]anthracene	ND	2	0.20
Benzo[ghi]perylene	ND	2	0.22
2-fluorophenol(surr)	X	2	
Phenol-d5(surr)	30.7	2	
Nitrobenzene-d5(surr)	51.4	2	
2,4,6-Tribromophenol(surr)	46.7	2	
2-Fluorobiphenyl(surr)	50.6	2	
Terphenyl-d14(surr)	64.6	2	

X= Interference due to 0010/0023 sampling
 BN=<5X the associated blank value

SVOC Sample Summary

Client ID 1427333-052311-0010/23-4-2
Lab ID 0511030-7,8,10,12 xad

Data File Name 06211R15.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator rkm
 Date Acquired 5/22/11
 Acq. Method File 8270CN
 Sample Amount (kg, L) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 5.0
 Sample Type N

Name	Amount (ug)	RL (ug)	DL(ug)	Q
N-Nitrosodimethylamine	ND	10.03	0.31	
Pyridine	ND	10	0.93	
Aniline	ND	10	5.53	
Phenol	24.5	10	0.59	
Bis(2-chloroethyl)ether	ND	10	0.67	
2-Chlorophenol	ND	10	0.66	
1,3-Dichlorobenzene	ND	10	0.77	
1,4-dichlorobenzene	ND	10	1.02	
1,2-Dichlorobenzene	ND	10	1.19	
Benzyl Alcohol	ND	10	0.39	3N
bis(2-Chloroisopropyl)ether	ND	10	1.16	
2-Methylphenol	99.8	10	1.20	
Hexachloroethane	ND	10	1.70	
N-Nitrosodi-n-propylamine	ND	10	0.35	
3/4-Methylphenol	88.6	10	1.16	
Nitrobenzene	ND	10	0.34	
Isopropylene	ND	10	0.24	
2-Nitrophenol	ND	10	0.51	
2,4-dimethylphenol	28.8	10	0.24	
bis(2-Chloroethoxy)methane	ND	10	0.35	
2,4-Dichlorophenol	ND	10	0.43	
1,2,4-Trichlorobenzene	ND	10	0.45	
Naphthalene	ND	10	1.45	
4-Chloroaniline	ND	10	0.84	
Hexachlorobutadiene	ND	10	1.09	
4-Chloro-3-methylphenol	ND	10	0.62	
2-Methylnaphthalene	ND	10	0.55	
1-Methylnaphthalene	ND	10	0.53	
Hexachlorocyclopentadiene	ND	10	1.26	
2,4,6-Trichlorophenol	ND	10	0.43	
2,4,5-Trichlorophenol	ND	10	0.74	
2-Chloronaphthalene	ND	10	0.81	
2-Nitroaniline	ND	10	0.28	
Benzene, 1,4-dinitro-	ND	10	0.26	
Benzene, 1,3-dinitro-	ND	10	0.57	
Acenaphthylene	ND	10	0.37	
Dimethyl phthalate	ND	10	0.64	
2,6-Dinitrotoluene	ND	10	0.55	
Benzene, 1,2 dinitro	ND	10	0.92	
Aceraphthene	ND	10	1.15	

3-Nitroaniline	ND	10	0.57
2,4-Dinitrophenol	ND	10	0.90
Dibenzofuran	ND	10	0.84
4-Nitrophenol	ND	10	0.79
2,4-Dinitrotoluene	ND	10	0.85
Phenol, 2,3,5,6-tetrachloro-	ND	10	2.42
Phenol, 2,3,4,6-tetrachloro-	ND	10	0.76
Fluorene	ND	10	0.43
4-Chlorophenylphenylether	ND	10	1.03
Diethylphthalate	ND	10	1.05
4-Nitroaniline	ND	10	0.70
2-Methyl-4,6-dinitrophenol	ND	10	0.46
Diphenylamine	ND	10	0.57
Azobenzene	ND	10	0.46
4-Bromophenylphenylether	ND	10	0.39
Hexachlorobenzene	ND	10	0.56
Pentachlorophenol	NU	10	0.42
Phenanthrene	ND	10	1.32
Anthracene	ND	10	0.37
Carbazole	ND	10	1.16
Di-n-butylphthalate	ND	10	1.20
Fluoranthene	ND	10	0.49
Pyrene	ND	10	0.40
Butylbenzylphthalate	ND	10	0.26
Benz[a]anthracene	ND	10	1.64
Chrysene	ND	10	1.16
Bis(2-ethylhexyl) phthalate	ND	10	1.25
Di-n-octylphthalate	ND	10	0.77
Benzo[h]fluoranthene	ND	10	0.30
Benzo[k]fluoranthene	ND	10	0.45
Benzo[a/c]pyrene	ND	10	1.02
Indeno[1,2,3-cd]pyrene	ND	10	1.05
Dibenz[a,h]anthracene	ND	10	0.99
Benzo[ghi]perylene	ND	10	1.09
2-fluorophenol(surr)	X	10	
Phenol-d5(surr)	ND	10	
Nitrobenzene-d5(surr)	33.3	10	
2,4,6-Tribromophenol(surr)	80.7	10	
2-Fluorobiphenyl(surr)	77.6	10	
Terphenyl-d14(surr)	107.5	10	

X= Interference due to 0010/0023 sampling
 ND=<5X the associated blank value

SVOC Sample Summary

Client ID 1427333-052311-0010/23-5-3
Lab ID 0511030-17 aq

Data File Name 06211R12.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator
 Date Acquired 6/22/11
 Acq. Method File 8270CN
 Sample Amount (kg, L) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 1.0
 Sample Type N

Name	Amount (ug)	RL (ug)	DL(ug)	Q
N-Nitrosodimethylamine	ND	2.00	0.06	
Pyridine	ND	2	0.19	
Aniline	ND	2	1.11	
Phenol	192.5	2	0.12	
Bis(2-chloroethyl)ether	ND	2	0.13	
2-Chlorophenol	ND	2	0.13	
1,3-Dichlorobenzene	ND	2	0.15	
1,4-dichlorobenzene	ND	2	0.20	
1,2-Dichlorobenzene	ND	2	0.24	
Benzyl Alcohol	ND	2	0.08	
bis(2-Chloroisopropyl)ether	ND	2	0.23	
2-Methylphenol	83.0	2	0.24	
Hexachloroethane	ND	2	0.34	
N-Nitrosodi-n-propylamine	ND	2	0.07	
3/4-Methylphenol	84.4	2	0.23	
Nitrobenzene	ND	2	0.07	
Isopropone	ND	2	0.05	
2-Nitrophenol	ND	2	0.10	
2,4-dimethylphenol	4.5	2	0.05	
bis(2-Chloroethoxy)methane	ND	2	0.07	
2,4-Dichlorophenol	ND	2	0.09	
1,2,4-Trichlorobenzene	ND	2	0.09	
Naphthalene	ND	2	0.29	
4-Chloroaniline	ND	2	0.17	
Hexachlorobutadiene	ND	2	0.22	
4-Chloro-3-methylphenol	ND	2	0.12	
2-Methylnaphthalene	ND	2	0.11	
1-Methylnaphthalene	ND	2	0.11	
Hexachlorocyclopentadiene	ND	2	0.25	
2,4,6-Trichlorophenol	ND	2	0.09	
2,4,5-Trichlorophenol	ND	2	0.15	
2-Chloronaphthalene	ND	2	0.16	
2-Nitroaniline	ND	2	0.06	
Benzene, 1,4-dinitro-	ND	2	0.05	
Benzene, 1,3-dinitro-	ND	2	0.11	
Acenaphthylene	ND	2	0.07	
Dimethyl phthalate	ND	2	0.13	
2,6-Dinitrotoluene	ND	2	0.11	
Benzene, 1,2-dinitro-	ND	2	0.18	
Aceraphthene	ND	2	0.23	

3-Nitroaniline	ND	2	0.11
2,4-Dinitrophenol	ND	2	0.18
Ditenzoturan	ND	2	0.17
4-Nitrophenol	ND	2	0.16
2,4-Dinitrotoluene	ND	2	0.17
Phenol, 2,3,5,6-tetrachloro-	NC	2	0.48
Phenol, 2,3,4,6-tetrachloro-	NC	2	0.15
Fluorene	ND	2	0.09
4-Chlorophenylphenylether	ND	2	0.21
Diethylphthalate	ND	2	0.21
4-Nitroaniline	ND	2	0.14
2-Methyl 4,6-dinitrophenol	ND	2	0.09
Diphenylamine	ND	2	0.11
Azobenzene	ND	2	0.09
4-Bromophenylphenylether	ND	2	0.08
Hexachlorobenzene	ND	2	0.11
Pentachlorophenol	ND	2	0.08
Phenanthrene	ND	2	0.26
Anthracene	ND	2	0.07
Carbazole	ND	2	0.23
Di-n-butylphthalate	ND	2	0.24
Fluoranthene	ND	2	0.10
Pyrene	ND	2	0.08
Butylbenzylphthalate	ND	2	0.05
Benz[a]anthracene	ND	2	0.33
Chrysene	ND	2	0.23
Bis(2-ethylhexyl) phthalate	ND	2	0.25
Di-n-octylphthalate	ND	2	0.15
Benzo[b]fluoranthene	ND	2	0.06
Benzo[k]fluoranthene	ND	2	0.09
Benzo[a/c]pyrene	ND	2	0.20
Indeno[1,2,3-cd]pyrene	ND	2	0.21
Dibenz[a,h]anthracene	ND	2	0.20
Benzo[ghi]perylene	ND	2	0.22
2-fluorophenol(surr)	X	2	
Phenol-d5(surr)	34.3	2	
Nitrobenzene-d5(surr)	64.3	2	
2,4,6-Tribromophenol(surr)	60.8	2	
2-Fluorobiphenyl(surr)	64.1	2	
Terphenyl-d11(surr)	76.0	2	

X= Interference due to 0010/0023 sampling
 RN=<5X the associated blank value

SVOC Sample Summary

Client ID 1427333-052311-0010/23-4-3
Lab ID 0511030-13 ,14,15,16,18 xad

Data File Name 06211R13.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator
 Date Acquired 6/22/11
 Acq. Method File 8270CN
 Sample Amount (kg, L) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 5.0
 Sample Type N

Name	Amount (ug)	RL (ug)	DL(ug)	Q
N-Nitrosodimethylamine	ND	10.00	0.31	
Pyridine	ND	10	0.93	
Aniline	ND	10	5.53	
Phenol	ND	10	0.59	
Bis(2-chloroethyl)ether	ND	10	0.67	
2-Chlorophenol	ND	10	0.66	
1,3-Dichlorobenzene	ND	10	0.77	
1,4-dichlorobenzene	ND	10	1.02	
1,2-Dichlorobenzene	ND	10	1.19	
Benzyl Alcohol	ND	10	0.39	3N
bis(2-Chloroisopropyl)ether	ND	10	1.16	
2-Methylphenol	40.6	10	1.20	
Hexachloroethane	ND	10	1.70	
N-Nitrosodi-n-propylamine	ND	10	0.35	
3/4-Methylphenol	36.0	10	1.16	
Nitrobenzene	ND	10	0.34	
Isopropone	ND	10	0.24	
2-Nitrophenol	ND	10	0.51	
2,4-dimethylphenol	ND	10	0.24	
bis(2-Chloroethoxy)methane	ND	10	0.35	
2,4-Dichlorophenol	ND	10	0.43	
1,2,4-Trichlorobenzene	ND	10	0.45	
Naphthalene	ND	10	1.45	
4-Chloroaniline	ND	10	0.84	
Hexachlorobutadiene	ND	10	1.09	
4-Chloro-3-methylphenol	ND	10	0.62	
2-Methylnaphthalene	ND	10	0.55	
1-Methylnaphthalene	ND	10	0.53	
Hexachlorocyclopentadiene	ND	10	1.26	
2,4,6-Trichlorophenol	ND	10	0.43	
2,4,5-Trichlorophenol	ND	10	0.74	
2-Chloronaphthalene	ND	10	0.81	
2-Nitroaniline	ND	10	0.28	
Benzene, 1,4-dinitro-	ND	10	0.26	
Benzene, 1,3-dinitro-	ND	10	0.57	
Aceraphthylene	ND	10	0.37	
Dimethyl phthalate	ND	10	0.64	
2,6-Dinitrotoluene	ND	10	0.55	
Benzene, 1,2-dinitro-	ND	10	0.92	
Aceraphthene	ND	10	1.15	

3-Nitroaniline	ND	10	0.57
2,4-Dinitrophenol	ND	10	0.90
Dibenzofuran	ND	10	0.84
4-Nitrophenol	ND	10	0.79
2,4-Dinitrotoluene	ND	10	0.85
Phenol, 2,3,5,6-tetrachloro-	ND	10	2.42
Phenol, 2,3,4,6-tetrachloro-	ND	10	0.76
Fluorene	ND	10	0.43
4-Chlorophenylphenyl ether	ND	10	1.03
Diethylphthalate	ND	10	1.05
4-Nitroaniline	ND	10	0.70
2-Methyl-1,6-dinitrophenol	ND	10	0.46
Diphenylamine	ND	10	0.57
Azobenzene	ND	10	0.46
4-Bromophenylphenyl ether	ND	10	0.39
Hexachlorobenzene	ND	10	0.56
Pentachlorophenol	ND	10	0.42
Phenanthrene	ND	10	1.32
Anthracene	ND	10	0.37
Carbazole	ND	10	1.16
Di-n-butylphthalate	ND	10	1.20
Fluoranthene	ND	10	0.49
Pyrene	ND	10	0.40
Butylbenzylphthalate	ND	10	0.26
Benz[a]anthracene	ND	10	1.64
Chrysene	ND	10	1.16
Bis(2-ethylhexyl) phthalate	73.6	10	1.25
Di-n-octylphthalate	ND	10	0.77
Benzo[b]fluoranthene	ND	10	0.30
Benzo[k]fluoranthene	ND	10	0.45
Benzo[a]pyrene	ND	10	1.02
Indeno[1,2,3-cd]pyrene	ND	10	1.05
Dibenz[a,h]anthracene	ND	10	0.99
Benzo[ghi]perylene	ND	10	1.09
2-fluorophenol(surr)	X	10	
Phenol-d5(surr)	8.6	10	
Nitrobenzene-d5(surr)	33.2	10	
2,4,6-Tribromophenol(surr)	82.1	10	
2-Fluorobiphenyl(surr)	62.6	10	
Terphenyl-d14(surr)	105.4	10	

X= Interference due to 0010/0023 sampling
 BN=<5X the associated blank value

SVOC Sample Summary

Client ID 1427333-052311-0010/23-A,M,T BL
Lab ID 0511030-19 ,20,21 xad

Data File Name 06211R16.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator
 Date Acquired 6/22/11
 Acq. Method File 8270CN
 Sample Amount (kg, L) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 5.0
 Sample Type N

Name	Amount (ug)	RL (ug)	DL(ug)	Q
N-Nitrosodimethylamine	ND	10.03	0.31	
Pyridine	ND	10	0.93	
Aniline	ND	10	5.53	
Phenol	ND	10	0.59	
Bis(2-chloroethyl)ether	ND	10	0.67	
2-Chlorophenol	ND	10	0.66	
1,3-Dichlorobenzene	ND	10	0.77	
1,4-dichlorobenzene	ND	10	1.02	
1,2-Dichlorobenzene	ND	10	1.19	
Benzyl Alcohol	ND	10	0.39	3N
bis(2-Chloroisopropyl)ether	ND	10	1.16	
2-Methylphenol	ND	10	1.20	
Hexachloromethane	ND	10	1.70	
N-Nitrosodi-n-propylamine	ND	10	0.35	
3/4-Methylphenol	ND	10	1.16	
Nitrobenzene	ND	10	0.34	
Isopropone	ND	10	0.24	
2-Nitrophenol	ND	10	0.51	
2,4-dimethylphenol	ND	10	0.24	
bis(2-Chloroethoxy)methane	ND	10	0.35	
2,4-Dichlorophenol	ND	10	0.43	
1,2,4-Trichlorobenzene	ND	10	0.45	
Naphthalene	ND	10	1.45	
4-Chloroaniline	ND	10	0.84	
Hexachlorobutadiene	ND	10	1.09	
4-Chloro-3-methylphenol	ND	10	0.62	
2-Methylnaphthalene	ND	10	0.55	
1-Methylnaphthalene	ND	10	0.53	
Hexachlorocyclopentadiene	ND	10	1.26	
2,4,6-Trichlorophenol	ND	10	0.43	
2,4,5-Trichlorophenol	ND	10	0.74	
2-Chloronaphthalene	ND	10	0.81	
2-Nitroaniline	ND	10	0.28	
Benzene, 1,4-dinitro-	ND	10	0.26	
Benzene, 1,3-dinitro-	ND	10	0.57	
Aceraphthylene	ND	10	0.37	
Dimethyl phthalate	ND	10	0.64	
2,6-Dinitrotoluene	ND	10	0.55	
Benzene, 1,2-dinitro-	ND	10	0.92	
Aceraphthene	ND	10	1.15	

3-Nitroaniline	ND	10	0.57
2,4-Dinitrophenol	ND	10	0.90
Dibenzofuran	ND	10	0.84
4-Nitrophenol	ND	10	0.70
2,4-Dinitrotoluene	ND	10	0.85
Phenol, 2,3,5,6-tetrachloro-	ND	10	2.42
Phenol, 2,3,4,6-tetrachloro-	ND	10	0.76
Fluorene	ND	10	0.43
4-Chlorophenylphenylether	ND	10	1.03
Dialkylphthalate	ND	10	1.06
4-Nitroaniline	ND	10	0.70
2-Methyl-4,6-dinitrophenol	ND	10	0.46
Diphenylamine	ND	10	0.57
Azobenzene	ND	10	0.46
4-Bromophenylphenylether	ND	10	0.39
Hexachlorobenzene	ND	10	0.56
Pentachlorophenol	ND	10	0.42
Phenanthrene	ND	10	1.32
Anthracene	ND	10	0.37
Carbazole	ND	10	1.16
Di-n-butylphthalate	ND	10	1.20
Fluoranthene	ND	10	0.49
Pyrene	ND	10	0.40
Butylbenzylphthalate	ND	10	0.26
Benzo[a]anthracene	ND	10	1.64
Chrysene	ND	10	1.16
Bis(2-ethylhexyl) phthalate	ND	10	1.25
Di-n-octylphthalate	ND	10	0.77
Benzo[b]fluoranthene	ND	10	0.30
Benzo[k]fluoranthene	ND	10	0.45
Benzo[a,c]pyrene	ND	10	1.02
Indeno[1,2,3-cd]pyrene	ND	10	1.05
Dibenz[a,h]anthracene	ND	10	0.99
Benzo[ghi]perylene	ND	10	1.09
2-fluorophenol(surr)	X	10	
Phenol-d5(surr)	ND	10	
Nitrobenzene-d5(surr)	25.3	10	
2,4,6-Tribromophenol(surr)	ND	10	
2-Fluorobiphenyl(surr)	70.0	10	
Terphenyl-d14(surr)	105.0	10	

X= Interference due to 0010/0023 sampling
 BN<5X the associated blank value

QC Summary : EPA Method 0010/SW-8270C

The extraction QC associated with Method 0010/8270C consists of an aqueous, XAD blank and the associated laboratory blank spike and blank spike duplicate. The analysis method QC has been performed and consists of an instrument tune to meet the instrument manufacturer's recommended tuning criteria, a 6 point calibration, a 12 hour Performance check and a 12 hour calibration check.

SVOC Sample Summary

Client ID **Method blank Aqueous**
Lab ID **0511030-mb aq**

Data File Name 06211R00.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator
 Date Acquired 6/22/11
 Acc. Method File 8270CN
 Sample Amount (kg, L) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 1.0
 Sample Type N

Name	Amount (ug)	RL (ug)	DL(ug)	Q
N-Nitrosodimethylamine	ND	2.00	0.06	
Pyridine	ND	2	0.19	
Aniline	ND	2	1.11	
Phenol	ND	2	0.12	
Bis(2-chloroethyl)ether	NU	2	0.13	
2-Chlorophenol	ND	2	0.13	
1,3-Dichlorobenzene	NU	2	0.15	
1,4-dichlorobenzene	ND	2	0.20	
1,2-Dichlorobenzene	ND	2	0.24	
Benzyl Alcohol	ND	2	0.08	
bis(2-Chloroisopropyl)ether	NU	2	0.23	
2-Methylphenol	ND	2	0.24	
Hexachloroethane	ND	2	0.34	
N-Nitrosodi-n-propylamine	ND	2	0.07	
3/4-Methylphenol	ND	2	0.23	
Nitrobenzene	ND	2	0.07	
Isophurone	ND	2	0.05	
2-Nitrophenol	ND	2	0.10	
2,4-dimethylphenol	ND	2	0.05	
bis(2-Chloroethoxy)methane	ND	2	0.07	
2,4-Dichlorophenol	ND	2	0.09	
1,2,4-Trichlorobenzene	ND	2	0.09	
Napthalene	ND	2	0.29	
4-Chloroaniline	ND	2	0.17	
Hexachlorobutadiene	ND	2	0.22	
4-Chloro-3-methylphenol	ND	2	0.12	
2-Methylnaphthalene	ND	2	0.11	
1-Methylnaphthalene	ND	2	0.11	
Hexachlorocyclopentadiene	ND	2	0.25	
2,4,6-Trichlorophenol	ND	2	0.09	
2,4,5-Trichlorophenol	ND	2	0.15	
2-Chloronaphthalene	ND	2	0.16	
2-Nitroaniline	ND	2	0.06	
Benzene, 1,4-dinitro-	ND	2	0.05	
Benzene, 1,3-dinitro-	ND	2	0.11	
Acenaphthylene	ND	2	0.07	
Dimethyl phthalate	ND	2	0.13	
2,6-Dinitrotoluene	ND	2	0.11	
Benzene, 1,2-dinitro-	ND	2	0.18	
Acenaphthene	ND	2	0.23	

3-Nitroaniline	ND	2	0.11
2,4-Dinitrophenol	ND	2	0.18
Dibenzofuran	ND	2	0.17
4-Nitrophenol	ND	2	0.16
2,4-Dinitrotoluene	ND	2	0.17
Phenol, 2,3,5,6-tetrachloro-	ND	2	0.48
Phenol, 2,3,4,6-tetrachloro-	ND	2	0.15
Fluorene	ND	2	0.09
4-Chlorophenylphenylether	ND	2	0.21
Dichlorophthalate	ND	2	0.21
4-Nitroaniline	ND	2	0.14
2-Methyl-4,6-dinitrophenol	ND	2	0.09
Diphenylamine	ND	2	0.11
Azobenzene	ND	2	0.09
4-Bromophenylphenylether	ND	2	0.08
Hexachlorobenzene	ND	2	0.11
Pentachlorophenol	ND	2	0.08
Phenanthrene	ND	2	0.26
Anthracene	ND	2	0.07
Carbazole	ND	2	0.23
Di-n-butylphthalate	ND	2	0.24
Fluoranthene	ND	2	0.10
Pyrene	ND	2	0.08
Butylbenzylphthalate	ND	2	0.05
Benz[a]anthracene	ND	2	0.33
Chrysene	ND	2	0.23
Bis(2-ethylhexyl) phthalate	ND	2	0.25
Di-n-octylphthalate	ND	2	0.15
Benzo[b]fluoranthene	ND	2	0.06
Benzo[k]fluoranthene	ND	2	0.09
Benzo[a,c]pyrene	ND	2	0.20
Indeno[1,2,3-cd]pyrene	ND	2	0.21
Dibenz[a,h]anthracene	ND	2	0.20
Benzo[ghi]perylene	ND	2	0.22
2-fluorophenol(surr)	X	2	
Phenol-d5(surr)	26.2	2	
Nitrobenzene-d5(surr)	64.5	2	
2,4,6-Tribromophenol(surr)	50.4	2	
2-Fluorobiphenyl(surr)	69.3	2	
Terphenyl-d14(surr)	76.6	2	

X= interference due to 0010.0023 sampling

BN=<5X the associated blank value

SVOC Sample Summary

Client ID

Lab ID 0511030-Is aq

Data File Name 06211R19.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator
 Date Acquired 6/22/11
 Acq. Method File 8270CN
 Sample Amount (kg, L) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 1.0
 Sample Type Q

Name	Amount (ug)	RL (ug)	DL(ug)	Q	%R
N-Nitrosodimethylamine	ND	2.00	0.06		
Pyridine	ND	2	0.19		
Aniline	ND	2	1.11		
Phenol	58.3	2	0.12		58
Bis(2-chloroethyl)ether	NU	2	0.13		
2-Chlorophenol	83.5	2	0.13		83
1,3-Dichlorobenzene	ND	2	0.15		
1,4-dichlorobenzene	67.3	2	0.20		67
1,2-Dichlorobenzene	ND	2	0.24		
Benzyl Alcohol	ND	2	0.08		
bis(2-Chloroisopropyl)ether	NU	2	0.23		
2-Methylphenol	ND	2	0.24		
Hexachloroethane	NU	2	0.34		
N-Nitrosodi-n-propylamine	65.7	2	0.07		66
3/4-Methylphenol	ND	2	0.23		
Nitrobenzene	ND	2	0.07		
Isophorone	ND	2	0.05		
2-Nitrophenol	ND	2	0.10		
2,4-dimethylphenol	ND	2	0.05		
bis(2-Chloroethoxy)methane	ND	2	0.07		
2,4-Dichlorophenol	ND	2	0.09		
1,2,4-Trichlorobenzene	64.9	2	0.09		65
Naphthalene	ND	2	0.29		
4-Chloroaniline	ND	2	0.17		
Hexachlorobutadiene	ND	2	0.22		
4-Chloro-3-methylphenol	87.5	2	0.12		87
2-Methylnaphthalene	ND	2	0.11		
1-Methylnaphthalene	ND	2	0.11		
Hexachlorocyclopentadiene	ND	2	0.25		
2,4,6-Trichlorophenol	ND	2	0.09		
2,4,5-Trichlorophenol	ND	2	0.15		
2-Chloronaphthalene	ND	2	0.16		
2-Nitroaniline	ND	2	0.06		
Benzene, 1,4-dinitro-	ND	2	0.05		
Benzene, 1,3-dinitro-	ND	2	0.11		
Acenaphthylene	ND	2	0.07		
Dimethyl phthalate	ND	2	0.13		
2,6-Dinitrotoluene	ND	2	0.11		
Benzene, 1,2-dinitro-	ND	2	0.18		
Acenaphthene	72.1	2	0.23		72

3-Nitroaniline	ND	2	0.11	
2,4-Dinitrophenol	ND	2	0.18	
Dibenzofuran	ND	2	0.17	
4-Nitrophenol	59.0	2	0.16	59
2,4-Dinitrotoluene	69.8	2	0.17	70
Phenol, 2,3,5,6-tetrachloro-	ND	2	0.48	
Phenol, 2,3,4,6-tetrachloro-	ND	2	0.15	
Fluorene	ND	2	0.09	
4-Chlorophenylphenylether	ND	2	0.21	
Diethylphthalate	ND	2	0.21	
4-Nitroaniline	ND	2	0.14	
2-Methyl-4,6-dinitrophenol	ND	2	0.09	
Diphenylamine	ND	2	0.11	
Azobenzene	ND	2	0.09	
4-bromophenylphenylether	ND	2	0.08	
Hexachlorobenzene	ND	2	0.11	
Pentachlorophenol	75.3	2	0.08	76
Phenanthrene	ND	2	0.26	
Anthracene	ND	2	0.07	
Carbazole	ND	2	0.23	
Di-n-butylphthalate	ND	2	0.24	
Fluoranthene	ND	2	0.10	
Pyrene	82.0	2	0.08	82
Butylbenzylphthalate	ND	2	0.05	
Benzo[a]anthracene	ND	2	0.33	
Chrysene	ND	2	0.23	
Bis(2-ethylhexyl) phthalate	ND	2	0.26	
Di-n-octylphthalate	ND	2	0.15	
Benzo[b]fluoranthene	ND	2	0.06	
Benzo[k]fluoranthene	ND	2	0.09	
Benzo[a,c]pyrene	ND	2	0.20	
Indeno[1,2,3-cd]pyrene	ND	2	0.21	
Dibenz[a,h]anthracene	ND	2	0.20	
Benzo[ghi]perylene	ND	2	0.22	
2-fluorophenol(surr)	X	2		
Phenol-d5(surr)	55.5	2		
Nitrobenzene-d5(surr)	76.1	2		
2,4,6-Tribromophenol(surr)	70.4	2		
2-Fluorobiphenyl(surr)	77.7	2		
Terphenyl-d14(surr)	86.6	2		

X= Interference due to 0010/0023 sampling
 BN--5X the associated blank value

SVOC Sample Summary

Client ID

Lab ID 0511030-lsd aq

Data File Name 06211R20.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator
 Date Acquired 6/22/11
 Acq. Method File 8270CN
 Sample Amount (kg, L) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 1.0
 Sample Type Q

Name	Amount (ug)	RL (ug)	DL(ug)	Q	%R
N-Nitrosodimethylamine	ND	2.00	0.06		
Pyridine	NU	2	0.19		
Aniline	ND	2	1.11		
Phenol	33.6	2	0.12		34
Bis(2-chloroethyl)ether	ND	2	0.13		
2-Chlorophenol	73.5	2	0.13		74
1,3-Dichlorobenzene	ND	2	0.15		
1,4-dichlorobenzene	60.7	2	0.20		61
1,2-Dichlorobenzene	ND	2	0.24		
Benzyl Alcohol	ND	2	0.08		
bis(2-Chloroisopropyl)ether	ND	2	0.23		
2-Methylphenol	ND	2	0.24		
Hexachloroethane	ND	2	0.34		
N-Nitrosodi-n-propylamine	61.1	2	0.07		61
3/4-Methylphenol	ND	2	0.23		
Nitrobenzene	ND	2	0.07		
Isophorone	ND	2	0.05		
2-Nitrophenol	ND	2	0.10		
2,4-dimethylphenol	ND	2	0.05		
bis(2-Chloroethoxy)methane	ND	2	0.07		
2,4-Dichlorophenol	ND	2	0.09		
1,2,4-Trichlorobenzene	59.4	2	0.09		59
Naphthalene	ND	2	0.29		
4-Chloroaniline	ND	2	0.17		
Hexachlorobutadiene	ND	2	0.22		
4-Chloro-3-methylphenol	81.7	2	0.12		82
2-Methylnaphthalene	NU	2	0.11		
1-Methylnaphthalene	ND	2	0.11		
Hexachlorocyclopentadiene	NU	2	0.25		
2,4,6-Trichlorophenol	ND	2	0.09		
2,4,5-Trichlorophenol	ND	2	0.15		
2-Chloronaphthalene	ND	2	0.16		
2-Nitroaniline	ND	2	0.06		
Benzene, 1,4-dinitro-	ND	2	0.05		
Benzene, 1,3-dinitro-	ND	2	0.11		
Acenaphthylene	ND	2	0.07		
Dimethyl phthalate	ND	2	0.13		
2,6-Dinitrotoluene	ND	2	0.11		
Benzene, 1,2-dinitro-	ND	2	0.18		
Acenaphthene	65.3	2	0.23		65

3-Nitroaniline	NC	2	0.11	
2,4-Dinitrophenol	NC	2	0.18	
Dibenzofuran	NC	2	0.17	
4-Nitrophenol	25.4	2	0.16	25
2,4-Dinitrotoluene	64.2	2	0.17	64
Phenol, 2,3,5,6-tetrachloro-	NC	2	0.48	
Phenol, 2,3,4,6-tetrachloro-	NC	2	0.15	
Fluorene	ND	2	0.09	
4-Chlorophenylphenylether	ND	2	0.21	
Diethylphthalate	ND	2	0.21	
4-Nitroaniline	ND	2	0.14	
2-Methyl-4,6-dinitrophenol	ND	2	0.09	
Diphenylamine	ND	2	0.11	
Azobenzene	ND	2	0.09	
4-Bromophenylphenylether	ND	2	0.08	
Hexachlorobenzene	ND	2	0.11	
Pentachlorophenol	72.2	2	0.08	72
Phenanthrene	ND	2	0.26	
Anthracene	ND	2	0.07	
Carbazole	ND	2	0.23	
Di-n-butylphthalate	ND	2	0.24	
Fluoranthene	ND	2	0.10	
Pyrene	75.3	2	0.08	76
Butylbenzylphthalate	ND	2	0.05	
Benzo[a]anthracene	ND	2	0.33	
Chrysene	ND	2	0.23	
Bis(2-ethylhexyl) phthalate	ND	2	0.25	
Di-n-octylphthalate	ND	2	0.15	
Benzo[b]fluoranthene	ND	2	0.06	
Benzo[k]fluoranthene	ND	2	0.09	
Benzo[a,c]pyrene	ND	2	0.20	
Indeno[1,2,3-cd]pyrene	ND	2	0.21	
Dibenz[a,h]anthracene	ND	2	0.20	
Benzo[ghi]perylene	ND	2	0.22	
2-fluorophenol(surr)	X	2		
Phenol-d5(surr)	31.3	2		
Nitrobenzene-d5(surr)	68.2	2		
2,4,3-Tribromophenol(surr)	68.0	2		
2-Fluorobiphenyl(surr)	71.7	2		
Terphenyl-d14(surr)	79.6	2		

X= Interference due to 00100023 sampling
 BN=<5X the associated blank value

SVOC Sample Summary

Client ID

Lab ID 0511030-mb xad

Data File Name 06211X09.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator
 Date Acquired 6/22/11
 Acq. Method File 8270CN
 Sample Amount (kg, L) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 5.0
 Sample Type N

Name	Amount (ug)	RL (ug)	DL(ug)	Q
N-Nitrosodimethylamine	ND	10.00	0.31	
Pyridine	ND	10	0.93	
Aniline	ND	10	5.53	
Phenol	ND	10	0.59	
Bis(2-chloroethyl)ether	ND	10	0.67	
2-Chlorophenol	ND	10	0.66	
1,3-Dichlorobenzene	ND	10	0.77	
1,4-dichlorobenzene	ND	10	1.02	
1,2-Dichlorobenzene	ND	10	1.19	
Benzyl Alcohol	ND	10	0.39	BN
bis(2-Chloroisopropyl)ether	ND	10	1.16	
2-Methylphenol	ND	10	1.20	
Hexachloroethane	ND	10	1.70	
N-Nitrosodi-n-propylamine	ND	10	0.35	
3/4-Methylphenol	ND	10	1.16	
Nitrobenzene	ND	10	0.34	
Isophorone	ND	10	0.24	
2-Nitrophenol	ND	10	0.51	
2,4-dimethylphenol	ND	10	0.24	
bis(2-Chloromethoxy)methane	ND	10	0.35	
2,4-Dichlorophenol	ND	10	0.43	
1,2,4-Trichlorobenzene	ND	10	0.45	
Naphthalene	ND	10	1.45	
4-Chloroaniline	ND	10	0.84	
Hexachlorobutadiene	ND	10	1.09	
4-Chloro-3-methylphenol	ND	10	0.62	
2-Methylnaphthalene	ND	10	0.55	
1-Methylnaphthalene	ND	10	0.53	
Hexachlorocyclopentadiene	ND	10	1.26	
2,4,3-Trichlorophenol	ND	10	0.43	
2,4,3-Trichlorophenol	ND	10	0.74	
2-Chloronaphthalene	ND	10	0.81	
2-Nitroaniline	ND	10	0.28	
Benzene, 1,4-dinitro-	ND	10	0.26	
Benzene, 1,3-dinitro-	ND	10	0.57	
Acenaphthylene	ND	10	0.37	
Dimethyl phthalate	ND	10	0.64	
2,6-Dinitrotoluene	ND	10	0.55	
Benzene, 1,2-dinitro-	ND	10	0.92	
Acenaphthene	ND	10	1.15	

3-Nitroaniline	ND	10	0.57
2,4-Dinitrophenol	ND	10	0.90
Dibenzofuran	ND	10	0.84
4-Nitrophenol	ND	10	0.79
2,4-Dinitrotoluene	ND	10	0.85
Phenol, 2,3,5,6-tetrachloro-	ND	10	2.42
Phenol, 2,3,4,6-tetrachloro-	ND	10	0.76
Fluorene	ND	10	0.43
4-Chlorophenylphenylether	ND	10	1.03
Diethylphthalate	ND	10	1.05
4-Nitroaniline	ND	10	0.70
2-Methyl-4,6-dinitrophenol	ND	10	0.46
Diphenylamine	ND	10	0.57
Azobenzene	ND	10	0.46
4-Bromophenylphenylether	ND	10	0.39
Hexachlorobenzene	ND	10	0.56
Pentachlorophenol	ND	10	0.42
Phenanthrene	ND	10	1.32
Anthracene	ND	10	0.37
Carbazole	ND	10	1.16
Di-n-butylphthalate	ND	10	1.20
Fluoranthene	ND	10	0.49
Pyrene	ND	10	0.40
Butylbenzylphthalate	ND	10	0.26
Benzo[a]anthracene	ND	10	1.64
Chrysene	ND	10	1.16
Bis(2-ethylhexyl) phthalate	ND	10	1.25
Di-n-octylphthalate	ND	10	0.77
Benzo[b]fluoranthene	ND	10	0.30
Benzo[k]fluoranthene	ND	10	0.45
Benzo[a/c]pyrene	ND	10	1.02
Indeno[1,2,3-cd]pyrene	ND	10	1.05
Dibenz[a,h]anthracene	ND	10	0.99
Benzo[ghi]perylene	ND	10	1.09
2-fluorophenol(surr)	X	10	
Phenol-d5(surr)	ND	10	
Nitrobenzene-d5(surr)	42.0	10	
2,4,6-Tribromophenol(surr)	ND	10	
2-Fluorobiphenyl(surr)	81.9	10	
Terphenyl-d14(surr)	110.1	10	

X= Interference due to 0010/0023 sampling
 BN<5X the associated blank value

SVOC Sample Summary

Client ID

Lab ID

0511030-Is xad

Data File Name 06211R17.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator
 Date Acquired 6/22/11
 Acc. Method File 8270CN
 Sample Amount (kg, l) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 5.0
 Sample Type Q

Name	Amount (ug)	RL (ug)	DL(ug)	Q	%R
N-Nitrosodimethylamine	ND	10.00	0.31		
Pyridine	ND	10	0.93		
Aniline	ND	10	5.53		
Phenol	5.9	10	0.59		6
Bis(2-chloroethyl)ether	ND	10	0.67		
2-Chlorophenol	7.4	10	0.66		7
1,3-Dichlorobenzene	ND	10	0.77		
1,4-dichlorobenzene	22.9	10	1.02		23
1,2-Dichlorobenzene	ND	10	1.19		
Benzyl Alcohol	1359.0	10	0.39		
bis(2-Chloroisopropyl)ether	ND	10	1.16		
2-Methylphenol	ND	10	1.20		
Hexachloroethane	ND	10	1.70		
N-Nitrosodi-n-propylamine	ND	10	0.35		
3/4-Methylphenol	ND	10	1.16		
Nitrobenzene	ND	10	0.34		
Isophorone	ND	10	0.24		
2-Nitrophenol	ND	10	0.51		
2,4-dimethylphenol	ND	10	0.24		
bis(2-Chloroethoxy)methane	ND	10	0.35		
2,4-Dichlorophenol	ND	10	0.43		
1,2,4-Trichlorobenzene	52.3	10	0.45		52
Napthalene	ND	10	1.45		
4-Chloroaniline	ND	10	0.84		
Hexachlorobutadiene	ND	10	1.09		
4-Chloro-3-methylphenol	8.9	10	0.62		9
2-Methylnaphthalene	ND	10	0.55		
1-Methylnaphthalene	ND	10	0.53		
Hexachlorocyclopentadiene	ND	10	1.26		
2,4,6-Trichlorophenol	ND	10	0.43		
2,4,5-Trichlorophenol	ND	10	0.74		
2-Chloronaphthalene	ND	10	0.81		
2-Nitroaniline	ND	10	0.28		
Benzene, 1,4-dinitro-	ND	10	0.26		
Benzene, 1,3-dinitro-	ND	10	0.57		
Acenaphthylene	ND	10	0.37		
Dimethyl phthalate	ND	10	0.64		
2,6-Dinitrotoluene	ND	10	0.55		
Benzene, 1,2-dinitro-	ND	10	0.92		
Acenaphthene	70.8	10	1.15		71

3-Nitroaniline	ND	10	0.57	
2,4-Dinitrophenol	ND	10	0.90	
Dibenzofuran	ND	10	0.84	
4-Nitrophenol	ND	10	0.79	
2,4-Dinitrotoluene	72.1	10	0.85	72
Phenol, 2,3,5,6-tetrachloro-	ND	10	2.42	
Phenol, 2,3,4,6-tetrachloro-	ND	10	0.76	
Fluorene	ND	10	0.43	
4-Chlorophenylphenylether	ND	10	1.03	
Diethylphthalate	ND	10	1.05	
4-Nitroaniline	ND	10	0.70	
2-Methyl-4,6-dinitrophenol	64.2	10	0.40	
Diphenylamine	ND	10	0.57	
Azobenzene	ND	10	0.40	
4-Bromophenylphenylether	ND	10	0.39	
Hexachlorobenzene	ND	10	0.50	
Pentachlorophenol	39.6	10	0.42	40
Phenanthrene	ND	10	1.32	
Anthracene	ND	10	0.37	
Carbazole	ND	10	1.16	
Di-n-butylphthalate	ND	10	1.20	
Fluoranthene	ND	10	0.49	
Pyrene	90.1	10	0.40	90
Butylbenzylphthalate	ND	10	0.26	
Benz[a]anthracene	ND	10	1.64	
Chrysene	ND	10	1.16	
Bis(2-ethylhexyl) phthalate	ND	10	1.25	
Di-n-octylphthalate	ND	10	0.77	
Benzo[b]fluoranthene	ND	10	0.30	
Benzo[k]fluoranthene	ND	10	0.45	
Benzo[a/c]pyrene	ND	10	1.02	
Indeno[1,2,3-cd]pyrene	ND	10	1.05	
Dibenz[a,h]anthracene	ND	10	0.99	
Benzo[ghi]perylene	ND	10	1.09	
2-fluorophenol(surr)	X	10		
Phenol-d5(surr)	1.8	10		
Nitrobenzene-d5(surr)	33.0	10		
2,4,6-Tribromophenol(surr)	12.5	10		
2-Fluorobiphenyl(surr)	79.3	10		
Terphenyl-r14(surr)	97.6	10		

X= Interference due to 0010/0023 sampling
 BN<5X the associated blank value

SVOC Sample Summary

Client ID

Lab ID 0511030-Isd xad

Data File Name 06211R18.D
 Data File Path C:\HPCHEM\1\DATA\0511030\
 Operator
 Date Acquired 6/22/11
 Acq. Method File 8270CN
 Sample Amount (kg, L) 1.0
 Extract Volume (ml) 1.0
 Dilution Factor 5.0
 Sample Type Q

Name	Amount (ug)	RL (ug)	DL(ug)	Q	%R
N-Nitrosodimethylamine	ND	10.00	0.31		
Pyridine	ND	10	0.93		
Aniline	ND	10	5.53		
Phenol	30.3	10	0.59		31
Bis(2-chloroethyl)ether	ND	10	0.67		
2-Chlorophenol	28.6	10	0.66		29
1,3-Dichlorobenzene	ND	10	0.77		
1,4-dichlorobenzene	41.6	10	1.02		42
1,2-Dichlorobenzene	ND	10	1.19		
Benzyl Alcohol	1060.2	10	0.39		
bis(2-Chloroisopropyl)ether	ND	10	1.16		
2-Methylphenol	ND	10	1.20		
Hexachloroethane	ND	10	1.70		
N-Nitrosodi-n-propylamine	ND	10	0.35		
3/4-Methylphenol	ND	10	1.16		
Nitrobenzene	ND	10	0.34		
Isophorone	ND	10	0.24		
2-Nitrophenol	ND	10	0.51		
2,4-dimethylphenol	ND	10	0.24		
bis(2-Chloroethoxy)methane	ND	10	0.35		
2,4-Dichlorophenol	ND	10	0.43		
1,2,4-Trichlorobenzene	67.3	10	0.45		37
Naphthalene	ND	10	1.45		
4-Chloroaniline	ND	10	0.84		
Hexachlorobutadiene	ND	10	1.09		
4-Chloro-3-methylphenol	54.4	10	0.62		54
2-Methylnaphthalene	ND	10	0.55		
1-Methylnaphthalene	ND	10	0.53		
Hexachlorocyclopentadiene	ND	10	1.26		
2,4,6-Trichlorophenol	ND	10	0.43		
2,4,5-Trichlorophenol	ND	10	0.74		
2-Chloronaphthalene	ND	10	0.81		
2-Nitroaniline	ND	10	0.28		
Benzene, 1,4-dinitro-	ND	10	0.26		
Benzene, 1,3-dinitro-	ND	10	0.57		
Acenaphthylene	ND	10	0.37		
Dimethyl phthalate	ND	10	0.64		
2,6-Dinitrotoluene	ND	10	0.55		
Benzene, 1,2-dinitro-	ND	10	0.92		
Acenaphthene	76.4	10	1.15		76

3-Nitroaniline	ND	10	0.57	
2,4-Dinitrophenol	ND	10	0.90	
Dibenzofuran	ND	10	0.84	
4-Nitrophenol	ND	10	0.79	
2,4-Dinitrotoluene	76.1	10	0.85	76
Phenol, 2,3,5,6-tetrachloro-	ND	10	2.42	
Phenol, 2,3,4,6-tetrachloro-	ND	10	0.76	
Fluorene	ND	10	0.43	
4-Chlorophenylphenylether	ND	10	1.03	
Dialkylphthalate	ND	10	1.05	
4-Nitroaniline	ND	10	0.70	
2-Methyl-4,6-dinitrophenol	ND	10	0.46	
Diphenylamine	ND	10	0.57	
Azobenzene	ND	10	0.46	
4-Bromophenylphenyl ether	ND	10	0.39	
Hexachlorobenzene	ND	10	0.50	
Pentachlorophenol	81.5	10	0.42	31
Phenanthrene	ND	10	1.32	
Anthracene	ND	10	0.37	
Carbazole	ND	10	1.16	
Di-n-butylphthalate	ND	10	1.20	
Fluoranthene	ND	10	0.49	
Pyrene	97.2	10	0.40	97
Butylbenzylphthalate	ND	10	0.26	
Benz[a]anthracene	ND	10	1.64	
Chrysene	ND	10	1.16	
Bis(2-ethylhexyl) phthalate	ND	10	1.25	
Di-n-octylphthalate	ND	10	0.77	
Benzo[b]fluoranthene	ND	10	0.30	
Benzo[k]fluoranthene	ND	10	0.45	
Benzo[a,c]pyrene	ND	10	1.02	
Indeno[1,2,3-cd]pyrene	ND	10	1.05	
Dibenz[a,h]anthracene	ND	10	0.99	
Benzo[ghi]perylene	ND	10	1.09	
2-fluorophenol(surr)	X	10		
Phenol-d5(surr)	15.2	10		
Nitrobenzene-d5(surr)	56.7	10		
2,4,6-Tribromophenol(surr)	53.8	10		
2-Fluorobiphenyl(surr)	86.3	10		
Terphenyl-d14(surr)	112.4	10		

X= Interference due to 0010/0023 sampling
 BN=<5X the associated blank value

DOCUMENTATION

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CHAIN OF CUSTODY / REQUEST FOR ANALYSIS (COC/RFA)

SHAW ENVIRONMENTAL INC.
4171 Essen Lane, Baton Rouge, LA 70809
Phone: 225-932-2746

Date 5/24/11 Page 1 of 2

PROJECT INFORMATION						PRESERVATIVE	
Project Number: 142733							
Project Name: CITGO ICR Testing							
Delivered Via:							
TAT: <input type="checkbox"/> 24 hr <input type="checkbox"/> 48 hr <input type="checkbox"/> 5 days <input type="checkbox"/> 21 days							
CONTACT: RICHARD@SHAWENV.COM 225-241-9984							
Sample ID	Sample Collection Date	Sample Collection Time	Sample Matrix	Number of Containers and Size	COMMENTS		
142733-052311-001023-1-1	5/23/11	10:25	Filler	1 / glass petri			
142733-052311-001023-2-1	5/23/11	10:25	Liquid	1 / 500 mL Amber			
142733-052311-001023-3-1	5/23/11	10:25	Liquid	1 / 500 mL Amber			
142733-052311-001023-4-1	5/23/11	10:25	Sorbent media	1 / 1 XAD Trap			
142733-052311-001023-5-1	5/23/11	10:25	Liquid	1 / 1 L Amber			
142733-052311-001023-6-1	5/23/11	10:25	Liquid	1 / 500 mL Amber			
142733-052311-001023-1-2	5/23/11	15:28	Filler	1 / glass petri			
142733-052311-001023-2-2	5/23/11	15:28	Liquid	1 / 500 mL Amber			
142733-052311-001023-3-2	5/23/11	15:28	Liquid	1 / 500 mL Amber			
142733-052311-001023-4-2	5/23/11	15:28	Sorbent media	1 / 1 XAD Trap			
142733-052311-001023-5-2	5/23/11	15:28	Liquid	1 / 1 L Amber			
142733-052311-001023-6-2	5/23/11	15:28	Liquid	1 / 500 mL Amber			
142733-052311-001023-1-3	5/24/11	08:35	Filler	1 / glass petri			
142733-052311-001023-2-3	5/24/11	08:35	Liquid	1 / 500 mL Amber			
142733-052311-001023-3-3	5/24/11	08:35	Liquid	1 / 500 mL Amber			
142733-052311-001023-4-3	5/24/11	08:35	Sorbent media	1 / 1 XAD Trap			
142733-052311-001023-5-3	5/24/11	08:35	Liquid	1 / 1 L Amber			
142733-052311-001023-6-3	5/24/11	08:35	Liquid	1 / 500 mL Amber			
Relinquished by Collector:						Relinquished by:	Received by:
Signature: <u>B. Shaw</u>	Time: <u>1315</u>	Signature: _____	Time: _____	Signature: _____	Time: _____	Signature: _____	Time: _____
Printed Name: <u>B. Shaw</u>	Date: _____	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Company: <u>Shaw</u>	Company: <u>CPS</u>	Company: _____	Company: _____	Company: _____	Company: _____	Company: <u>PAR</u>	Company: _____

Page 33 of 39

Phone: 225-932-2745

Date 2/25/14

Page 34 of 39

DAT Labs Inc. **Sample Receipt Report**

Client/Number: Shaw Project 142733 The client has been contacted. Yes No
 Custodian Initial: SL Date: 5/26/11

Secondary Review: Initials: Date:

Upon receipt of samples, check if any of the following discrepancies have been noted.

Discrepancy Type	Specify applicable client ID or "all"
COC and samples do not match	
No unique sample identifications	
Samples received outside of the required temp criteria. Receipt Temp: <u>12</u> °C	
No preservation type was noted Correction Factor: <u>+2.6</u> °C	
No date of collection stated Corrected Temp: <u>9.8</u> °C	
No time of collection stated	
The sample collector was not named	
Sample containers were not appropriate	
Sample labels were destroyed or unreadable	
Samples were received outside of holding time	
There was not enough sample to perform the requested analysis.	
Samples showed sign of damage or contamination.	
Aqueous samples for volatile analysis: Headspace? Y N If Yes, list sample ID(s) in details:	

Details:

Sample pH for nonvolatile aqueous samples and presence or absence of headspace (Y or N) for VOA aqueous samples shall be recorded at time of sample log-in.
 Under no circumstances shall VOA vials be opened at time of sample receipt.

Other Discrepancies

Sample ID Discrepancy

Container Return

Yes / No

Price:

Size:

Return Spl wt:

☒ Upon receipt, the samples met all of DAT's acceptance criteria. DAT Project # 1251354

Effective 05/03/11

DAIFRM1049 Revision 4

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0511030

Date Received: 5/26/2011	Carrier: UPS
Client Name: Shaw Environmental	Analysis: Method 0010/23
Tracking number: 1Z58V3780197476464 (master)	Package Temp: 8.8°C (ice packs)
Custody Seals ?: No	COC: <input checked="" type="checkbox"/> check if COC from client

Sample Information

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052311-0010/23-1-1	0511030-1	5/23/2011	air filter	petri dish	
1427333-052311-0010/23-2-1	0511030-2	5/23/2011	solvents	500mL wm amber	
1427333-052311-0010/23-3-1	0511030-3	5/23/2011	toluene	500mL wm amber	
1427333-052311-0010/23-4-1	0511030-4	5/23/2011	air	XAD trap	
1427333-052311-0010/23-5-1	0511030-5	5/23/2011	rinse	1L wm amber	
1427333-052311-0010/23-6-1	0511030-6	5/23/2011	rinse	500mL wm amber	
1427333-052311-0010/23-1-2	0511030-7	5/23/2011	air filter	petri dish	


Laboratory Receiving Initials

0511030
5/26/2011 11:10:19 AM

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0511030

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052311-0010/23-2-2 0511030-8		5/23/2011	solvents	500mL wm amber	
1427333-052311-0010/23-3-2 0511030-9		5/23/2011	toluene	500mL wm amber	
1427333-052311-0010/23-4-2 0511030-10		5/23/2011	air	XAD trap	
1427333-052311-0010/23-5-2 0511030-11		5/23/2011	rinse	1L wm amber	
1427333-052311-0010/23-6-2 0511030-12		5/23/2011	rinse	500mL wm amber	
1427333-052311-0010/23-1-3 0511030-13		5/24/2011	air filter	petri dish	
1427333-052311-0010/23-2-3 0511030-14		5/24/2011	solvents	500mL wm amber	
1427333-052311-0010/23-3-3 0511030-15		5/24/2011	toluene	500mL wm amber	
1427333-052311-0010/23-4-3 0511030-16		5/24/2011	air	XAD trap	
1427333-052311-0010/23-5-3 0511030-17		5/24/2011	rinse	1L wm amber	


Laboratory Receiving Initials

0511030

5/25/2011 11:16:20 AM

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0511030

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052311-0010/23-6-3	0511030-18	5/24/2011	rinse	500mL wm amber	
1427333-052411-0010/23-A- BL	0511030-19	5/24/2011	acetone	500mL wm amber	blank
1427333-052411-0010/23-M- BL	0511030-20	5/24/2011	methylene chloride	500mL wm amber	blank
1427333-052411-0010/23-T- BL	0511030-21	5/24/2011	toluene	500mL wm amber	blank

A/E 3 of 3
Laboratory Receiving Initials
0511030
5/26/2011 11:16:20 AM

UPS CampusShip: View/Print Label

1. **Print the label(s):** Select the Print button on the print dialog box that appears. Note: if your browser does not support this function select Print from the File menu to print the label.
2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
3. **GETTING YOUR SHIPMENT TO UPS**
Customers without a Daily Pickup
 Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
 Hand the package to any UPS driver in your area.
 Take your package to any location of The UPS Store®, UPS Drop Box, UPS Customer Center, UPS Alliances (Office Depot® or Staples®) or Authorized Shipping Outlet near you. Items sent via UPS Return ServicesSM (including via Ground) are also accepted at Drop Boxes.
 To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.

Customers with a Daily Pickup

Your driver will pickup your shipment(s) as usual.

FOLD HERE

MAJOUR DUBOIS 327 626 7429 220 4500 B HARBOR ST SULPHUR LA 70665 SHIP TO: RON MITCHELL 8007338644 DAI 7715 CORPORATE BLVD PLAIN CITY OH 43064-9212		20 LBS 1 OF 2 DWT: 24.17,11	
		OH 432 9-30 	
UPS NEXT DAY AIR TRACKING #: 1Z 58V 378 0L 9747 6464			
BILLING: P/P		 Reference: 00501.142733.47C1.02 Senders Name: Blake Hogleman CB B.1.13 W01E7 15 0A 0/2011	

DAT Reports®

Data Analysis Technologies, Inc.

7715 Corporate Blvd.

Plain City, OH 43064

800-733-8644

Sample Analysis Certificate

Client: Shaw Environmental, Inc.
Address: 4171 Essen Lane
Baton Rouge, LA 70809

Date: 7/25/2011
DAT Project ID: 0511030
Date Received: 5/26/2011
Date Analyzed: 6/22/2011

Attn: Richard Ishikawa
Client Project: CITGO
Analysis: Method 0010-appended compounds

The following samples were received on 5/26/2011:

DAT Sample ID	Client Sample ID	Date Sampled	Matrix
0511030-1	1427333-052311-0010/23-1-1	5/23/2011	air filter
0511030-10	1427333-052311-0010/23-4-2	5/23/2011	air
0511030-11	1427333-052311-0010/23-5-2	5/23/2011	rinse
0511030-12	1427333-052311-0010/23-6-2	5/23/2011	rinse
0511030-13	1427333-052311-0010/23-1-3	5/24/2011	air filter
0511030-14	1427333-052311-0010/23-2-3	5/24/2011	solvents
0511030-15	1427333-052311-0010/23-3-3	5/24/2011	toluene
0511030-16	1427333-052311-0010/23-4-3	5/24/2011	air
0511030-17	1427333-052311-0010/23-5-3	5/24/2011	rinse
0511030-18	1427333-052311-0010/23-6-3	5/24/2011	rinse
0511030-19	1427333-052411-0010/23-A-BL	5/24/2011	acetone
0511030-2	1427333-052311-0010/23-2-1	5/23/2011	solvents
0511030-20	1427333-052411-0010/23-M-BL	5/24/2011	methylene
0511030-21	1427333-052411-0010/23-T-BL	5/24/2011	toluene
0511030-3	1427333-052311-0010/23-3-1	5/23/2011	toluene
0511030-4	1427333-052311-0010/23-4-1	5/23/2011	air
0511030-5	1427333-052311-0010/23-5-1	5/23/2011	rinse
0511030-6	1427333-052311-0010/23-6-1	5/23/2011	rinse
0511030-7	1427333-052311-0010/23-1-2	5/23/2011	air filter

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0511030-8	1427333-052311-0010/23-2-2	5/23/2011	solvents
0511030-9	1427333-052311-0010/23-3-2	5/23/2011	toluene

Results: Dibenzo(a,e)pyrene can not be determined using method 0010. Cresol mixed isomers are 2,3 and 4 methylphenol and were reported on the standard method 0010 report. All appended results were determined using database retention time indices for the appended list. The retention time accuracy was determined using retention time indices for the internal standards. The quantitative accuracy was determined using the surrogate recovery. Positive values, reporting limits and detection limits should be treated as estimates. See attached summary.

Reviewed and approved for release by:


Ronald K. Mitchum, Ph.D.
President, DAT

Date:

7/25/11

Data Summary Method 0010

Misc Info 1427333-052311-0010/23-5-1
Sample Name 0511030-5.aq
Date Acquired 6/22/2011 8:01

Name	Amount	RL	DL
	ug	ug	
o/p-Toluidine	ND	2	0.2
a,a-Dimethylphenylamine	ND	2	0.2
1,4-Phenylenediamine	ND	2	0.2
Fluoranthene	ND	2	0.2
Dimethylaminoazobenzene	ND	2	0.2
3,3'-Dimethylbenzidine	ND	2	0.2
7,12-Dimethylbenz[a]anthracene	ND	2	0.2
Benzo[e]pyrene	ND	2	0.2
3-Methylcholanthrene	ND	2	0.2
Biphenyl	ND	2	0.2
3,3'-dimethoxybenzidine	ND	2	0.2
Perylene	ND	2	0.2

Data Summary Method 0010

Misc Info 1427333-052311-0010/23-4
Sample Name 0511030-1,2,4,6 xad
Date Acquired 6/22/2011 1:36

Name	Amount	RL	DL
	ug	ug	ug
o/p-Toluidine	ND	2	0.2
a,a-Dimethylphenylamine	ND	2	0.2
1,4-Phenylenediamine	ND	2	0.2
Fluoranthene	ND	2	0.2
Dimethylaminoazobenzene	ND	2	0.2
3,3'-Dimethylbenzidine	ND	2	0.2
7,12-Dimethylbenz[a]anthracene	ND	2	0.2
Benzo[e]pyrene	ND	2	0.2
3-Methylcholanthrene	ND	2	0.2
Biphenyl	ND	2	0.2
3,3'-dimethoxybenzidine	ND	2	0.2
Perylene	ND	2	0.2

Data Summary Method 0010

Misc Info 1427333-052311-0010/23-5-2
Sample Name 0511030-11eq
Date Acquired 6/22/2011 10:57

Name	Amount		RL DL	
	ug	ug		
o/p-Toluidine	ND	2	0.2	
a,a-Dimethylphenylamine	ND	2	0.2	
1,4-Phenylenediamine	ND	2	0.2	
Fluoranthene	ND	2	0.2	
Dimethylaminoazobenzene	ND	2	0.2	
3,3'-Dimethylbenzidine	ND	2	0.2	
7,12-Dimethylbenz[a]anthracene	ND	2	0.2	
Benzo[e]pyrene	ND	2	0.2	
3-Methylcholanthrene	ND	2	0.2	
Biphenyl	ND	2	0.2	
3,3'-dimethoxybenzidine	ND	2	0.2	
Perylene	ND	2	0.2	

Data Summary Method 0010

Misc Info 1427333-052311-0010/23-4-2
Sample Name 0511030-7 ,8,10,12 xad
Date Acquired 6/22/2011 2:23

Name	Amount	RL	DL
	ug	ug	
o/p-Toluidine	ND	2	0.2
a,a-Dimethylphenylamine	ND	2	0.2
1,4-Phenylenediamine	ND	2	0.2
Fluoranthene	ND	2	0.2
Dimethylaminoazobenzene	ND	2	0.2
3,3'-Dimethylbenzidine	ND	2	0.2
7,12-Dimethylbenz[a]anthracene	ND	2	0.2
Benzo[e]pyrene	ND	2	0.2
3-Methylcholanthrene	ND	2	0.2
Biphenyl	ND	2	0.2
3,3'-dimethoxybenzidine	ND	2	0.2
Perylene	ND	2	0.2

Data Summary Method 0010

Misc Info 1427333-052311-0010/23-5-3
Sample Name 0511030-17 aq
Date Acquired 6/22/2011 11:52

Name	Amount	RL	DL
	ug	ug	ug
o/p-Toluidine	ND	2	0.2
a,a-Dimethylphenylamine	ND	2	0.2
1,4-Phenylenediamine	ND	2	0.2
Fluoranthene	ND	2	0.2
Dimethylaminazobenzene	ND	2	0.2
3,3'-Dimethylbenzidine	ND	2	0.2
7,12-Dimethylbenz[a]anthracene	ND	2	0.2
Benzo[e]pyrene	ND	2	0.2
3-Methylcholanthrene	ND	2	0.2
Biphenyl	ND	2	0.2
3,3'-dimethoxybenzidine	ND	2	0.2
Perylene	ND	2	0.2

Data Summary Method 0010

Misc Info 1427333-052311-0010/23-4-3
Sample Name 0511030-13 ,14,15,16,18 xad
Date Acquired 6/22/2011 12:47

Name	Amount	RL	DL
	ug	ug	
o/p-Toluidine	ND	2	0.2
a,a-Dimethylphenylamine	ND	2	0.2
1,4-Phenylenediamine	ND	2	0.2
Fluoranthene	ND	2	0.2
Dimethylaminoazobenzene	ND	2	0.2
3,3'-Dimethylbenzidine	ND	2	0.2
7,12-Dimethylbenz[a]anthracene	ND	2	0.2
Benzo[e]pyrene	ND	2	0.2
3-Methylcholanthrene	ND	2	0.2
Biphenyl	ND	2	0.2
3,3'-dimethoxybenzidine	ND	2	0.2
Perylene	ND	2	0.2

Data Summary Method 0010

Misc Info

1427333-052311-0010/23-A,M,T BL

Sample Name

0511030-19 ,20,21 xad

Date Acquired

6/22/2011 3:10

Name	Amount		RL	DL
	ug	ug		
o/p-Toluidine	ND	2	0.2	
a,a-Dimethylphenylamine	ND	2	0.2	
1,4-Phenylenediamine	ND	2	0.2	
Fluoranthene	ND	2	0.2	
Dimethylaminobenzene	ND	2	0.2	
3,3'-Dimethylbenzidine	ND	2	0.2	
7,12 Dimethylbenz[a]anthracene	ND	2	0.2	
Benzo[e]pyrene	ND	2	0.2	
3-Methylcholanthrene	ND	2	0.2	
Biphenyl	ND	2	0.2	
3,3'-dimethoxybenzidine	ND	2	0.2	
Perylene	ND	2	0.2	

DOCUMENTATION

CHAIN OF CUSTODY / REQUEST FOR ANALYSIS (COC/RFA)

Shaw Environmental, Inc.

4171 Essen Lane, Baton Rouge, LA 70809

Phone: 225-952-2745

Date 5/24/11 Page 1 of 2

PROJECT INFORMATION				PRESERVATIVE	
Project Number: 142733					
Project Name: CILCO ICR Testing					
Delivered Via:					
TAT: <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 5 days <input type="checkbox"/> 21 days					
Comments: Richard Remawa 225-261-9234					
Sample ID	Sample Collection Date	Sample Collection Time	Sample Matrix	Number of Containers and Size	Comments
X 142733-05231-001023-1-1	5/23/11	10:25	Filter	1 / glass petri	
X 142733-05231-001023-2-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-3-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-4-1	5/23/11	10:25	Sorbent media	1 / 1 XAD Trap	
X 142733-05231-001023-5-1	5/23/11	10:25	Liquid	1 / 1 L Amber	
X 142733-05231-001023-6-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-7-1	5/23/11	10:25	Filter	1 / glass petri	
X 142733-05231-001023-8-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-9-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-10-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-11-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-12-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-13-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-14-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-15-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-16-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-17-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-18-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-19-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-20-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-21-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-22-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-23-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-24-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-25-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-26-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-27-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-28-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-29-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-30-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-31-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-32-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-33-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-34-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-35-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-36-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-37-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-38-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-39-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-40-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-41-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-42-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-43-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-44-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-45-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-46-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-47-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-48-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-49-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-50-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-51-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-52-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-53-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-54-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-55-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-56-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-57-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-58-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-59-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-60-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-61-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-62-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-63-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-64-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-65-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-66-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-67-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-68-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-69-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-70-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-71-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-72-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-73-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-74-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-75-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-76-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-77-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-78-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-79-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-80-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-81-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-82-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-83-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-84-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-85-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-86-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-87-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-88-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-89-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-90-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-91-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-92-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-93-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-94-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-95-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-96-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-97-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-98-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-99-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	
X 142733-05231-001023-100-1	5/23/11	10:25	Liquid	1 / 500 mL Amber	

Date 5/24/0 Page 2 of 2

[illegible]

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064

Project Number: 0511030

Date Received: 5/26/2011
 Client Name: Shaw Environmental
 Tracking Number: 1Z58V3780197476464 (Master)
 Custody Seal(s): No

Carrier: UPS
 Analysis: Method 0010/23
 Package Temp: 8.8°C (ice packs)
 COC: ☒ check if COC from client

Sample Information

Client ID	Laboratory ID	Date	Matrix	Container	Comment
1427333-052311-0010/23-1-1	0511030-1	5/23/2011	air filter	petri dish	
1427333-052311-0010/23-2-1	0511030-2	5/23/2011	solvents	500mL wm amber	
1427333-052311-0010/23-3-1	0511030-3	5/23/2011	toluene	500mL wm amber	
1427333-052311-0010/23-4-1	0511030-4	5/23/2011	air	XAD trap	
1427333-052311-0010/23-5-1	0511030-5	5/23/2011	rinse	1L wm amber	
1427333-052311-0010/23-6-1	0511030-6	5/23/2011	rinse	500mL wm amber	
1427333-052311-0010/23-1-2	0511030-7	5/23/2011	air filter	petri dish	

JK *10/3*
 Laboratory Receipt Initials

0511030
 5/26/2011 11:08:10 AM

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0511030

Client ID	Lab Sample ID	Date	Matrix	Container	Comment
1427333-052311-0010/23-2-2	0511030-8	5/23/2011	solvents	500mL wm amber	
1427333-052311-0010/23-3-2	0511030-9	5/23/2011	toluene	500mL wm amber	
1427333-052311-0010/23-4-2	0511030-10	5/23/2011	air	XAD trap	
1427333-052311-0010/23-5-2	0511030-11	5/23/2011	rinse	1L wm amber	
1427333-052311-0010/23-6-2	0511030-12	5/23/2011	rinse	500mL wm amber	
1427333-052311-0010/23-1-3	0511030-13	5/24/2011	air filter	petri dish	
1427333-052311-0010/23-2-3	0511030-14	5/24/2011	solvents	500mL wm amber	
1427333-052311-0010/23-3-3	0511030-15	5/24/2011	toluene	500mL wm amber	
1427333-052311-0010/23-4-3	0511030-16	5/24/2011	air	XAD trap	
1427333-052311-0010/23-5-3	0511030-17	5/24/2011	rinse	1L wm amber	

JAK *2/3*
Laboratory Receiving Initials

0511030

5/25/2011 11:10:20 AM

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43034.

Project Number: 0511030

Sample ID	Laboratory ID	Date	Material	Container	Comment
1427333-052311-0010/23-6-3	0511030-18	5/24/2011	rinse	500mL wm amber	
1427333-052411-0010/23-A-BL	0511030-19	5/24/2011	acetone	500mL wm amber	blank
1427333-052411-0010/23-M-BL	0511030-20	5/24/2011	methylene chloride	500mL wm amber	blank
1427333-052411-0010/23-T-BL	0511030-21	5/24/2011	toluene	500mL wm amber	blank

[Signature] 3 of 3
Laboratory Receiving Initials

0511030
5/26/2011 11:36:26 AM

DAT Reports®

Data Analysis Technologies, Inc.

7715 Corporate Blvd.
Plain City, OH 43064
800-733-8644

Sample Analysis Certificate

Client: Shaw Environmental, Inc.
Address: 4171 Essen Lane
Baton Rouge, LA 70809

Date: 7/25/2011
DAT Project ID: 0511030
Date Received: 5/26/2011
Date Analyzed: 7/20/2011

Attn: Richard Ishikawa
Client Project: CITGO
Analysis: PCB-Method 1668

The following samples were received on 5/26/2011:

DAT Sample ID	Client Sample ID	Date Sampled	Matrix
0511030-1	1427333-052311-0010/23-1-1	5/23/2011	air filter
0511030-10	1427333-052311-0010/23-4-2	5/23/2011	air
0511030-11	1427333-052311-0010/23-5-2	5/23/2011	rinse
0511030-12	1427333-052311-0010/23-6-2	5/23/2011	rinse
0511030-13	1427333-052311-0010/23-1-3	5/24/2011	air filter
0511030-14	1427333-052311-0010/23-2-3	5/24/2011	solvents
0511030-15	1427333-052311-0010/23-3-3	5/24/2011	toluene
0511030-16	1427333-052311-0010/23-4-3	5/24/2011	air
0511030-17	1427333-052311-0010/23-5-3	5/24/2011	rinse
0511030-18	1427333-052311-0010/23-6-3	5/24/2011	rinse
0511030-19	1427333-052411-0010/23-A-BL	5/24/2011	acetone
0511030-2	1427333-052311-0010/23-2-1	5/23/2011	solvents
0511030-20	1427333-052411-0010/23-M-BL	5/24/2011	methylene
0511030-21	1427333-052411-0010/23-T-BL	5/24/2011	toluene
0511030-3	1427333-052311-0010/23-3-1	5/23/2011	toluene
0511030-4	1427333-052311-0010/23-4-1	5/23/2011	air
0511030-5	1427333-052311-0010/23-5-1	5/23/2011	rinse
0511030-6	1427333-052311-0010/23-6-1	5/23/2011	rinse
0511030-7	1427333-052311-0010/23-1-2	5/23/2011	air filter

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0511030-8	1427333-052311-0010/23-2-2	5/23/2011	solvents
0511030-9	1427333-052311-0010/23-3-2	5/23/2011	toluene

Results: See attached summary.

QC: Met the criteria for the method. See attached summary.

Reviewed and approved for release by:


Ronald K. Mitchum, Ph.D.
President, DAT

Date:

7/28/11

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Page 2 of 21

Data Analysis Technologies, Inc. 7715 Corporate Blvd. Plain City OH 43064			
Method 1668A-PCB			
Client:	Shaw Environmental	Client Sample:	1427333-052111-001023-1
Client Project:	SITGO	Date Sampled:	5/24/2011
Lab Project #:	3511030	Date Received:	5/26/2011
Lab Sample ID:	3511030-1	Date Est:	6/2/2011
Sample Size	1	Traie	
Dry Weight	1	NA	
GC-Column	JW55-DB-S		
Detection Factor	1	Analyst:	CSM

Congener	PCB#	# homologs	Response	Ratio	Ratio(y/n)	RT(min)	Amount	DC	Q	REL	Q
WHO-12							PG	PG		PG	
2,3,4,4'-TetraCB	77	1	1.100E+02	0.71	y	26.2700	49.76	41.78		5.07	
3,4,4',5-TetraCB	81	1	1.200E+05	0.71	y	37.0900	56.59	31.09		6.19	
2,3,3',4,4'-PentaCB	105	1	2.500E+06	1.08	y	40.4800	982.08	981.08		4.48	
2,3,4,4',5-PentaCB	114	1	2.100E+02	0.39	y	39.4200	80.55	95.88		5.15	
2,3,4,4',5-PentaCB	118	1	9.100E+06	1.19	y	38.5700	2867.35	2861.35		8.43	
2,3,4,4',5-PentaCB	123	1	9.100E+06	1.19	y	38.8700	2784.94	2781.94		8.40	
3,3',4,4',5-PentaCB	126	0								4.26	
2,3,3',4,4',5-HexaCB	156	1	6.600E+05	1.2	y	45.5800	179.17	175.17		3.18	
2,3,3',4,4',5'-HexaCB	157	1	1.300E+05	0.92	n	46.2200				3.71	EMPC
2,3,4,4',5,5'-HexaCB	167	1	1.300E+06	1.34	y	48.1800	328.87	326.87		3.87	
3,3',4,4',5,5'-HexaCB	169	0								4.85	
2,3,3',4,4',5,5'-HeptaCB	189	0								3.07	

Total CB

MonoCB	3	1.500E+06				789.5	786.48			5.5	
DiCB	0									827.9	
TriCB	7	2.400E+06				870.1	870.05			10.6	
TetraCB	18	1.030E+07				3994.3	3984.32			11.1	
PentaCB	19	4.520E+07				61198.1	61184.08			10.7	
HexaCB	17	2.300E+07				7473.7	7472.75			9.5	
HeptaCB	8	1.400E+06				551.5	551.47			3.7	
OctaCB	0									6.8	
NonCB	8									2.6	

Total PCBs

18877.14 59873.14

EMRL = Estimated Method Reporting Limit
EDL = Estimated Detection Limit
LOD/WDM = Wiersma Defining PCB
WHO 12 = World Health Organization 12 Toxic Isomers
EMPC = The EDL was an EMPC
DC = Blank Corrected Count

Shaw-XAD-Train-Via-0

Data Analysis Technologies, Inc. 7715 Corporate Blvd. Plain City OH 43064			
Method 1668A-PCB-Internal Standard Recovery			
Client:	Shaw Environmental	Client Sample:	1427333-062311-001023-1
Client Project:	CRGO	Date Sampled:	5/24/2011
Lab Project #:	0511030	Date Received:	5/26/2011
Lab Sample ID:	0511030-1	Date Exp:	6/2/2011
		Date Anal:	7/20/2011
Sample Size:	1	Train	Moisture%
Dry Weight:	1	Train	Solids/Lipids%
GC-Column:	JW5-DB-5		
Dilution Factor:	1	Analyst:	CSM

Concentr	PCB #	Abundance	Response	Ratio	Ratio(y/n)	RT(min)	Conc(pg)	DL(pg)	% Recovery	Q	Limits(% R)
MonoCB_#1L	1	1	4.70E+06	2.97	y	14:49:00	1382.3	21.5	39.6	15	150
MonoCB_#3L	3	1	4.70E+06	3.05	y	15:53:00	1999.3	20.9	38.0	15	150
DiCB_#4L	4	1	3.30E+06	1.48	y	18:02:00	1648.5	8.1	4.2	25	150
DiCB_#15L	15	1	6.80E+06	1.52	y	25:17:00	3770.6	7.1	8.8	25	150
TriCB_#19L	19	1	3.10E+06	1.06	y	31:41:00	2307.1	1115.6	57.7	25	150
TriCB_#37L	37	1	8.80E+06	0.98	y	33:12:00	2869.2	236.4	71.7	25	150
TetraCB_#44L	44	1	4.60E+06	0.84	y	25:13:00	1481.6	9.1	37.0	25	150
TetraCB_#77L	77	1	8.10E+06	0.77	y	35:27:00	1861.6	7.1	46.5	25	150
PentaCB_#11L	81	1	8.80E+06	0.75	y	37:09:00	2114.0	7.6	53.9	25	150
PentaCB_#104L	104	1	4.30E+06	1.74	y	29:27:00	2455.2	6.4	61.4	25	150
PentaCB_#123L	123	1	7.50E+06	1.37	y	38:46:00	2113.2	3.6	52.8	25	150
PentaCB_#118L	118	1	7.40E+06	1.42	y	38:56:00	2004.1	3.5	50.1	25	150
PentaCB_#114L	114	1	7.70E+06	1.58	y	38:43:00	2175.3	4.3	54.4	25	150
PentaCB_#103L	103	1	8.00E+06	1.64	y	40:47:00	2218.5	4.3	53.5	25	150
PentaCB_#126L	126	1	8.60E+06	1.67	y	40:04:00	1988.9	4.3	60.0	25	150
HexaCB_#55L	155	1	4.80E+06	1.32	y	33:55:00	1769.3	3.7	44.2	25	150
HexaCB_#67L	167	1	7.00E+06	1.22	y	44:23:00	1875.0	2.9	46.9	25	150
HexaCB_#368L	136	1	7.90E+06	1.26	y	40:56:00	1892.3	2.9	47.3	25	150
HexaCB_#57L	157	1	8.10E+06	1.22	y	48:19:00	1531.7	2.9	48.3	25	150
HexaCB_#69L	169	1	8.20E+06	1.34	y	48:35:00	2210.4	3.2	53.3	25	150
HeptaCB_#188L	188	1	6.50E+06	1.12	y	40:02:00	2031.0	3.4	53.8	25	150
HeptaCB_#189L	189	1	5.90E+06	1.13	y	51:02:00	2174.5	4.3	59.4	25	150
OctaCB_#202L	202	1	4.40E+06	0.91	y	49:47:00	2194.5	3.6	50.9	25	150
OctaCB_#205L	205	1	6.80E+06	0.87	y	53:45:00	1925.6	2.1	45.6	25	150
NonCB_#206L	206	1	6.20E+06	0.88	y	51:57:00	2231.2	3.1	55.8	25	150
NonCB_#208L	208	1	3.10E+06	0.88	y	55:55:00	2600.9	2.5	63.0	25	150
DecaCB_#209L	209	1	5.40E+06	1.31	y	58:06:00	1906.3	2.5	47.7	25	150
Recovery Standards											
DiCB_#9L	9	1	6.50E+06	1.46	y	19:27:00	413.3	2.7	21.3 *	25	150
TetraCB_#52L	52	1	5.80E+06	0.84	y	28:30:00	1489.2	7.4	37.2	25	150
PentaCB_#101L	101	1	6.80E+06	1.36	y	34:33:00	2130.7	4.0	53.3	25	150
HexaCB_#138L	138	1	8.50E+06	1.19	y	42:25:00	2500.0	3.5	62.5	25	150
OctaCB_#194L	194	1	6.10E+06	0.91	y	53:23:00	2461.9	3.7	61.5	25	150
Cleanup Standards											
TriCB_#28L	28	1	8.10E+06	1.02	y	26:11:00	2205.4	198.7	55.1	30	135
PentaCB_#111L	111	1	7.10E+06	1.4	y	26:21:00	2168.9	4.0	54.2	30	135
HeptaCB_#178L	178	1	4.40E+06	1.08	y	49:01:00	2857.7	6.0	51.4	30	135

Data Analysis Technologies, Inc. 7715 Corporate Blvd. Plain City OH 43064			
Method 1668A-PCB			
Client:	Shaw Environmental	Client Sample:	1427333-052211-001023-2
Client Project:	21TGO	Date Sampled:	5/24/2011
Lab Project #:	3511030	Date Received:	5/29/2011
Lab Sample ID:	3511030-7	Date Ext:	6/2/2011
Sample Size:	1	Date Anal:	7/20/2011
Dry Weight:	1	Analyst: CSM	
GC-Column:	IWIS-DB-5		
Dilution Factor:	1		

Congener	PCB#	# homologs	Response	Ratio	Ratio(y/n)	RT(min)	Amount pg	nc pg	Q	Wt%	Q
WBO-12											
3,2',4,4'-TetraCB	77	1	2.100E+05	0.02	y	36.2000	222.61	222.61		0.38	
3,4,4',5-TetraCB	81	1	3.700E+05	0.78	y	37.1100	155.17	155.17		10.33	
2,3,3',4,4'-PentaCB	105	1	4.700E+06	1.65	y	40.4700	2289.93	2288.80		4.84	
2,3,4,4',5-PentaCB	114	1	4.100E+05	1.7	y	39.4500	226.81	226.81		8.32	
2,3,4,4',5'-PentaCB	118	1	2.800E+07	1.42	y	38.5800	8136.04	8128.04		11.87	
2,3,4,4',5-PentaCB	123	1	2.800E+07	1.42	y	38.6800	7637.04	7667.04		12.33	
3,2,4,4',5-PentaCB	126	0								4.54	
2,3,3',4,4',5-HexaCB	158	1	5.800E+05	1.24	y	45.5900	198.56	198.56		6.27	
2,3,3',4,4',5'-HexaCB	157	1	1.200E+05	0.89	n	46.2000				6.29	EMPC
2,3,4,4',5,5'-HexaCB	167	1	1.400E+06	1.27	y	44.1800	628.92	628.92		7.23	
3,3,4,4',5,5'-HexaCB	169	0								6.86	
2,3,3',4,4',5,5'-HeptaCB	189	0								6.23	

Total CBs

MonoCB	1	2.400E+06					905.1	905.08		1.3	
DiCB	0									180.7	
TriCB	7	2.420E+06					762.4	762.38		0.8	
TetraCB	20	1.00E+07					12704.8	12704.80		16.1	
PentaCB	20	1.756E+08					177138.1	177138.06		18.2	
HexaCB	21	5.890E+07					24819.9	24819.90		0.6	
HexaCB	8	1.800E+06					913.6	913.84		6.1	
OctaCB	2	3.260E+04					23.9	21.95		18.8	
NonCB	0									1.8	

Total PCBs

267267.74 217207.74

EDRL = Estimated Method Reporting Limit
EDL = Estimated Detection Limit
LOC/WDN = Window Detecting PCB
WBO 12 = World Health Organization 12 Toxic Isomers
EMPC = The EDL was an EMPC
BC = Blank Corrected Result

Data Analysis Technologies, Inc. 7715 Corporate Blvd. Plain City OH 43064			
Method 1668A-PCB-Internal Standard Recovery			
Client:	Shaw Environmental	Client Sample:	1427533-052511-0016/23-2
Client Project:	OTCO	Date Sampled:	5/24/2011
Lab Project #:	0511030	Date Received:	5/26/2011
Lab Sample ID:	0511030-7	Date Exp:	6/2/2011
		Date Anal:	7/20/2011
Sample Size	1	Train	0.0%
Dry Weight	1	Train	100
GC-Column	JWS-DB-5		
Dilution Factor	1	Analyst:	USM

Compound	PCB #	# Injections	Response	Ratio	Ratio(y/n)	RT(min)	Conc(ppg)	DL (pg)	% Recovery	Q	Limit (% R)
MonoCB_A1L	1	1	7.40E+06	2.97	y	14:49:00	1722.6	206	45.1	15	150
MonoCB_A3L	3	1	6.90E+06	3.14	y	15:23:00	2009.2	257	53.2	13	150
DiCB_A4L	4	1	4.70E+06	1.48	y	18:01:00	1770.7	52	44.3	25	150
DiCB_A15L	15	1	7.80E+06	1.3	y	23:17:00	2198.4	46	65.9	25	150
TriCB_A19L	19	1	4.70E+06	1.01	y	21:41:00	2451.0	2587	61.3	25	150
TriCB_A37L	37	1	8.90E+06	0.93	y	30:12:00	2138.6	1972	71.0	25	150
TetraCB_A41L	41	1	8.00E+06	0.89	y	25:14:00	1989.1	80	41.0	25	150
TetraCB_A77L	77	1	6.80E+06	0.78	y	36:29:00	1696.5	57	47.4	25	150
TetraCB_A81L	81	1	7.20E+06	0.8	y	37:10:00	1925.4	61	45.1	25	150
PentaCB_A104L	104	1	2.90E+06	1.0	y	29:37:00	2261.3	59	59.0	25	150
PentaCB_A123L	123	1	6.10E+06	1.45	y	28:47:00	1852.3	39	41.3	25	150
PentaCB_A181L	118	1	5.80E+06	1.39	y	38:57:00	1702.2	38	42.6	25	150
PentaCB_A141L	114	1	5.90E+06	1.62	y	39:44:00	1818.0	69	45.5	25	150
PentaCB_A105L	105	1	6.00E+06	1.62	y	40:46:00	1814.7	68	45.4	25	150
PentaCB_A126L	136	1	6.10E+06	1.58	y	43:03:00	1927.7	69	44.3	25	150
HexaCB_A155L	155	1	4.30E+06	1.27	y	33:55:00	2912.2	43	53.3	25	150
HexaCB_A167L	167	1	5.70E+06	1.19	y	44:24:00	1686.2	40	42.2	25	150
HexaCB_A150L	150	1	3.90E+06	1.21	y	45:57:00	1763.5	40	41.1	25	150
HexaCB_A157L	157	1	6.20E+06	1.19	y	46:19:00	1865.3	40	46.6	25	150
HexaCB_A169L	169	1	6.20E+06	1.36	y	48:32:00	2883.7	45	52.1	25	150
HeptaCB_A188L	188	1	5.10E+06	1.09	y	40:03:00	2197.1	37	54.9	25	150
HeptaCB_A189L	189	1	4.20E+06	1.12	y	51:02:00	2267.8	47	56.7	25	150
OctaCB_A203L	203	1	3.00E+06	0.9	y	45:48:00	2219.6	50	55.5	25	150
OctaCB_A205L	205	1	5.10E+06	0.9	y	53:45:00	1843.3	23	46.1	25	150
NonaCB_A206L	205	1	4.60E+06	0.85	y	51:57:00	2212.8	33	55.3	25	150
NonaCB_A208L	208	1	3.00E+06	0.86	y	55:52:00	1884.1	37	67.1	25	150
DecaCB_A209L	209	1	3.80E+06	1.34	y	58:06:00	1781.4	34	46.5	25	150
Recovery Standards											
DiCB_A91L	9	1	9.40E+06	1.47	y	19:27:00	1477.3	32	36.9	25	150
TetraCB_A52L	52	1	3.80E+06	0.85	y	28:31:00	1890.8	13	47.3	25	150
HeptaCB_A101L	101	1	6.20E+06	1.44	y	34:34:00	2455.0	49	61.4	25	150
HexaCB_A138L	138	1	6.80E+06	1.19	y	42:26:00	2100.0	49	62.5	25	150
OctaCB_A194L	194	1	4.60E+06	0.91	y	23:23:00	2115.2	40	57.9	25	150
Cleanup Standards											
TriCB_A28L	28	1	8.20E+06	0.96	y	26:11:00	2196.3	163.7	54.9	30	135
PentaCB_A111L	111	1	5.90E+06	1.35	y	36:21:00	1984.3	43	46.6	30	135
HeptaCB_A178L	178	1	3.40E+06	1.09	y	43:02:00	1987.7	1.6	49.7	30	135

Data Analysis Technologies, Inc. 7715 Corporate Blvd. Plain City OH 43064				
Method 1668A-PCB				
Client:	Shaw Environmental		Client Sample:	1427333-052211-001023-3
Client Project:	2ITGO		Date Sampled:	5/24/2011
Lab Project #:	3511030		Date Received:	5/29/2011
Lab Sample ID:	3511030-13		Date Est:	6/2/2011
Sample Size	1	Train	Date Anal:	7/21/2011
Dry Weight	1	NA		
GC-Column	JW9-DB5			
Dilution Factor	1		Analyst:	CSM

Congener	PCB#	# homologs	Response	Ratio	Ratio(y/n)	RT(min)	Amount pg	PC	PC	CJ	EDL	Q
WBO-12												
2,2,4,4'-TetraCB	77	1	2.10E+04	0.81	n	26.2000					5.51 EMPC	
1,4,4',5-TetraCB	81	1	7.50E+04	0.99	n	37.1500					6.39 EMPC	
2,3,3',4,4'-PentaCB	105	1	3.10E+05	1.6	y	40.5000	142.04		142.04		4.54	
2,2,4,4',5-PentaCB	114	0									5.19	
2,3,4,4',5-PentaCB	118	1	1.10E+06	1.41	y	39.0000	393.95		305.95		4.30	
2,3,4,4',5-PentaCB	123	1	1.10E+06	1.41	y	39.0000	342.73		342.73		4.27	
3,3,4,4',5-PentaCB	126	0									4.40	
2,3,3',4,4',5-HexaCB	156	1	1.10E+05	1.53	y	45.5900	40.05		48.05		3.18	
2,3,3',4,4',5-HexaCB	157	1	3.10E+04	0.83	n	46.2200					3.72 EMPC	
2,3,4,4',5,5'-HexaCB	167	1	2.10E+04	1.3	y	44.1000	72.35		77.35		3.88	
3,3,4,4',5,5'-HexaCB	169	0									4.14	
2,3,3',4,4',5,5'-HeptaCB	189	0									3.16	

Total CB

MonoCB	3	2.10E+06					856.9		856.91		2.7	
DiCB	0										131.4	
TriCB	12	2.10E+06					041.8		041.81		10.7	
TetraCB	12	4.10E+06					1831.7		1831.68		5.5	
PentaCB	12	7.10E+06					6192.7		6192.70		5.4	
HexaCB	11	4.10E+06					1021.5		1021.48		5.0	
HeptaCB	8	1.10E+06					446.3		446.27		3.6	
OctaCB	1	4.10E+04					26.3		28.30		5.6	
NonCB	0										2.8	

Total PCBs

11817.12 11817.12

ENRL = Estimated Method Reporting Limit
EDL = Estimated Detection Limit
LOC/WDML = Window Defining PCB
WBO 12 = World Health Organization 12 Toxic Isomers
EMPC = The EDL was an EMPC
BC = Blank Corrected Results

Shaw-XAD-Train-Vol-01

Data Analysis Technologies, Inc. 7715 Corporate Blvd. Plain City OH 43064				
Method 1668A-PCB-Internal Standard Recovery				
Client:	Shaw Environmental		Client Sample:	1427333-052311-001023-3
Client Project:	CITGO		Date Sampled:	5/24/2011
			Date Received:	5/26/2011
Lab Project #:	0511030		Date Exp:	6/2/2011
Lab Sample ID:	0511030-12		Date Anal:	7/21/2011
Sample Size	1	Train	Moisture%	0.0%
Dry Weight	1	Train	Solids/Lipids%	100
GC-Column	JWS-DB-5			
Dilution Factor	1		Analyse	CSM

Compound	PCB #	Abundance	Response	Ratio	Ratio(y/n)	RT(min)	Conc(pg)	DL(pg)	% Recovery	Q	Limit(% R)
MonoCB_#1L	1	1	7.10E+06	3.05	y	14:49:00	1703.4	15.3	42.6	15	150
MonoCB_#3L	3	1	3.30E+06	2.92	y	18:33:00	2229.3	19.2	33.7	13	150
DiCB_#4L	4	1	5.10E+06	1.43	y	18:01:00	1948.7	5.4	41.7	25	150
DiCB_#15L	13	1	8.30E+06	1.45	y	25:18:00	2942.6	4.8	77.6	25	150
TriCB_#19L	19	1	6.10E+06	0.99	y	21:42:00	3209.1	254.1	8.7	25	150
TriCB_#37L	37	1	9.30E+06	0.93	y	30:13:00	2876.0	321.4	7.9	25	150
TetraCB_#54L	54	1	4.70E+06	0.89	y	35:13:00	1410.7	6.1	35.3	25	150
TetraCB_#77L	77	1	7.50E+06	0.74	y	35:31:00	1789.4	5.1	44.7	25	150
TetraCB_#81L	81	1	8.30E+06	0.77	y	37:13:00	2122.9	5.5	53.1	25	150
PentaCB_#104L	104	1	4.70E+06	1.7	y	29:38:00	2640.1	4.6	64.2	25	150
PentaCB_#123L	123	1	7.20E+06	1.33	y	33:49:00	2645.4	3.3	5.1	25	150
PentaCB_#118L	118	1	6.50E+06	1.44	y	38:59:00	1838.9	3.2	46.0	25	150
PentaCB_#114L	114	1	6.50E+06	1.66	y	39:46:00	1906.5	3.8	47.7	25	150
PentaCB_#105L	105	1	6.70E+06	1.66	y	40:49:00	1510.1	3.8	47.8	25	150
PentaCB_#136L	136	1	7.20E+06	1.64	y	45:05:00	2103.9	3.8	52.6	25	150
HexaCB_#155L	155	1	5.30E+06	1.32	y	39:57:00	2162.6	3.9	54.1	25	150
HexaCB_#167L	167	1	6.30E+06	1.23	y	44:24:00	1904.5	2.9	47.6	25	150
HexaCB_#156L	156	1	7.20E+06	1.23	y	45:59:00	1541.3	2.9	43.8	25	150
HexaCB_#157L	157	1	7.10E+06	1.19	y	45:20:00	1581.8	2.9	48.5	25	150
HexaCB_#169L	169	1	7.50E+06	1.33	y	48:36:00	2362.2	3.3	59.1	25	150
HeptaCB_#188L	188	1	5.70E+06	1.08	y	40:04:00	2280.6	2.6	57.0	25	150
HeptaCB_#189L	189	1	5.30E+06	1.07	y	51:05:00	2653.3	3.2	66.3	25	150
OctaCB_#202L	202	1	3.30E+06	0.88	y	45:48:00	2631.1	4.6	65.8	25	150
OctaCB_#205L	205	1	5.80E+06	0.9	y	53:48:00	1527.5	2.7	43.2	25	150
NonaCB_#206L	206	1	5.50E+06	0.87	y	51:59:00	2423.9	3.4	60.6	25	150
NonaCB_#208L	208	1	4.20E+06	0.86	y	55:46:00	3170.8	3.8	51.8	25	150
DecaCB_#209L	209	1	4.80E+06	1.31	y	58:09:00	2118.9	2.9	53.0	25	150
Recovery Standards											
DiCB_#9L	9	1	9.10E+06	1.43	y	16:28:00	1126.0	2.4	35.1	25	150
TetraCB_#32L	52	1	6.30E+06	0.83	y	28:32:00	1877.1	5.9	43.9	25	150
PentaCB_#101L	101	1	6.50E+06	1.39	y	34:36:00	2186.3	4.0	57.7	25	150
HexaCB_#138L	138	1	7.30E+06	1.21	y	42:27:00	2100.0	3.6	62.5	25	150
OctaCB_#194L	194	1	4.90E+06	0.91	y	53:25:00	2299.9	4.6	57.5	25	150
Cleanup Standards											
TriCB_#28L	28	1	1.20E+07	0.99	y	26:11:00	2388.6	270.1	72.2	30	135
PentaCB_#111L	111	1	6.80E+06	1.34	y	36:24:00	2172.1	3.7	54.3	30	135
HeptaCB_#178L	178	1	3.80E+06	1.04	y	48:02:00	2085.7	4.3	57.1	30	135

Data Analysis Technologies, Inc. 7315 Corporate Blvd. Plain City OH 43064				
Method 1668A-PCB				
Client:	Shaw Environmental		Client Sample:	1427333-052411-001023-BL
Client Project:	2ITGO		Date Sampled:	5/24/2011
			Date Received:	5/29/2011
Lab Project #:	3511030		Date Ext:	6/2/2011
Lab Sample ID:	3511030L01		Date Anal:	7/20/2011
Sample Size	1	Trials		
Dry Weight	1	NA		
GC-Column	7MS-DB5			
Dilution Factor	1		Analyst:	CSM

Congener	PCB #	# homologs	Response	Ratio	Ratio(y/n)	RT(min)	Amount pg	nc pg	Q	RTS %	Q
WBO-12											
1,2,4,6-TetraCB	77	0								4.11	
1,4,4',5-TetraCB	81	1	1.100E+04	0.6	n	30.5200				4.78	EMPC
2,3,3',4,4'-PentaCB	105	1	4.100E+04	1.73	y	40.4800	18.40	18.80		3.33	
2,3,4,4',5-PentaCB	114	0								4.12	
2,3,4,4',5-PentaCB	118	1	1.100E+05	1.59	y	38.5700	43.10	43.10		3.33	
2,3,4,4',5-PentaCB	123	1	1.100E+05	1.59	y	38.5700	43.70	43.70		3.10	
3,3',4,4',5-PentaCB	126	0								3.33	
2,3,3',4,4',5-HexaCB	156	0								2.18	
2,3,3',4,4',5-HexaCB	157	0								2.17	
2,3,4,4',5,5'-HexaCB	167	0								2.36	
3,3,4,4',5,5'-HexaCB	169	0								2.29	
2,3,3',4,4',5,5'-HeptaCB	189	0								3.79	

Total CB

MonoCB	2	1.100E+06				773.8	775.78			2.9	
DiCB	0									401.3	
TriCB	3	1.120E+05				32.1	33.80			16.6	
TetraCB	6	3.100E+05				131.4	131.38			3.1	
PentaCB	7	6.150E+05				553.0	552.96			3.8	
HexaCB	1	3.100E+04				30.9	30.81			1.5	
HeptaCB	0									4.6	
OctaCB	0									5.4	
NonCB	0									2.7	

Total PCBs

1544.13 1544.13

ENRL = Estimated Method Reporting Limit
EDL = Estimated Detection Limit
LOC/WDM = Window Defining PCB
WHO 12 = World Health Organization 12 Toxic Isomers
EMPC = The EDL was an EMPC
DC = Blank Corrected Result

Back-XAD-Train-Ven-01

Data Analysis Technologies, Inc. 7715 Corporate Blvd. Plain City OH 43064			
Method 1668A-PCB-Internal Standard Recovery			
Client:	Shaw Environmental	Client Sample:	1427333-052411-001023-BL
Client Project:	CITGO	Date Sampled:	5/24/2011
Lab Project #:	0511030	Date Received:	5/26/2011
Lab Sample ID:	0511030-13	Date Ex:	6/2/2011
		Date Anal:	7/20/2011
Sample Size	1	Moisture%	0.0%
Dry Weight	1	Solids/Lipids%	100
GC-Column	JWS-DB-5	Analyst:	C.S.M
Dilution Factor	1		

Compound	PCB #	Response	Ratio	Ratio(y/n)	RT(min)	Conc(pg)	DL (pg)	% Recovery	Q	Limit(% R)
MonoCB #1L	1	4.10E+06	3.03 y		14:49:00	1325.4	11.7	33.1	15	150
MonoCB #3L	3	5.10E+06	3.22 y		16:33:00	2026.0	14.7	5.4	15	150
DiCB #4L	4	3.20E+06	1.45 y		18:01:00	1688.3	8.6	4.2	25	150
DiCB #15L	15	8.20E+06	1.49 y		21:17:00	3781.4	7.6	9.5	25	150
TriCB #19L	19	4.50E+06	0.96 y		21:40:00	1320.3	648.7	85.0	25	150
TriCB #37L	37	8.10E+06	0.97 y		36:12:00	2124.6	2099	55.1	25	150
TetraCB #4L	54	6.50E+06	0.86 y		31:13:00	1704.3	8.2	42.6	25	150
TetraCB #77L	77	7.80E+06	0.77 y		36:27:00	1750.1	6.0	43.8	25	150
TetraCB #81L	81	8.20E+06	0.76 y		37:09:00	1967.0	6.5	48.2	25	150
PentaCB # 94L	104	4.50E+06	1.60 y		29:36:00	2288.3	3.0	34.0	25	150
PentaCB # 123L	123	6.80E+06	1.47 y		33:45:00	1802.4	4.9	46.6	25	150
PentaCB # 138L	138	6.80E+06	1.32 y		31:56:00	1801.5	4.7	45.0	25	150
PentaCB # 14L	114	6.80E+06	1.67 y		39:43:00	1855.8	5.4	46.4	25	150
PentaCB # 103L	103	6.80E+06	1.74 y		40:45:00	1856.7	5.3	46.4	25	150
PentaCB # 26L	126	7.20E+06	1.67 y		41:04:00	1957.3	5.4	48.9	25	150
HexaCB #155L	155	5.30E+06	1.32 y		31:54:00	2113.5	4.6	52.8	25	150
HexaCB #167L	167	6.70E+06	1.22 y		40:23:00	1822.8	4.0	43.6	25	150
HexaCB #150L	150	6.90E+06	1.27 y		47:56:00	1892.2	4.1	47.3	25	150
HexaCB #157L	157	7.20E+06	1.2 y		45:19:00	1975.7	4.1	48.4	25	150
HexaCB #169L	169	7.30E+06	1.4 y		48:35:00	2427.7	4.6	68.7	25	150
HexaCB #188L	188	5.70E+06	1.09 y		40:02:00	2036.5	3.1	58.9	25	150
HexaCB #189L	189	5.50E+06	1.04 y		51:02:00	2474.6	3.9	6.9	25	150
OctaCB #202L	202	3.70E+06	0.95 y		45:47:00	2282.8	4.3	57.1	25	150
OctaCB #205L	205	6.50E+06	0.9 y		51:48:00	1634.8	2.6	43.4	25	150
NonalCB #206L	205	6.20E+06	0.87 y		51:57:00	2297.1	3.8	59.9	25	150
NonalCB #208L	208	3.20E+06	0.94 y		55:57:00	2381.5	4.2	51.5	25	150
DecaCB #209L	209	5.50E+06	1.27 y		55:12:00	2389.4	3.5	54.7	25	150
Recovery Standards										
DiCB #9L	9	6.80E+06	1.49 y		13:27:00	571.7	3.1	24.5 *	25	150
TetraCB #52L	52	7.20E+06	0.84 y		28:30:00	2110.5	9.1	51.8	25	150
PentaCB #101L	101	6.90E+06	1.39 y		34:33:00	2493.0	6.1	62.3	25	150
HexaCB # 138L	138	7.50E+06	1.2 y		42:25:00	2500.0	5.0	61.5	25	150
OctaCB #194L	194	5.50E+06	0.93 y		53:24:00	2225.8	4.6	61.1	25	150
Cleanup Standards										
TriCB #28L	28	1.30E+07	0.8 n		25:11:00	2763.1	176.4	69.1	30	135
PentaCB #111L	111	7.00E+06	1.37 y		35:20:00	2094.8	5.4	51.4	30	135
HeptaCB #178L	178	3.90E+06	1.08 y		48:00:00	2114.0	3.4	52.9	30	135

QC SUMMARY

Data Analysis Technologies, Inc. 7715 Corporate Blvd. Plain City OH 43064			
Method 1668A-PCR-OPR Recovery			
Client:	Shaw Environmental	Client Sample:	Lab Spks Dup.
Client Project:	CITGO	Date Sampled:	5/24/2011
Lab Project #:	0511033	Date Received:	5/26/2011
Lab Sample ID:	0010003-LSD	Date Ext:	6/2/2011
		Date Anal:	7/21/2011
Sample Size	1	Moisture%	0.0%
Dry Weight	1	Solids/Lids%	100
GC-Column	JWS-D3-5		
Dilution Factor	1	Analyst:	CSM

Congener	PCB #	# homologs	Response	Ratio	Ratio(y/n)	RT(min)	Amount pg	Recovery % % Rec	BC Rec % % Rec	Q	QC Limits
WHO-12											
2,3,4,4'-TetraCB	77	1	3.700E+06	0.77	y	36.27.00	1005.62	101.0	101.0		50 - 150
1,4,4',5-TetraCB	81	1	1.600E+06	0.78	y	37.07.00	1064.81	106.5	106.5		50 - 150
2,3,3',4,4'-PentaCB	105	1	1.400E+06	1.61	y	40.46.00	970.75	97.1	97.1		50 - 150
2,3,4,4',5-PentaCB	114	1	1.400E+06	1.58	y	39.42.00	1115.34	111.9	111.9		50 - 150
2,3,4,4',5'-PentaCB	118	1	4.100E+06	1.4	y	38.56.00	1045.55	105.6	105.6		50 - 150
2,3,4,4',5-PentaCB	123	1	1.500E+06	1.41	y	38.46.00	934.55	93.7	93.7		50 - 150
2,3,4,4',5-PentaCB	126	1	3.200E+06	1.68	y	40.05.00	896.51	89.9	89.9		50 - 150
2,3,3',4,4',5-HexaCB	156	1	1.900E+06	1.33	y	45.57.00	802.24	80.5	80.5		50 - 150
2,3,3',4,4',5'-HexaCB	157	1	1.800E+06	1.32	y	45.20.00	966.68	96.7	96.7		50 - 150
2,3,4,4',5'-HexaCB	167	1	1.900E+06	1.31	y	44.24.00	922.70	92.4	92.4		50 - 150
3,3',4,4',5'-HexaCB	169	1	1.900E+06	1.25	y	46.32.00	892.10	89.3	89.3		50 - 150
2,2,3',4,4',5'-HeptaCB	189	1	1.100E+06	1.07	y	51.03.00	914.41	91.4	91.4		50 - 150
LOC/WDM											
MonoCB(1)	1	1	3.200E+06	2.95	y	18.30.00	946.00	94.1	94.1		20 - 120
MonoCB(3)	3	1	4.800E+06	3.03	y	15.54.00	951.34	95.1	95.1		50 - 150
DiCB(4)	4	1	3.200E+06	1.32	y	18.02.00	1088.10	108.8	108.8		50 - 150
DiCB(13)	13	1	4.900E+06	1.24	y	25.18.00	1125.28	112.5	112.5		50 - 150
TriCB(19)	19	1	2.900E+06	1.07	y	21.41.00	780.98	78.7	78.7		50 - 150
TriCB(37)	37	1	1.600E+06	1.03	y	33.12.00	1021.65	102.4	102.4		50 - 150
TetraCB(54)	54	1	1.400E+06	0.83	y	25.15.00	902.70	90.3	90.3		50 - 150
PentaCB(104)	104	1	2.000E+06	1.8	y	29.38.00	918.57	91.9	91.9		50 - 150
HexaCB(155)	155	1	2.900E+06	1.3	y	35.54.00	916.08	91.6	91.6		50 - 150
HeptaCB(188)	188	1	2.900E+06	1.1	y	43.03.00	921.11	92.1	92.1		50 - 150
OctaCB(202)	202	1	2.000E+06	0.92	y	45.48.00	924.29	92.6	92.6		50 - 150
NonCB(205)	205	1	3.200E+06	0.96	y	55.46.00	931.68	93.0	93.0		50 - 150
NonCB(206)	206	1	1.400E+06	0.76	y	51.58.00	834.02	83.4	83.4		50 - 150
NonCB(208)	208	1	2.700E+06	0.8	y	55.53.00	911.15	91.1	91.1		50 - 150
DecaCB(209)	209	1	1.300E+06	1.14	y	54.07.00	1007.06	100.7	100.7		50 - 150

BC Rec % = Blank corrected % recovery
 LOC/WDM= Window Defining PCB
 WHO 12 = World Health Organization 12 Toxic Homers

Data Analysis Technologies, Inc. 7715 Corporate Blvd. Plain City OH 43084			
Method 1668A-PCB-OPR Recovery			
Client:	Shaw Environmental	Client Sample:	Lab Spike
Client Project:	CITGO	Date Sampled:	5/24/2011
Lab Project #:	0511030	Date Received:	5/26/2011
Lab Sample ID:	US11030-LS	Date Ext:	6/2/2011
		Date Anal:	7/21/2011
Sample Size	1	Moisture%	0.0%
Dry Weight	1	Solids/T spike%	100
GC-Column	JWS-DB-5		
Dilution Factor	1	Analyst:	CSM

Congener	PCB #	# homologs	Response	Ratio	Ratio(y/n)	RT(min)	Amount pg	Recovery % % Rec	BC Rec% % Rec	Q	QC Limits
WHO-12											
2,2,4,4'-TetraCB	77	1	4.300E+06	0.75	y	35:27:00	972.52	97.6	97.6		50 -150
3,4,4',5-TetraCB	81	1	4.200E+06	0.75	y	37:08:00	1041.24	104.3	104.3		50 -150
2,2,3',4,4'-PentaCB	105	1	1.800E+06	1.64	y	43:47:00	985.61	98.0	98.0		50 -150
2,3,4,4',5-PentaCB	114	1	1.800E+06	1.63	y	39:44:00	1066.06	106.6	106.6		50 -150
2,3,4,4',5'-PentaCB	118	1	4.400E+06	1.42	y	38:57:00	971.18	97.1	97.1		50 -150
2',3,4,4',5-PentaCB	123	1	4.100E+06	1.29	y	38:47:00	961.07	96.1	96.1		50 -150
3,3',4,4',5-PentaCB	126	1	1.700E+06	1.68	y	45:05:00	876.41	87.0	87.0		50 -150
2,3,3',4,4',5-HexaCB	156	1	4.600E+06	1.32	y	45:59:00	832.67	83.3	83.3		50 -150
2,3,3',4,4',5'-HexaCB	157	1	4.700E+06	1.32	y	45:22:00	905.79	91.0	91.0		50 -150
2,3,4,4',5,5'-HexaCB	167	1	4.500E+06	1.31	y	44:26:00	862.81	86.4	86.4		50 -150
3,3',4,4',5,5'-HexaCB	169	1	4.200E+06	1.35	y	48:34:00	846.90	84.7	84.7		50 -150
2,3,3',4,4',5,5'-HeptaCB	189	1	1.000E+06	1.09	y	51:03:00	882.10	88.2	88.2		50 -150
LOC/WDM											
MonoCB(1)	1	1	1.600E+06	3.08	y	18:00:00	921.12	92.2	92.2		50 -150
MonoCB(3)	3	1	1.100E+06	3.09	y	15:53:00	937.38	93.7	93.7		50 -150
DiCB(4)	4	1	1.700E+06	1.9	y	18:03:00	860.00	86.0	86.0		50 -150
DiCB(15)	15	1	1.600E+06	1.47	y	25:39:00	982.93	98.9	98.9		50 -150
TriCB(19)	19	1	2.000E+06	1.05	y	21:42:00	613.88	61.9	61.9		50 -150
TriCB(37)	37	1	1.700E+06	1.08	y	31:13:00	664.50	66.6	66.6		50 -150
TetraCB(34)	34	1	1.600E+06	0.83	y	25:15:00	891.86	89.2	89.2		50 -150
PentaCB(104)	104	1	2.500E+06	1.64	y	28:38:00	901.13	90.3	90.3		50 -150
HexaCB(151)	155	1	1.000E+06	1.22	y	35:56:00	821.02	82.5	82.5		50 -150
HeptaCB(188)	188	1	1.600E+06	1.07	y	40:03:00	911.17	91.5	91.5		50 -150
OctaCB(202)	202	1	2.600E+06	0.93	y	45:49:00	908.99	90.9	90.9		50 -150
NonCB(205)	205	1	1.400E+06	0.97	y	53:47:00	892.65	89.6	89.6		50 -150
DecaCB(206)	206	1	1.800E+06	0.79	y	51:59:00	882.15	88.2	88.2		50 -150
NonCB(208)	208	1	1.000E+06	0.81	y	55:54:00	847.78	84.8	84.8		50 -150
DecaCB(209)	209	1	1.600E+06	1.18	y	54:08:00	969.91	97.0	97.0		50 -150

BC Rec % = Blank corrected % recovery
LOC/WDM= Window Defining PCB
WHO 12 = World Health Organization 12 Toxic Isomers

Data Analysis Technologies, Inc. 7715 Corporate Blvd. Plain City OH 43064			
Method 1668A-PCB-internal Standard Recovery			
Client:	Shaw Environmental	Client Sample:	Method_Biark
Client Project:	CITGO	Date Sampled:	5/24/2011
Lab Project #:	0511030	Date Received:	5/26/2011
Lab Sample ID:	0511030-MB	Date Exp:	6/2/2011
		Date Anal:	7/20/2011
Sample Size	1	Train	Moisture%
Dry Weight	1	Train	Solids/Lipids%
GC-Column	JWS-DB-5		
Dilution Factor	1	ANALYSE	CSM

Compound	PCB #	#homologs	Response	Ratio	Ratio(y/n)	RT(min)	Conc(pg)	DL(pg)	% Recovery	Q	Limit(% R)
MonoCB_#1L	1	1	4.30E+06	3.09	y	14:49:00	1590.9	139	39.8	15	150
MonoCB_#3L	3	1	3.00E+06	2.90	y	16:34:00	2078.9	174	52.9	15	150
DiCB_#4L	4	1	3.20E+06	1.45	y	18:02:00	1697.9	111	42.4	25	150
DiCB_#15L	15	1	1.20E+07	1.47	y	21:18:00	5727.9	99	142.2	25	150
TriCB_#19L	19	1	9.20E+06	0.91	y	21:41:00	6801.7	6426	178.0 *	25	150
TriCB_#37L	37	1	1.70E+07	1	y	30:12:00	1080.5	2085	77.0	25	150
TetraCB_#41L	41	1	8.50E+06	0.88	y	21:13:00	1513.7	57	37.8	25	150
TetraCB_#77L	77	1	1.50E+07	0.77	y	36:26:00	1934.8	45	48.4	25	150
TetraCB_#81L	81	1	1.50E+07	0.78	y	37:08:00	2170.6	49	54.3	25	150
PentaCB_#104L	104	1	7.80E+06	1.08	y	29:36:00	2087.1	51	67.2	25	150
PentaCB_#123L	123	1	1.40E+07	1.37	y	31:45:00	2098.6	22	52.5	25	150
PentaCB_#138L	138	1	1.40E+07	1.38	y	31:55:00	2080.3	21	5.5	25	150
PentaCB_#144L	144	1	1.40E+07	1.66	y	39:42:00	2143.9	62	57.6	25	150
PentaCB_#105L	105	1	1.40E+07	1.62	y	40:45:00	2166.4	61	54.2	25	150
PentaCB_#176L	176	1	1.50E+07	1.67	y	41:04:00	2295.0	62	57.4	25	150
HexaCB_#155L	155	1	1.00E+07	1.3	y	31:34:00	2367.5	26	59.2	25	150
HexaCB_#167L	167	1	1.40E+07	1.25	y	41:24:00	2044.5	22	5.6	25	150
HexaCB_#126L	126	1	1.40E+07	1.26	y	41:56:00	2115.5	22	52.9	25	150
HexaCB_#157L	157	1	1.40E+07	1.25	y	41:19:00	2141.8	22	57.5	25	150
HexaCB_#169L	169	1	1.40E+07	1.21	y	41:33:00	2302.6	23	57.6	25	150
HexaCB_#188L	188	1	1.20E+07	1.1	y	40:02:00	1971.2	17	48.3	25	150
HexaCB_#189L	189	1	1.20E+07	1.09	y	51:02:00	2557.3	21	67.9	25	150
OctaCB_#232L	202	1	8.30E+06	0.96	y	41:47:00	2280.3	22	57.0	25	150
OctaCB_#235L	205	1	1.50E+07	0.89	y	51:47:00	2170.6	14	54.3	25	150
NonCB_#206L	205	1	1.30E+07	0.86	y	51:57:00	2434.0	16	66.8	25	150
NonCB_#200L	200	1	1.20E+07	0.86	y	51:57:00	2406.3	18	66.1	25	150
DecaCB_#209L	209	1	1.30E+07	1.24	y	58:12:00	2409.6	15	66.2	25	150
Recovery Standards											
DiCB_#9L	9	1	6.50E+06	1.5	y	13:27:00	514.7	23	12.9 *	25	150
TetraCB_#22L	52	1	1.30E+07	0.83	y	23:30:00	1685.2	56	42.1	25	150
PentaCB_#101L	101	1	1.20E+07	1.39	y	31:33:00	2429.6	28	66.7	25	150
HexaCB_#136L	136	1	1.40E+07	1.24	y	42:25:00	2500.0	27	62.5	25	150
OctaCB_#194L	194	1	1.20E+07	0.9	y	51:24:00	2580.7	33	74.5	25	150
Cleanup Standards											
TriCB_#28L	28	1	1.50E+07	1.11	y	25:11:00	2301.1	1752	57.5	30	135
PentaCB_#111L	111	1	1.40E+07	1.41	y	35:17:00	2295.6	24	57.4	30	135
HexaCB_#178L	178	1	8.20E+06	1.06	y	45:01:00	2430.6	38	66.8	30	135

Data Analysis Technologies, Inc. 7715 Corporate Blvd. Plain City OH 43064			
Method 1668A-PCB			
Client:	Shaw Environmental	Client Sample:	Method Blank
Client Project:	GITGO	Date Sampled:	5/24/2011
Lab Project #:	4511030	Date Received:	5/26/2011
Lab Sample ID:	4511030-LAB	Date Ext:	6/2/2011
Sample Size:	1	Date Anal:	7/30/2011
Dry Weight:	1	Analyst:	CSN
GC-Column:	AW5-DB-5		
Dilution Factor:	1		

Congener	PCB#	# homologs	Response	Ratio	Ratio(y/n)	RT(min)	Amount pg	BC	Q	REL	Q
WHO-12											
2,3,4,4'-TetraCB	77	0								2.73	
3,4,4',5-TetraCB	81	0								3.81	
2,3,3',4,4'-PentaCB	105	1	3.30E+04	0.91	n	40:45:00				1.33 EMPC	
2,3,4,4',5-PentaCB	114	0								1.38	
2,3,4,4',5-PentaCB	118	1	7.30E+04	1.02	n	38:57:00				1.32 EMPC	
2,3,4,4',5-PentaCB	123	1	7.30E+04	1.02	n	38:57:00				1.89 EMPC	
2,3,4,4',5-PentaCB	129	0								1.40	
2,3,3',4,4',5-HexaCB	156	0								1.64	
2,3,3',4,4',5-HexaCB	157	0								1.70	
2,3,3',4,4',5-HexaCB	167	0								1.85	
3,3',4,4',5,5'-HexaCB	169	0								1.75	
2,3,3',4,4',5,5'-HexaCB	189	0								1.48	

Total CB

MonoCB	0									4.2	
DiCB	0									431.8	
TriCB	0									3.6	
TetraCB	3	2.35E+05					59.2	86.23		5.5	
PentaCB	4	3.65E+05					150.3	156.47		3.9	
HexaCB	1	8.90E+04					14.3	14.40		4.0	
HeptaCB	2	3.30E+04					6.4	6.43		2.4	
OctaCB	1	9.40E+03					2.7	1.67		3.8	
NonCB	0									1.3	

Total PCBs

235.25 237.28

EMRL = Estimated Method Reporting Limit
EDL = Estimated Detection Limit
LOOWDNI = Windows Default %CD
WHO 12 = World Health Organization 12 Toxic Isomers
EMPC = The EDL was an EMPC
BC = Blank Corrected Results

Back XAD-Train-Ven-Cl

DOCUMENTATION

CHAIN OF CUSTODY / REQUEST FOR ANALYSIS (COC/RFA)



4171 Essen Lane, Baton Rouge, LA 70809
Phone: 225-932-2745

Date 5/24/11 Page 1 of 2

PROJECT INFORMATION				PRESERVATIVE			
Project Number: 142733							
Project Name: CITGO ICR Testing							
Delivered Via:							
TAT: <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 5 days <input type="checkbox"/> 21 days				Contact Person: 225-931-9594			
Sample ID	Sample Collection Date	Sample Collection Time	Sample Matrix	Number of Containers and Size	COMMENTS	Received by: 1.	Relinquished by: 2.
X 142733-052311-001023-1-1	5/23/11	10:25	Filter	1 glass petri		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
X 142733-052311-001023-2-1	5/23/11	10:25	Liquid	1/500 mL Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
M 142733-052311-001023-3-1	5/23/11	10:25	Liquid	1/500 mL Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
X 142733-052311-001023-4-1	5/23/11	10:25	Sorbent media	1/1 XAD Trap		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
Y 142733-052311-001023-5-1	5/23/11	10:25	Liquid	1/1 L Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
W 142733-052311-001023-6-1	5/23/11	10:25	Liquid	1/500 mL Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
A 142733-052311-001023-1-2	5/23/11	16:28	Filter	1 glass petri		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
M 142733-052311-001023-2-2	5/23/11	16:28	Liquid	1/500 mL Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
X 142733-052311-001023-3-2	5/23/11	16:28	Liquid	1/500 mL Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
X 142733-052311-001023-4-2	5/23/11	16:28	Sorbent media	1/1 XAD Trap		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
Y 142733-052311-001023-5-2	5/23/11	16:28	Liquid	1/1 L Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
X 142733-052311-001023-6-2	5/23/11	16:28	Liquid	1/500 mL Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
X 142733-052311-001023-1-3	5/24/11	08:35	Filter	1 glass petri		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
W 142733-052311-001023-2-3	5/24/11	08:35	Liquid	1/500 mL Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
M 142733-052311-001023-3-3	5/24/11	08:35	Liquid	1/500 mL Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
X 142733-052311-001023-4-3	5/24/11	08:35	Sorbent media	1/1 XAD Trap		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
Y 142733-052311-001023-5-3	5/24/11	08:35	Liquid	1/1 L Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
X 142733-052311-001023-6-3	5/24/11	08:35	Liquid	1/500 mL Amber		Signature: _____ Printed Name: _____ Date: _____	Signature: _____ Printed Name: _____ Date: _____
Relinquished by Collector:				Relinquished by: 2.			
Signature: _____ Printed Name: B. Farber Date: 5/24/11				Signature: _____ Printed Name: John Koltentech Date: 5/24/11			
Company: Shaw				Company: DAT			



**CHAIN OF CUSTODY / REQUEST FOR ANALYSIS
(COC/RFA)**

PROJECT INFORMATION		PRESERVATIVE	
Project Number: 142733		Spaced Semi-Volts Pt Km 23/0010	
Project Name: CITGO ICR Testing			
Delivered Via:			
-AT: <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 5 days <input type="checkbox"/> 21 days			
Contract Reference Number: 225-201-3994			

[illegible]

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0511030

Date Received: 5/26/2011
Client Name: Shaw Environmental
Tracking number: 1Z58V3780197476464 (master)
Custody Seals?: No

Carrier: UPS
Analysis: Method 0010/23
Package Temp: 8.8°C (ice packs)
COC ☒ check if COC from client

Sample Information

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052311-0010/23-1-1	0511030-1	5/23/2011	air filter	petri dish	
1427333-052311-0010/23-2-1	0511030-2	5/23/2011	solvents	500mL wm amber	
1427333-052311-0010/23-3-1	0511030-3	5/23/2011	toluene	500mL wm amber	
1427333-052311-0010/23-4-1	0511030-4	5/23/2011	air	XAD trap	
1427333-052311-0010/23-5-1	0511030-5	5/23/2011	rinse	1L wm amber	
1427333-052311-0010/23-6-1	0511030-6	5/23/2011	rinse	500mL wm amber	
1427333-052311-0010/23-1-2	0511030-7	5/23/2011	air filter	petri dish	

JR 10/3
Laboratory Receiving Initials

0511030
5/26/2011 11:16:19 AM

DAT SAMPLE RECEIVING

7715 Corporate Blvd, Plain City, OH 43064.

Project Number: 0511030

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052311-0010/23-2-2	0511030-8	5/23/2011	solvents	500mL wm amber	
1427333-052311-0010/23-3-2	0511030-9	5/23/2011	toluene	500mL wm amber	
1427333-052311-0010/23-4-2	0511030-10	5/23/2011	air	XAD trap	
1427333-052311-0010/23-5-2	0511030-11	5/23/2011	rinse	1L wm amber	
1427333-052311-0010/23-6-2	0511030-12	5/23/2011	rinse	500mL wm amber	
1427333-052311-0010/23-1-3	0511030-13	5/24/2011	air filter	petri dish	
1427333-052311-0010/23-2-3	0511030-14	5/24/2011	solvents	500mL wm amber	
1427333-052311-0010/23-3-3	0511030-15	5/24/2011	toluene	500mL wm amber	
1427333-052311-0010/23-4-3	0511030-16	5/24/2011	air	XAD trap	
1427333-052311-0010/23-5-3	0511030-17	5/24/2011	rinse	1L wm amber	

JR 2/3
Laboratory Receiving Initials

0511030
5/25/2011 11:16:20 AM

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0511030

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052311-0010/23-6-3	0511030-18	5/24/2011	rinse	500mL. wm amber	
1427333-052411-0010/23-A- BL	0511030-19	5/24/2011	acetone	500mL. wm amber	blank
1427333-052411-0010/23-M- BL	0511030-20	5/24/2011	methylene chloride	500mL. wm amber	blank
1427333-052411-0010/23-T- BL	0511030-21	5/24/2011	toluene	500mL. wm amber	blank

 3 of 3
Laboratory Receiving Initials

0511030

5/26/2011 11:16:20AM

DAT Reports®

Data Analysis Technologies, Inc.

7715 Corporate Blvd.
Plain City, OH 43064
800-733-8644

Sample Analysis Certificate

Client: Shaw Environmental, Inc.
Address: 4171 Essen Lane
Baton Rouge, LA 70809

Date: 7/5/2011
DAT Project ID: 0611002
Date Received: 6/2/2011
Date Analyzed: 6/30/2011

Attn: Richard Ishikawa
Client Project: CITGO-ICR
Analysis: Ontario Hydro - Mercury

The following samples were received on 6/2/2011:

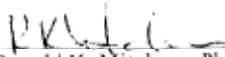
DAT Sample ID	Client Sample ID	Date Sampled	Matrix
0611002-14	1427333-052511-Hg-1-1 Cont 1	5/25/2011	Filter
0611002-15	1427333-052511-Hg-2-1 Cont 2	5/25/2011	Liquid
0611002-16	1427333-052511-Hg-3-1 Cont 3	5/25/2011	Liquid
0611002-17	1427333-052511-Hg-4-1 Cont 4	5/25/2011	Liquid
0611002-18	1427333-052511-Hg-5-1 Cont 5	5/25/2011	Liquid
0611002-19	1427333-052511-Hg-1-2 Cont 1	5/25/2011	Filter
0611002-20	1427333-052511-Hg-2-2 Cont 2	5/25/2011	Liquid
0611002-21	1427333-052511-Hg-3-2 Cont 3	5/25/2011	Liquid
0611002-22	1427333-052511-Hg-4-2 Cont 4	5/25/2011	Liquid
0611002-23	1427333-052511-Hg-5-2 Cont 5	5/25/2011	Liquid
0611002-24	1427333-052611-Hg-1-3 Cont 1	5/26/2011	Filter
0611002-25	1427333-052611-Hg-2-3 Cont 2	5/26/2011	Liquid
0611002-26	1427333-052611-Hg-3-3 Cont 3	5/26/2011	Liquid
0611002-27	1427333-052611-Hg-4-3 Cont 4	5/26/2011	Liquid
0611002-28	1427333-052611-Hg-5-3 Cont 5	5/26/2011	Liquid
0611002-29	1427333-052611-Hg-12-BL Cont 12	5/26/2011	Filter
0611002-30	1427333-052611-Hg-7-BL Cont 7	5/26/2011	Liquid
0611002-31	1427333-052611-Hg-8-BL Cont 8	5/26/2011	Liquid
0611002-32	1427333-052611-Hg-9-BL Cont 9	5/26/2011	Liquid
0611002-33	1427333-052611-Hg-10-BL Cont 10	5/26/2011	Liquid
0611002-34	1427333-052611-Hg-11-BL Cont 11	5/26/2011	Liquid

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Results: See attached summary.

QC: Met the criteria for the method. See attached summary.

Reviewed and approved for release by:


Ronald K. Mitchum, Ph.D.
President, DAT

Date:

7/5/11

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Page 2 of 13

Data Analysis Technologies, Inc.

7715 Corporate Boulevard

Plain City, OH 43064

**Data Summary Table
Ontario Hydro / Mercury**

Client: Shaw Environmental
Client Project: Citgo ICR 142733
DAT Project: 0611002
Date Sampled: 5/25,26/11
Date Received: 6/2/11
Date Prepped: 6/29,30/11
Date Analyzed: 6/30/11
Analyst: LES/JK

Client ID:	DATID:	PQL, ug	MDL, ug	Total Hg in Sample, ug	Q
052511-Hg-1					
Cont 1 Filter & Cont 2A 0.1n HNO3	0611002- 14.15	0.020	0.0012	0.0053	J
Container 3 KCL Imp. 1-3	0611002- 16	0.24	0.015	ND	
Container 4 HNO3/H2O2 Imp. 4	0611002- 17	0.062	0.0037	0.011	J
Container 5 H2SO4/KMNO4 Imp. 5-7	0611002- 18	0.10	0.0061	0.40	
Total Hg in Entire Train, ug				0.42	
052511-Hg-2					
Cont 1 Filter & Cont 2A 0.1n HNO3	0611002- 19.20	0.020	0.0012	0.010	J
Container 3 KCL Imp. 1-3	0611002- 21	0.20	0.012	ND	
Container 4 HNO3/H2O2 Imp. 4	0611002- 22	0.055	0.0033	ND	
Container 5 H2SO4/KMNO4 Imp. 5-7	0611002- 23	0.088	0.0053	0.41	
Total Hg in Entire Train, ug				0.42	
052511-Hg-3					
Cont 1 Filter & Cont 2A 0.1n HNO3	0611002- 24.25	0.020	0.0012	0.0030	J
Container 3 KCL Imp. 1-3	0611002- 26	0.23	0.014	0.023	J
Container 4 HNO3/H2O2 Imp. 4	0611002- 27	0.062	0.0037	0.0065	J
Container 5 H2SO4/KMNO4 Imp. 5-7	0611002- 28	0.10	0.0061	0.42	
Total Hg in Entire Train, ug				0.45	
052511-Hg-BL					
Cont 12 Filter & Cont. 7 0.1n HNO3 Blank	0611002- 29.30	0.020	0.0012	0.0076	J
Cont 8 1N KCl Blank	0611002- 31	0.014	0.00084	ND	
Cont 9 5% HNO3/10% H2O2 Blank	0611002- 32	0.035	0.0021	0.0028	J
Cont 10 H2SO4/KMNO4 Blank	0611002- 33	0.014	0.001	ND	
Cont 11 10% Hydrosylamine Blank	0611002- 34	0.0054	0.000	0.043	
Total Hg in Entire Train, ug				0.054	

ND = Not detected at the Method Detection Limit shown.

J = Value below Practical Quantitation Limit shown.

D = Value calculated from a dilution.

DOCUMENTATION

CHAIN OF CUSTODY / REQUEST FOR ANALYSIS (COC/IRFA)

Shaw Shaw Environmental, Inc.
4171 Essen Lane, Baton Rouge, LA 70809
Phone: 225-932-2746

Date 6/21/11 Page 1 of 2

PROJECT INFORMATION				PRESERVATIVE	
Project Number: 142733					
Project Name: CITGO ICR Testing					
Delivered Via:					
TAT: <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 5 days <input type="checkbox"/> 21 days					
COC/IRFA Requested: 7/25/2013					

Sample ID	Sample Collection Date	Sample Collection Time	Sample Matrix	Number of Containers and Size	Comments
142733-052511-0061-4-BL	5/25/11	16:58	Liquid	1 / 500 mL Amber	
142733-052511-0061-5-BL	5/25/11	16:58	Liquid	1 / 500 mL Amber	
142733-052511-0061-4-BL	5/25/11	16:58	Liquid	1 / 500 mL Amber	
142733-052511-0061-1-1	5/25/11	11:10	Liquid	1 / 1 L Amber	
142733-052511-0061-2-1	5/25/11	11:10	Liquid	1 / 500 mL Amber	
142733-052511-0061-1-2	5/25/11	10:08	Liquid	2 / 1 L Amber	
142733-052511-0061-2-2	5/25/11	9:06	Liquid	1 / 500 mL Amber	
142733-052511-0001-1-3	5/26/11	8:46	Liquid	1 / 1 L Amber	
142733-052511-0061-2-3	5/26/11	8:46	Liquid	1 / 500 mL Amber	
142733-052511-Hg-7-BL	5/26/11	9:00	Liquid	1 / 500 mL Amber	
142733-052511-Hg-8-BL	5/26/11	9:00	Liquid	1 / 500 mL Amber	
142733-052511-Hg-9-BL	5/26/11	9:00	Liquid	1 / 500 mL Amber	
142733-052511-Hg-10-BL	5/26/11	9:00	Liquid	1 / 500 mL Amber	
142733-052511-Hg-11-BL	5/26/11	9:00	Liquid	1 / 500 mL Amber	
142733-052511-Hg-12-BL	5/26/11	9:00	Filtrate	1 / petri	
142733-052511-Hg-1-1	5/25/11	11:10	Filtrate	1 / petri	
142733-052511-Hg-2-1	5/25/11	11:10	Liquid	1 / 500 mL Amber	
142733-052511-Hg-3-1	5/25/11	11:10	Liquid	2 / 1 L Amber	
142733-052511-Hg-4-1	5/25/11	11:10	Liquid	1 / 500 mL Amber	
142733-052511-Hg-5-1	5/25/11	11:10	Liquid	1 / 1 L Amber	
142733-052511-Hg-1-2	5/26/11	16:06	Filtrate	1 / petri	
142733-052511-Hg-2-2	5/26/11	16:06	Liquid	1 / 500 mL Amber	

0611002

Shaw Shaw Environmental, Inc.
4471 Essen Lane, Baton Rouge, LA 70819
Phone: 225-932-2745

Date 05/31/11 Page 2 of 2

Relinquished by Collector:		Received by: 1.		Relinquished by: 1.		Received by: 2.		Relinquished by: 2.		Received by: (lab)	
Signature	Date	Signature	Date	Signature	Date	Signature	Date	Signature	Date	Signature	Date
142733-052511-Hg-3-2 ✓	5/25/11	16.06	Liquid	2 / 1 L Amber	✓						
142733-052511-Hg-4-2 ✓	5/25/11	16.06	Liquid	1 / 500 mL Amber	✓						
142733-052511-Hg-5-2 ✓	5/25/11	16.06	Liquid	1 / 1 L Amber	✓						
142733-052511-Hg-1-3 ✓	5/2/11	8.46	Filter	1 / pellets	✓						
142733-052511-Hg-2-3 ✓	5/25/11	8.46	Liquid	1 / 500 mL Amber	✓						
142733-052511-Hg-3-3 ✓	5/25/11	8.46	Liquid	2 / 1 L Amber	✓						
142733-052511-Hg-4-3 ✓	5/25/11	8.46	Liquid	1 / 500 mL Amber	✓						
142733-052511-Hg-5-3 ✓	5/25/11	8.46	Liquid	1 / 1 L Amber	✓						

Signature: *[Signature]* Date: *5/25/11*

Printed Name: *[Name]* Date: *5-25-11*

Company: *[Company]*

Page 7 of 13

Lacked Shop

0611002

③

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0611002

Date Received: 6/2/2011	Carrier: UPS Air
Client Name: Shaw Environmental Bat	Analysis: M29, M0061, Hg
Tracking number: 1ZA831R5019134C899	Package Temp: 3.7°C (Ice-Cooler)
Custody Seals ? No	COC: <input checked="" type="checkbox"/> check if COC from client

Sample Information

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment
1427333-052611-29-1-1 Cont 1	0611002-01	5/26/2011	Filter	Petri Dish-Sm	
1427333-052611-29-3-1 Cont 3	0611002-02	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-29-4-1 Cont 4	0611002-03	5/26/2011	Liquid	1liter Amber WM Bottle	
1427333-052711-29-1-2 Cont 1	0611002-04	5/27/2011	Filter	Petri Dish-Sm	
1427333-052711-29-3-2 Cont 3	0611002-05	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-4-2 Cont 4	0611002-06	5/27/2011	Liquid	1liter Amber WM Bottle	
1427333-052711-29-1-3 Cont 1	0611002-07	5/27/2011	Filter	Petri Dish-Sm	

12
Laboratory Receiving Initials

0611002

6/2/2011 12:08:01 PM

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0611002

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052711-29-3-3 Cont 3	0611002-08	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-4-3 Cont 4	0611002-09	5/27/2011	Liquid	1liter Amber WM Bottle	
1427333-052711-29-12-BL Cont 12	0611002-10	5/27/2011	Filter	Petri Dish-Sm	
1427333-052711-29-8A-BL Cont 8A	0611002-11	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-8B-BL Cont 8B	0611002-12	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-9-BL Cont 9	0611002-13	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-Hg-1-1 Cont 1	0611002-14	5/25/2011	Filter	Petri Dish-Sm	
1427333-052511-Hg-2-1 Cont 2	0611002-15	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-Hg-3-1 Cont 3	0611002-16 A&B	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-Hg-4-1 Cont 4	0611002-17	5/25/2011	Liquid	500ml Amber WM Bottle	

LK
Laboratory Receiving Initials

0611002

5/2/2011 12:06:00 PM

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DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0611002

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052511-Hg-5-1 Cont 5	0611002-18	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-Hg-1-2 Cont 1	0611002-19	5/25/2011	Filter:	Petri Dish-Sm	
1427333-052511-Hg-2-2 Cont 2	0611002-20	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-Hg-3-2 Cont 3	0611002-21 A&B	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-Hg-4-2 Cont 4	0611002-22	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-Hg-5-2 Cont 5	0611002-23	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052611-Hg-1-3 Cont 1	0611002-24	5/26/2011	Filter	Petri Dish-Sm	
1427333-052611-Hg-2-3 Cont 2	0611002-25	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-3-3 Cont 3	0611002-26 A&B	5/26/2011	Liquid	1liter Amber WM Bottle	
1427333-052611-Hg-4-3 Cont 4	0611002-27	5/26/2011	Liquid	500ml Amber WM Bottle	

L4
Laboratory Receiving Initials

0611002

5/26/2011 12:00:00 PM

3065

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0611002

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052611-Hg-5-3 Cont 5	0611002-28	5/26/2011	Liquid	1liter Amber WM Bottle	
1427333-052611-Hg-12-BL Cont 12	0611002-29	5/26/2011	Filter	Petri Dish-Sm	
1427333-052611-Hg-7-BL Cont 7	0611002-30	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-8-BL Cont 8	0611002-31	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-9-BL Cont 9	0611002-32	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-10-BL Cont 10	0611002-33	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-11-BL Cont 11	0611002-34	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-1-1 Cont 1	0611002-35	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-0061-2-1 Cont 2	0611002-36	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-1-2 Cont 1	0611002-37 A&B	5/25/2011	Liquid	1liter Amber WM Bottle	

LL
Laboratory Receiving Initials

0611002

6/2/2011 12:08:01 PM

4 of 5

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0611002

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment
1427333-052511-0061-2-2 Cont 2	0611002-38	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-1-3 Cont 1	0611002-39	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-0061-2-3 Cont 2	0611002-40	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-4-BL Cont 4	0611002-41	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-5-BL Cont 5	0611002-42	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-6-BL Cont 6	0611002-43	5/25/2011	Liquid	500ml Amber WM Bottle	

LA
Laboratory Receiving Initials

0611002

6/2/2011 12:08:11 PM

5 of 5

DAT Labs Inc. Sample Receipt Report			
Client/Number: <u>Shaw Environmental (11701) Baton Rouge</u>		The client has been contacted. Yes <input type="checkbox"/> No <input type="checkbox"/>	
Custodian Initial: <u>LR</u>	Date: <u>6-2-11</u>		
Secondary Review: Initials: _____ Date: _____			
Upon receipt of samples, check if any of the following discrepancies have been noted.			
Discrepancy Type	Specify applicable client ID or "all"		
<input checked="" type="checkbox"/> COC and samples do not match			
<input type="checkbox"/> No unique sample identifications			
<input type="checkbox"/> Samples received outside of the required temp criteria.	Receipt Temp: <u>8.3 C</u>		
<input type="checkbox"/> No preservation type was noted	Correction Factor: <u>+0.6 C</u>		
<input type="checkbox"/> No date of collection stated	Corrected Temp: <u>8.7 C</u>	(See notes)	
<input type="checkbox"/> No time of collection stated			
<input type="checkbox"/> The sample collector was not named			
<input type="checkbox"/> Sample containers were not appropriate			
<input type="checkbox"/> Sample labels were destroyed or unreadable			
<input type="checkbox"/> Samples were received outside of holding time			
<input type="checkbox"/> There was not enough sample to perform the requested analysis.			
<input type="checkbox"/> Samples showed sign of damage or contamination.			
<input type="checkbox"/> Aqueous samples for volatile analysis: Headspace? Y <input type="checkbox"/> N <input type="checkbox"/>	If Yes, list sample ID(s) in details: _____		
Details: _____			
<p>Sample pH for nonvolatile aqueous samples and presence or absence of headspace (Y or N) for VOA aqueous samples shall be recorded at time of sample login. Under no circumstances shall VOA vials be opened at time of sample receipt.</p> <p>Other Discrepancies: _____</p> <p>Discrepancy: <u>Headspace Run 3 & Bk - Coc. Smiles 052511 Btle 052611</u></p> <p>Sample ID: <u>0611002</u></p> <p><u>colleg Run 3 & Bk used Date on label</u></p> <p><u>Headsp Run 3 Coc Smiles 052511 Btle 052611</u></p> <p><u>used date on label</u></p>			
<input checked="" type="checkbox"/> Upon receipt, the samples met all of DAT's acceptance criteria.		DAT Project # <u>0611002</u>	

LATRM1049 Revision 4

Effective 05/03/11

Data Analysis Technologies, Inc.

7715 Corporate Boulevard
Plain City, OH 43064

QC Summary Table **Ontario Hydro / Mercury**

Client: Shaw Environmental
Client Project: Cingo CR 142733
DAT Project: 0611002
Date Sampled: 5/25,26/11
Date Received: 6/2/11
Date Prepped: 6/29,30/11
Date Analyzed: 6/30/11
Analyst: LES/JK

		Measured Hg conc., ug/L	Hg Added, ug/L	PQL, ug/L	% Rec	%RPD
Method Blank	MB	ND		0.02		
Laboratory Spike	LCS	10.11	10		101	
Duplicate	0611002-16 Dup	0.0040				
Matrix Spike	0611002-21 MS	9.991	10		100	
Matrix Spike Duplicate	0611002-21 MSE	9.953	10		99.3	
Methoc Blank	MB	ND		0.05		
Methoc Blank Front	MBF	0.0545				
Laboratory Spike Front	LCSF	11.61	10		116	
Laboratory Spike Duplicate	LCS	10.02				
Matrix Spike	0611002-15,20 MS	10.85	10		108	
Matrix Spike Duplicate	0611002-15,20 MSD	10.89	10		109	

ND = Not detected at the Practical Quantitation Limit shown.

Note: RPD is not calculated if sample and/or duplicate results are less than 2 times the PQL.

DAT Reports®

Data Analysis Technologies, Inc.

7715 Corporate Blvd.

Plain City, OH 43064

800-733-8644

Sample Analysis Certificate

Client: Shaw Environmental, Inc.
Address: 4171 Essen Lane
Baton Rouge, LA 70809

Date: 7/5/2011
DAT Project ID: 0611002
Date Received: 6/2/2011
Date Analyzed: Numerous

Attn: Richard Ishikawa
Client Project: CITGO ICR
Analysis: Method 29 Metals

The following samples were received on 6/2/2011:

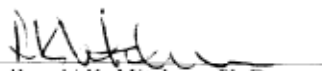
DAT Sample ID	Client Sample ID	Date Sampled	Matrix
0611002-01	1427333-052611-29-1-1 Cont 1	5/26/2011	Filter
0611002-02	1427333-052611-29-3-1 Cont 3	5/26/2011	Liquid
0611002-03	1427333-052611-29-4-1 Cont 4	5/26/2011	Liquid
0611002-04	1427333-052711-29-1-2 Cont 1	5/27/2011	Filter
0611002-05	1427333-052711-29-3-2 Cont 3	5/27/2011	Liquid
0611002-06	1427333-052711-29-4-2 Cont 4	5/27/2011	Liquid
0611002-07	1427333-052711-29-1-3 Cont 1	5/27/2011	Filter
0611002-08	1427333-052711-29-3-3 Cont 3	5/27/2011	Liquid
0611002-09	1427333-052711-29-4-3 Cont 4	5/27/2011	Liquid
0611002-10	1427333-052711-29-12-BL Cont 12	5/27/2011	Filter
0611002-11	1427333-052711-29-8A-3L Cont 8A	5/27/2011	Liquid
0611002-12	1427333-052711-29-8B-BL Cont 8B	5/27/2011	Liquid
0611002-13	1427333-052711-29-9-BL Cont 9	5/27/2011	Liquid

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Results: See attached summary.

OC: Met the criteria for the method. See attached summary.

Reviewed and approved for release by:


Ronald K. Mitchum, Ph.D.
President, DAT

Date:

7/5/2011

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Data Analysis Technologies, Inc.
7715 Corporate Boulevard
Plain City, OH 43064

Sample Analysis Certificate

Method 29 Metals

Client:	Shaw Environmental	Project:	0611002
Client Run/Test No.	29-1		
Site:	CITGO ICR Testing	Lab Sample ID:	
Sample Date:	5/26/11	FH:	0611002-1.2
Preparation Date:	6/10/11	BH:	0611002-3
Analysis Date:	6/15/11	Matrix:	Air

Analyte:			Front Half				Back Half	
	MDL, ug	LOQ, ug	Total ug	Q	MDL, ug	LOQ, ug	Total ug	Q
Antimony	1.77	5.06	ND		1.48	5.30	ND	
Arsenic	2.43	5.06	ND		2.88	5.30	ND	
Beryllium	0.017	0.25	0.040	J	0.018	0.26	ND	
Cadmium	0.088	2.50	ND		0.093	2.65	ND	
Chromium	0.13	1.00	12.9		0.14	1.06	ND	
Cobalt	0.57	2.50	ND		0.93	2.65	ND	
Lead	0.30	5.00	8.09		0.53	5.30	ND	
Manganese	0.27	2.50	7.88		0.29	2.65	2.54	J
Nickel	0.17	2.50	23.6		0.40	2.65	2.11	J
Selenium	4.19	5.00	6.30		4.44	5.30	ND	

ND= Not detected at the method detection limit shown
J = Value below LOQ but above MDL

Data Analysis Technologies, Inc

7715 Corporate Boulevard

Plain City, OH 43064

Sample Analysis Certificate

Method 29 Metals

Client:	Shaw Environmental	Project:	0611002				
Client Run/Test No.	29-1 Dup						
Site:	CITGO ICR Testing	Lab Sample ID:					
		FH:	0611002-1.2 Dup				
Sample Date:	5/26/11	BH:	0611002-3 Dup				
Preparation Date:	6/10/11						
Analysis Date:	6/15/11	Matrix:	Alr				
Analyte:	MDL, ug	LOQ, ug					
	Front Half		Back Half				
	Total ug	Q	Total ug Q				
Antimony	1.79	5.06	ND	1.38	5.30	ND	
Arsenic	2.43	5.06	ND	2.88	5.30	ND	
Beryllium	0.017	0.25	0.020	J	0.018	0.26	ND
Cadmium	0.088	2.56	ND	0.093	2.65	ND	
Chromium	0.13	1.06	12.9	0.14	1.06	ND	
Cobalt	0.57	2.50	ND	0.93	2.65	ND	
Lead	0.20	5.00	5.80	0.45	5.30	ND	
Manganese	0.27	2.50	6.40	0.20	2.65	2.64	J
Nickel	0.27	2.50	19.1	0.40	2.65	2.24	J
Selenium	4.19	5.00	4.70	J	4.44	5.30	ND

ND= Not detected at the method detection limit shown

J = Value below LOQ but above MDL

Data Analysis Technologies, Inc.

7715 Corporate Boulevard

Plain City, OH 43064

Sample Analysis Certificate

Method 29 Metals

Client:	Shaw Environmental	Project:	0611002
Client Run/Test No.:	29-2		
Site:	CUIGO ICR Testing	Lab Sample ID:	
Sample Date:	5/27/11	FH:	0611002-4.5
Preparation Date:	6/10/11	BH:	0611002-6
Analysis Date:	6/15/11	Matrix:	Au

Analyte:	MDL, ug	LOQ, ug	Front Half				Back Half			
			Total ug	Q			Total ug	Q		
Antimony	1.77	5.06	ND				1.57	5.28	ND	
Arsenic	2.51	5.06	ND				2.97	3.28	ND	
Beryllium	0.017	0.25	0.030	J			0.018	0.26	ND	
Calcium	0.088	2.50	ND				0.093	2.64	9.71	J
Chromium	0.13	1.00	9.77				0.14	1.00	ND	
Cobalt	0.17	2.50	ND				0.92	2.64	ND	
Lead	0.40	5.00	4.71	J			0.42	5.28	ND	
Manganese	0.27	2.50	4.75				0.29	2.04	1.81	J
Nickel	0.17	2.50	15.9				0.39	2.64	2.36	J
Selenium	4.19	5.00	5.32				4.42	5.28	4.92	J

ND = Not detected at the method detection limit shown.

J = Value below LOQ but above MDL.

Data Analysis Technologies, Inc

1115 Corporate Boulevard

Plain City, OH 43064

Sample Analysis Certificate

Method 29 Metals

Client:	Shaw Environmental	Project:	061 002
Client Run/Test No.:	29-5		
Site:	CITGOICR Testing	Lab Sample ID:	
Sample Date:	5/27/11	FH:	0611002-7.8
Preparation Date:	6/10/11	BH:	0611002-9
Analysis Date:	6/15/11	Matrix:	Air
Analyte:	<i>MDL, ug</i>	Front Half <i>LOQ, ug</i>	Back Half <i>LOQ, ug</i>
		Total ug	Total ug
		Q	Q
Antimony	1.77	5.00	ND
Arsenic	2.51	5.00	ND
Beryllium	0.007	0.25	ND
Cadmium	0.008	2.50	0.54 J
Chromium	0.13	1.00	11.5 J
Cobalt	0.17	2.50	ND
Lead	0.30	5.00	5.94
Manganese	0.27	2.50	6.43
Nickel	0.17	2.50	23.4
Selenium	4.19	5.00	4.57 J

ND= Not detected at the method detection limit shown.

J = Value below LOQ but above MDL.

Data Analysis Technologies, Inc
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Plain City, OH 43064

Sample Analysis Certificate

Method 29 Metals

Client:	Shaw Environmental	Project:	061.002
Client Run/Test No.:	29-Blank		
Site:	CTGOICR Testing	Lab Sample ID:	
		FH:	061002-10,11
Sample Date:	5/27/11	BH:	061002-12
Preparation Date:	6/10/11		
Analysis Date:	6/15/11	Matrix:	Air
Analyte:	<i>MDL, ug</i>	Front Half <i>LOQ, ug</i>	Back Half <i>MDL, ug</i>
		Total ug	Total ug
		Q	Q
Antimony	1.77	5.00	ND
Arsenic	2.51	5.00	ND
Beryllium	0.017	0.25	ND
Cadmium	0.068	2.50	ND
Chromium	0.13	1.00	13.3
Cobalt	0.87	2.50	ND
Lead	0.60	5.00	4.47 J
Manganese	0.17	1.50	5.19
Nickel	0.37	2.50	16.1
Selenium	4.19	5.00	5.42

ND = Not detected at the method detection limit shown.
J = Value below LOQ but above MDL

Data Analysis Technologies, Inc.
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Plain City, OH 43064

Sample Analysis Certificate

Method 29 Metals

Client:	State Environmental	Project #:	0611002
Client Run/Test No.	DI Blank		
Site:	CITGO ICR Testing	Lab Sample ID:	06-1002-12
Sample Date:	5/27/11		
Preparation Date:	6/10/11		
Analysis Date:	6/15/11		

Analyte:	MFL, ug	PQL, ug	Total ug	Q
Antimony	2	3	ND	
Arsenic	3	3	ND	
Beryllium	0.02	0.3	ND	
Cadmium	0.1	3	ND	
Chromium	0.1	1	ND	
Cobalt	0.9	3	ND	
Lead	0.4	3	ND	
Manganese	0.3	2.7	ND	
Nickel	0.40	2.7	ND	
Selenium	5	3	ND	

ND = Not detected at the method detection limit shown.
J = Value below Practical Quantifiable Limit
D = Value calculated from dilution

QC SUMMARY

Data Analysis Technologies, Inc
7715 Corporate Boulevard
Plain City, OH 43064

Matrix Blank Summary
Method 29 Metals

Client:	Shaw Environmental	Project:	0611002
Client Run/Test No.:	Method Blank		
Site:	CITGO ICR Testing	Lab Sample ID:	
Sample Date:		FH:	061 002-MDI
Preparation Date:	6/10/11	BH:	061 002-MBB
Analysis Date:	6/15/11	Matrix:	Air
Analyte:	MDL, ug	LOQ, ug	Front Half
			Total ug
			Q
			Back Half
			Total ug
			Q
Antimony	1.77	5.00	ND
Arsenic	2.41	5.00	ND
Beryllium	0.017	0.25	ND
Cadmium	0.088	2.50	ND
Chromium	0.13	1.00	0.14 J
Cobalt	0.57	2.50	ND
Lead	0.40	5.00	ND
Manganese	0.27	2.50	ND
Nickel	0.27	2.50	ND
Selenium	4.19	5.00	ND

ND= Not Detected at the method detection limit shown
100 mL laboratory water digested for the prep blank.

J = Value below LOQ but above MDL

Data Analysis Technologies, Inc.
7715 Corporate Boulevard
Plain City, OH 43064

LCS/LCSD Summary
Method 29 Metals

Client: CITGO ICR Testing
Sample ID: 0611002-LCSB
Analysis Date: 6/15/11
Project #: 0611002

Analyte	LS Front	LS Front	% Rec	QC Limits
	Added, ug/L	Found, ug/L		
Antimony	1000	1055	106	83-120
Arsenic	1000	1077	108	86-118
Beryllium	50	54	107	77-118
Cadmium	500	501	100	87-113
Chromium	200	216	108	86-106
Cobalt	500	603	121	83-122
Lead	1000	1080	108	85-118
Manganese	500	577	115	84-115
Nickel	500	570	114	76-126
Selenium	1000	1108	111	76-124

* Outside QC Limits

Data Analysis Technologies, Inc.
7715 Corporate Boulevard
Plain City, OH 43064

LCS/LCSD Summary

Method 29 Metals

Client: CITGO ICR Testing
Sample ID 0611002-LCSB
Analysis Date: 6/15/11
Project #: 0611002

Analyte	LS Back Added, ug/L	LS Back Found, ug/L	% Rec	QC Limits
Antimony	1000	1025	103	73-125
Arsenic	1000	1054	105	84-117
Beryllium	50	53	106	78-116
Cadmium	500	467	93.3	87-117
Chromium	200	200	100	84-110
Cobalt	500	535	107	77-124
Lead	1000	1041	104	87-114
Manganese	500	538	108	80-118
Nickel	500	534	107	77-124
Selenium	1000	1065	107	79-112

Data Analysis Technologies, Inc.

77.5 Corporate Boulevard

Plain City, OH 43064

PDS Summary

Method 29 Metals

Client: Shaw Environmental
Sample ID: 0611002-4.5 PDS
Analysis Date: 6/15/11
Project #: 0611002

Analyte	Amt Found, ug/L	Amt Spiked, ug/L	Sample Amt	% Rec	QC Limits
Antimony	833.6	1000	0	83.4	74-120
Arsenic	918.7	1000	0	91.9	73-124
Beryllium	44.9	50	0.3	89.2	63-116
Cadmium	438.5	500	0	87.7	75-113
Chromium	372.3	200	97.7	137	66-128
Cobalt	446.3	500	0	89.3	66-127
Lead	1014	1000	47.1	96.7	65-126
Manganese	562.4	500	47.5	103	71-120
Nickel	786.8	500	158.7	126	65-134
Selenium	974.6	1000	53.2	92.1	61-132

*Outside of QC limits

Data Analysis Technologies, Inc.
7715 Corporate Boulevard
Plain City, OH 43064

PDS Summary

Method 29 Metals

Client: Shaw Environmental
Sample ID: 0611002-6 PDS
Analysis Date: 6-15-11
Project #: 0611002

Analyte	Amt Found, ug/L	Amt Spiked, ug/L	Sample Amt	% Rec	QC Limits
Antimony	841.2	1000	C	84.1	69-126
Arsenic	874.6	1000	C	87.5	75-124
Beryllium	40.2	50	C	80.4	66-119
Cadmium	372	500	6.7	73.1	78-120
Chromium	150.7	200	0	75.4	67-126
Cobalt	417.4	500	0	83.5	67-126
Lead	802.8	1000	0	80.3	70-119
Manganese	430.1	500	17.1	82.6	71-121
Nickel	450.4	500	22.4	85.6	74-127
Selenium	780.7	1000	46.6	73.4	47-162

*Outside of QC Limits

DOCUMENTATION

CHAIN OF CUSTODY / REQUEST FOR ANALYSIS (COC/RFA)

Shaw Environmental, Inc.
4171 Essen Lane, Baton Rouge, LA 70809
Phone: 225-932-2746

Date 5/27/11 Page 1 of 1

PROJECT INFORMATION			PRESERVATIVE		
Project Number: 142733					
Project Name: CITGO ICR Testing					
Delivered Via:					
TAT: <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 5 days <input type="checkbox"/> 2+ days	Contact: Richard (504) 333-2251/3554				

COMMENTS					
Sample ID	Sample Collection Date	Sample Collection Time	Sample Matrix	Number of Containers and Size	
1427333-052711-29-8A-BL	5/27/11	13:15	Liquid	1 / 500 mL Amber	
1427333-052711-29-8B-BL	5/27/11	13:15	Liquid	1 / 500 mL Amber	
1427333-052711-29-9-BL	5/27/11	13:15	Liquid	1 / 500 mL Amber	
1427333-052711-29-1-1	5/26/11	16:15	Fiber	1 / petri	
1427333-052711-29-3-1	5/26/11	16:15	Liquid	1 / 500 mL Amber	
1427333-052711-29-4-1	5/26/11	16:15	Liquid	1 / 1 L Amber	
1427333-052711-29-1-2	5/27/11	10:42	Fiber	1 / petri	
1427333-052711-29-3-2	5/27/11	10:42	Liquid	1 / 500 mL Amber	
1427333-052711-29-4-2	5/27/11	10:42	Liquid	1 / 1 L Amber	
1427333-052711-29-1-3	5/27/11	14:58	Fiber	1 / petri	
1427333-052711-29-3-3	5/27/11	14:58	Liquid	1 / 500 mL Amber	
1427333-052711-29-4-3	5/27/11	14:58	Liquid	1 / 1 L Amber	
1427333-052711-29-12-BL	5/27/11	15:23	Fiber	1 / petri	
Relinquished by Collector:					
Signature: <u>[Signature]</u>	Received by: 1.	Signature: Time:	Relinquished by: 1.	Signature: Time:	Received by: (lab)
Printed Name: <u>Blake Taylor</u>	Date: <u>5/27/11</u>	Printed Name: <u>Blake Taylor</u>	Date: <u>5/27/11</u>	Printed Name: <u>Blake Taylor</u>	Date: <u>6-2-11</u>
Company: <u>Shaw</u>	Company: <u>Shaw</u>	Company: <u>Shaw</u>	Company: <u>Shaw</u>	Company: <u>Shaw</u>	Laboratory: <u>Shaw</u>

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DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0611002

Date Received: 6/2/2011	Carrier: UPS Air
Client Name: Shaw Environmental Bat	Analysis: M29, M0061, Hg
Tracking number: 1ZA831R50191340899	Package Temp: 8.7°C (Ice-Cooler)
Custody Seals ?: No	COC: <input checked="" type="checkbox"/> check if COC from client

Sample Information

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052611-29-1-1 Cont 1	0611002-01	5/26/2011	Filter	Petri Dish-Sm	
1427333-052611-29-3-1 Cont 3	0611002-02	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-29-4-1 Cont 4	0611002-03	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052711-29-1-2 Cont 1	0611002-04	5/27/2011	Filter	Petri Dish-Sm	
1427333-052711-29-3-2 Cont 3	0611002-05	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-4-2 Cont 4	0611002-06	5/27/2011	Liquid	1liter Amber WM Bottle	
1427333-052711-29-1-3 Cont 1	0611002-07	5/27/2011	Filter	Petri Dish-Sm	

12
Laboratory Receiving Initials

0611002

6/2/2011 12:38:01 PM

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0611002

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052711-29-3-3 Cont 3	0611002-08	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-4-3 Cont 4	0611002-09	5/27/2011	Liquid	1liter Amber WM Bottle	
1427333-052711-29-12-BL Cont 12	0611002-10	5/27/2011	Filter	Petri Dish-Sm	
1427333-052711-29-8A-BL Cont 8A	0611002-11	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-8B-BL Cont 8B	0611002-12	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-9-BL Cont 9	0611002-13	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-Hg-1-1 Cont 1	0611002-14	5/25/2011	Filter	Petri Dish-Sm	
1427333-052511-Hg-2-1 Cont 2	0611002-15	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-Hg-3-1 Cont 3	0611002-16 A&B	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-Hg-4-1 Cont 4	0611002-17	5/25/2011	Liquid	500ml Amber WM Bottle	

L4
Laboratory Receiving Initials

3511002

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DAT SAMPLE RECEIVING

7715 Corporate Blvd. Pain City, OH 43064.

Project Number: 0611002

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052511-Hg-5-1 Cont 5	0611002-18	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-Hg-1-2 Cont 1	0611002-19	5/25/2011	Filter	Petri Dish-Sm	
1427333-052511-Hg-2-2 Cont 2	0611002-20	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-Hg-3-2 Cont 3	0611002-21 A&B	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-Hg-4-2 Cont 4	0611002-22	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-Hg-5-2 Cont 5	0611002-23	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052611-Hg-1-3 Cont. 1	0611002-24	5/26/2011	Filter	Petri Dish-Sm	
1427333-052611-Hg-2-3 Cont 2	0611002-25	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-3-3 Cont 3	0611002-26 A&B	5/26/2011	Liquid	1 liter Amber WM Bottle	
1427333-052611-Hg-4-3 Cont 4	0611002-27	5/26/2011	Liquid	500ml Amber WM Bottle	

LA
Laboratory Receiving Initials

0611002

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DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0611002

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052611-Hg-5-3 Cont 5	0611002-28	5/26/2011	Liquid	1liter Amber WM Bottle	
1427333-052611-Hg-12-BL Cont 12	0611002-29	5/26/2011	Filter	Petri Dish-Sm	
1427333-052611-Hg-7-BL Cont 7	0611002-30	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-8-BL Cont 8	0611002-31	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-9-BL Cont 9	0611002-32	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-10-BL Cont 10	0611002-33	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-11-BL Cont 11	0611002-34	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-1-1 Cont 1	0611002-35	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-0051-2-1 Cont 2	0611002-36	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-1-2 Cont 1	0611002-37 A&B	5/25/2011	Liquid	1liter Amber WM Bottle	

LAL
Laboratory Receiving Initials

0611002

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DAT SAMPLE RECEIVING

7715 Corporate Blvd. Pain City, OH 43064.

Project Number: 0611002

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052511-0061-2-2 Cont 2	0611002-38	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-1-3 Cont 1	0611002-39	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-0061-2-3 Cont 2	0611002-40	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-4-BL Cont 4	0611002-41	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-5-BL Cont 5	0611002-42	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-6-BL Cont 6	0611002-43	5/25/2011	Liquid	500ml Amber WM Bottle	

Laboratory Receiving Initials

0611002

6/2/2011 12:08:01 PM

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DAT Labs Inc. Sample Receipt Report			
Client/Number: <u>Shaw Environmental (11701) Boston Buge</u> Custodian Initial: <u>LE</u> Date: <u>6-2-11</u>	The client has been contacted. <div style="text-align: right;"> <input type="checkbox"/> Yes <input type="checkbox"/> No </div>		
Secondary Review: Initials: _____ Date: _____			
Upon receipt of samples, check if any of the following discrepancies have been noted.			
<input checked="" type="checkbox"/> Discrepancy Type COC and samples do not match No unique sample identifications Samples received outside of the required temp criteria. No preservation type was noted No date of collection stated No time of collection stated The sample collector was not named Sample containers were not appropriate Sample labels were destroyed or unreadable Samples were received outside of holding time There was not enough sample to perform the requested analysis. Samples showed sign of damage or contamination. Aqueous samples for volatile analysis: Headspace? Y N If Yes, list sample ID(s) in details:	Receipt Temp: <u>8.2 C</u> Correction Factor: <u>+0.6 C</u> Corrected Temp: <u>8.7 C</u> <i>(See Labels)</i>	Specify applicable client ID or "all"	
Details:			
<small>Sample pH for nonvolatile aqueous samples and presence or absence of headspace (Y or N) for VOA aqueous samples shall be recorded at time of sample log-in. Under no circumstances shall VOA vials be opened at time of sample receipt.</small>			
Other Discrepancies:			
Sample ID <u>0611002</u> <u>0611007</u>	Discrepancy <u>H-3 Run 3 + BL - COC. States 052511 Bile 052611</u> <u>on H-3 Run 3 + BL used Date on label</u> <u>Model Run 3 COC States 052511 Bile 052611</u> <u>used date on label</u>		
Container Return <input checked="" type="checkbox"/> Yes / <input type="checkbox"/> No Price Size: <u>4 - Lg</u> Return Splwt:		DAT Project # <u>0611002</u>	
<input checked="" type="checkbox"/> Upon receipt, the samples met all of DAT's acceptance criteria.			

DATRM1049 Revision 4


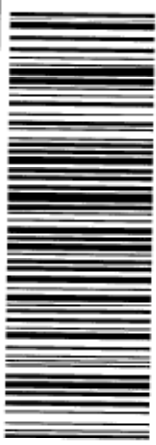
Effective 05/03/11

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2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
3. **GETTING YOUR SHIPMENT TO UPS**
Customers without a Daily Pickup
 Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
 Hand the package to any UPS driver in your area.
 Take your package to any location of The UPS Store®, UPS Drop Box, UPS Customer Center, UPS Alliances (Office Depot® or Staples®) or Authorized Shipping Outlet near you. Items sent via UPS Return ServicesSM (including via Ground) are also accepted at Drop Boxes.
 To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.

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 Your driver will pickup your shipment(s) as usual.

FOLD HERE

PAGE 1 OF 4 35 LBS 1 OF 4 SHIP TO: RON MITCHELL (800) 733-8644 DAC LABORATORY 7715 CORPORATE BLVD. PLAIN CITY OH 43064-9212	OH 432 9-30  UPS NEXT DAY AIR TRACKING #: 1Z A83 IR5 01 9134 0869	 BILLING: E/P Reference: 005015011721453701 Sender Name: Richard Ishikawa US 121 13 #00000015 DA 04/2011
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3. **GETTING YOUR SHIPMENT TO UPS**
Customers without a Daily Pickup
 Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
 Hand the package to any UPS driver in your area.
 Take your package to any location of The UPS Store®, UPS Drop Box, UPS Customer Center, UPS Alliances (Office Depot® or Staples®) or Authorized Shipping Outlet near you. Items sent via UPS Return ServicesSM (including via Ground) are also accepted at Drop Boxes.
 To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.

Customers with a Daily Pickup

Your driver will pickup your shipment(s) as usual.

FOLD HERE

RICHIE HUBSON HUGHES 3350 E. 10TH AVE BAYTOWN RICHIE A831R5 4171 BSEB LJI BAYTOWN RICHIE LA 70802 SHIP TO: RICH MITCHELL (800) 733-8644 DART LABORATORY 7715 CORPORATE BLVD. PLAIN CITY OH 43064-9212	35 LBS 2 OF 4	OH 432 9-30 	1 UPS NEXT DAY AIR TRACKING #: 1Z A83 1R5 0 9497 2700 	 Reference: 005601501125145.5701 Sender's Name: Richard Ishikawa CS 151 13 #0907015 08 24 0211 BILLING: P/P
--	------------------------------------	---	---	--

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2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
3. **GETTING YOUR SHIPMENT TO UPS**
Customers without a Daily Pickup
Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
Hand the package to any UPS driver in your area.
Take your package to any location of The UPS Store®, UPS Drop Box, UPS Customer Center, UPS Alliances (Office Depot® or Staples®) or Authorized Shipping Outlet near you. Items sent via UPS Return ServicesSM (including via Ground) are also accepted at Drop Boxes.
To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.

Customers with a Daily Pickup

Your driver will pickup your shipment(s) as usual.

<p>PAID HERE</p>	<p>35 LBS</p> <p>3 OF 4</p>	<p>SHIP TO:</p> <p>ROB MITCHELL</p> <p>(800) 733-8644</p> <p>DAT LABORATORY</p> <p>7715 CORPORATE BLVD.</p> <p>PLAIN CITY OH 43064-9212</p>	<p>OH 432 9-30</p> 	<p>UPS NEXT DAY AIR</p> <p>1</p> <p>TRACKING #: 1Z AS3 1R5 01 9386 7915</p> 	<p>BILLING: P/P</p> <p>Reference: 005015011231455701</p> <p>Senders Name: Richard Ishikawa CS 331.13. 0092-9715.04 P4 2011</p> 
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1. **Print the label(s):** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.
2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
3. **GETTING YOUR SHIPMENT TO UPS**
Customers without a Daily Pickup
Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
Hand the package to any UPS driver in your area.
Take your package to any location of The UPS Store®, UPS Drop Box, UPS Customer Center, UPS Alliance (Office Depot® or Staples®) or Authorized Shipping Outlet near you. Items sent via UPS Return ServicesSM (including via Ground) are also accepted at Drop Boxes.
To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.

Your driver will pickup your shipment(s) as usual.

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PAGE THREE OF FOUR 324-947-7734 BATHO ROUGE AB31R5 4111 ESSAH LN BATHO ROUGE LA 70809	35 LBS 4 OF 4
SHIP TO: ROB MITCHELL (800) 733-8644 DAT LABORATORY 7715 CORPORATE BLVD PLAIN CITY OH 43064-9212	OH 432 9-30 
	UPS NEXT DAY AIR TRACKING #: 1Z AB3 1R5 01 9330 2524 
BILLING: P/P	

DAT Report®

Data Analysis

7715 Corporate Blvd.
Plain City, OH 43064
800-733-8644

Sample Analysis

Client: Shaw Environmental, Inc.
Address: 4171 Essen Lane
Baton Rouge, LA 70809

Date: 7/27/201
DAT Project: 0511030
Date: 5/26/201
Date:

Attn: Richard Ishikawa
Site: CITGO
Analysis: Method 23 PCDD/PCDF

The following samples were received on

DAT Sample ID	Client Sample ID	Date Sample	Matrix
0511030-1	1427333-052311-0010/23-1-1	5/23/2	air filter
0511030-	1427333-052311-0010/23-4-2	5/23/2	air
0511030-	1427333-052311-0010/23-5-2	5/23/2	rinse
0511030	1427333-052311-0010/23-6-2	5/23/2	rinse
0511030-	1427333-052311-0010/23-1-3	5/24/2	air filter
0511030-	1427333-052311-0010/23-2-3	5/24/2	solvents
0511030-	1427333-052311-0010/23-3-3	5/24/2	toluene
0511030-	1427333-052311-0010/23-4-3	5/24/2	air
0511030-	1427333-052311-0010/23-5-3	5/24/2	rinse
0511030-	1427333-052311-0010/23-6-3	5/24/2	rinse
0511030-	1427333-052411-0010/23-	5/24/2	acetone
0511030-2	1427333-052311-0010/23-2-1	5/23/2	solvents
0511030-	1427333-052411-0010/23-	5/24/2	methylene
0511030-	1427333-052411-0010/23-T-	5/24/2	toluene
0511030-3	1427333-052311-0010/23-3-1	5/23/2	toluene
0511030-4	1427333-052311-0010/23-4-1	5/23/2	air
0511030-5	1427333-052311-0010/23-5-1	5/23/2	rinse
0511030-6	1427333-052311-0010/23-6-1	5/23/2	rinse
0511030-7	1427333-052311-0010/23-1-2	5/23/2	air filter

0511030-8	1427333-052311-0010/23-2-2	5/23/2	solvents
0511030-9	1427333-052311-0010/23-3-2	5/23/2	toluene

Results: See attached summary.

QC: Met the criteria for the method.

Reviewed and approved for


Ronald K. Mitchum, Ph.D.
President, DAT

Date:

7/27/11

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Page 2 of 24

Method 23 - Determination of Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Municipal Waste Combustors

Applicability. This method is applicable to the determination of emissions of polychlorinated dibenzo-p-dioxins (PCDD's) and polychlorinated dibenzofurans (PCDF's) from stationary sources.

Principle. A sample is withdrawn isokinetically from the gas stream and collected in the sample probe, on a glass fiber filter, and on a packed column of adsorbent material. The sample cannot be separated into a particle and vapor fraction. The PCDD's and PCDF's are extracted from the sample, separated by high resolution gas chromatography (HRGC), and measured by high resolution mass spectrometry (HRMS) using EPA Method 8290¹.

1. U.S. Environmental Protection Agency. Method 8290 - The Analysis of Polychlorinated Dibenzo-p-dioxin and Polychlorinated Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry. In: Test Methods for Evaluating Solid Waste. Washington, DC. SW-846.

US EPA - Method 8230A

10FA - Form I-HR CDD-1
CDD/CCF SAMPLE DATA SUMMARY
HIGH RESOLUTION

Sample No.

1427333-052311-0010/23-4-BL

Lab Name: DATA/ANALYSIS TECHNOLOGIES Contract: Shaw Environmental

Lab Code: OH-01241 Case No.: CITGO ICR TO No.: 142733 SDG No.: NA

Matrix: Soil Lab Sample ID: Ub11930-19

Sample wt/vol: 1.00 g / L NA QC Code: N

Water Sample Prep: (SEPF/SPE) Lab File ID: 0511020AS:7

Concentrated Extract Volume: 20.00 (ul) Date Received: 5/26/2011

Injection Volume: 1 (ul) % Solids/Lipids 100.0% Date Extracted: 6/2/2011

QC Columns: JW3-DB-5 ID: 0.25 (mm) Dilution Factor: 1

CONCENTRATION UNITS: (pg/L, ng/Kg, pg) pg ISRC: Ns

TARGET ANALYTE	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
2,3,7,8-TCDF				U	6.39
1,2,3,7,8-PeCDF				U	8.66
2,3,4,7,8-PeCDF				U	8.87
1,2,3,4,7,8-HxCDF				U	11.62
1,2,3,6,7,8-HxCDF				U	12.62
2,3,4,6,7,8-HxCDF				U	13.70
1,2,3,7,8,9-HxCDF				U	16.22
1,2,3,4,6,7,8-HpCDF				U	19.92
1,2,3,4,7,8,9-HpCDF				U	14.40
OCDF				U	25.61
2,3,7,8-TCDD				U	5.73
1,2,3,7,8-PeCDD				U	11.18
1,2,3,4,7,8-HxCDD				U	16.59
1,2,3,6,7,8-HxCDD				U	14.77
1,2,3,7,8,9-HxCDD				U	15.19
1,2,3,4,6,7,8-HpCDD				U	11.32
OCDD	44.21	0.88 *		U	20.10 CMPC

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

LABELLED COMPOUNDS	Type	PEAK RT	ION RATIO #	ION RATIO LIMITS	RECOVERY LIMITS
13C-2,3,7,8-TCDF	IS	27.24	0.77	0.65 0.89	40 135
13C-1,2,3,7,8-PeCDF	IS	31.46	1.55	1.32 1.78	40 135
13C-1,2,3,6,7,8-HxCDF	IS	36.45	0.54	0.43 0.59	40 135
13C-1,2,3,4,6,7,8-HpCDF	IS	40.97	0.44	0.37 0.51	40 135
13C-2,3,7,8-TCDD	IS	28.12	0.78	0.65 0.89	40 135
13C-1,2,3,7,8-PeCDD	IS	33.02	1.58	1.32 1.78	40 135
13C-1,2,3,6,7,8-HxCDD	IS	37.55	1.24	1.05 1.43	40 135
13C-1,2,3,4,6,7,8-HpCDD	IS	41.37	1.08	0.88 1.2	40 135
13C-OCDD	IS	44.21	0.96	0.76 1.02	40 135
37C12-2,3,7,8-TCDD	Surr	28.13	1.00	1 1	40 135
13C-2,3,4,7,8-PeCDF	Surr	32.37	1.51	1.32 1.78	40 135
13C-1,2,3,4,7,8-HxCDF	Surr	36.35	0.50	0.43 0.59	40 135
13C-1,2,3,4,7,8-HxCDD	Surr	37.48	1.30	1.09 1.43	40 135
13C-1,2,3,4,7,8,9-HpCDF	Surr	42.00	0.41	0.37 0.51	40 135
13C13 1,2,3,7,8,9-HxCDF	All	38.90	0.66	0.43 0.80	40 135
13C-1,2,3,4-TCDD	RS	27.59	0.81	0.65 0.89	NA NA
13C-1,2,3,7,8,9-HxCDD	RS	38.22	1.27	1.05 1.43	NA NA

Column to be used to flag values outside QC limits. B= In Blank X=DPE Interference SRC=IS Recovery Corrected Results
C= 2,3,7,8-TCDF second column confirmation result was entered U= not found

Ims 03260Arev2

10FB - Form I-HR CDD-2
CDD/CDF TOXICITY EQUIVALENCE SUMMARY
HIGH RESOLUTION

Sample No.

1427333 062311 0010/23-4 GL

Lab Name: DATA ANALYSIS TECHNOLOGIES Contract: Shaw Environmental

Lab Code: OH01261 Case No: CITGO ICR TO No: 142733 SDG No.: NA

Matrix: Train Lab Sample ID: 0511630-19

Sample wt/vol: 1.00 g/L NA Lab File ID: 0511630AS-7

Water Sample Prep: (SEPF/SPE) Date Received: 5/26/2011

Concentrated Extract Volume: 20 (ul) Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids: 100.0% Date Analyzed: 09/29/2011

% Lipids: _____

GC Column: JWS-DB-5 ID: 0.25 (mm) Dilution Factor: 1

ISNC No

CONCENTRATION UNITS: (pg/L or ng/Kg) 19

TARGET ANALYTE	CONCENTRATION	TEF*	TEF-ADJUSTED CONCENTRATIONS
2,3,7,8-TCDF		x 0.10 =	
1,2,3,7,8-PeCDF		x 0.35 =	
2,3,4,7,8-PeCDF		x 0.50 =	
1,2,3,4,7,8-HxCDF		x 0.10 =	
1,2,3,6,7,8-HxCDF		x 0.10 =	
2,3,4,6,7,8-HxCDF		x 0.10 =	
1,2,3,7,8,9-HxCDF		x 0.10 =	
1,2,3,4,6,7,8-HpCDF		x 0.01 =	
1,2,3,4,7,8,9-HpCDF		x 0.01 =	
OCDF		x 0.001 =	
2,3,7,8-TCDD		x 1.00 =	
1,2,3,7,8-PeCDD		x 0.50 =	
1,2,3,4,7,8-HxCDD		x 0.10 =	
1,2,3,6,7,8-HxCDD		x 0.10 =	
1,2,3,7,8,9-HxCDD		x 0.10 =	
1,2,3,4,6,7,8-HpCDD		x 0.01 =	
OCDD		x 0.001 =	
		Total =	0.00

TEF* - Toxicity Equivalent Factors from EPA/625/3-89/013 March 1989 - Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and Chlorinated Dibenzofurans (CDDs and CDFs) and 1989 Update.
XcDFE interference - Cc TCDF confirmation value used in calculation of TEF

Im18296Am2

US EPA - Method 8290A

2DF - Form II HR CDD
CDD/CDF TCAL HCMOLOGY CONCENTRATION SUMMARY
HIGH RESOLUTION

Sample No.

1427333-052311-0010/23-4-8L

Lab Name: Data/Analysis Technologies Contract: Shaw Environmental

Lab Code: CH21241 Case No.: CT1160 ILK TO No. 142733 SDG No.: NA

Matrix: Train Lab Sample ID: 0511930-19

Sample wt/vol: 1.00 g / L NA Lab File ID: 0511030AS.7

Water Sample Prep: (SEPF/SPE) Date Received: 5/26/2011

Concentrated Extract Volume: 22 (ul) Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids: 100% Date Analyzed: 06/29/2011

% Lipids

GC Column: JWS-DB-5 ID: 2.25 (mm) Dilution Factor: 1

ISRC No

CONCENTRATION UNITS: (pg/L or ng/Kg) pg

HCMOLOGY	PEAKS	#DPE	CONCENTRATION	Q	EMPC/EDL
DIOXINS					
Total TCDD	3			U	3.42
Total PeCDD	3			U	11.03
Total HxCDD	3			U	10.11
Total HpCDD	3			U	10.73
FURANS					
Total TCDF	3	0		U	6.10
Total PeCDF	3	0		U	8.63
Total HxCDF	3	0		U	13.03
Total HpCDF	3	0		U	12.08

Note: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Limits (EDLs) for solid samples are calculated on a dry weight basis (except lipids, which are reported on a wet weight basis with % Lipids). The total homologous concentrations do not affect the TEF (Toxicity Equivalent Factor) calculations.
X= DPE interference-corrected value C= TCDF confirmation value used for total TCDF concentration

8m13290Arev2

US EPA - Method 8290A

10FA - Form 1-RR CDD-1
CDD/CDF SAMPLE DATA SUMMARY
HIGH RESOLUTION

Sample No.

1427333-052311-0010/23-1

Lab Name: DATA/ANALYSIS TECHNOLOGIES Contract: Shaw Environmental

Lab Code: CH01241 Case No.: CITGO ICR TO No.: 142733 SDG No.: NA

Matrix: Train Lab Sample ID: 0511030-1

Sample wt/vol: 1.00 g/L NA QC Code: N

Water Sample Prep: (SEPF/SPE) Lab File ID: 0511030AS.8

Concentrated Extract Volume: 20.80 (uL) Date Received: 5/26/2011

Injection Volume: 1 (uL) % Solids/Lipids: 100.0% Date Extracted: 6/2/2011

GC Column: JWS-DB-1 ID: 0.25 (mm) Date Analyzed: 6/29/2011 20:40

Dilution Factor: 1

CONCENTRATION UNITS: (pg/L, ng/Kg, pg) ISRC No

TARGET ANALYTE	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
2,3,7,8-TCDF				U	2.96
1,2,3,7,8-PeCDF				U	5.14
2,3,4,7,8-PeCDF				U	5.26
1,2,3,4,7,8-HxCDF				U	7.77
1,2,3,6,7,8-HxCDF				U	7.20
2,3,4,6,7,8-HxCDF				U	7.82
1,2,3,7,8,9-HxCDF				U	9.26
1,2,3,4,6,7,8-HpCDF				U	6.89
1,2,3,4,7,8,9-HpCDF				U	9.09
OCDF	44.28	0.85	30.09		11.99
2,3,7,8-TCDD				U	3.74
1,2,3,7,8-PeCDD				U	5.85
1,2,3,4,7,8-HxCDD				U	10.09
1,2,3,6,7,8-HxCDD				U	9.53
1,2,3,7,8,9-HxCDD				U	9.63
1,2,3,4,6,7,8-HpCDD				U	8.10
OCDD	44.21	0.35	573.71	D	12.31

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

LABELLED COMPOUNDS	Type	PEAK RT	ION RATIO #	ION RATIO LIMITS LOW HIGH	% REC #	RECOVERY LIMITS LOW HIGH
13C-2,3,7,8-TCDF	IS	27.23	0.78	0.65 0.89	65	40 135
13C-1,2,3,7,8-PeCDF	IS	31.46	1.63	1.32 1.78	57	40 135
13C-1,2,3,6,7,8-HxCDF	IS	36.45	0.52	0.43 0.59	77	40 135
13C-1,2,3,4,6,7,8-HpCDF	IS	40.37	0.43	0.37 0.51	73	40 135
13C-2,3,7,8-TCDD	IS	28.12	0.12	0.05 0.19	80	40 135
13C-1,2,3,7,8-PeCDD	IS	33.01	1.59	1.32 1.78	66	40 135
13C-1,2,3,6,7,8-HxCDD	IS	37.54	1.20	1.05 1.43	57	40 135
13C-1,2,3,4,6,7,8-HpCDD	IS	41.37	1.19	0.88 1.2	76	40 135
13C-OCDD	IS	44.21	0.31	0.26 0.37	70	40 135
37C-12,2,3,7,8-TCDD	Surr	28.13	1.60	1 1	83	40 135
13C-2,3,4,7,8-PeCDF	Surr	32.36	1.57	1.32 1.78	95	40 135
13C-1,2,3,4,7,8-HxCDF	Surr	36.34	0.52	0.43 0.59	64	40 135
13C-1,2,3,4,7,8-HxCDD	Surr	37.48	1.29	1.09 1.43	107	40 135
13C-1,2,3,4,7,8,9-HpCDF	Surr	42.01	0.41	0.37 0.51	92	40 135
13C-12-1,2,3,7,8,9-HxCDF	Alt	35.40	0.50	0.43 0.55	67	40 135
13C-1,2,3,4-TCDD	RS	27.59	0.30	0.65 0.85	NA	NA NA
13C-1,2,3,7,8,9-HxCDD	RS	38.21	1.73	1.05 1.42	NA	NA NA

Column to be used to flag values outside IIC limits.

R= In Blank

X=DPE interference

ISRC=IS Recovery Corrected Results

C = 2,3,7,8-TCDF second column confirmation result; was entered

U= notfound

Im18290/rev2

US EPA - Method 8230A

10FB - Form 1-HK CDD-2
CDD/CDF TOXICITY EQUIVALENCE SUMMARY
HIGH RESOLUTION

Sample No.

1427333-052311-0010/23.1

Lab Name: DATA ANALYSIS TECHNOLOGIES Contract: Shaw Environmental

Lab Code: OH01241 Case No: CITGO ICR TO No.: 142733 SDG No.: NA

Matrix: Train Lab Sample ID: 0511030-1

Sample wt/vol: 1.00 g / L NA Lab File ID: 0511030AS.8

Water Sample Prep: SEPF(SPE) Date Received: 5/26/2011

Concentrated Extract Volume: 20 (ul) Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids: 100.0% Date Analyzed: 06/29/2011

% Lipids

GC Column: JW5-DB-5 ID: 3.25 (mm) Dilution Factor: 1

ISRC: N/A

CONCENTRATION UNITS: (pg/L or ng/Kg) pg

TARGET ANALYTE	CONCENTRATION	TEF*	TEF-ADJUSTED CONCENTRATIONS
2,3,7,8-TCDF		X 0.10 =	
1,2,3,7,8-PeCDF		X 0.05 =	
2,3,4,7,8-PeCDF		X 0.50 =	
1,2,3,4,7,8-HxCDF		X 0.10 =	
1,2,3,6,7,8-HxCDF		X 0.10 =	
2,3,4,6,7,8-HxCDF		X 0.10 =	
1,2,3,7,8,9-HxCDF		X 0.10 =	
1,2,3,4,6,7,8-HpCDF		X 0.01 =	
1,2,3,4,7,8,9-HpCDF*		X 0.01 =	
OCDF	30.00	X 0.001 =	0.03
2,3,7,8-TCDD		X 1.00 =	
1,2,3,7,8-PeCDD		X 0.50 =	
1,2,3,4,7,8-HxCDD		X 0.10 =	
1,2,3,6,7,8-HxCDD		X 0.10 =	
1,2,3,7,8,9-HxCDD		X 0.10 =	
1,2,3,4,6,7,8-HpCDD		X 0.01 =	
OCDD	573.71	X 0.001 =	0.57
		Total =	6.40

TEF* - Toxicity Equivalent Factors from EPA/0250-09/010 March 1999 - Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and Chlorinated Dibenzofurans (CDDs and CDFs) and 1989 Update.
X=DPE interference C= TCDF confirmation value used in calculation of TEF

Form 8230Arev2

2DF - Farm B HR CDD
CDD/CDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY
HIGH RESOLUTION

Sample No.

1427333-052311-0010/23-1

Lab Name: Data/Analysis Technologies Contract: Shaw Environmental

Lab Code: CH01241 Case No.: CITGO ICR TO No.: 142733 SDC No.: NA

Matrix: Train Lab Sample ID: 0511030-1

Sample wt/vol: 1.00 g / L NA Lab File ID: 0511030AS.8

Water Sample Prep: (SEPF/SPE) Date Received: 5/26/2011

Concentrated Extract Volume: 10 (ul) Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids: 100% Date Analyzed: 06/29/2011

% Lipids:

GC Column: JW/SDB-5 ID: 0.25 (mm) Dilution Factor: 1

ISRC: No

CONCENTRATION UNITS: (pg/L or ng/Kg) pg

HOMOLOGUE	PEAKS	#DPE	CONCENTRATION	Q	EMPCEDL
DIOXINS					
Total TCDD	0			U	3.54
Total PeCDD	0			U	5.80
Total HxCDD	0			U	6.66
Total HpCDD	0			U	7.68
FURANS					
Total TCDF	0	0		U	2.85
Total PeCDF	0	0		U	5.13
Total HxCDF	0	0		U	7.89
Total HpCDF	0	0		U	7.83

Note: Concentrations, Estimated Maximum Possible Concentrations (EMPCs) and Estimated Detection Limits (EDLs) for solid samples are calculated on a dry weight basis (except tissues which are reported on a wet weight basis with % Lipids). The total homologue concentrations do not affect the TEF (Toxicity Equivalent Factor) calculations. X= DPE interference corrected value C= TCDF confirmation value used for total TCDF concentration

fm18290Am2

US EPA - Method 8290A

10FA - Form I-HR CDD-1
CDD/PCDF SAMPLE DATA SUMMARY
HIGH RESOLUTION

Sample No.

142733-052311-0010/23-2

Lab Name: DATA/ANALYSIS TECHNOLOGIES Contract: Shaw Environmental

Lab Code: OH01241 Case No.: CITGO ICR TO No.: 142733 SDG No.: NA

Matrix: Train

Lab Sample ID: 0511630-7

Sample wt (unit): 1.00 g / L NA

QC Code: N

Lab File ID: 0511630/AS-0

Water Sample Prep: (SEPF/SPE)

Date Received: 5/26/2011

Concentrated Extract Volume: 20.00 (ul)

Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids/Lipids 100.0%

Date Analyzed: 6/29/2011 21:30

GC Column: JWS-DB-S RT: 0.25 (min)

Dilution Factor: 1

CONCENTRATION UNITS: (pg/L, ng/Kg, pg)

ISRC No

TARGET ANALYTE	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
1,2,3,7,8-TCDF	27.25	0.63 *			3.94 EMPC
1,2,3,7,8-PeCDF				U	3.61
2,3,4,7,8-PeCDF				U	3.94
1,2,3,4,7,8-HxCDF				U	1.37
1,2,3,6,7,8-HxCDF				U	0.53
2,3,4,6,7,8-HxCDF				U	1.44
1,2,3,7,8,9-HxCDF				U	3.54
1,2,3,4,6,7,8-HpCDF				U	0.04
1,2,3,4,7,8,9-HpCDF				U	3.24
OCDF				U	0.19
1,2,3,7,8-TCDD				U	3.35
1,2,3,7,8-PeCDD				U	0.23
1,2,3,4,7,8-HxCDD				U	3.94
1,2,3,6,7,8-HxCDD				U	3.16
1,2,3,7,8,9-HxCDD				U	3.58
1,2,3,4,6,7,8-HpCDD				U	0.85
OCDD	44.20	0.80	118.12	Q	5.05

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

LABELLED COMPOUNDS	Type	PEAK RT	ION RATIO #	ION RATIO LIMITS			RECOVERY LIMITS	
				LOW	HIGH	% REC #	LOW	HIGH
13C-2,3,7,8-TCDF	IS	27.23	0.80	0.65	0.89	58	40	135
13C-1,2,3,7,8-PeCDF	IS	31.46	1.50	1.32	1.78	50	40	135
13C-1,2,3,6,7,8-HxCDF	IS	36.44	0.51	0.43	0.59	65	40	135
13C-1,2,3,4,6,7,8-HpCDF	IS	40.37	0.43	0.37	0.51	65	40	135
13C-2,3,7,8-TCDD	IS	28.11	0.80	0.65	0.89	70	40	135
13C-1,2,3,7,8-PeCDD	IS	33.01	1.62	1.32	1.78	58	40	135
13C-1,2,3,6,7,8-HxCDD	IS	37.55	1.33	1.05	1.43	49	40	135
13C-1,2,3,4,6,7,8-HpCDD	IS	41.36	1.11	0.88	1.2	68	40	135
13C-OCDD	IS	44.20	0.93	0.76	1.02	61	40	135
13C12-2,3,7,8-TCDD	Surr	28.12	1.00	1	1	87	40	135
13C-2,3,4,7,8-PeCDF	Surr	32.36	1.51	1.32	1.78	102	40	135
13C-1,2,3,4,7,8-HxCDF	Surr	36.34	0.53	0.43	0.59	87	40	135
13C-1,2,3,6,7,8-HxCDD	Surr	37.47	1.31	1.05	1.43	112	40	135
13C-1,2,3,4,7,8,9-HpCDF	Surr	42.00	0.43	0.37	0.51	97	40	135
13C12-1,2,3,7,8,9-HxCDF	Alt	38.30	0.60	0.43	0.69	50	40	135
13C-1,2,3,4-TCDD	RS	27.58	0.81	0.65	0.89	NA	NA	NA
13C-1,2,3,7,8,9-HxCDD	RS	38.21	1.26	1.05	1.43	NA	NA	NA

Column to be used to flag values outside QC limits.

B= In Blank

X=DPE Interference

ISRC=IS Recovery Corrected Results

C = 2,3,7,8-TCDF second column confirmation result was entered

L= not found

Im18250Arev2

US EPA - Method 8290A

10FB - Form 1000 CDD-2
CDD/CDF TOXICITY EQUIVALENCE SUMMARY
HIGH RESOLUTION

Sample No.

1427333-352311-0010/23.2

Lab Name: DATA/ANALYSIS TECHNOLOGIES Contract: Shaw Environmental

Lab Code: DH01241 Case No.: CITGO ICR TO No.: 142733 SDG No.: NA

Matrix: Train Lab Sample ID: 0511330-7

Sample wt/vol: 1.00 g / L NA Lab File ID: 0511330AS-5

Water Sample Prep: (SEPF/SPE) Date Received: 5/26/2011

Concentrated Extract Volume: 20 (ul) Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids: 100.0%
% Lipids: _____

GC Column: J&S DB-5 ID: 0.25 (mm) Dilution Factor: 1

ISRC No

CONCENTRATION UNITS: (pg/L or ng/Kg) pg

TARGET ANALYTE	CONCENTRATION	TEF*	TEF-ADJUSTED CONCENTRATION
2,3,7,8-TCDF		x 0.10 =	
1,2,3,7,8-PeCDF		x 0.05 =	
2,3,4,7,8-PeCDF		x 0.50 =	
1,2,3,4,7,8-HxCDF		x 0.10 =	
1,2,3,6,7,8-HxCDF		x 0.10 =	
2,3,4,6,7,8-HxCDF		x 0.10 =	
1,2,3,7,8,9-HxCDF		x 0.10 =	
1,2,3,4,6,7,8-HpCDF		x 0.01 =	
1,2,3,4,7,8,9-HpCDF		x 0.01 =	
OCDF		x 0.001 =	
2,3,7,8-TCDD		x 1.00 =	
1,2,3,7,8-PeCDD		x 0.50 =	
1,2,3,4,7,8-HxCDD		x 0.10 =	
1,2,3,6,7,8-HxCDD		x 0.10 =	
1,2,3,7,8,9-HxCDD		x 0.10 =	
1,2,3,4,6,7,8-HpCDD		x 0.01 =	
OCDD	118.12	x 0.001 =	0.12
		Total =	0.12

TEF* - Toxicity Equivalent Factors from EPA/625/3-89/010 March 1989 - Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and Chlorinated Dibenzofurans (CDDs and CDFs) and 1989 Update.
X=DPE interference C= TCDF confirmation value used in calculation of TEF

fm18290/rev2

2DF - Form 8 IIR CDD
CDD/CDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY
HIGH RESOLUTION

Sample No.

1427333-452311-0010/23-2

Lab Name: Data/Analysis Technologies Contract: Shaw Environmental

Lab Code: 09-01241 Case No: CITGO ICR TO No: 142733 SDG No.: NA

Matrix: Train Lab Sample ID: 0511030-7

Sample wt/vol: 1.00 g / L NA Lab File ID: 0511030AS-9

Water Sample Prep: (SEPF/SPE) Date Received: 5/26/2011

Concentrated Extract Volume: 20 (ul) Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids: 100% Date Analyzed: 06/20/2011

% Lipids:

GC Column: JW5 DB-S ID: 3.25 (mm) Dilution Factor:

ISRC: No

CONCENTRATION UNITS: (pg/L or ng/Kg) P2

HOMOLOGUE	PEAKS	#DPE	CONCENTRATION	Q	EMPCEDL
DIOXINS					
Total TCDD	0			U	6.01
Total PeCDD	0			U	12.14
Total HxCDD	0			U	9.04
Total HpCDD	0			U	12.28
FURANS					
Total TCDF	0	0		U	13.94
Total PeCDF	0	0		U	9.58
Total HxCDF	0	0		U	11.54
Total HpCDF	0	0		U	11.11

Note: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Limits (EDLs) for solid samples are calculated on a dry weight basis (except lipids, which are reported on a wet weight basis with % Lipids). The total homologue concentrations do not affect the TEF (Toxicity Equivalent Factor) calculations.
X= SPE interference corrected value C= TCDF confirmation value used for total TCDF concentration

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USEPA - Method 8290A

INFA - Form IAR CDD-1
CDD/CDF SAMPLE DATA SUMMARY
HIGH RESOLUTION

Sample No.

1427331-052311-0019/233

Lab Name: DATA/ANALYSIS/TECHNOLOGIES Contract: Shaw Environmental

Lab Code: CH01241 Case No.: CITEO ICR TO No.: 142733 SDG No.: NA

Matrix: Iron

Sample wt/vol: 1.00 g / L NA

Water Sample Prep: (SEPF/SPE)

Concentrated Extract Volume: 20.00 (uL)

Injection Volume: 1 (uL) % Solids/Lipids: 100.0%

QC Column: JWS-DB-5 ID: 0.25 (mm)

CONCENTRATION UNITS: (pg/L, ng/Kg, pg) pg

Lab Sample ID: 051'030-13

QC Code: N

Lab File ID: 051'030/AS:10

Date Received: 5/26/2011

Date Extracted: 6/2/2011

Date Analyzed: 6/29/2011 22:20

Dilution Factor: 1

ISRC: No

TARGET ANALYTE	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
2,3,7,8-TCDF				U	3.76
1,2,3,7,8-PeCDF				U	7.75
2,3,4,7,8-PeCDF				U	7.93
1,2,3,4,7,8-HxCDF				U	7.79
1,2,3,6,7,8-HxCDF				U	7.21
2,3,4,6,7,8-HxCDF				U	7.83
1,2,2,7,8,9-HxCDF				U	9.27
1,2,3,4,6,7,8-HpCDF				U	7.38
1,2,3,4,7,8,9-HpCDF	42.01	0.79 *		E	22.35 EMPC
OCDF	44.20	0.64 *			30.58 EMPC
2,3,7,8-TCDD				U	4.73
1,2,3,7,8-PeCDD				U	8.26
1,2,3,4,7,8-HxCDD				U	12.61
1,2,3,6,7,8-HxCDD				U	11.81
1,2,3,7,8,9-HxCDD				U	12.29
1,2,3,4,6,7,8-HpCDD				U	8.80
OCDD	44.20	0.68	80.70	E	11.59

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids).

LABELLED COMPOUNDS	Type	PEAK RT	ION RATIO #	ION RATIO LIMITS			RECOVERY LIMITS	
				LOW	HIGH	% REC #	LOW	HIGH
13C-2,3,7,8-TCDF	IS	27.23	0.86	0.65	0.89	52	40	135
13C-1,2,3,7,8-PeCDF	IS	31.46	1.51	1.12	1.78	48	40	135
13C-1,2,3,6,7,8-HxCDF	IS	36.44	0.51	0.43	0.59	60	40	135
13C-1,2,3,4,6,7,8-HpCDF	IS	40.36	0.42	0.37	0.51	59	40	135
13C-2,3,7,8-TCDD	IS	28.10	0.81	0.65	0.89	65	40	135
13C-1,2,3,7,8-PeCDD	IS	33.01	1.61	1.12	1.78	56	40	135
13C-1,2,3,6,7,8-HxCDD	IS	37.54	1.21	1.05	1.43	44	40	135
13C-1,2,3,4,6,7,8-HpCDD	IS	41.37	1.01	0.88	1.2	65	40	135
13C-OCDD	IS	44.20	0.91	0.76	1.02	62	40	135
17C12-2,3,7,8-TCDD	Surr	28.11	1.00	1	1	83	40	135
13C-2,3,4,7,8-PeCDF	Surr	32.35	1.54	1.12	1.78	98	40	135
13C-1,2,3,4,7,8-HxCDF	Surr	36.33	0.51	0.43	0.59	85	40	135
13C-1,2,3,4,7,8-HxCDD	Surr	37.46	1.27	1.05	1.43	110	40	135
13C-1,2,3,4,7,8,9-HpCDF	Surr	42.90	0.45	0.37	0.51	93	40	135
13C12-1,2,3,7,8,9-HxCDF	Alt	36.38	0.52	0.43	0.59	86	40	135
13C-1,2,3,4-TCDD	RS	27.58	0.81	0.65	0.89	NA	NA	NA
13C-1,2,3,7,8,9-HxCDD	RS	38.20	1.26	1.06	1.43	NA	NA	NA

Column to be used to flag values outside QC limits.

B= In Blank

X=DPE Interference

ISRC=IS Recovery Corrected Results

C = 2,3,7,8-TCDF second column confirmation result was entered

L= not found

In 8290Arev2

USEPA - Method 8290A

2DF - Form II HR CDD
CDD/CDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY
HIGH RESOLUTION

Sample No.

1427333-052311-0010/23-3

Lab Name: DataAnalysis Technologies Contract: Shaw Environmental
Lab Code: 0-01241 Case No.: CITCO ICR IU No.: 142733 SDG No.: NA
Matrix: Train Lab Sample ID: 0511030 13
Sample wt/vol: 1.00 g / L NA Lab File ID: 0511030AS:10
Water Sample Prep: (SEPF/SPE) Date Received: 5/26/2011
Concentrated Extract Volume: 20 (ul) Date Extracted: 6/2/2011
Injection Volume: 1 (ul) % Solids: 100% Date Analyzed: 06/29/2011
GC Column: JWS-DB-5 ID: 0.25 (mm) % Lipids:
Dilution Factor: 1
CONCENTRATION UNITS: (pg/L or ng/Kg) pg ISRC: No

HOMOLOGUE	PEAKS	#DFE	CONCENTRATION	Q	EMPC/EDL
DIOXINS					
Total TCDD	3			U	4.48
Total PeCDD	3			U	5.19
Total HxCDD	3			U	3.18
Total HpCDD	3			U	3.34
FURANS					
Total TCDF	0	0		U	3.82
Total PeCDF	0	0		U	7.72
Total HxCDF	0	0		U	7.91
Total HpCDF	0	0		U	22.35

Note: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Limits (EDLs) for solid samples are calculated on a dry weight basis (except furans, which are reported on a wet weight basis with % Lipids). The total homologue concentrations do not affect the TEF (Toxicity Equivalence Factor) calculations. X= DPE interference corrected value Q= TCDF confirmation value used for total TCDF concentration

06/11/2011 09:00 AM

US EPA - Method 8290A

TEPB - Form I-HK CDD-2
CDD/CDF TOXICITY EQUIVALENCE SUMMARY
HIGH RESOLUTION

Sample No.

1427333-052811-0010WZ5-3

Lab Name: DATA/ANALYSIS TECHNOLOGIES Contract: Shaw Environmental

Lab Code: OH01241 Case No.: CITGD ICR TO No.: 142733 SDG No.: NA

Matrix: Train Lab Sample ID: 0511030-13

Sample wt/vol: 1.00 g / L NA Lab File ID: 0511030AS.10

Water Sample Prep: (SEPF/SPE) Date Received: 5/26/2011

Concentrated Extract Volume: 20 (ul) Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids: 100.0% Date Analyzed: 05/29/2011

GC Column: JWS-DB-5 ID: 0.25 (mm) % Lipids

Dilution Factor: 1

CONCENTRATION UNITS: (pg/L or ng/Kg) pg ISRC No:

TARGET ANALYTE	CONCENTRATION	TEF*	TEF*-ADJUSTED CONCENTRATIONS
2,3,7,8-TCDF		x 0.10 =	
1,2,3,7,8-PeCDF		x 0.05 =	
2,3,4,7,8-PeCDF		x 0.50 =	
1,2,3,4,7,8-HxCDF		x 0.10 =	
1,2,3,6,7,8-HxCDF		x 0.10 =	
2,3,4,6,7,8-HxCDF		x 0.10 =	
1,2,3,7,8,9-HxCDF		x 0.10 =	
1,2,3,4,6,7,8-HpCDF		x 0.01 =	
1,2,3,4,7,8,9-HpCDF		x 0.01 =	
OCDF		x 0.001 =	
2,3,7,8-TCDD		x 1.00 =	
1,2,3,7,8-PeCDD		x 0.50 =	
1,2,3,4,7,8-HxCDD		x 0.10 =	
1,2,3,6,7,8-HxCDD		x 0.10 =	
1,2,3,7,8,9-HxCDD		x 0.10 =	
1,2,3,4,6,7,8-HpCDD		x 0.01 =	
OCDD	80.70	x 0.001 =	0.08
		Total =	0.08

TEF* - Toxicity Equivalent Factor from EPA/625/3-89/011, March 1989 - Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and Chlorinated Dibenzofurans (CDDs and CDFs) and 1989 Update.
X=DPE interference C= TCDF confirmation value used in calculation of TEF

Item 8290Arev2

QC-Method 23/SW-8290 - Determination of Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans from Municipal Waste Combustors

The method QC associated with Method 23 analyzed using EPA Method 8290 consists of one method blank. In addition a blank spike and blank spike duplicate are extracted with the batch. The filter, XAD and the extracted impinger contents and rinses are combined. The total train is consolidated into one sample. The method blank is an indicator of the system suitability for analysis, while the spike recovery is an indicator of the overall system performance.

1. U.S. Environmental Protection Agency. Method 8290 - The Analysis of Polychlorinated Dibenzo-p-dioxin and Polychlorinated Dibenzofurans by High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry. In: Test Methods for Evaluating Solid Waste. Washington, DC. SW-846.

US EPA - Method 8290A

101FA - Form 1-HR CDD-1
CDD/COF SAMPLE DATA SUMMARY
HIGH RESOLUTION

Sample No.

Method_Blank

Lab Name: DATA/ANALYSIS TECHNOLOGIES Contract: Shaw Environmental

Lab Code: O-101241 Case No.: CITGO ICR TO No.: 142733 SDG No.: NA

Matrix: Train

Lab Sample ID: 051103D-MB

Sample wt/Vol: 1.0 g / L NA

QC Code: ME

Lab File ID: 051103DAS-5

Water Sample Prep: (SEPF/SPE)

Date Received: 5/28/2011

Concentrated Extract Volume: 20.00 (ul)

Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids/Lipids 100.0%

Date Analyzed: 06/29/2011 18:10

GC Column: JWS-DB-5 ID: 0.25 (mm)

Dilution Factor: 1

CONCENTRATION UNITS: (pg/L, ng/Kg, pg)

FR

TARGET ANALYTE	PEAK RT	ION RATIO #	CONCENTRATION	Q	EMPC/EDL
2,3,7,8-TCDF				U	5.64
1,2,3,7,8-PeCDF				U	9.59
2,3,4,7,8-PeCDF				U	9.62
1,2,3,4,7,8-HxCDF				U	12.03
1,2,3,6,7,8-HxCDF				U	11.14
2,3,4,6,7,8-HxCDF				U	12.10
1,2,3,7,8,9-HxCDF				U	14.33
1,2,3,4,6,7,8-HpCDF				U	11.06
1,2,3,4,7,8,9-HpCDF	42.00	1.44 *			26.21
OCDF				U	28.42
2,3,7,8-TCDD				U	7.03
1,2,3,7,8-PeCDD				U	12.00
1,2,3,4,7,8-HxCDD				U	16.77
1,2,3,6,7,8-HxCDD				U	15.94
1,2,3,7,8,9-HxCDD				U	16.33
1,2,3,4,6,7,8-HpCDD				U	14.78
OCDD	44.23	1.17 *			31.94

NOTE: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Levels (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids)

LABELED COMPONENTS	Type	PEAK RT	ION RATIO #	ION RATIO LIMITS		% REC #	RECOVERY LIMITS	
				LOW	HIGH		LOW	HIGH
13C-2,3,7,8-TCDF	IS	27.24	0.77	0.65	0.89	56	40	125
13C-1,2,3,7,8-PeCDF	IS	31.47	1.40	1.32	1.78	47	40	125
13C-1,2,3,6,7,8-HxCDF	IS	36.45	0.51	0.43	0.59	72	40	125
13C-1,2,3,4,6,7,8-HpCDF	IS	40.37	0.44	0.37	0.51	65	40	125
13C-2,3,7,8-TCDD	IS	28.12	0.79	0.65	0.89	73	40	125
13C-1,2,3,7,8-PeCDD	IS	33.03	1.70	1.32	1.78	56	40	125
13C-1,2,3,6,7,8-HxCDD	IS	37.56	1.29	1.05	1.43	55	40	125
13C-1,2,3,4,6,7,8-HpCDD	IS	41.37	1.03	0.88	1.2	65	40	125
13C-OCDD	IS	44.21	0.90	0.76	1.02	61	40	125
17C12-2,3,7,8-TCDD	Surr	28.13	1.00	1	1	83	40	125
13C-2,3,4,7,8-PeCDF	Surr	32.37	1.52	1.32	1.78	101	40	125
13C-1,2,3,4,7,8-HxCDF	Surr	36.35	0.55	0.43	0.59	83	40	125
13C-1,2,3,6,7,8-HxCDF	Surr	37.48	1.21	1.05	1.43	101	40	125
13C-1,2,3,4,7,8-HpCDF	Surr	42.01	0.42	0.37	0.51	92	40	125
13C12-1,2,3,7,8,9-HpCDF	Alt	36.40	0.92	0.43	0.99	60	40	125
13C-1,2,3,4-TCDD	RS	27.59	0.80	0.65	0.89	NA	NA	NA
13C-1,2,3,7,8,9-HxCDD	RS	38.22	1.23	1.05	1.43	NA	NA	NA

Column to be used to flag values outside QC limits.

8m 8290Arev2

USEPA - Method 8290A

10F8 - Form 1-HR CDD-2
CDD/CDF TOXICITY EQUIVALENCE SUMMARY
HIGH RESOLUTION

Sample No.

Method Blank

Lab Name: DATA/ANALYSIS TECHNOLOGIES Contract: Shaw Environmental

Lab Code: 0101241 Case No.: CITGO ICR TD No.: 142733 SDG No.: NA

Matrix: Train Lab Sample ID: 0511030-MB

Sample wt/vol: 1.00 g / L NA Lab File ID: 0511030AS.5

Water Sample Prep: (SEPF/SPE) Date Received: 5/26/2011

Concentrated Extract Volume: 20 (ul) Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids: 100.0% Date Analyzed: 06/29/2011

GC Column: JWS-DB-5 ID: 0.25 (mm) Dilution Factor: 1

CONCENTRATION UNITS: (pg/L or ng/Kg) pg

TARGET ANALYTE	CONCENTRATION	TEF*	TEF-ADJUSTED CONCENTRATIONS
2,3,7,8-TCDF		x 0.10 =	
1,2,3,7,8-PeCDF		x 0.05 =	
2,3,4,7,8-PeCDF		x 0.50 =	
1,2,3,4,7,8-HxCDF		x 0.10 =	
1,2,3,6,7,8-HxCDF		x 0.10 =	
2,3,4,6,7,8-HxCDF		x 0.10 =	
1,2,3,7,8,9-HxCDF		x 0.10 =	
1,2,3,4,6,7,8-HpCDF		x 0.01 =	
1,2,3,4,7,8,9-HpCDF		x 0.01 =	
OCDF		x 0.001 =	
2,3,7,8-TCDD		x 1.00 =	
1,2,3,7,8-PeCDD		x 0.50 =	
1,2,3,4,7,8-HxCDD		x 0.10 =	
1,2,3,6,7,8-HxCDD		x 0.10 =	
1,2,3,7,8,9-HxCDD		x 0.10 =	
1,2,3,4,6,7,8-HpCDD		x 0.01 =	
OCDD		x 0.001 =	
		Total =	0.08

TEF* - Toxicity Equivalency Factors from EPA/525/3-89/016 March 1989 - Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzop-dioxins and Chlorinated Dibenzofurans (CDDs and CDFs) and 1989 Update.

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USEPA-Method 8290A

2DF - Form II HR CDD
CDD/CDF TOTAL HOMOLOGUE CONCENTRATION SUMMARY
HIGH RESOLUTION

Sample No.

Method_Blank

Lab Name: Data/Analysis Technologies Contract: _____

Lab Code: CH01241 Case No.: CITGO ICR TO No.: 142733 SDG No.: NA

Matrix: Train Lab Sample ID: 0611030 MB

Sample wt/vol: 1.00 g / L NA Lab File ID: 0511030AS.5

Water Sample Prep: (SEPF/SPE) Date Received: 5/26/2011

Concentrated Extract Volume: 0 (uL) Date Extracted: 6/2/2011

Injection Volume: 1 (uL) % Solids: 100% Date Analyzed: 06/29/2011

% Lipids: _____

GC Column: JW5-DB-E ID: 0.25 mm) Dilution Factor: 1

CONCENTRATION UNITS: (pg/L or ng/Kg) pg

HOMOLOGUE	PEAKS	CONCENTRATION	Q	EMPC/EDL
DIOXINS				
Total TCDD	0		U	6.65
Total PeCDD	0		U	11.89
Total HxCDD	0		U	10.88
Total HpCDD	0		U	14.01
FLURANS				
Total TCDF	0		U	5.43
Total PeCDF	0		U	9.56
Total HxCDF	0		U	12.22
Total HpCDF	0		U	26.21

Note: Concentrations, Estimated Maximum Possible Concentrations (EMPCs), and Estimated Detection Limits (EDLs) for solid samples are calculated on a dry weight basis (except tissues, which are reported on a wet weight basis with % Lipids). The total homologue concentration allows to not affect the TEF (Toxicity Equivalent Factor) calculations.

frm13290Arev2

USEPA

3da-Form III-HR CDD
CDD/CDF LAB CONTROL SAMPLE SUMMARY
HIGH RESOLUTION

Sample No.

Lab_Spike

Lab Name: DATA/ANALYSIS TECHNOLOGIES Contract: Shaw Environmental

Lab Code: OH01241 Case No.: CITGO ICR TO No.: 142733 SDG No.: NA

Matrix: (SOILWATER/ASH/ISSUE/OIL) Train Lab Sample ID: 0511030-LS

Sample wt/vol: NA g / L NA Lab File ID: 0511030DS:6

Water Sample Prep: (SEPI/SPE) Date Recieved:

Concentrated Extract Volume: 20 (ul) Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids/Lipids 100 Date Analyzed: 07/04/2011

GC Column: JW5-DB-5 ID: 0.25 (mm) Dilution Factor: 1

CONCENTRATION UNITS: (pg/L or ng/Kg) pg

SPIKE ANALYTE	SPIKE ADDED	AMOUNT RECOVERED	PERCENT RECOVERY	#	QC LIMITS	
					LOW	HIGH
2,3,7,8-TCDF	400	523	131		93	135
1,2,3,7,8-PeCDF	2000	2505	125		85	133
2,3,4,7,8-PeCDF	2000	2639	132		89	138
1,2,3,4,7,8-HxCDF	2000	2076	104		64	140
1,2,3,6,7,8-HxCDF	2000	2241	112		78	134
2,3,4,6,7,8-HxCDF	2000	2286	114		72	140
1,2,3,7,8,9-HxCDF	2000	2037	102		21	200
1,2,3,4,6,7,8-HpCDF	2000	2592	130		78	148
1,2,3,4,7,8,9-HpCDF	2000	2311	116		76	158
OCDF	4000	5009	127		90	153
2,3,7,8-TCDD	400	397	99		60	140
1,2,3,7,8-PeCDD	2000	2227	111		67	131
1,2,3,4,7,8-HxCDD	2000	2781	139		68	140
1,2,3,6,7,8-HxCDD	2000	2991	150		73	155
1,2,3,7,8,9-HxCDD	2000	2801	140		50	106
1,2,3,4,6,7,8-HxCDD	2000	2536	127		74	131
OCDD	4000	7184	180	*	81	146

Column to be used to flag values outside Quality Control (QC) Limits.

Laboratory Control Sample Recovery: 1 Outside limits out of 17 total.

fm35ox040545

USEPA

3cfa-Form III-IR CDD
CDD/CDF LAB CONTROL SAMPLE SUMMARY
HIGH RESOLUTION

Sample No.

Lab_Spike_Dup.

Lab Name: DATA/ANALYSIS TECHNOLOGIES Contract: Shaw Environmental

Lab Code: OH01241 Case No.: CITCO ICR TO No.: 142733 SDG No.: NA

Matrix: (SOILWATER/ASH/ISSUE/OIL) Train Lab Sample ID: 0511030-LSO

Sample wt/vol: NA g / L L Lab File ID: 0511030eS:1

Water Sample Prep: (SEPP/SPE) Date Received:

Concentrated Extract Volume: 20 (ul) Date Extracted: 6/2/2011

Injection Volume: 1 (ul) % Solids/Lipids 100 Date Analyzed: 07/01/2011

GC Column: JWS-DB-5 ID: 0.25 (mm) Dilution Factor: 1

CONCENTRATION UNITS: (pg/L or ng/Kg) pg

SPIKE ANAL YTE	SPIKE ADDED	AMOUNT RECOVERED	PERCENT RECOVERY	#	QC LIMITS	
					LOW	HIGH
2,3,7,8-TCDF	400	509	127		93	135
1,2,3,7,8-PeCDF	2000	2514	126		86	133
2,3,4,7,8-PeCDF	2000	2533	127		89	138
1,2,3,4,7,8-HxCDF	2000	1947	97		64	140
1,2,3,6,7,8-HxCDF	2000	2061	103		78	134
2,3,4,6,7,8-HxCDF	2000	2313	116		72	140
1,2,3,7,8,9-HxCDF	2000	1807	92		21	200
1,2,3,4,6,7,8-HpCDF	2000	2622	131		78	148
1,2,3,4,7,8,9-HpCDF	2000	2230	112		76	158
OCDF	4000	5497	137		86	153
2,3,7,8-TCDD	400	371	93		60	140
1,2,3,7,8-PeCDD	2000	2033	102		87	131
1,2,3,4,7,8-HxCDD	2000	2568	129		68	140
1,2,3,6,7,8-HxCDD	2000	2805	140		73	155
1,2,3,7,8,9-HxCDD	2000	2598	130		56	166
1,2,3,4,6,7,8-HpCDD	2000	2293	115		74	131
OCDD	4000	6009	150	*	81	146

Column to be used to flag values outside Quality Control (QC) limits

Laboratory Control Sample Recovery: 1 Outside limits out of 17 total.

form 3diox040006

DAT Labs, Inc. Extraction Form

Project #	0511030
Sample:	SOLIDS LIQUID AIR
Analysis:	BZD HVO Imp.
Prepared By:	L.S.M.
Date:	5/27/11
Spill Witness:	JPK
Solvent Manifest:	E.M.D.
Solvent Lot #	51020

SURROGATE ID	VOL ml / ul	CONC
SL-42-43 Bphv	1.0ml	100µg/ml
SL-42-17 And	1.0ml	100µg/ml
SL-		

ISMS ID	VOL ml / ul	CONC
SI-42-45 Bphv	1.0ml	100µg/ml
SI-42-18 And	1.0ml	100µg/ml
SI-		

INT STE ID	VOL ml / ul	CONC
SL-		
SL-		
SL-		

COMMENTS: Se water.

SAMPLE ID	TOTAL SAMPLE AMNT	SAMPLE AMNT EXTRACTED	TOTAL EXTRACT VOL	FINAL EXTRACT VOL	SUBS INIT	SPK INIT	IS INIT
-MB	-	1.0L	1.0mL	1.0mL	✓		✓
-5	1.0L	1.0L	1.0mL	1.0mL	✓		✓
-11	1.0L	1.0L	1.0mL	1.0mL	✓		✓
-17	1.0L	1.0L	1.0mL	1.0mL	✓		✓
-LS	-	1.0L	1.0mL	1.0mL	✓	✓	✓
-LSD	-	1.0L	1.0mL	1.0mL	✓	✓	✓

If extract was split for additional analyses, please note the aliquot volume for this analysis and at what point the excess was analyzed.

AUOQUT VOLUME: N/A ml ul (Circle one)

Extract was spiked: Before After the split. (Circle one)

Additional samples may be listed on the back of this page.

[illegible]

DAT Labs, Inc. Extraction Form

Project # 0571030

Sample: SOLIDS LIQUID (AIR)

Analysis: XAD Trm 827/m23

Prepared By: C.S.M.

Date: 6/6/11

Spike Witness: JK

Extract Manufacturer: E.M.D

Extract Lot # 50342

Extraction	Solvent	Volume ml	Reps
<input checked="" type="checkbox"/> Double	<u>DIAM</u>		
<input type="checkbox"/> Sep Funnel	<u>Methanol</u>		
<input type="checkbox"/> Sonication	<u>Methylene Chloride</u>		
<input type="checkbox"/> Cent. Ext.	<u>AOH</u>		
<input type="checkbox"/> Vial	<u>Ethyl Acetate</u>		
<input type="checkbox"/> SPE Disc	<u>IPA</u>		
<input type="checkbox"/> Other	<input checked="" type="checkbox"/> Toluene	<u>300</u>	<u>12x</u>
<input type="checkbox"/> No Extract	<u>Water</u>		
Other (Describe): <u>Start: 5:15pm 6/6/11</u> <u>End: 1:02pm 6/7/11</u>			

SUBSTRATE ID	VOL. ml	CONC
<u>SL-42-21 (m23)</u>	<u>40ul</u>	<u>100mg/ml 4mg/ml</u>
<u>SL-42-43 (827/m23) 1.0ml</u>	<u>1.0ml</u>	<u>100mg/ml</u>
<u>SL-42-17 (827/m23) 1.0ml</u>	<u>1.0ml</u>	<u>100mg/ml</u>

INT STD ID	VOL. ml	CONC
<u>SL-42-22 (m23)</u>	<u>40ul</u>	<u>100mg/ml 4mg/ml</u>
<u>SL-42-54 (m23)</u>	<u>40ul</u>	<u>100mg/ml (LS, 40)</u>

LSMS ID	VOL. ml	CONC
<u>SL-42-42 (m23)</u>	<u>1ul</u>	<u>40mg/ml 4mg/ml</u>
<u>SL-42-45 (827/m23) 1.0ml</u>	<u>1.0ml</u>	<u>100mg/ml</u>
<u>SL-42-46 (827/m23) 1.0ml</u>	<u>1.0ml</u>	<u>100mg/ml</u>

COMMENTS: M23 ALT STD SL-42-66 D
100mg/ml - 40ul - 4mg

SAMPLE ID	TOTAL SAMPLE AMNT	SAMPLE AMNT EXTRACTED	TOTAL EXTRACT VOL, (ADD ALL REPS)	FINAL EXTRACT VOL (ml)	SEED INIT	SPK INIT	IS INIT
<u>- MB</u>	<u>-</u>	<u>-</u>	<u>178.0300</u>	<u>5.0</u>	<u>/</u>		<u>/</u>
<u>- 1</u>	<u>-</u>	<u>-1, 2, 3, 4, 6</u>	<u>10.300</u>	<u>5.0</u>	<u>/</u>		<u>/</u>
<u>- 7</u>	<u>-</u>	<u>-7, 8, 9, 10, 12</u>	<u>300</u>	<u>5.0</u>	<u>/</u>		<u>/</u>
<u>- 13</u>	<u>-</u>	<u>-13, 14, 15, 16, 18</u>	<u>300</u>	<u>5.0</u>	<u>/</u>		<u>/</u>
<u>- 19</u>	<u>-</u>	<u>-19, 20, 21</u>	<u>300</u>	<u>5.0</u>	<u>/</u>		<u>/</u>
<u>- LS</u>	<u>-</u>	<u>-</u>	<u>300</u>	<u>5.0</u>	<u>/</u>		<u>/</u>
<u>- L5D</u>	<u>-</u>	<u>-</u>	<u>300</u>	<u>5.0</u>	<u>/</u>		<u>/</u>

If extract was split for additional analyses, please note the aliquot volume for this analysis and at what point the extract was split.

ALiquot VOLUME: N/A ml at (Circle one)

Extract was spiked: Before After the split (Circle one)

Additional samples may be listed on the back of this page.

DAT Reports®

Data Analysis Technologies, Inc.

7715 Corporate Blvd.
Plain City, OH 43064
800-733-8644

Sample Analysis Certificate

Client: Shaw Environmental, Inc.
Address: 4171 Essen Lane
Baton Rouge, LA 70809

Date: 7/5/2011
DAT Project ID: 0611002
Date Received: 6/2/2011
Date Analyzed: Numerous

Attn: Richard Ishikawa
Client Project: CITGO-ICR
Analysis: Method 0061/SW-7199 Hexavalent Chromium

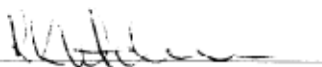
The following samples were received on 6/2/2011:

DAT Sample ID	Client Sample ID	Date Sampled	Matrix
0611002-35	1427333-052511-0061-1-1 Cont 1	5/25/2011	Liquid
0611002-36	1427333-052511-0061-2-1 Cont 2	5/25/2011	Liquid
0611002-37	1427333-052511-0061-1-2 Cont 1	5/25/2011	Liquid
0611002-38	1427333-052511-0061-2-2 Cont 2	5/25/2011	Liquid
0611002-39	1427333-052511-0061-1-3 Cont 1	5/25/2011	Liquid
0611002-40	1427333-052511-0061-2-3 Cont 2	5/25/2011	Liquid
0611002-41	1427333-052511-0061-4-BL Cont 4	5/25/2011	Liquid
0611002-42	1427333-052511-0061-5-BL Cont 5	5/25/2011	Liquid
0611002-43	1427333-052511-0061-6-BL Cont 6	5/25/2011	Liquid

Results: See attached summary.

QC: Met the criteria for the method. See attached summary.

Reviewed and approved for release by:


Ronald K. Mitchum, Ph.D.
President, DAT

Date: 7/5/2011

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DAT Reports®

Data Analysis Technologies, Inc.

7715 Corporate Boulevard

Plain City, OH 43064

Data Summary Table**SW-0061/SW-7199 / Hexavalent Chromium**

Client: Shaw
Client Project: CITGO ICR-Hexavalent chromium
DAT Project: 0611002
Date Sampled: NA
Date Received: 6/2/2011
Date Analyzed: 6/6/2011
Analyst: JJK

Client Sample ID:	DAT ID:	Analyte	Result,	
			ug	DL, ug
1427333-052511-0061-1-1 Cont 1	0611002- 35	Hexavalent Chromium	ND	1.74
1427333-052511-0061-2-1 Cont 2	0611002- 36	Hexavalent Chromium	ND	0.38
1427333-052511-0061-1-2 Cont 1	0611002- 37	Hexavalent Chromium	ND	2.11
1427333-052511-0061-2-2 Cont 2	0611002- 38	Hexavalent Chromium	ND	0.40
1427333-052511-0061-1-3 Cont 1	0611002- 39	Hexavalent Chromium	ND	1.82
1427333-052511-0061-2-3 Cont 2	0611002- 40	Hexavalent Chromium	ND	0.29
1427333-052511-0061-4-BL Cort 4	0611002- 41	Hexavalent Chromium	ND	0.44
1427333-052511-0061-5-BL Cort 5	0611002- 42	Hexavalent Chromium	ND	0.22
1427333-052511-0061-6-BL Cort 6	0611002- 43	Hexavalent Chromium	ND	0.37

ND = Not detected at the DL shown.

DAT Reports®

Data Analysis Technologies, Inc.

7715 Corporate Boulevard

Plain City, OH 43064

QC Summary Table**SW-0061/SW-7199 / Hexavalent Chromium**

Client: Shaw
Client Project: CHGO ICR-Hexavalent chromium
DAT Project: 0611002
Date Sampled: NA
Date Received: 6/2/2011
Date Analyzed: 6/6/2011
Analyst: JJK

Laboratory ID		Cr6+ POL ug/ml	Cr6+ Avg., ug/ml	Spike Added, ug/ml	% Rec	% RPD
Initial Calib Verif Std	0611002- ICV		1.05	1	105	
Initial Calib Blank	0611002- ICB	0.05	ND			
1427333-052511-0061-2-3	0611002- 43 Dup	0.05	ND			
Lab Spike	0611002- LS		0.90	1	90	
	0611002- LSD		0.93	1	93	4
1427333-052511-0061-1-2	0611002- 37-MS		1.01	1	101	
	0611002- 37-MSD		0.93	1	93	8
Continuing Calib Std	0611002- CCV		0.95	1	95	
Continuing Calib Blank	0611002- CCB	0.05	ND			

ND = Not detected at the quantitation limit shown.

DOCUMENTATION

DOCUMENTATION

CHAIN OF CUSTODY / REQUEST FOR ANALYSIS (COC/RFA)

Shaw Environmental Inc.
4171 Essen Lane, Baton Rouge, LA 70809
Phone: 225-932-3745

Date 5/21/11 Page 1 of 2

PROJECT INFORMATION				PRESERVATIVE			
Project Number: 142733							
Project Name: CITGO ICR Testing							
Delivered Via:							
TAT: <input type="checkbox"/> 24 hr <input type="checkbox"/> 48 hr <input type="checkbox"/> 5 days <input type="checkbox"/> 21 days				Contract: contract number: 225-201-3554			
Sample ID	Sample Collection Date	Sample Collection Time	Sample Matrix	Number of Containers and Size	Comments		
142733-052511-0061-4-BL	5/25/11	16:58	Liquid	1/500 mL Amber	✓		
142733-052511-0061-5-BL	5/25/11	16:58	Liquid	1/500 mL Amber	✓		
142733-052511-0061-6-BL	5/25/11	16:58	Liquid	1/500 mL Amber	✓		
142733-052511-0061-1-1	5/25/11	11:10	Liquid	1/1 L Amber	✓		
142733-052511-0061-2-1	5/25/11	11:10	Liquid	1/500 mL Amber	✓		
142733-052511-0061-1-2	5/25/11	16:06	Liquid	2/1 L Amber	✓		
142733-052511-0061-2-2	5/25/11	16:06	Liquid	1/500 mL Amber	✓		
142733-052511-0061-1-3	5/26/11	8:46	Liquid	1/1 L Amber	✓		
142733-052511-0061-2-3	5/26/11	8:46	Liquid	1/500 mL Amber	✓		
142733-052511-Hg-7-BL	5/26/11	9:00	Liquid	1/500 mL Amber	✓		
142733-052511-Hg-8-BL	5/26/11	9:00	Liquid	1/500 mL Amber	✓		
142733-052511-Hg-9-BL	5/26/11	9:00	Liquid	1/500 mL Amber	✓		
142733-052511-Hg-10-BL	5/26/11	9:00	Liquid	1/500 mL Amber	✓		
142733-052511-Hg-11-BL	5/26/11	9:00	Liquid	1/500 mL Amber	✓		
142733-052511-Hg-12-BL	5/26/11	9:00	Filter	1/ petri	✓		
142733-052511-Hg-1-1	5/25/11	11:10	Filter	1/ petri	✓		
142733-052511-Hg-2-1	5/25/11	11:10	Liquid	1/500 mL Amber	✓		
142733-052511-Hg-3-1	5/25/11	11:10	Liquid	2/1 L Amber	✓		
142733-052511-Hg-4-1	5/25/11	11:10	Liquid	1/500 mL Amber	✓		
142733-052511-Hg-5-1	5/25/11	11:10	Liquid	1/1 L Amber	✓		
142733-052511-Hg-1-2	5/25/11	16:06	Filter	1/ petri	✓		
142733-052511-Hg-2-2	5/25/11	16:06	Liquid	1/500 mL Amber	✓		

0611002

Phone: 225.932.2745

Page 2. of 2

Page 7 of 17

③

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 45064.

Project Number: 0611002

Date Received: 6/2/2011	Carrier: JPS Air
Client Name: Shaw Environmental Bat	Analysis: M29, M0001, Hg
Tracking number: 1ZA831R50191340899	Package Temp: 3.7°C (Ice-Cooler)
Custody Seals ?: No	COC: <input checked="" type="checkbox"/> check if COC from client

Sample Information

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment
1427333-052611-29-1-1 Cont 1	0611002-01	5/26/2011	Filter	Petri Dish-Sm	
1427333-052611-29-3-1 Cont 3	0611002-02	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-29-4-1 Cont 4	0611002-03	5/26/2011	Liquid	1liter Amber WM Bottle	
1427333-052711-29-1-2 Cont 1	0611002-04	5/27/2011	Filter	Petri Dish-Sm	
1427333-052711-29-3-2 Cont 3	0611002-05	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-4-2 Cont 4	0611002-06	5/27/2011	Liquid	1liter Amber WM Bottle	
1427333-052711-29-1-3 Cont 1	0611002-07	5/27/2011	Filter	Petri Dish-Sm	

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Laboratory Receiving Initials

0611002

06/02/2011 12:08:01 PM

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0611002

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
1427333-052711-29-3-3 Cont 3	0611002-08	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-4-3 Cont 4	0611002-09	5/27/2011	Liquid	1liter Amber WM Bottle	
1427333-052711-29-12-BL Cont 12	0611002-10	5/27/2011	Filter	Petri Dish-Sm	
1427333-052711-29-8A-BL Cont 8A	0611002-11	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-8B-BL Cont 8B	0611002-12	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052711-29-9-BL Cont 9	0611002-13	5/27/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-Hg-1-1 Cont 1	0611002-14	5/25/2011	Filter	Petri Dish-Sm	
1427333-052511-Hg-2-1 Cont 2	0611002-15	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-Hg-3-1 Cont 3	0611002 16 A&B	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-Hg-4-1 Cont 4	0611002-17	5/25/2011	Liquid	500ml Amber WM Bottle	

L4
Laboratory Receiving Initials

0611002

5/27/2011 12:08:01 PM

2 of 5

######

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0611002

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment
1427333-052611-Hg-5-3 Cont 5	0611002-28	5/26/2011	Liquid	1liter Amber WM Bottle	
1427333-052611-Hg-12-BL Cont 12	0611002-29	5/26/2011	Filter	Petri Dish-Sm	
1427333-052611-Hg-7-BL Cont 7	0611002-30	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-8-BL Cont 8	0611002-31	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-9-BL Cont 9	0611002-32	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-10-BL Cont 10	0611002-33	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052611-Hg-11-BL Cont 11	0611002-34	5/26/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-1-1 Cont 1	0611002-35	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-0061-2-1 Cont 2	0611002-36	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-1-2 Cont 1	0611002-37 A&B	5/25/2011	Liquid	1liter Amber WM Bottle	

LL
Laboratory Receiving Initials

0611002

6/2/2011 12:08:01 PM

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0611002

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment
1427333-052511-0061-2-2 Cont 2	0611002-38	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-1-3 Cont 1	0611002-39	5/25/2011	Liquid	1liter Amber WM Bottle	
1427333-052511-0061-2-3 Cont 2	0611002-40	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-4-BL Cont 4	0611002-41	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-5-BL Cont 5	0611002-42	5/25/2011	Liquid	500ml Amber WM Bottle	
1427333-052511-0061-6-BL Cont 6	0611002-43	5/25/2011	Liquid	500ml Amber WM Bottle	


Laboratory Receiving Initials

0611002

6/2/2011 12:08:01 PM

5 of 5

DAT Labs Inc. **Sample Receipt Report**

Client/Number: Shaw Environmental (11701) Berton Ridge The client has been contacted. Yes ☐ No ☐

Custodian Initial: CL Date: 6-2-11

Secondary Review: Initials: _____ Date: _____

Upon receipt of samples, check if any of the following discrepancies have been noted.

Discrepancy Type	Specify applicable client ID or "all"
<input checked="" type="checkbox"/> COC and samples do not match	
<input type="checkbox"/> No unique sample identifications	
<input type="checkbox"/> Samples received outside of the required temp criteria. Receipt Temp: <u>15.2 C</u>	
<input type="checkbox"/> No preservation type was noted. Correction Factor: <u>+2.6 C</u>	
<input type="checkbox"/> No date of collection stated. Corrected Temp: <u>12.6 C (See Letter)</u>	
<input type="checkbox"/> No time of collection stated	
<input type="checkbox"/> The sample collector was not named	
<input type="checkbox"/> Sample containers were not appropriate	
<input type="checkbox"/> Sample labels were destroyed or unreadable	
<input type="checkbox"/> Samples were received outside of holding time	
<input type="checkbox"/> There was not enough sample to perform the requested analysis.	
<input type="checkbox"/> Samples showed sign of damage or contamination.	
<input type="checkbox"/> Aqueous samples for volatile analysis: Headspace? Y <input type="checkbox"/> N <input type="checkbox"/> If Yes, list sample ID(s) in details:	

Details: _____

Sample pH for nonvolatile aqueous samples and presence or absence of headspace (Y or N) for VOA aqueous samples shall be recorded at time of sample log-in. Under no circumstances shall VOA vials be opened at time of sample receipt.

Other Discrepancies:

Sample ID

CL11002

CL11002

Discrepancy

4 of 1000 3 + 3H - COC Shakes 052511 File 052611

COHES Run 3 or 3H used Date on label

Neckel Run 3 COC Shakes 052511 Date 052611

used date on label

Container Return

Yes/No

Price:

Size: 4 - Lg

Return Spl wt:

CL 11 002

DAT Project #

Upon receipt, the samples met all of DAT's acceptance criteria.

☒

Effective 05/03/11

DATFRM1049 Revision 4

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2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
3. **GETTING YOUR SHIPMENT TO UPS**
Customers without a Daily Pickup
 Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
 Hand the package to any UPS driver in your area.
 Take your package to any location of The UPS Store®, UPS Drop Box, UPS Customer Center, UPS Alliances (Office Depot® or Staples®) or Authorized Shipping Outlet near you. Items sent via UPS Return ServicesSM (including via Ground) are also accepted at Drop Boxes.
 To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.

Customers with a Daily Pickup

Your driver will pickup your shipment(s) as usual.

FOLD HERE

1 OF 4 35 LBS 10001501150115 225 987 7369 DAYTON ROUTE A83115 4171 1550115 DAYTON ROUTE LA 70899 SHIP TO: RON MITCHELL (810) 733-8644 DAT LABORATORY 7715 CORPORATE BLVD. PLAIN CITY OH 43064-9212	OH 432 9-30  	UPS NEXT DAY AIR 1 TRACKING #: 1Z A83 1R5 01 9134 0399 	BILLING: P/P Reference: 000015011501155703 Sender Name: Richard Ishikawa © 13.3.33 WORLDWIDE 15.04.04/2013 
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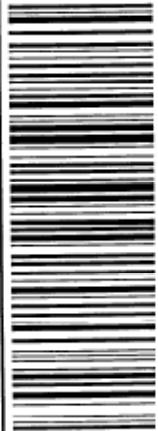
UPS CampusShip: View/Print Label

1. **Print the label(s):** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.
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 To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.

Customers with a Daily Pickup

Your driver will pickup your shipment(s) as usual.

FOLD HERE

PART#: 00000000000000000000 225 982 7169 DAT: 01/30/08 08:31:15 41.1 125581 141 EATON 30100 LA 70809	35 LBS 2 OF 4	SHIP TO: RON MITCHELL (800) 733-8644 DAT LABORATORY 7715 CORPORATE BLVD. PLAIN CITY OH 43064-9212	OH 432 9-30 	UPS NEXT DAY AIR 1 TRACKING #: 1Z A83 1R5 01 9497 2700		BILLING: P/P Reference: 0050115011751455700 Sender's Name: Richard Ishikawa © 1997-2001 UPS of America, Inc.
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UPS CampusShip: View/Print Label

1. **Print the label(s):** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.
2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
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 To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.

Customers with a Daily Pickup

Your driver will pickup your shipment(s) as usual.

FOLD HERE

35 LBS 3 OF 4 FROM: THUSCHH000200S 325 082 7369 EASTON ROUTE 883183 41711 ENSHET LH EASTON ROUTE LA 70809 SHIP TO: RON MITCHEUM (800) 723-8644 DAT LABORATORY 7715 CORPORATE BLVD. PLAIN CITY OH 43064-9212	OH 432 9-30  	UPS NEXT DAY AIR 1 TRACKING #: 1Z A83 1R501 9386 7915	 BILLING: D/P Reference: 0050150117514557C1 Sender Name: Richard Ishikawa 08 13 11 11 002070 15 06 04/2011
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monship in

Page 16 of 17

Receipts POP

UPS CampusShip: View/Print Label

1. **Print the label(s):** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.
2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.
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 To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.

Customers with a Daily Pickup

Your driver will pickup your shipment(s) as usual.

2/2/11

FOLD HERE

35 LBS 4 OF 4 SHIP TO: RON MITCHELL (800) 733-8644 DAT LABORATORY 7715 CORPORATE BLVD. PLAIN CITY OH 43064-9212		OH 432 9-30 		UPS NEXT DAY AIR 1 TRACKING #: 1Z A83 1R5 J1 9330 2524 		BILLING: P/P Reference: 009015011751455701 Senders Name: Richard Ishikawa 03/13/11 009015 15/04/2011 	
--	--	--	--	--	--	---	--

Appendix D

Calculations

Appendix D1
U.S. EPA Method 26A

Company:	Citgo	Test Date:	05/18/11
Location:	Sulphur, LA	Test Number:	1
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	26A		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.77 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.62 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.275 inches
Nozzle Area (ft ²)	A_n	4.12E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.833 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6731 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	80.7 °F
Sampling Time	Θ	128 min
Moisture Measured by Weight	$(W_f - W_i)$	576.2 g
Dry Gas Meter Volume (actual)	V_m	90.611 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	87.860 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.75 vol%
Carbon Dioxide	%CO ₂	17.80 vol%
Nitrogen	%N ₂	81.45 vol%
Temperature	T_s	140.6 °F
Molecular Weight, dry	M_d	30.88 lb/lb*mol
Molecular Weight, wet	M_s	28.27 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2362
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2025
Stack Static Pressure	P_g	0.40 in. H ₂ O
Absolute Stack Pressure	P_s	29.65 in. Hg
Average Velocity	V_s	40.92 ft/sec
Volumetric Flow Rate	Q_{sd}	7,442,892 acfh
		124,048 acfm
	Q_{sd}	5,170,935 dscfh
		86,182 dscfm
Isokinetic Sampling Rate	I	97.57 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	HC	7/25/2011

Company:	Citgo	Test Date:	05/18/11
Location:	Sulphur, LA	Test Number:	2
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method	26A		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.72 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.57 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.275 inches
Nozzle Area (ft ²)	A_n	4.12E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.823 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6779 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	78.0 °F
Sampling Time	Θ	128 min
Moisture Measured by Weight	$(W_f - W_i)$	555.1 g
Dry Gas Meter Volume (actual)	V_m	90.457 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	88.000 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.76 vol%
Carbon Dioxide	%CO ₂	17.50 vol%
Nitrogen	%N ₂	81.74 vol%
Temperature	T_s	140.7 °F
Molecular Weight, dry	M_d	30.83 lb/lb*mol
Molecular Weight, wet	M_s	28.22 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2292
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2035
Stack Static Pressure	P_g	0.33 in. H ₂ O
Absolute Stack Pressure	P_s	29.59 in. Hg
Average Velocity	V_s	41.29 ft/sec
Volumetric Flow Rate	Q_{sd}	7,510,235 acfh
		125,171 acfm
	Q_{sd}	5,200,609 dscfh
		86,677 dscfm
Isokinetic Sampling Rate	I	97.16 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	HC	7/25/2011

Company:	Citgo	Test Date:	5/19/11
Location:	Sulphur, LA	Test Number:	3
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method	26A		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.78 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.63 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.275 inches
Nozzle Area (ft ²)	A_n	4.12E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.645 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6470 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	88.2 °F
Sampling Time	Θ	128 min
Moisture Measured by Weight	$(W_f - W_i)$	442.6 g
Dry Gas Meter Volume (actual)	V_m	86.171 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	82.440 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.63 vol%
Carbon Dioxide	%CO ₂	18.08 vol%
Nitrogen	%N ₂	81.29 vol%
Temperature	T_s	140.0 °F
Molecular Weight, dry	M_d	30.92 lb/lb*mol
Molecular Weight, wet	M_s	28.34 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2020
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.1993
Stack Static Pressure	P_g	0.33 in. H ₂ O
Absolute Stack Pressure	P_s	29.65 in. Hg
Average Velocity	V_s	39.25 ft/sec
Volumetric Flow Rate	Q_{sd}	7,140,149 acfh
		119,002 acfm
	Q_{sd}	4,986,380 dscfh
		83,106 dscfm
Isokinetic Sampling Rate	I	94.94 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	HC	7/25/2011

TEST 1

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	140.6	y_1
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

y_1 = interpolated absolute pressure at stack temperature.

6.0047 in Hg

Moisture content calculated:

20.252 %

TEST 2

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	140.7	y_2
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

y_2 = interpolated absolute pressure at stack temperature.

6.0225 in Hg

Moisture content calculated:

20.353 %

TEST 3

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	114.44	2.96
B	140.0	y_3
C	140.18	5.93

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.115385$$

$$b = y \text{ intercept} \quad -10.2446$$

y_3 = interpolated absolute pressure at stack temperature.

5.9092 in Hg

Moisture content calculated:

19.930 %

Based on Method 4 - *Determination of Moisture Content in Stack Gases* (4.1), the moisture content of saturated gas streams as measured by method 4 may be positively biased. In cases where this is suspected, a second determination may be made. This determination can be accomplished by using a psychrometric chart or by using a saturation vapor pressure table.

Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

Values

TESTS:	Moisture Content (Steam Table) %	Moisture Content (Impinger) %	Lower of Two Values:
TEST 1	20.25	23.62	20.25
TEST 2	20.35	22.92	20.35
TEST 3	19.93	20.20	19.93

Company: Citgo Petroleum Corporation
Location: Sulphur, LA
Unit: Cat B Wet Gas Scrubber

Test No.	1	2	3	Average
Date	05/18/11	05/18/11	05/19/11	n/a
Start Time	12:50	19:18	9:46	n/a
End Time	18:15	21:35	12:10	n/a
Test Duration, min	128	128	128	128

Unit Operating Parameters

Oxygen Content	vol%	0.75	0.76	0.63	0.71
Carbon Dioxide Content	vol%	17.80	17.50	18.08	17.79
Moisture Content	vol%	20.25	20.35	19.93	20.18
Wet Molecular Weight	lb/lb-mol	28.27	28.22	28.34	28.28
Velocity	ft/sec	40.92	41.29	39.25	40.49
Volumetric Flow Rate	dscfm	86,182	86,677	83,106	85,322

Sampling Parameters

Isokinetic Sampling Rate	%	97.57	97.16	94.94	96.56
Sample Volume	dscf	87.860	88.000	82.440	86.100
	dscm	2.488	2.492	2.334	2.438

Laboratory Results ¹

Hydrogen Chloride (HCl)	µg	2,023	1,388	1,093	1,501
Hydrogen Fluoride (HF)	µg	[<232] BDL	[<187] BDL	[<172] BDL	[<197] BDL
Chloride ²	µg	10,889	9,693	9,135	9,906

Pollutants

Hydrogen Chloride (HCl)	mg/dscm	0.8131	0.5570	0.4682	0.6128
	lb/hr	0.263	0.181	0.146	0.196
Hydrogen Fluoride (HF)	mg/dscm	[<0.0933] BDL	[<0.0750] BDL	[<0.0737] BDL	[<0.0807] BDL
	lb/hr	[<0.030] BDL	[<0.024] BDL	[<0.023] BDL	[<0.026] BDL
Chlorine (Cl ₂) ²	mg/dscm	0.1239	0.1101	0.1108	0.1150
	lb/hr	1.413	1.263	1.218	1.298

¹ Laboratory Results provided by Data Analysis Technologies, Inc.

² Chlorine (Cl₂) and Chloride are equal in mass

BDL (below detection level) - all analytical values used to calculate and report an in-stack emissions value are less than the laboratory's reported detection level(s)

	Initials	Date
Data Entry	JP	7/11/2011
Review	RI	8/17/2011

Reference Method 4 - Determination of Moisture Content in Stack Gases

Nomenclature:

H_2O	=	Moisture content of gas stream, vol%.
B_{ws}	=	Proportion of water vapor, by volume, in the gas stream.
M_w	=	Molecular weight of water, 18.0 lb/lb-mole.
P_m	=	Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
R_i	=	Ideal gas constant, 21.85 (in. Hg)(ft ³)/(lb-mole)(°R).
T_{mf}	=	Temperature at meter, °F.
T_m	=	Absolute temperature at meter, °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_f	=	Final volume of condenser water, ml.
V_i	=	Initial volume, if any, of condenser water, ml.
V_m	=	Dry gas volume measured by dry gas meter, dcf.
V_{mstd}	=	Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscf.
V_{wcstd}	=	Volume of water vapor condensed, corrected to standard conditions, scf.
V_{wsgstd}	=	Volume of water vapor collected in silica gel, corrected to standard conditions, scf.
W_f	=	Final weight of silica gel or silica gel plus impinger, g.
W_i	=	Initial weight of silica gel or silica gel plus impinger, g.
Y	=	Dry gas meter calibration factor.
ρ_w	=	Density of water, 0.002201 lb/ml.

Variables:

Run 1:

$V_{m1} := 90.611 \cdot ft^3$	$P_{m1} := 29.62 \cdot in_Hg$
$W_{i1} := 0.0 \cdot g$	$T_{mf1} := 80.7 \cdot ^\circ F$
$W_{f1} := 576.2 \cdot g$	$Y_1 := 1.003$
$V_{f1} := 0$	$V_{i1} := 0$

Run 3:

$V_{m3} := 86.171 \cdot ft^3$	$P_{m3} := 29.63 \cdot in_Hg$
$W_{i3} := 0.0 \cdot g$	$T_{mf3} := 88.2 \cdot ^\circ F$
$W_{f3} := 442.6 \cdot g$	$Y_3 := 1.003$
$V_{f3} := 0$	$V_{i3} := 0$

Run 2:

$V_{m2} := 90.457 \cdot ft^3$	$P_{m2} := 29.57 \cdot in_Hg$
$W_{i2} := 0.0 \cdot g$	$T_{mf2} := 78.0 \cdot ^\circ F$
$W_{f2} := 555.1 \cdot g$	$Y_2 := 1.003$
$V_{f2} := 0$	$V_{i2} := 0$

Constants:

$M_w := 18.0 \cdot \frac{lb}{lb \cdot mol}$	$K_1 := 0.04706 \cdot \frac{ft^3}{ml}$
$P_{std} := 29.92 \cdot in_Hg$	$K_2 := 453.6 \cdot \frac{g}{lb}$
$T_{std} := 528 \cdot ^\circ R$	$K_3 := 0.04715 \cdot \frac{ft^3}{g}$
$\rho_w := 0.002201 \cdot \frac{lb}{ml}$	$K_4 := 17.64 \cdot \frac{^{\circ}R}{in_Hg}$
$R_i := 21.85 \cdot \frac{in_Hg \cdot ft^3}{lb \cdot mol \cdot ^{\circ}R}$	

Calculations:

Run 1:

$$V_{wcstd1} := \frac{(V_{f1} - V_{i1}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd1} := \frac{(W_{f1} - W_{i1}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd1} := K_1(V_{f1} - V_{i1})$$

$$V_{wsgstd1} := K_3(W_{f1} - W_{i1})$$

$$V_{wcstd1} = 0.000 \text{ scf}$$

$$V_{wsgstd1} = 27.211 \text{ scf}$$

$$V_{mstd1} := \frac{V_{m1} \cdot Y_1 \cdot P_{m1} \cdot T_{std}}{P_{std} \cdot (T_{mf1} + 460)} \quad Eq. 4-3$$

$$B_{ws1} := \frac{V_{wcstd1} + V_{wsgstd1}}{V_{wcstd1} + V_{wsgstd1} + V_{mstd1}} \quad Eq. 4-4$$

$$V_{mstd1} := K_4 Y_1 (V_{m1} P_{m1}) / T_{m1}$$

$$B_{ws1} = 0.2365$$

$$V_{mstd1} = 87.9 \text{ dscf}$$

$$H_2O_1 := B_{ws1} \cdot 100 \cdot \text{vol\%}$$

$$H_2O_1 = 23.65 \text{ vol\%}$$

Run 2:

$$V_{wcstd2} := \frac{(V_{f2} - V_{i2}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd2} := \frac{(W_{f2} - W_{i2}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd2} := K_1(V_{f2} - V_{i2})$$

$$V_{wsgstd2} := K_3(W_{f2} - W_{i2})$$

$$V_{wcstd2} = 0.000 \text{ scf}$$

$$V_{wsgstd2} = 26.215 \text{ scf}$$

$$V_{mstd2} := \frac{V_{m2} \cdot Y_2 \cdot P_{m2} \cdot T_{std}}{P_{std} \cdot (T_{mf2} + 460)} \quad Eq. 4-3$$

$$B_{ws2} := \frac{V_{wcstd2} + V_{wsgstd2}}{V_{wcstd2} + V_{wsgstd2} + V_{mstd2}} \quad Eq. 4-4$$

$$V_{mstd2} := K_4 Y_2 (V_{m2} P_{m2}) / T_{m2}$$

$$B_{ws2} = 0.2295$$

$$V_{mstd2} = 88.0 \text{ dscf}$$

$$H_2O_2 := B_{ws2} \cdot 100 \cdot \text{vol\%}$$

$$H_2O_2 = 22.95 \text{ vol\%}$$

Run 3:

$$V_{wcstd3} := \frac{(V_{f3} - V_{i3}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad \text{Eq. 4-1}$$

$$V_{wcstd3} := K_1(V_{f3} - V_{i3})$$

$$V_{wcstd3} = 0.000 \text{ scf}$$

$$V_{mstd3} := \frac{V_{m3} \cdot Y_3 \cdot P_{m3} \cdot T_{std}}{P_{std} \cdot (T_{mf3} + 460)} \quad \text{Eq. 4-3}$$

$$V_{mstd3} := K_4 Y_3 (V_{m3} P_{m3}) / T_{m3}$$

$$\boxed{V_{mstd3} = 82.4 \text{ dscf}}$$

$$V_{wsstd3} := \frac{(W_{f3} - W_{i3}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad \text{Eq. 4-2}$$

$$V_{wsstd3} := K_3(W_{f3} - W_{i3})$$

$$V_{wsstd3} = 20.902 \text{ scf}$$

$$B_{ws3} := \frac{V_{wcstd3} + V_{wsstd3}}{V_{wcstd3} + V_{wsstd3} + V_{mstd3}} \quad \text{Eq. 4-4}$$

$$B_{ws3} = 0.2023$$

$$H_2O_3 := B_{ws3} \cdot 100 \cdot \text{vol\%}$$

$$\boxed{H_2O_3 = 20.23 \text{ vol\%}}$$

Reference Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

Nomenclature:

M_d	=	Dry molecular weight, lb/lb-mole.
M_s	=	Wet molecular weight, lb/lb-mole.
$\%CO_2$	=	Percent CO_2 by volume, dry basis.
$\%O_2$	=	Percent O_2 by volume, dry basis.
$\%CO$	=	Percent CO by volume, dry basis.
$\%N_2$	=	Percent N_2 by volume, dry basis.
Bal	=	$\%N_2 + \%CO$.
28	=	Molecular weight of N_2 or CO , lb/lb-mol.
32	=	Molecular weight of O_2 , lb/lb-mol.
44	=	Molecular weight of CO_2 , lb/lb-mol.

Variables:

$$\%O2_1 := 0.75 \cdot vol\% \quad \%O2_2 := 0.76 \cdot vol\% \quad \%O2_3 := 0.63 \cdot vol\%$$

$$\%CO2_1 := 17.80 \cdot vol\% \quad \%CO2_2 := 17.5 \cdot vol\% \quad \%CO2_3 := 18.08 \cdot vol\%$$

$$Bal_1 := 100 \cdot vol\% - (\%O2_1 + \%CO2_1) \quad Bal_2 := 100 \cdot vol\% - (\%O2_2 + \%CO2_2)$$

$$Bal_1 = 81.45 \text{ vol}\% \quad Bal_2 = 81.74 \text{ vol}\%$$

$$Bal_3 := 100 \cdot vol\% - (\%O2_3 + \%CO2_3)$$

$$Bal_3 = 81.29 \text{ vol}\%$$

Calculations:

$$M_{d1} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO2_1 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O2_1 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_1) \quad Eq. 3-1$$

$$M_{d1} = 30.88 \frac{lb}{lb \cdot mol}$$

$$M_{d2} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO2_2 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O2_2 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_2) \quad Eq. 3-1$$

$$M_{d2} = 30.83 \frac{lb}{lb \cdot mol}$$

$$M_{d3} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO2_3 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O2_3 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_3) \quad Eq. 3-1$$

$$M_{d3} = 30.92 \frac{lb}{lb \cdot mol}$$

Reference Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate

Nomenclature:

A_s	=	Cross-sectional area of stack, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
B_{wST}	=	Water vapor in gas stream calculated using steam table.
C_p	=	Pitot tube coefficient, dimensionless.
K_p	=	Velocity equation constant.
M_d	=	Molecular weight of stack gas, dry basis, lb/lb-mol.
M_s	=	Molecular weight of stack gas, wet basis, lb/lb-mol.
P_m	=	Barometric pressure at measurement site, in. Hg.
P_g	=	Stack static pressure, in. H ₂ O.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
Q_{sd}	=	Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr, dscf/min.
T_s	=	Stack temperature, °F.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
Δp_{avgqrt}	=	Average square root of Δp , in. H ₂ O.
3600	=	Conversion factor, sec/hr.
18.0	=	Molecular weight of water, lb/lb-mol.

Constants:

$$K_p := 85.49 \cdot \frac{ft}{sec} \cdot \left[\frac{\left(\frac{lb}{lb \cdot mol} \right) \cdot (in_Hg)}{(R) \cdot (in_H2O)} \right]^{\frac{1}{2}}$$

Variables:

$A_s := 50.528 \cdot ft^2$	$\Delta p_{avgqrt2} := 0.6779 \cdot in_H2O^{\frac{1}{2}}$
$C_p := 0.84$	$T_{s2} := 140.7 \cdot ^\circ F$
$\Delta p_{avgqrt1} := 0.6731 \cdot in_H2O^{\frac{1}{2}}$	$P_{g2} := 0.33 \cdot in_H2O$
$T_{s1} := 140.6 \cdot ^\circ F$	$\Delta p_{avgqrt3} := 0.6470 \cdot in_H2O^{\frac{1}{2}}$
$P_{g1} := .40 \cdot in_H2O$	$T_{s3} := 140.0 \cdot ^\circ F$
$B_{wST1} := 0.2025$	$P_{g3} := 0.33 \cdot in_H2O$
$B_{wST2} := 0.2035$	
$B_{wST3} := 0.1993$	

Note the lower of the two moisture fractions will be used: either the one measured by impinger analysis or calculated by the steam table.

Calculations:

Run 1:

$$T_{sabs1} := T_{s1} + 460 \quad T_{sabs1} = 600.6 \text{ }^{\circ}\text{R} \quad P_{s1} := P_{m1} + \frac{P_{g1}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s1} = 29.65 \text{ in}_{Hg}$$

$$M_{s1} := M_{d1} \cdot (1 - B_{wST1}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST1} \quad \text{Eq. 2-6} \quad M_{s1} = 28.27 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s1} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT1}} \cdot \sqrt{\frac{T_{sabs1}}{P_{s1} \cdot M_{s1}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s1} = 40.92 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd1} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST1}) \cdot V_{s1} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s1}}{T_{sabs1} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd1} = 5170859.36 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd1} = 86180.99 \frac{\text{dscf}}{\text{min}}}$$

Run 2:

$$T_{sabs2} := T_{s2} + 460 \quad T_{sabs2} = 600.7 \text{ }^{\circ}\text{R} \quad P_{s2} := P_{m2} + \frac{P_{g2}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s2} = 29.59 \text{ in}_{Hg}$$

$$M_{s2} := M_{d2} \cdot (1 - B_{wST2}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST2} \quad \text{Eq. 2-6} \quad M_{s2} = 28.22 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s2} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT2}} \cdot \sqrt{\frac{T_{sabs2}}{P_{s2} \cdot M_{s2}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s2} = 41.29 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd2} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST2}) \cdot V_{s2} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s2}}{T_{sabs2} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd2} = 5200605.71 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd2} = 86676.76 \frac{\text{dscf}}{\text{min}}}$$

Run 3:

$$T_{sabs3} := T_{s3} + 460 \quad T_{sabs3} = 600 \text{ }^{\circ}\text{R} \quad P_{s3} := P_{m3} + \frac{P_{g3}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s3} = 29.65 \text{ in}_{Hg}$$

$$M_{s3} := M_{d3} \cdot (1 - B_{wST3}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST3} \quad \text{Eq. 2-6} \quad M_{s3} = 28.34 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s3} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs3}}{P_{s3} \cdot M_{s3}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s3} = 39.26 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd3} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST3}) \cdot V_{s3} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s3}}{T_{sabs3} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd3} = 4986746.71 \frac{\text{dscf}}{\text{hr}}} \quad \boxed{Q_{sd3} = 83112.45 \frac{\text{dscf}}{\text{min}}}$$

Isokinetic Sampling Rate

Nomenclature:

A_n	=	Cross-sectional area of nozzle, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
I	=	Percent of isokinetic sampling.
N_d	=	Nozzle diameter, in.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
V_{mstd}	=	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Θ_t	=	Total sampling time, min.
60	=	Conversion factor, sec/min.
100	=	Conversion to percent.

Variables:

$$\Theta_t := 128 \cdot \text{min}$$

$$N_d := 0.275 \cdot \text{in}$$

$$A_n := \pi \cdot \left(\frac{N_d}{12 \cdot \frac{\text{in}}{\text{ft}}} \right)^2 \quad A_n = 4.12 \times 10^{-4} \text{ ft}^2$$

Constants:

$$K_5 := 0.09450 \cdot \frac{\text{in_Hg} \cdot \% \cdot \text{min}}{\text{sec} \cdot \mathcal{R}}$$

$$T_{std} = 528 \mathcal{R}$$

$$P_{std} = 29.92 \text{ in_Hg}$$

Calculations:

$$I_1 := \frac{T_{sabs1} \cdot V_{mstd1} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s1} \cdot \Theta_t \cdot A_n \cdot P_{s1} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST1})} \quad \text{Eq. 5-8}$$

$$I_1 = 97.57 \%$$

$$I_2 := \frac{T_{sabs2} \cdot V_{mstd2} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s2} \cdot \Theta_t \cdot A_n \cdot P_{s2} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST2})} \quad \text{Eq. 5-8}$$

$$I_2 = 97.17 \%$$

$$I_3 := \frac{T_{sabs3} \cdot V_{mstd3} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s3} \cdot \Theta_t \cdot A_n \cdot P_{s3} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST3})} \quad \text{Eq. 5-8}$$

$$I_3 = 94.93 \%$$

RM 26A - Determination of hydrogen halide and halogen emissions from stationary sources —isokinetic method

Nomenclature:

v_n	=	volume of the samples (Runs 1 to 3), dscf and dscm.
M_{HCl_n}	=	Mass of HCL (Runs 1 to 3), ug.
M_{HF_n}	=	Mass of HF (Runs 1 to 3), ug.
$M_{Cl_2_n}$	=	Mass of Cl_2 (Runs 1 to 3), ug.
c_{HCl_n}	=	Concentration of HCl (Runs 1 to 3), mg/dscm.
C_{HCl_n}	=	Concentration of HCl (Runs 1 to 3), lb/hr.
c_{HF_n}	=	Concentration of HF (Runs 1 to 3), mg/dscm.
C_{HF_n}	=	Concentration of HF (Runs 1 to 3), lb/hr.
$c_{Cl_2_n}$	=	Concentration of Cl_2 (Runs 1 to 3), mg/dscm.
$C_{Cl_2_n}$	=	Concentration of Cl_2 (Runs 1 to 3), lb/hr.

Variables:

$$v_1 := 87.86 dscf$$

$$v_2 := 88.00 dscf$$

$$v_3 := 82.44 dscf$$

$$M_{HCl.1} := 2023 ug$$

$$M_{HCl.2} := 1388 ug$$

$$M_{HCl.3} := 1093 ug$$

$$M_{HF.1} := 232 ug$$

$$M_{HF.2} := 187 ug$$

$$M_{HF.3} := 172 ug$$

$$M_{Cl_2.1} := 10889 ug$$

$$M_{Cl_2.2} := 9693 ug$$

$$M_{Cl_2.3} := 9135 ug$$

Constants:

$$K_6 := 35.31467 \frac{dscf}{m^3}$$

$$K_7 := 453.59 \frac{g}{lb}$$

$$K_8 := 1000 \frac{mg}{g}$$

Calculations:

$$v_1 = 2.488 \text{ dscm}$$

$$c_{HCl.1} := \frac{M_{HCl.1}}{v_1}$$

$$c_{HCl.1} = 0.813 \frac{\text{mg}}{\text{dscm}}$$

$$C_{HCl.1} := c_{HCl.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HCl.1} = 0.262 \frac{\text{lb}}{\text{hr}}$$

$$v_2 = 2.492 \text{ dscm}$$

$$c_{HCl.2} := \frac{M_{HCl.2}}{v_2}$$

$$c_{HCl.2} = 0.557 \frac{\text{mg}}{\text{dscm}}$$

$$C_{HCl.2} := c_{HCl.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HCl.2} = 0.181 \frac{\text{lb}}{\text{hr}}$$

$$v_3 = 2.334 \text{ dscm}$$

$$c_{HCl.3} := \frac{M_{HCl.3}}{v_3}$$

$$c_{HCl.3} = 0.468 \frac{\text{mg}}{\text{dscm}}$$

$$C_{HCl.3} := c_{HCl.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HCl.3} = 0.146 \frac{\text{lb}}{\text{hr}}$$

$$c_{HF.1} := \frac{M_{HF.1}}{v_1}$$

$$c_{HF.1} = 0.093 \frac{\text{mg}}{\text{dscm}}$$

$$C_{HF.1} := c_{HF.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HF.1} = 0.03 \frac{\text{lb}}{\text{hr}}$$

$$c_{HF.2} := \frac{M_{HF.2}}{v_2}$$

$$c_{HF.2} = 0.075 \frac{\text{mg}}{\text{dscm}}$$

$$C_{HF.2} := c_{HF.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HF.2} = 0.024 \frac{\text{lb}}{\text{hr}}$$

$$c_{HF.3} := \frac{M_{HF.3}}{v_3}$$

$$c_{HF.3} = 0.074 \frac{\text{mg}}{\text{dscm}}$$

$$C_{HF.3} := c_{HF.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HF.3} = 0.023 \frac{\text{lb}}{\text{hr}}$$

$$c_{Cl2.1} := \frac{M_{Cl2.1}}{v_1}$$

$$c_{Cl2.1} = 4.377 \frac{\text{mg}}{\text{dscm}}$$

$$C_{Cl2.1} := c_{Cl2.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Cl2.1} = 1.413 \frac{\text{lb}}{\text{hr}}$$

$$c_{Cl2.2} := \frac{M_{Cl2.2}}{v_2}$$

$$c_{Cl2.2} = 3.89 \frac{\text{mg}}{\text{dscm}}$$

$$C_{Cl2.2} := c_{Cl2.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Cl2.2} = 1.263 \frac{\text{lb}}{\text{hr}}$$

$$c_{Cl2.3} := \frac{M_{Cl2.3}}{v_3}$$

$$c_{Cl2.3} = 3.913 \frac{\text{mg}}{\text{dscm}}$$

$$C_{Cl2.3} := c_{Cl2.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Cl2.3} = 1.218 \frac{\text{lb}}{\text{hr}}$$

Appendix D2
U.S. EPA Other Test Method 29

Company:	Citgo	Test Date:	05/18/11
Location:	Sulphur, LA	Test Number:	1
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	OTM 29		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.77 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.62 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.160 inches
Nozzle Area (ft ²)	A_n	1.40E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	1.960 in. H ₂ O
Dry Gas Meter Correction Factor	Y	0.996
Average ΔH	ΔH	0.189 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6343 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	81.2 °F
Sampling Time	Θ	128 min
Moisture Measured by Weight	$(W_f - W_i)$	258.5 g
Dry Gas Meter Volume (actual)	V_m	29.231 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	28.118 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.75 vol%
Carbon Dioxide	%CO ₂	17.80 vol%
Nitrogen	%N ₂	81.45 vol%
Temperature	T_s	143.1 °F
Molecular Weight, dry	M_d	30.88 lb/lb*mol
Molecular Weight, wet	M_s	28.08 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.3024
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2175
Stack Static Pressure	P_g	0.40 in. H ₂ O
Absolute Stack Pressure	P_s	29.65 in. Hg
Average Velocity	V_s	38.77 ft/sec
Volumetric Flow Rate	Q_{sd}	7,052,074 acfh
		117,535 acfm
	Q_{sd}	4,787,582 dscfh
		79,793 dscfm
Isokinetic Sampling Rate	I	99.63 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	KT	7/27/2011

Company:	Citgo	Test Date:	05/18/11
Location:	Sulphur, LA	Test Number:	2
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	OTM 29		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.72 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.57 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.160 inches
Nozzle Area (ft ²)	A_n	1.40E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	1.960 in. H ₂ O
Dry Gas Meter Correction Factor	Y	0.996
Average ΔH	ΔH	0.203 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6796 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	78.3 °F
Sampling Time	Θ	128 min
Moisture Measured by Weight	$(W_f - W_i)$	247.4 g
Dry Gas Meter Volume (actual)	V_m	30.111 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	29.072 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.76 vol%
Carbon Dioxide	%CO ₂	17.50 vol%
Nitrogen	%N ₂	81.74 vol%
Temperature	T_s	142.9 °F
Molecular Weight, dry	M_d	30.83 lb/lb*mol
Molecular Weight, wet	M_s	28.05 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2863
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2168
Stack Static Pressure	P_g	0.33 in. H ₂ O
Absolute Stack Pressure	P_s	29.59 in. Hg
Average Velocity	V_s	41.59 ft/sec
Volumetric Flow Rate	Q_{sd}	7,565,563 acfh
		126,093 acfm
	Q_{sd}	5,132,675 dscfh
		85,545 dscfm
Isokinetic Sampling Rate	I	96.08 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	KT	7/27/2011

Company:	Citgo	Test Date:	05/19/11
Location:	Sulphur, LA	Test Number:	3
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	OTM 29		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.78 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.63 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.160 inches
Nozzle Area (ft ²)	A_n	1.40E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	1.960 in. H ₂ O
Dry Gas Meter Correction Factor	Y	0.996
Average ΔH	ΔH	0.175 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6666 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	88.2 °F
Sampling Time	Θ	128 min
Moisture Measured by Weight	$(W_f - W_i)$	218.4 g
Dry Gas Meter Volume (actual)	V_m	27.768 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	26.379 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.63 vol%
Carbon Dioxide	%CO ₂	18.08 vol%
Nitrogen	%N ₂	81.29 vol%
Temperature	T_s	143.2 °F
Molecular Weight, dry	M_d	30.92 lb/lb*mol
Molecular Weight, wet	M_s	28.10 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2808
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2181
Stack Static Pressure	P_g	0.33 in. H ₂ O
Absolute Stack Pressure	P_s	29.65 in. Hg
Average Velocity	V_s	40.73 ft/sec
Volumetric Flow Rate	Q_{sd}	7,407,949 acfh
		123,466 acfm
	Q_{sd}	5,024,846 dscfh
		83,747 dscfm
Isokinetic Sampling Rate	I	89.05 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	KT	7/27/2011

TEST 1

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	143.1	y_1
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

y_1 = interpolated absolute pressure at stack temperature.

6.4495 in Hg

Moisture content calculated:

21.752 %

TEST 2

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	142.9	y_2
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

y_2 = interpolated absolute pressure at stack temperature.

6.4140 in Hg

Moisture content calculated:

21.676 %

TEST 3

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	143.2	y_3
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

y_3 = interpolated absolute pressure at stack temperature.

6.4673 in Hg

Moisture content calculated:

21.812 %

Based on Method 4 - *Determination of Moisture Content in Stack Gases* (4.1), the moisture content of saturated gas streams as measured by method 4 may be positively biased. In cases where this is suspected, a second determination may be made. This determination can be accomplished by using a psychrometric chart or by using a saturation vapor pressure table.

Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

Values

TESTS:	Moisture Content (Steam Table) %	Moisture Content (Impinger) %	Lower of Two Values:
TEST 1	21.75	30.24	21.75
TEST 2	21.68	28.63	21.68
TEST 3	21.81	28.08	21.81

Company: Citgo Petroleum Corporation
Location: Sulphur, LA
Unit: Cat B Wet Gas Scrubber

Test No.	1	2	3	Average
Date	05/18/11	05/18/11	05/19/11	n/a
Start Time	12:50	19:18	9:46	n/a
End Time	18:15	21:35	12:10	n/a
Test Duration, min	128	128	128	128

Unit Operating Parameters

Oxygen Content	vol%	0.75	0.76	0.63	0.71
Carbon Dioxide Content	vol%	17.80	17.50	18.08	17.79
Moisture Content	vol%	21.75	21.68	21.81	21.75
Wet Molecular Weight	lb/lb-mol	28.08	28.05	28.10	28.08
Velocity	ft/sec	38.77	41.59	40.73	40.36
Volumetric Flow Rate	dscfm	79,793	85,545	83,747	83,028

Sampling Parameters

Isokinetic Sampling Rate	%	99.63	96.08	89.05	94.92
Sample Volume	dscf	28.118	29.072	26.379	27.856
	dscm	0.796	0.823	0.747	0.789

Laboratory Results ¹

Hydrogen Cyanide (HCN)	µg	42,721	119,064	81,553	81,113
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Pollutants

Hydrogen Cyanide (HCN)	µg/dscm	53,655	144,630	109,178	102,488
	lb/hr	16.04	46.35	34.25	32.21

¹ Laboratory Results provided by Enthalpy Analytical, Inc.

	Initials	Date
Data Entry	JP	7/11/2011
Review	RI	8/17/2011

Reference Method 4 - Determination of Moisture Content in Stack Gases

Nomenclature:

H_2O	=	Moisture content of gas stream, vol%.
B_{ws}	=	Proportion of water vapor, by volume, in the gas stream.
M_w	=	Molecular weight of water, 18.0 lb/lb-mole.
P_m	=	Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
R_i	=	Ideal gas constant, 21.85 (in. Hg)(ft ³)/(lb-mole)(°R).
T_{mf}	=	Temperature at meter, °F.
T_m	=	Absolute temperature at meter, °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_f	=	Final volume of condenser water, ml.
V_i	=	Initial volume, if any, of condenser water, ml.
V_m	=	Dry gas volume measured by dry gas meter, dcf.
V_{mstd}	=	Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscf.
V_{wcstd}	=	Volume of water vapor condensed, corrected to standard conditions, scf.
V_{wsgstd}	=	Volume of water vapor collected in silica gel, corrected to standard conditions, scf.
W_f	=	Final weight of silica gel or silica gel plus impinger, g.
W_i	=	Initial weight of silica gel or silica gel plus impinger, g.
Y	=	Dry gas meter calibration factor.
ρ_w	=	Density of water, 0.002201 lb/ml.

Variables:

Run 1:

$V_{m1} := 29.231 \cdot ft^3$	$P_{m1} := 29.62 \cdot in_Hg$
$W_{i1} := 0.0 \cdot g$	$T_{mf1} := 81.2 \cdot ^\circ F$
$W_{f1} := 258.5 \cdot g$	$Y_1 := 0.996$
$V_{f1} := 0$	$V_{i1} := 0$

Run 3:

$V_{m3} := 27.768 \cdot ft^3$	$P_{m3} := 29.63 \cdot in_Hg$
$W_{i3} := 0.0 \cdot g$	$T_{mf3} := 88.2 \cdot ^\circ F$
$W_{f3} := 218.4 \cdot g$	$Y_3 := 0.996$
$V_{f3} := 0$	$V_{i3} := 0$

Run 2:

$V_{m2} := 30.111 \cdot ft^3$	$P_{m2} := 29.57 \cdot in_Hg$
$W_{i2} := 0.0 \cdot g$	$T_{mf2} := 78.3 \cdot ^\circ F$
$W_{f2} := 247.4 \cdot g$	$Y_2 := 0.996$
$V_{f2} := 0$	$V_{i2} := 0$

Constants:

$M_w := 18.0 \cdot \frac{lb}{lb \cdot mol}$	$K_1 := 0.04706 \cdot \frac{ft^3}{ml}$
$P_{std} := 29.92 \cdot in_Hg$	$K_2 := 453.6 \cdot \frac{g}{lb}$
$T_{std} := 528 \cdot ^\circ R$	$K_3 := 0.04715 \cdot \frac{ft^3}{g}$
$\rho_w := 0.002201 \cdot \frac{lb}{ml}$	$K_4 := 17.64 \cdot \frac{^{\circ}R}{in_Hg}$
$R_i := 21.85 \cdot \frac{in_Hg \cdot ft^3}{lb \cdot mol \cdot ^{\circ}R}$	

Calculations:

Run 1:

$$V_{wcstd1} := \frac{(V_{f1} - V_{i1}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd1} := \frac{(W_{f1} - W_{i1}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd1} := K_1(V_{f1} - V_{i1})$$

$$V_{wsgstd1} := K_3(W_{f1} - W_{i1})$$

$$V_{wcstd1} = 0.000 \text{ scf}$$

$$V_{wsgstd1} = 12.208 \text{ scf}$$

$$V_{mstd1} := \frac{V_{m1} \cdot Y_1 \cdot P_{m1} \cdot T_{std}}{P_{std} \cdot (T_{mf1} + 460)} \quad Eq. 4-3$$

$$B_{ws1} := \frac{V_{wcstd1} + V_{wsgstd1}}{V_{wcstd1} + V_{wsgstd1} + V_{mstd1}} \quad Eq. 4-4$$

$$V_{mstd1} := K_4 Y_1 (V_{m1} P_{m1}) / T_{m1}$$

$$B_{ws1} = 0.3027$$

$$\boxed{V_{mstd1} = 28.1 \text{ dscf}}$$

$$H2O1 := B_{ws1} \cdot 100 \cdot \text{vol}\%$$

$$\boxed{H2O1 = 30.27 \text{ vol}\%}$$

Run 2:

$$V_{wcstd2} := \frac{(V_{f2} - V_{i2}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd2} := \frac{(W_{f2} - W_{i2}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd2} := K_1(V_{f2} - V_{i2})$$

$$V_{wsgstd2} := K_3(W_{f2} - W_{i2})$$

$$V_{wcstd2} = 0.000 \text{ scf}$$

$$V_{wsgstd2} = 11.684 \text{ scf}$$

$$V_{mstd2} := \frac{V_{m2} \cdot Y_2 \cdot P_{m2} \cdot T_{std}}{P_{std} \cdot (T_{mf2} + 460)} \quad Eq. 4-3$$

$$B_{ws2} := \frac{V_{wcstd2} + V_{wsgstd2}}{V_{wcstd2} + V_{wsgstd2} + V_{mstd2}} \quad Eq. 4-4$$

$$V_{mstd2} := K_4 Y_2 (V_{m2} P_{m2}) / T_{m2}$$

$$B_{ws2} = 0.2867$$

$$\boxed{V_{mstd2} = 29.1 \text{ dscf}}$$

$$H2O2 := B_{ws2} \cdot 100 \cdot \text{vol}\%$$

$$\boxed{H2O2 = 28.67 \text{ vol}\%}$$

Run 3:

$$V_{wcstd3} := \frac{(V_{f3} - V_{i3}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad Eq. 4-1$$

$$V_{wcstd3} := K_1(V_{f3} - V_{i3})$$

$$V_{wcstd3} = 0.000 \text{ scf}$$

$$V_{mstd3} := \frac{V_{m3} \cdot Y_3 \cdot P_{m3} \cdot T_{std}}{P_{std} \cdot (T_{mf3} + 460)} \quad Eq. 4-3$$

$$V_{mstd3} := K_4 Y_3 (V_{m3} P_{m3}) / T_{m3}$$

$$V_{mstd3} = 26.4 \text{ dscf}$$

$$V_{wsstd3} := \frac{(W_{f3} - W_{i3}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wsstd3} := K_3(W_{f3} - W_{i3})$$

$$V_{wsstd3} = 10.314 \text{ scf}$$

$$B_{ws3} := \frac{V_{wcstd3} + V_{wsstd3}}{V_{wcstd3} + V_{wsstd3} + V_{mstd3}} \quad Eq. 4-4$$

$$B_{ws3} = 0.2811$$

$$H_2O_3 := B_{ws3} \cdot 100 \cdot \text{vol\%}$$

$$H_2O_3 = 28.11 \text{ vol\%}$$

Reference Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

Nomenclature:

M_d	=	Dry molecular weight, lb/lb-mole.
M_s	=	Wet molecular weight, lb/lb-mole.
$\%CO_2$	=	Percent CO_2 by volume, dry basis.
$\%O_2$	=	Percent O_2 by volume, dry basis.
$\%CO$	=	Percent CO by volume, dry basis.
$\%N_2$	=	Percent N_2 by volume, dry basis.
Bal	=	$\%N_2 + \%CO$.
28	=	Molecular weight of N_2 or CO , lb/lb-mol.
32	=	Molecular weight of O_2 , lb/lb-mol.
44	=	Molecular weight of CO_2 , lb/lb-mol.

Variables:

$$\%O_2_1 := 0.75 \cdot vol\%$$

$$\%O_2_2 := 0.76 \cdot vol\%$$

$$\%O_2_3 := 0.63 \cdot vol\%$$

$$\%CO_2_1 := 17.80 \cdot vol\%$$

$$\%CO_2_2 := 17.5 \cdot vol\%$$

$$\%CO_2_3 := 18.08 \cdot vol\%$$

$$Bal_1 := 100 \cdot vol\% - (\%O_2_1 + \%CO_2_1)$$

$$Bal_2 := 100 \cdot vol\% - (\%O_2_2 + \%CO_2_2)$$

$$Bal_1 = 81.45 \text{ vol}\%$$

$$Bal_2 = 81.74 \text{ vol}\%$$

$$Bal_3 := 100 \cdot vol\% - (\%O_2_3 + \%CO_2_3)$$

$$Bal_3 = 81.29 \text{ vol}\%$$

Calculations:

$$M_{d1} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_1 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_1 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_1) \quad Eq. 3-1$$

$$M_{d1} = 30.88 \frac{lb}{lb \cdot mol}$$

$$M_{d2} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_2 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_2 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_2) \quad Eq. 3-1$$

$$M_{d2} = 30.83 \frac{lb}{lb \cdot mol}$$

$$M_{d3} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_3 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_3 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_3) \quad Eq. 3-1$$

$$M_{d3} = 30.92 \frac{lb}{lb \cdot mol}$$

Reference Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate

Nomenclature:

A_s	=	Cross-sectional area of stack, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
B_{wST}	=	Water vapor in gas stream calculated using steam table.
C_p	=	Pitot tube coefficient, dimensionless.
K_p	=	Velocity equation constant.
M_d	=	Molecular weight of stack gas, dry basis, lb/lb-mol.
M_s	=	Molecular weight of stack gas, wet basis, lb/lb-mol.
P_m	=	Barometric pressure at measurement site, in. Hg.
P_g	=	Stack static pressure, in. H ₂ O.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
Q_{sd}	=	Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr, dscf/min.
T_s	=	Stack temperature, °F.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
Δp_{avgqrt}	=	Average square root of Δp , in. H ₂ O.
3600	=	Conversion factor, sec/hr.
18.0	=	Molecular weight of water, lb/lb-mol.

Constants:

$$K_p := 85.49 \cdot \frac{ft}{sec} \cdot \left[\frac{\left(\frac{lb}{lb \cdot mol} \right) \cdot (in_Hg)}{(R) \cdot (in_H2O)} \right]^{\frac{1}{2}}$$

Variables:

$$A_s := 50.528 \cdot ft^2$$

$$C_p := 0.84$$

$$\Delta p_{avgqrt1} := 0.6343 \cdot in_H2O^{\frac{1}{2}}$$

$$T_{s1} := 143.1 \cdot ^\circ F$$

$$P_{g1} := .40 \cdot in_H2O$$

$$B_{wST1} := 0.2175$$

$$B_{wST2} := 0.2168$$

$$B_{wST3} := 0.2181$$

$$\Delta p_{avgqrt2} := 0.6796 \cdot in_H2O^{\frac{1}{2}}$$

$$T_{s2} := 142.9 \cdot ^\circ F$$

$$P_{g2} := 0.33 \cdot in_H2O$$

$$\Delta p_{avgqrt3} := 0.6666 \cdot in_H2O^{\frac{1}{2}}$$

$$T_{s3} := 143.2 \cdot ^\circ F$$

$$P_{g3} := 0.33 \cdot in_H2O$$

Note the lower of the two moisture fractions will be used: either the one measured by impinger analysis or calculated by the steam table.

Calculations:

Run 1:

$$T_{sabs1} := T_{s1} + 460 \quad T_{sabs1} = 603.1 \text{ }^{\circ}\text{R} \quad P_{s1} := P_{m1} + \frac{P_{g1}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s1} = 29.65 \text{ in}_{Hg}$$

$$M_{s1} := M_{d1} \cdot (1 - B_{wST1}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST1} \quad \text{Eq. 2-6} \quad M_{s1} = 28.08 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s1} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs1}}{P_{s1} \cdot M_{s1}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s1} = 38.77 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd1} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST1}) \cdot V_{s1} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s1}}{T_{sabs1} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd1} = 4787605.51 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd1} = 79793.43 \frac{\text{dscf}}{\text{min}}}$$

Run 2:

$$T_{sabs2} := T_{s2} + 460 \quad T_{sabs2} = 602.9 \text{ }^{\circ}\text{R} \quad P_{s2} := P_{m2} + \frac{P_{g2}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s2} = 29.59 \text{ in}_{Hg}$$

$$M_{s2} := M_{d2} \cdot (1 - B_{wST2}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST2} \quad \text{Eq. 2-6} \quad M_{s2} = 28.05 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s2} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs2}}{P_{s2} \cdot M_{s2}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s2} = 41.59 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd2} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST2}) \cdot V_{s2} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s2}}{T_{sabs2} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd2} = 5132770.24 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd2} = 85546.17 \frac{\text{dscf}}{\text{min}}}$$

Run 3:

$$T_{sabs3} := T_{s3} + 460 \quad T_{sabs3} = 603.2 \text{ }^{\circ}\text{R} \quad P_{s3} := P_{m3} + \frac{P_{g3}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s3} = 29.65 \text{ in}_{Hg}$$

$$M_{s3} := M_{d3} \cdot (1 - B_{wST3}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST3} \quad \text{Eq. 2-6} \quad M_{s3} = 28.10 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s3} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs3}}{P_{s3} \cdot M_{s3}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s3} = 40.73 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd3} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST3}) \cdot V_{s3} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s3}}{T_{sabs3} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd3} = 5025430.92 \frac{\text{dscf}}{\text{hr}}} \quad \boxed{Q_{sd3} = 83757.18 \frac{\text{dscf}}{\text{min}}}$$

Isokinetic Sampling Rate

Nomenclature:

A_n	=	Cross-sectional area of nozzle, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
I	=	Percent of isokinetic sampling.
N_d	=	Nozzle diameter, in.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
V_{mstd}	=	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Θ_t	=	Total sampling time, min.
60	=	Conversion factor, sec/min.
100	=	Conversion to percent.

Variables:

$$\Theta_t := 128 \cdot \text{min}$$

$$N_d := 0.160 \cdot \text{in}$$

$$A_n := \pi \cdot \left(\frac{N_d}{12 \cdot \frac{\text{in}}{\text{ft}}} \right)^2 \quad A_n = 1.40 \times 10^{-4} \text{ ft}^2$$

Constants:

$$K_5 := 0.09450 \cdot \frac{\text{in}_\text{Hg} \cdot \% \cdot \text{min}}{\text{sec} \cdot \text{R}}$$

$$T_{std} = 528 \text{ R}$$

$$P_{std} = 29.92 \text{ in}_\text{Hg}$$

Calculations:

$$I_1 := \frac{T_{sabs1} \cdot V_{mstd1} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s1} \cdot \Theta_t \cdot A_n \cdot P_{s1} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST1})} \quad \text{Eq. 5-8}$$

$$I_1 = 99.63 \%$$

$$I_2 := \frac{T_{sabs2} \cdot V_{mstd2} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s2} \cdot \Theta_t \cdot A_n \cdot P_{s2} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST2})} \quad \text{Eq. 5-8}$$

$$I_2 = 96.08 \%$$

$$I_3 := \frac{T_{sabs3} \cdot V_{mstd3} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s3} \cdot \Theta_t \cdot A_n \cdot P_{s3} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST3})} \quad \text{Eq. 5-8}$$

$$I_3 = 89.04 \%$$

Other Method 29 - Determination of metals emissions from stationary sources

Nomenclature:

v_n	=	volume of the samples (Runs 1 to 3), dscf and dscm.
M_{HCNn}	=	Mass of HCN (Runs 1 to 3), ug.
c_{HCNn}	=	Concentration of HCN (Runs 1 to 3), ug/dscm.
C_{HCNn}	=	Concentration of HCN (Runs 1 to 3), lb/hr.

Variables:

$$v_1 := 28.118 dscf$$

$$v_2 := 29.072 dscf$$

$$v_3 := 26.379 dscf$$

$$M_{HCN.1} := 42721 ug$$

$$M_{HCN.2} := 119064 ug$$

$$M_{HCN.3} := 81553 ug$$

Constants:

$$K_6 := 35.31467 \frac{dscf}{m^3}$$

$$K_7 := 453.59 \frac{g}{lb}$$

$$K_8 := 1000 \frac{mg}{g}$$

Calculations:

$$v_1 = 0.796 dscm$$

$$v_2 = 0.823 dscm$$

$$v_3 = 0.747 dscm$$

$$c_{HCN.1} := \frac{M_{HCN.1}}{v_1}$$

$$c_{HCN.2} := \frac{M_{HCN.2}}{v_2}$$

$$c_{HCN.3} := \frac{M_{HCN.3}}{v_3}$$

$$c_{HCN.1} = 53655 \frac{ug}{dscm}$$

$$c_{HCN.2} = 144631 \frac{ug}{dscm}$$

$$c_{HCN.3} = 109178 \frac{ug}{dscm}$$

$$C_{HCN.1} := c_{HCN.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HCN.2} := c_{HCN.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HCN.3} := c_{HCN.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HCN.1} = 16.04 \frac{lb}{hr}$$

$$C_{HCN.2} = 46.34 \frac{lb}{hr}$$

$$C_{HCN.3} = 34.25 \frac{lb}{hr}$$

Appendix D3
SW-846 Method 0011

Company:	Citgo	Test Date:	05/20/11
Location:	Sulphur, LA	Test Number:	1
Unit:	B-Cat		
Source:	Wet Gas Scrubber		
Method:	MTD 0011 Spiked		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.81 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.66 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.282 inches
Nozzle Area (ft ²)	A_n	4.34E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	1.960 in. H ₂ O
Dry Gas Meter Correction Factor	Y	0.996
Average ΔH	ΔH	1.850 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6579 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	87.8 °F
Sampling Time	Θ	64 min
Moisture Measured by Weight	$(W_f - W_i)$	269.8 g
Dry Gas Meter Volume (actual)	V_m	46.375 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	44.137 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.64 vol%
Carbon Dioxide	%CO ₂	17.41 vol%
Nitrogen	%N ₂	81.95 vol%
Temperature	T_s	143.9 °F
Molecular Weight, dry	M_d	30.81 lb/lb*mol
Molecular Weight, wet	M_s	27.97 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2237
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2220
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.69 in. Hg
Average Velocity	V_s	40.30 ft/sec
Volumetric Flow Rate	Q_{sd}	7,330,036 acfh
		122,167 acfm
	Q_{sd}	4,946,675 dscfh
		82,445 dscfm
Isokinetic Sampling Rate	I	97.45 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	KT	7/26/2011

Company:	Citgo	Test Date:	05/20/11
Location:	Sulphur, LA	Test Number:	1
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	MTD 0011 Unspiked		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.81 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.66 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.283 inches
Nozzle Area (ft ²)	A_n	4.37E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	2.019 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P}_{avg}$	0.6658 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	85.1 °F
Sampling Time	Θ	64 min
Moisture Measured by Weight	$(W_f - W_i)$	271.7 g
Dry Gas Meter Volume (actual)	V_m	47.474 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	45.725 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.64 vol%
Carbon Dioxide	%CO ₂	17.41 vol%
Nitrogen	%N ₂	81.95 vol%
Temperature	T_s	140.6 °F
Molecular Weight, dry	M_d	30.81 lb/lb*mol
Molecular Weight, wet	M_s	28.22 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2189
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2023
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.69 in. Hg
Average Velocity	V_s	40.48 ft/sec
Volumetric Flow Rate	Q_{sd}	7,363,427 acfh
		122,724 acfm
	Q_{sd}	5,124,123 dscfh
		85,402 dscfm
Isokinetic Sampling Rate	I	96.77 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	PH	7/25/2011

Company:	Citgo	Test Date:	05/20/11
Location:	Sulphur, LA	Test Number:	2
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	MTD 0011 Unspiked		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.81 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.66 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.283 inches
Nozzle Area (ft ²)	A_n	4.37E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	2.003 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6636 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	86.5 °F
Sampling Time	Θ	64 min
Moisture Measured by Weight	$(W_f - W_i)$	277.0 g
Dry Gas Meter Volume (actual)	V_m	47.664 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	45.787 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.69 vol%
Carbon Dioxide	%CO ₂	17.32 vol%
Nitrogen	%N ₂	81.99 vol%
Temperature	T_s	140.4 °F
Molecular Weight, dry	M_d	30.80 lb/lb*mol
Molecular Weight, wet	M_s	28.23 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2219
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2011
Stack Static Pressure	P_g	0.34 in. H ₂ O
Absolute Stack Pressure	P_s	29.69 in. Hg
Average Velocity	V_s	40.34 ft/sec
Volumetric Flow Rate	Q_{sd}	7,338,274 acfh
		122,305 acfm
	Q_{sd}	5,115,111 dscfh
		85,252 dscfm
Isokinetic Sampling Rate	I	97.07 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	KT	7/26/2011

Company:	Citgo	Test Date:	05/20/11
Location:	Sulphur, LA	Test Number:	3
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	MTD 0011 Unspiked		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.79 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.64 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.283 inches
Nozzle Area (ft ²)	A_n	4.37E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.913 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6495 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	86.8 °F
Sampling Time	Θ	64 min
Moisture Measured by Weight	$(W_f - W_i)$	277.3 g
Dry Gas Meter Volume (actual)	V_m	47.231 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	45.315 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.50 vol%
Carbon Dioxide	%CO ₂	17.42 vol%
Nitrogen	%N ₂	82.08 vol%
Temperature	T_s	140.6 °F
Molecular Weight, dry	M_d	30.81 lb/lb*mol
Molecular Weight, wet	M_s	28.22 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2239
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2024
Stack Static Pressure	P_g	0.35 in. H ₂ O
Absolute Stack Pressure	P_s	29.67 in. Hg
Average Velocity	V_s	39.50 ft/sec
Volumetric Flow Rate	Q_{sd}	7,185,922 acfh
		119,765 acfm
	Q_{sd}	4,996,291 dscfh
		83,272 dscfm
Isokinetic Sampling Rate	I	98.35 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	KT	7/26/2011

TEST 1

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	143.9	y_1
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

 y_1 = interpolated absolute pressure at stack temperature.

6.5919 in Hg

Moisture content calculated:

22.202 %

TEST 2

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A		
B	-	y_2
C		

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad -$$

$$b = y \text{ intercept} \quad -$$

 y_2 = interpolated absolute pressure at stack temperature.

- in Hg

Moisture content calculated:

- %

TEST 3

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A		
B	-	y_3
C		

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad -$$

$$b = y \text{ intercept} \quad -$$

 y_3 = interpolated absolute pressure at stack temperature.

- in Hg

Moisture content calculated:

- %

Based on Method 4 - *Determination of Moisture Content in Stack Gases* (4.1), the moisture content of saturated gas streams as measured by method 4 may be positively biased. In cases where this is suspected, a second determination may be made. This determination can be accomplished by using a psychrometric chart or by using a saturation vapor pressure table.

Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

Values

TESTS:	Moisture Content (Steam Table) %	Moisture Content (Impinger) %	Lower of Two Values:
TEST 1	22.20	22.37	22.20
TEST 2	-	-	-
TEST 3	-	-	-

TEST 1

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	140.6	y_1
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

 y_1 = interpolated absolute pressure at stack temperature.

6.0047 in Hg

Moisture content calculated:

20.225 %

TEST 2

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	140.4	y_2
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

 y_2 = interpolated absolute pressure at stack temperature.

5.9691 in Hg

Moisture content calculated:

20.105 %

TEST 3

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	140.6	y_3
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

 y_3 = interpolated absolute pressure at stack temperature.

6.0047 in Hg

Moisture content calculated:

20.238 %

Based on Method 4 - *Determination of Moisture Content in Stack Gases* (4.1), the moisture content of saturated gas streams as measured by method 4 may be positively biased. In cases where this is suspected, a second determination may be made. This determination can be accomplished by using a psychrometric chart or by using a saturation vapor pressure table.

Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

Values

TESTS:	Moisture Content (Steam Table) %	Moisture Content (Impinger) %	Lower of Two Values:
TEST 1	20.22	21.89	20.22
TEST 2	20.10	22.19	20.10
TEST 3	20.24	22.39	20.24

Company: Citgo Petroleum Corporation
Location: Sulphur, LA
Unit: Cat B Wet Gas Scrubber

Test No.	1	2	3	Average
Date	05/20/11	05/20/11	05/20/11	n/a
Start Time	11:40	13:50	15:40	n/a
End Time	12:54	14:57	16:48	n/a
Test Duration, min	64	64	64	64

Unit Operating Parameters

Oxygen Content	vol%	0.64	0.69	0.50	0.61
Carbon Dioxide Content	vol%	17.41	17.32	17.42	17.38
Moisture Content	vol%	20.23	20.11	20.15	20.16
Wet Molecular Weight	lb/lb-mol	28.22	28.23	28.23	28.23
Velocity	ft/sec	40.48	40.34	39.50	40.11
Volumetric Flow Rate	dscfm	85,402	85,252	83,347	84,667

Sampling Parameters

Isokinetic Sampling Rate	%	96.77	97.07	98.27	97.37
Sample Volume	dscf	45.725	45.787	45.315	45.609
	dscm	1.295	1.297	1.283	1.292

Laboratory Results ¹

Formaldehyde	µg	31.7	23.0	17.4	24.0
Acetaldehyde	µg	[<0.634] BDL	[<0.615] BDL	6.460	2.570 DLL
Propionaldehyde	µg	[<2.20] BDL	[<2.13] BDL	[<1.48] BDL	[<1.94] BDL

Pollutants

Formaldehyde	µg/dscm	24.483	17.739	13.560	18.5940
	lb/hr	7.83E-03	5.67E-03	4.23E-03	5.91E-03
Acetaldehyde	µg/dscm	[<0.490] BDL	[<0.474] BDL	5.034	1.999 DLL
	lb/hr	[<1.57E-04] BDL	[<1.51E-04] BDL	1.57E-03	6.27E-04 DLL
Propionaldehyde	µg/dscm	[<1.699] BDL	[<1.643] BDL	[<1.153] BDL	[<1.498] BDL
	lb/hr	[<5.44E-04] BDL	[<5.25E-04] BDL	[<3.60E-04] BDL	[<4.76E-04] BDL

¹ Laboratory Results provided by Enthalpy Analytical, Inc.

BDL (below detection level) - all analytical values used to calculate and report an in-stack emissions value are less than the laboratory's reported detection level(s)

DLL (detection level limited) - at least one but not all values used to calculate and report an in-stack emissions value are greater than the laboratory's reported detection level(s)

	Initials	Date
Data Entry	JP	7/11/2011
Review	RI	8/17/2011

Reference Method 4 - Determination of Moisture Content in Stack Gases

Nomenclature:

H_2O	=	Moisture content of gas stream, vol%.
B_{ws}	=	Proportion of water vapor, by volume, in the gas stream.
M_w	=	Molecular weight of water, 18.0 lb/lb-mole.
P_m	=	Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
R_i	=	Ideal gas constant, 21.85 (in. Hg)(ft ³)/(lb-mole)(°R).
T_{mf}	=	Temperature at meter, °F.
T_m	=	Absolute temperature at meter, °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_f	=	Final volume of condenser water, ml.
V_i	=	Initial volume, if any, of condenser water, ml.
V_m	=	Dry gas volume measured by dry gas meter, dcf.
V_{mstd}	=	Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscf.
V_{wcstd}	=	Volume of water vapor condensed, corrected to standard conditions, scf.
V_{wsgstd}	=	Volume of water vapor collected in silica gel, corrected to standard conditions, scf.
W_f	=	Final weight of silica gel or silica gel plus impinger, g.
W_i	=	Initial weight of silica gel or silica gel plus impinger, g.
Y	=	Dry gas meter calibration factor.
ρ_w	=	Density of water, 0.002201 lb/ml.

Variables:

Run 1:

$V_{mI} := 46.375 \cdot ft^3$	$P_{mI} := 29.66 \cdot in_Hg$
$W_{iI} := 0.0 \cdot g$	$T_{mfI} := 87.8 \cdot ^\circ F$
$W_{fI} := 269.8 \cdot g$	$Y_I := 0.996$
$V_{fI} := 0$	$V_{iI} := 0$

Constants:

$M_w := 18.0 \cdot \frac{lb}{lb \cdot mol}$	$K_1 := 0.04706 \cdot \frac{ft^3}{ml}$
$P_{std} := 29.92 \cdot in_Hg$	$K_2 := 453.6 \cdot \frac{g}{lb}$
$T_{std} := 528 \cdot ^\circ R$	$K_3 := 0.04715 \cdot \frac{ft^3}{g}$
$\rho_w := 0.002201 \cdot \frac{lb}{ml}$	$K_4 := 17.64 \cdot \frac{^{\circ}R}{in_Hg}$
$R_i := 21.85 \cdot \frac{in_Hg \cdot ft^3}{lb \cdot mol \cdot ^{\circ}R}$	

Calculations:

Run 1:

$$V_{wcstd1} := \frac{(V_{f1} - V_{i1}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

Eq. 4-1

$$V_{wsgstd1} := \frac{(W_{f1} - W_{i1}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2}$$

Eq. 4-2

$$V_{wcstd1} := K_1(V_{f1} - V_{i1})$$

$$V_{wsgstd1} := K_3(W_{f1} - W_{i1})$$

$$V_{wcstd1} = 0.000 \text{ scf}$$

$$V_{wsgstd1} = 12.741 \text{ scf}$$

$$V_{mstd1} := \frac{V_{m1} \cdot Y_1 \cdot P_{m1} \cdot T_{std}}{P_{std} \cdot (T_{mf1} + 460)}$$

Eq. 4-3

$$B_{ws1} := \frac{V_{wcstd1} + V_{wsgstd1}}{V_{wcstd1} + V_{wsgstd1} + V_{mstd1}}$$

Eq. 4-4

$$V_{mstd1} := K_4 Y_1 (V_{m1} P_{m1}) / T_{m1}$$

$$B_{ws1} = 0.2240$$

$$V_{mstd1} = 44.1 \text{ dscf}$$

$$H2O1 := B_{ws1} \cdot 100 \cdot \text{vol}\%$$

$$H2O1 = 22.40 \text{ vol}\%$$

Reference Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

Nomenclature:

M_d	=	Dry molecular weight, lb/lb-mole.
M_s	=	Wet molecular weight, lb/lb-mole.
$\%CO_2$	=	Percent CO_2 by volume, dry basis.
$\%O_2$	=	Percent O_2 by volume, dry basis.
$\%CO$	=	Percent CO by volume, dry basis.
$\%N_2$	=	Percent N_2 by volume, dry basis.
Bal	=	$\%N_2 + \%CO$.
28	=	Molecular weight of N_2 or CO, lb/lb-mol.
32	=	Molecular weight of O_2 , lb/lb-mol.
44	=	Molecular weight of CO_2 , lb/lb-mol.

Variables:

$$\%O_2_I := 0.64 \cdot vol\%$$

$$\%CO_2_I := 17.41 \cdot vol\%$$

$$Bal_I := 100 \cdot vol\% - (\%O_2_I + \%CO_2_I)$$

$$Bal_I = 81.95 \text{ vol}\%$$

Calculations:

$$M_{dI} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_I + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_I + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_I) \quad Eq. 3-1$$

$$M_{dI} = 30.81 \frac{lb}{lb \cdot mol}$$

Reference Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate

Nomenclature:

A_s	=	Cross-sectional area of stack, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
B_{wST}	=	Water vapor in gas stream calculated using steam table.
C_p	=	Pitot tube coefficient, dimensionless.
K_p	=	Velocity equation constant.
M_d	=	Molecular weight of stack gas, dry basis, lb/lb-mol.
M_s	=	Molecular weight of stack gas, wet basis, lb/lb-mol.
P_m	=	Barometric pressure at measurement site, in. Hg.
P_g	=	Stack static pressure, in. H ₂ O.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
Q_{sd}	=	Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr, dscf/min.
T_s	=	Stack temperature, °F.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
$\Delta p_{avgsqrt}$	=	Average square root of Δp , in. H ₂ O.
3600	=	Conversion factor, sec/hr.
18.0	=	Molecular weight of water, lb/lb-mol.

Constants:

$$K_p := 85.49 \cdot \frac{ft}{sec} \cdot \left[\frac{\left(\frac{lb}{lb \cdot mol} \right) \cdot (in_Hg)}{(R) \cdot (in_H2O)} \right]^{\frac{1}{2}}$$

Variables:

$$A_s := 50.528 \cdot ft^2$$

$$C_p := 0.84$$

$$\Delta p_{avgsqrt1} := 0.6579 \cdot in_H2O^{\frac{1}{2}}$$

$$T_{s1} := 143.9 \cdot ^\circ F$$

$$P_{g1} := .36 \cdot in_H2O$$

$$B_{wST1} := 0.2220$$

Note the lower of the two moisture fractions will be used: either the one measured by impinger analysis or calculated by the steam table.

Calculations:

Run 1:

$$T_{sabsI} := T_{sI} + 460 \quad T_{sabsI} = 603.9 \text{ }^{\circ}\text{R} \quad P_{sI} := P_{mI} + \frac{P_{gI}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{sI} = 29.69 \text{ in}_{Hg}$$

$$M_{sI} := M_{dI} \cdot (1 - B_{wSTI}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wSTI} \quad \text{Eq. 2-6} \quad M_{sI} = 27.97 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{sI} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabsI}}{P_{sI} \cdot M_{sI}}} \quad \text{Eq. 2-7} \quad \boxed{V_{sI} = 40.29 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sdI} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wSTI}) \cdot V_{sI} \cdot A_s \cdot \left(\frac{T_{std} P_{sI}}{T_{sabsI} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sdI} = 4946681.80 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sdI} = 82444.70 \frac{\text{dscf}}{\text{min}}}$$

Isokinetic Sampling Rate

Nomenclature:

A_n	=	Cross-sectional area of nozzle, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
I	=	Percent of isokinetic sampling.
N_d	=	Nozzle diameter, in.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
V_{mstd}	=	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Θ_t	=	Total sampling time, min.
60	=	Conversion factor, sec/min.
100	=	Conversion to percent.

Variables:

$$\Theta_t := 64 \cdot \text{min}$$

$$N_d := 0.282 \cdot \text{in}$$

$$A_n := \pi \cdot \left(\frac{\frac{N_d}{2}}{12 \cdot \frac{\text{in}}{\text{ft}}} \right)^2 \quad A_n = 4.34 \times 10^{-4} \text{ ft}^2$$

Constants:

$$K_5 := 0.09450 \cdot \frac{\text{in_Hg} \cdot \% \cdot \text{min}}{\text{sec} \cdot \text{R}}$$

$$T_{std} = 528 \text{ R}$$

$$P_{std} = 29.92 \text{ in_Hg}$$

Calculations:

$$I_I := \frac{T_{sabs} I \cdot V_{mstd} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} V_{sI} \cdot \Theta_t \cdot A_n \cdot P_{sI} \cdot 60 \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wSTI})}$$

Eq. 5-8

$$I_I = 97.44 \%$$

Reference Method 4 - Determination of Moisture Content in Stack Gases

Nomenclature:

H_2O	=	Moisture content of gas stream, vol%.
B_{ws}	=	Proportion of water vapor, by volume, in the gas stream.
M_w	=	Molecular weight of water, 18.0 lb/lb-mole.
P_m	=	Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
R_i	=	Ideal gas constant, 21.85 (in. Hg)(ft ³)/(lb-mole)(°R).
T_{mf}	=	Temperature at meter, °F.
T_m	=	Absolute temperature at meter, °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_f	=	Final volume of condenser water, ml.
V_i	=	Initial volume, if any, of condenser water, ml.
V_m	=	Dry gas volume measured by dry gas meter, dcf.
V_{mstd}	=	Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscf.
V_{wcstd}	=	Volume of water vapor condensed, corrected to standard conditions, scf.
V_{wsgstd}	=	Volume of water vapor collected in silica gel, corrected to standard conditions, scf.
W_f	=	Final weight of silica gel or silica gel plus impinger, g.
W_i	=	Initial weight of silica gel or silica gel plus impinger, g.
Y	=	Dry gas meter calibration factor.
ρ_w	=	Density of water, 0.002201 lb/ml.

Variables:

Run 1:

$V_{m1} := 47.474 \cdot ft^3$	$P_{m1} := 29.66 \cdot in_Hg$
$W_{i1} := 0.0 \cdot g$	$T_{mf1} := 85.1 \cdot ^\circ F$
$W_{f1} := 271.7 \cdot g$	$Y_1 := 1.003$
$V_{f1} := 0$	$V_{i1} := 0$

Run 3:

$V_{m3} := 47.231 \cdot ft^3$	$P_{m3} := 29.64 \cdot in_Hg$
$W_{i3} := 0.0 \cdot g$	$T_{mf3} := 86.8 \cdot ^\circ F$
$W_{f3} := 277.3 \cdot g$	$Y_3 := 1.003$
$V_{f3} := 0$	$V_{i3} := 0$

Run 2:

$V_{m2} := 47.664 \cdot ft^3$	$P_{m2} := 29.66 \cdot in_Hg$
$W_{i2} := 0.0 \cdot g$	$T_{mf2} := 86.5 \cdot ^\circ F$
$W_{f2} := 277.0 \cdot g$	$Y_2 := 1.003$
$V_{f2} := 0$	$V_{i2} := 0$

Constants:

$M_w := 18.0 \cdot \frac{lb}{lb \cdot mol}$	$K_1 := 0.04706 \cdot \frac{ft^3}{ml}$
$P_{std} := 29.92 \cdot in_Hg$	$K_2 := 453.6 \cdot \frac{g}{lb}$
$T_{std} := 528 \cdot ^\circ R$	$K_3 := 0.04715 \cdot \frac{ft^3}{g}$
$\rho_w := 0.002201 \cdot \frac{lb}{ml}$	$K_4 := 17.64 \cdot \frac{^{\circ}R}{in_Hg}$
$R_i := 21.85 \cdot \frac{in_Hg \cdot ft^3}{lb \cdot mol \cdot ^{\circ}R}$	

Calculations:

Run 1:

$$V_{wcstd1} := \frac{(V_{f1} - V_{i1}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd1} := \frac{(W_{f1} - W_{i1}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd1} := K_1(V_{f1} - V_{i1})$$

$$V_{wsgstd1} := K_3(W_{f1} - W_{i1})$$

$$V_{wcstd1} = 0.000 \text{ scf}$$

$$V_{wsgstd1} = 12.831 \text{ scf}$$

$$V_{mstd1} := \frac{V_{m1} \cdot Y_1 \cdot P_{m1} \cdot T_{std}}{P_{std} \cdot (T_{mf1} + 460)} \quad Eq. 4-3$$

$$B_{ws1} := \frac{V_{wcstd1} + V_{wsgstd1}}{V_{wcstd1} + V_{wsgstd1} + V_{mstd1}} \quad Eq. 4-4$$

$$V_{mstd1} := K_4 Y_1 (V_{m1} P_{m1}) / T_{m1}$$

$$B_{ws1} = 0.2191$$

$$V_{mstd1} = 45.7 \text{ dscf}$$

$$H_2O_1 := B_{ws1} \cdot 100 \cdot \text{vol\%}$$

$$H_2O_1 = 21.91 \text{ vol\%}$$

Run 2:

$$V_{wcstd2} := \frac{(V_{f2} - V_{i2}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd2} := \frac{(W_{f2} - W_{i2}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd2} := K_1(V_{f2} - V_{i2})$$

$$V_{wsgstd2} := K_3(W_{f2} - W_{i2})$$

$$V_{wcstd2} = 0.000 \text{ scf}$$

$$V_{wsgstd2} = 13.082 \text{ scf}$$

$$V_{mstd2} := \frac{V_{m2} \cdot Y_2 \cdot P_{m2} \cdot T_{std}}{P_{std} \cdot (T_{mf2} + 460)} \quad Eq. 4-3$$

$$B_{ws2} := \frac{V_{wcstd2} + V_{wsgstd2}}{V_{wcstd2} + V_{wsgstd2} + V_{mstd2}} \quad Eq. 4-4$$

$$V_{mstd2} := K_4 Y_2 (V_{m2} P_{m2}) / T_{m2}$$

$$B_{ws2} = 0.2222$$

$$V_{mstd2} = 45.8 \text{ dscf}$$

$$H_2O_2 := B_{ws2} \cdot 100 \cdot \text{vol\%}$$

$$H_2O_2 = 22.22 \text{ vol\%}$$

Run 3:

$$V_{wcstd3} := \frac{(V_{f3} - V_{i3}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad \text{Eq. 4-1}$$

$$V_{wcstd3} := K_1(V_{f3} - V_{i3})$$

$$V_{wcstd3} = 0.000 \text{ scf}$$

$$V_{mstd3} := \frac{V_{m3} \cdot Y_3 \cdot P_{m3} \cdot T_{std}}{P_{std} \cdot (T_{mf3} + 460)} \quad \text{Eq. 4-3}$$

$$V_{mstd3} := K_4 Y_3 (V_{m3} P_{m3}) / T_{m3}$$

$$V_{mstd3} = 45.3 \text{ dscf}$$

$$V_{wsstd3} := \frac{(W_{f3} - W_{i3}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad \text{Eq. 4-2}$$

$$V_{wsstd3} := K_3(W_{f3} - W_{i3})$$

$$V_{wsstd3} = 13.096 \text{ scf}$$

$$B_{ws3} := \frac{V_{wcstd3} + V_{wsstd3}}{V_{wcstd3} + V_{wsstd3} + V_{mstd3}} \quad \text{Eq. 4-4}$$

$$B_{ws3} = 0.2242$$

$$H_2O_3 := B_{ws3} \cdot 100 \cdot \text{vol\%}$$

$$H_2O_3 = 22.42 \text{ vol\%}$$

Reference Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

Nomenclature:

M_d	=	Dry molecular weight, lb/lb-mole.
M_s	=	Wet molecular weight, lb/lb-mole.
$\%CO_2$	=	Percent CO_2 by volume, dry basis.
$\%O_2$	=	Percent O_2 by volume, dry basis.
$\%CO$	=	Percent CO by volume, dry basis.
$\%N_2$	=	Percent N_2 by volume, dry basis.
Bal	=	$\%N_2 + \%CO$.
28	=	Molecular weight of N_2 or CO , lb/lb-mol.
32	=	Molecular weight of O_2 , lb/lb-mol.
44	=	Molecular weight of CO_2 , lb/lb-mol.

Variables:

$$\%O_2_1 := 0.64 \cdot vol\%$$

$$\%O_2_2 := 0.69 \cdot vol\%$$

$$\%O_2_3 := 0.50 \cdot vol\%$$

$$\%CO_2_1 := 17.41 \cdot vol\%$$

$$\%CO_2_2 := 17.32 \cdot vol\%$$

$$\%CO_2_3 := 17.42 \cdot vol\%$$

$$Bal_1 := 100 \cdot vol\% - (\%O_2_1 + \%CO_2_1)$$

$$Bal_2 := 100 \cdot vol\% - (\%O_2_2 + \%CO_2_2)$$

$$Bal_1 = 81.95 \text{ vol}\%$$

$$Bal_2 = 81.99 \text{ vol}\%$$

$$Bal_3 := 100 \cdot vol\% - (\%O_2_3 + \%CO_2_3)$$

$$Bal_3 = 82.08 \text{ vol}\%$$

Calculations:

$$M_{d1} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_1 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_1 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_1) \quad Eq. 3-1$$

$$M_{d1} = 30.81 \frac{lb}{lb \cdot mol}$$

$$M_{d2} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_2 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_2 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_2) \quad Eq. 3-1$$

$$M_{d2} = 30.80 \frac{lb}{lb \cdot mol}$$

$$M_{d3} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_3 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_3 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_3) \quad Eq. 3-1$$

$$M_{d3} = 30.81 \frac{lb}{lb \cdot mol}$$

Reference Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate

Nomenclature:

A_s	=	Cross-sectional area of stack, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
B_{wST}	=	Water vapor in gas stream calculated using steam table.
C_p	=	Pitot tube coefficient, dimensionless.
K_p	=	Velocity equation constant.
M_d	=	Molecular weight of stack gas, dry basis, lb/lb-mol.
M_s	=	Molecular weight of stack gas, wet basis, lb/lb-mol.
P_m	=	Barometric pressure at measurement site, in. Hg.
P_g	=	Stack static pressure, in. H ₂ O.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
Q_{sd}	=	Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr, dscf/min.
T_s	=	Stack temperature, °F.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
Δp_{avgqrt}	=	Average square root of Δp , in. H ₂ O.
3600	=	Conversion factor, sec/hr.
18.0	=	Molecular weight of water, lb/lb-mol.

Constants:

$$K_p := 85.49 \cdot \frac{ft}{sec} \cdot \left[\frac{\left(\frac{lb}{lb \cdot mol} \right) \cdot (in_Hg)}{(R) \cdot (in_H2O)} \right]^{\frac{1}{2}}$$

Variables:

$A_s := 50.528 \cdot ft^2$	$\Delta p_{avgqrt2} := 0.6636 \cdot in_H2O^{\frac{1}{2}}$
$C_p := 0.84$	$T_{s2} := 140.4 \cdot ^\circ F$
$\Delta p_{avgqrt1} := 0.6658 \cdot in_H2O^{\frac{1}{2}}$	$P_{g2} := 0.34 \cdot in_H2O$
$T_{s1} := 140.6 \cdot ^\circ F$	$\Delta p_{avgqrt3} := 0.6495 \cdot in_H2O^{\frac{1}{2}}$
$P_{g1} := 0.36 \cdot in_H2O$	$T_{s3} := 140.6 \cdot ^\circ F$
$B_{wST1} := 0.2023$	$P_{g3} := 0.35 \cdot in_H2O$
$B_{wST2} := 0.2011$	
$B_{wST3} := 0.2024$	

Note the lower of the two moisture fractions will be used: either the one measured by impinger analysis or calculated by the steam table.

Calculations:

Run 1:

$$T_{sabs1} := T_{s1} + 460 \quad T_{sabs1} = 600.6 \text{ }^{\circ}\text{R} \quad P_{s1} := P_{m1} + \frac{P_{g1}}{13.6 \cdot \frac{\text{in_H2O}}{\text{in_Hg}}} \quad P_{s1} = 29.69 \text{ in_Hg}$$

$$M_{s1} := M_{d1} \cdot (1 - B_{wST1}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST1} \quad \text{Eq. 2-6} \quad M_{s1} = 28.22 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s1} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT1}} \cdot \sqrt{\frac{T_{sabs1}}{P_{s1} \cdot M_{s1}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s1} = 40.48 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd1} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST1}) \cdot V_{s1} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s1}}{T_{sabs1} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd1} = 5123856.23 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd1} = 85397.60 \frac{\text{dscf}}{\text{min}}}$$

Run 2:

$$T_{sabs2} := T_{s2} + 460 \quad T_{sabs2} = 600.4 \text{ }^{\circ}\text{R} \quad P_{s2} := P_{m2} + \frac{P_{g2}}{13.6 \cdot \frac{\text{in_H2O}}{\text{in_Hg}}} \quad P_{s2} = 29.68 \text{ in_Hg}$$

$$M_{s2} := M_{d2} \cdot (1 - B_{wST2}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST2} \quad \text{Eq. 2-6} \quad M_{s2} = 28.22 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s2} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT2}} \cdot \sqrt{\frac{T_{sabs2}}{P_{s2} \cdot M_{s2}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s2} = 40.34 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd2} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST2}) \cdot V_{s2} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s2}}{T_{sabs2} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd2} = 5114837.63 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd2} = 85247.29 \frac{\text{dscf}}{\text{min}}}$$

Run 3:

$$T_{sabs3} := T_{s3} + 460 \quad T_{sabs3} = 600.6 \text{ }^{\circ}\text{R} \quad P_{s3} := P_{m3} + \frac{P_{g3}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s3} = 29.67 \text{ in}_{Hg}$$

$$M_{s3} := M_{d3} \cdot (1 - B_{wST3}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST3} \quad \text{Eq. 2-6} \quad M_{s3} = 28.22 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s3} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs3}}{P_{s3} \cdot M_{s3}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s3} = 39.51 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd3} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST3}) \cdot V_{s3} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s3}}{T_{sabs3} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd3} = 4996438.42 \frac{\text{dscf}}{\text{hr}}} \quad \boxed{Q_{sd3} = 83273.97 \frac{\text{dscf}}{\text{min}}}$$

Isokinetic Sampling Rate

Nomenclature:

A_n	=	Cross-sectional area of nozzle, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
I	=	Percent of isokinetic sampling.
N_d	=	Nozzle diameter, in.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
V_{mstd}	=	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Θ_t	=	Total sampling time, min.
60	=	Conversion factor, sec/min.
100	=	Conversion to percent.

Variables:

$$\Theta_t := 64 \cdot \text{min}$$

$$N_d := 0.283 \cdot \text{in}$$

$$A_n := \pi \cdot \left(\frac{N_d}{2} \right)^2 \cdot \left(\frac{12 \cdot \frac{\text{in}}{\text{ft}}}{12 \cdot \frac{\text{in}}{\text{ft}}} \right)^2 \quad A_n = 4.37 \times 10^{-4} \text{ ft}^2$$

Constants:

$$K_5 := 0.09450 \cdot \frac{\text{in}_\text{Hg} \cdot \% \cdot \text{min}}{\text{sec} \cdot \text{R}}$$

$$T_{std} = 528 \text{ R}$$

$$P_{std} = 29.92 \text{ in}_\text{Hg}$$

Calculations:

$$I_1 := \frac{T_{sabs1} \cdot V_{mstd1} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s1} \cdot \Theta_t \cdot A_n \cdot P_{s1} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST1})} \quad \text{Eq. 5-8}$$

$$I_1 = 96.77 \%$$

$$I_2 := \frac{T_{sabs2} \cdot V_{mstd2} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s2} \cdot \Theta_t \cdot A_n \cdot P_{s2} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST2})} \quad \text{Eq. 5-8}$$

$$I_2 = 97.08 \%$$

$$I_3 := \frac{T_{sabs3} \cdot V_{mstd3} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s3} \cdot \Theta_t \cdot A_n \cdot P_{s3} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST3})} \quad \text{Eq. 5-8}$$

$$I_3 = 98.35 \%$$

SW-846 Method 0011 - (Unspiked) - Determination of Aldehyde and Ketone Emissions from Standard Sources

Nomenclature:

v_n	=	volume of the samples (Runs 1 to 3), dscf and dscm.
M_{Fn}	=	Mass of Formaldehyde (Runs 1 to 3), ug.
M_{An}	=	Mass of Acetaldehyde (Runs 1 to 3), ug.
M_{Pn}	=	Mass of Propionaldehyde (Runs 1 to 3), ug.
c_{Fn}	=	Concentration of Formaldehyde (Runs 1 to 3), mg/dscm.
C_{Fn}	=	Concentration of Formaldehyde (Runs 1 to 3), lb/hr.
c_{An}	=	Concentration of Acetaldehyde (Runs 1 to 3), mg/dscm.
C_{An}	=	Concentration of Acetaldehyde (Runs 1 to 3), lb/hr.
c_{Pn}	=	Concentration of Propionaldehyde (Runs 1 to 3), mg/dscm.
C_{Pn}	=	Concentration of Propionaldehyde (Runs 1 to 3), lb/hr.

Variables:

$$v_1 := 45.725 \text{ dscf}$$

$$v_2 := 45.787 \text{ dscf}$$

$$v_3 := 45.315 \text{ dscf}$$

$$M_{F.1} := 31.7 \text{ ug}$$

$$M_{F.2} := 23.0 \text{ ug}$$

$$M_{F.3} := 17.4 \text{ ug}$$

$$M_{A.1} := 0.634 \text{ ug}$$

$$M_{A.2} := 0.615 \text{ ug}$$

$$M_{A.3} := 6.460 \text{ ug}$$

$$M_{P.1} := 2.20 \text{ ug}$$

$$M_{P.2} := 2.13 \text{ ug}$$

$$M_{P.3} := 1.48 \text{ ug}$$

Constants:

$$K_6 := 35.31467 \frac{\text{dscf}}{\text{m}^3}$$

$$K_7 := 453.59 \frac{\text{g}}{\text{lb}}$$

$$K_8 := 1000 \frac{\text{mg}}{\text{g}}$$

Calculations:

$$v_1 = 1.295 \text{ dscm}$$

$$v_2 = 1.297 \text{ dscm}$$

$$v_3 = 1.283 \text{ dscm}$$

$$c_{F.1} := \frac{M_{F.1}}{v_1}$$

$$c_{F.2} := \frac{M_{F.2}}{v_2}$$

$$c_{F.3} := \frac{M_{F.3}}{v_3}$$

$$c_{F.1} = 0.024 \frac{\text{mg}}{\text{dscm}}$$

$$c_{F.2} = 0.018 \frac{\text{mg}}{\text{dscm}}$$

$$c_{F.3} = 0.014 \frac{\text{mg}}{\text{dscm}}$$

$$C_{F.1} := c_{F.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{F.2} := c_{F.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{F.3} := c_{F.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{F.1} = 7.83 \times 10^{-3} \frac{\text{lb}}{\text{hr}}$$

$$C_{F.2} = 5.66 \times 10^{-3} \frac{\text{lb}}{\text{hr}}$$

$$C_{F.3} = 4.23 \times 10^{-3} \frac{\text{lb}}{\text{hr}}$$

$$c_{A.1} := \frac{M_{A.1}}{v_1}$$

$$c_{A.2} := \frac{M_{A.2}}{v_2}$$

$$c_{A.3} := \frac{M_{A.3}}{v_3}$$

$$c_{A.1} = 4.897 \times 10^{-4} \frac{\text{mg}}{\text{dscm}}$$

$$c_{A.2} = 4.743 \times 10^{-4} \frac{\text{mg}}{\text{dscm}}$$

$$c_{A.3} = 5.034 \times 10^{-3} \frac{\text{mg}}{\text{dscm}}$$

$$C_{A.1} := c_{A.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{A.2} := c_{A.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{A.3} := c_{A.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{A.1} = 1.57 \times 10^{-4} \frac{\text{lb}}{\text{hr}}$$

$$C_{A.2} = 1.51 \times 10^{-4} \frac{\text{lb}}{\text{hr}}$$

$$C_{A.3} = 1.57 \times 10^{-3} \frac{\text{lb}}{\text{hr}}$$

$$c_{P.1} := \frac{M_{P.1}}{v_1}$$

$$c_{P.2} := \frac{M_{P.2}}{v_2}$$

$$c_{P.3} := \frac{M_{P.3}}{v_3}$$

$$c_{P.1} = 1.699 \times 10^{-3} \frac{\text{mg}}{\text{dscm}}$$

$$c_{P.2} = 1.643 \times 10^{-3} \frac{\text{mg}}{\text{dscm}}$$

$$c_{P.3} = 1.153 \times 10^{-3} \frac{\text{mg}}{\text{dscm}}$$

$$C_{P.1} := c_{P.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{P.2} := c_{P.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{P.3} := c_{P.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{P.1} = 5.44 \times 10^{-4} \frac{\text{lb}}{\text{hr}}$$

$$C_{P.2} = 5.25 \times 10^{-4} \frac{\text{lb}}{\text{hr}}$$

$$C_{P.3} = 3.6 \times 10^{-4} \frac{\text{lb}}{\text{hr}}$$

Appendix D4
U.S. EPA Method 23 and Method 0010

Company:	Citgo	Test Date:	05/23/11
Location:	Sulphur, LA	Test Number:	1
Unit:	B-Cat		
Source:	Wet Gas Scrubber		
Method	23 / 0010		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.87 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.72 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.265 inches
Nozzle Area (ft ²)	A_n	3.83E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.457 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6457 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	86.8 °F
Sampling Time	Θ	240 min
Moisture Measured by Weight	$(W_f - W_i)$	888.1 g
Dry Gas Meter Volume (actual)	V_m	153.738 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	147.905 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.63 vol%
Carbon Dioxide	%CO ₂	18.17 vol%
Nitrogen	%N ₂	81.20 vol%
Temperature	T_s	140.1 °F
Molecular Weight, dry	M_d	30.93 lb/lb*mol
Molecular Weight, wet	M_s	28.36 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2206
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.1990
Stack Static Pressure	P_g	0.35 in. H ₂ O
Absolute Stack Pressure	P_s	29.75 in. Hg
Average Velocity	V_s	39.11 ft/sec
Volumetric Flow Rate	Q_{sd}	7,114,341 acfh
		118,572 acfm
	Q_{sd}	4,984,386 dscfh
		83,073 dscfm
Isokinetic Sampling Rate	I	97.86 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	HC	7/25/2011

Company:	Citgo	Test Date:	05/23/11
Location:	Sulphur, LA	Test Number:	2
Unit:	B-Cat		
Source:	Wet Gas Scrubber		
Method	23 / 0010		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.84 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.69 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.252 inches
Nozzle Area (ft ²)	A_n	3.46E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.187 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6322 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	86.3 °F
Sampling Time	Θ	240 min
Moisture Measured by Weight	$(W_f - W_i)$	834.9 g
Dry Gas Meter Volume (actual)	V_m	137.751 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	132.522 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.79 vol%
Carbon Dioxide	%CO ₂	18.06 vol%
Nitrogen	%N ₂	81.15 vol%
Temperature	T_s	140.2 °F
Molecular Weight, dry	M_d	30.92 lb/lb*mol
Molecular Weight, wet	M_s	28.34 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2290
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.1997
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.72 in. Hg
Average Velocity	V_s	38.33 ft/sec
Volumetric Flow Rate	Q_{sd}	6,971,612 acfh
		116,194 acfm
	Q_{sd}	4,874,899 dscfh
		81,248 dscfm
Isokinetic Sampling Rate	I	99.14 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	HC	7/25/2011

Company:	Citgo	Test Date:	05/24/11
Location:	Sulphur, LA	Test Number:	3
Unit:	B-Cat		
Source:	Wet Gas Scrubber		
Method	23 / 0010		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.82 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.67 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.265 inches
Nozzle Area (ft ²)	A_n	3.83E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.544 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6604 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	86.1 °F
Sampling Time	Θ	240 min
Moisture Measured by Weight	$(W_f - W_i)$	937.4 g
Dry Gas Meter Volume (actual)	V_m	157.033 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	151.010 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.50 vol%
Carbon Dioxide	%CO ₂	18.05 vol%
Nitrogen	%N ₂	81.45 vol%
Temperature	T_s	139.8 °F
Molecular Weight, dry	M_d	30.91 lb/lb*mol
Molecular Weight, wet	M_s	28.35 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2264
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.1982
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.70 in. Hg
Average Velocity	V_s	40.03 ft/sec
Volumetric Flow Rate	Q_{sd}	7,281,522 acfh
		121,359 acfm
	Q_{sd}	5,101,354 dscfh
		85,023 dscfm
Isokinetic Sampling Rate	I	97.63 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	HC	7/25/2011

TEST 1

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	114.44	2.96
B	140.1	y_1
C	140.18	5.93

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.115385$$

$$b = y \text{ intercept} \quad -10.2446$$

y_1 = interpolated absolute pressure at stack temperature.

5.9208 in Hg

Moisture content calculated:

19.902 %

TEST 2

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	140.2	y_2
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

y_2 = interpolated absolute pressure at stack temperature.

5.9336 in Hg

Moisture content calculated:

19.965 %

TEST 3

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	114.44	2.96
B	139.8	y_3
C	140.18	5.93

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.115385$$

$$b = y \text{ intercept} \quad -10.2446$$

y_3 = interpolated absolute pressure at stack temperature.

5.8862 in Hg

Moisture content calculated:

19.819 %

Based on Method 4 - *Determination of Moisture Content in Stack Gases* (4.1), the moisture content of saturated gas streams as measured by method 4 may be positively biased. In cases where this is suspected, a second determination may be made. This determination can be accomplished by using a psychrometric chart or by using a saturation vapor pressure table.

Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

Values

TESTS:	Moisture Content (Steam Table) %	Moisture Content (Impinger) %	Lower of Two Values:
TEST 1	19.90	22.06	19.90
TEST 2	19.96	22.90	19.96
TEST 3	19.82	22.64	19.82

Company: Citgo Petroleum Corporation
Location: Sulphur, LA
Unit: Cat B Wet Gas Scrubber

Test No.	1	2	3	Average
Date	05/23/11	05/23/11	05/24/11	n/a
Start Time	10:25	16:28	8:35	n/a
End Time	14:31	20:35	12:39	n/a
Test Duration, min	240	240	240	240

Unit Operating Parameters

Oxygen Content	vol%	0.63	0.79	0.50	0.64
Carbon Dioxide Content	vol%	18.17	18.06	18.05	18.09
Moisture Content	vol%	19.90	19.97	19.82	19.90
Wet Molecular Weight	lb/lb-mol	28.36	28.34	28.35	28.35
Velocity	ft/sec	39.11	38.33	40.03	39.16
Volumetric Flow Rate	dscfm	83,073	81,248	85,023	83,115

Sampling Parameters

Isokinetic Sampling Rate	%	97.86	99.14	97.63	98.21
Sample Volume	dscf	147.905	132.522	151.010	143.812
	dscm	4.188	3.753	4.276	4.072

Laboratory Results ¹

3,3',4,4'-TetraCB (PCB 77)	pg	49.76	222.61	<5.51] BDL	92.63 DLL
3,4,4',5'-TetraCB (PCB 81)	pg	56.59	155.17	<6.09] BDL	72.62 DLL
2,3,3',4,4'-PentaCB (PCB 105)	pg	982.08	2,289.93	142.04	1,138.02
2,3,4,4',5'-PentaCB (PCB 114)	pg	80.55	228.54	<5.18] BDL	104.76 DLL
2,3',4,4',5'-PentaCB (PCB 118)	pg	2,867.35	8,136.04	393.95	3,799.11
2',3,4,4',5'-PentaCB (PCB 123)	pg	2,784.94	7,657.04	362.73	3,601.57
3,3',4,4',5'-PentaCB (PCB 126)	pg	<4.50] BDL	<4.54] BDL	<4.40] BDL	<4.48] BDL
2,3,3',4,4',5'-HexaCB (PCB 156)	pg	179.17	198.56	40.05	139.26
2,3,3',4,4',5'-HexaCB (PCB 157)	pg	<3.71] BDL	<6.29] BDL	<3.72] BDL	<4.57] BDL
2',3',4,4',5,5'-HexaCB (PCB 167)	pg	328.47	628.92	72.33	343.24
3,3',4,4',5,5'-HexaCB (PCB169)	pg	<4.05] BDL	<6.86] BDL	<4.24] BDL	<5.05] BDL
2,3,3',4,4',5,5'-HeptaCB (PCB 189)	pg	<3.37] BDL	<6.23] BDL	<3.46] BDL	<4.35] BDL
2,3,7,8-TCDF	pg	<2.96] BDL	13.94 ADL	<3.76] BDL	6.89 DLL
1,2,3,7,8-PeCDF	pg	<5.14] BDL	<9.61] BDL	<7.75] BDL	<7.50] BDL
2,3,4,7,8-PeCDF	pg	<5.26] BDL	<9.84] BDL	<7.93] BDL	<7.68] BDL
1,2,3,4,7,8-HxCDF	pg	<7.77] BDL	<11.37] BDL	<7.79] BDL	<8.98] BDL
1,2,3,6,7,8-HxCDF	pg	<7.20] BDL	<10.53] BDL	<7.21] BDL	<8.31] BDL
2,3,4,6,7,8-HxCDF	pg	<7.82] BDL	<11.44] BDL	<7.83] BDL	<9.03] BDL
1,2,3,7,8,9-HxCDF	pg	<9.26] BDL	<13.54] BDL	<9.27] BDL	<10.69] BDL
1,2,3,4,6,7,8-HpCDF	pg	<6.89] BDL	<10.04] BDL	<7.38] BDL	<8.10] BDL
1,2,3,4,7,8,9-HpCDF	pg	<9.09] BDL	<13.24] BDL	22.35 ADL	14.89 DLL
OCDF	pg	30.00	<18.19] BDL	39.58 ADL	29.26 DLL
2,3,7,8-TCDD	pg	<3.74] BDL	<6.35] BDL	<4.73] BDL	<4.94] BDL
1,2,3,7,8-PeCDD	pg	<5.85] BDL	<10.23] BDL	<8.26] BDL	<8.11] BDL
1,2,3,4,7,8-HxCDD	pg	<10.09] BDL	<13.94] BDL	<12.61] BDL	<12.21] BDL
1,2,3,6,7,8-HxCDD	pg	<9.53] BDL	<13.16] BDL	<11.91] BDL	<11.53] BDL
1,2,3,7,8,9-HxCDD	pg	<9.83] BDL	<13.58] BDL	<12.29] BDL	<11.90] BDL
1,2,3,4,6,7,8-HpCDD	pg	<8.10] BDL	<10.85] BDL	<8.80] BDL	<9.25] BDL
OCDD	pg	373.71	118.12	80.70	190.84

Pollutants

3,3',4,4'-TetraCB (PCB 77)	pg/dscm	11.8809	59.3211	<1.29] BDL	24.16 DLL
	lb/hr	3.70E-09	1.81E-08	<4.10E-10] BDL	7.39E-09 DLL
3,4,4',5-TetraCB (PCB 81)	pg/dscm	13.5117	41.3497	<1.42] BDL	18.76 DLL
	lb/hr	4.21E-09	1.26E-08	<4.54E-10] BDL	5.75E-09 DLL
2,3,3',4,4'-PentaCB (PCB 105)	pg/dscm	234.4859	610.2208	33.2168	292.6412
	lb/hr	7.30E-08	1.86E-07	1.06E-08	8.98E-08
2,3,4,4',5-PentaCB (PCB 114)	pg/dscm	19.2325	60.9014	<1.21] BDL	27.12 DLL
	lb/hr	5.99E-09	1.85E-08	<3.86E-10] BDL	8.30E-09 DLL
2,3',4,4',5-PentaCB (PCB 118)	pg/dscm	684.6216	2168.0927	92.1273	981.6139
	lb/hr	2.13E-07	6.60E-07	2.93E-08	3.01E-07
2',3,4,4',5-PentaCB (PCB 123)	pg/dscm	664.9450	2040.4488	84.8263	930.0734
	lb/hr	2.07E-07	6.21E-07	2.70E-08	2.85E-07
3,3',4,4',5-PentaCB (PCB 126)	pg/dscm	<1.07] BDL	<1.21] BDL	<1.03] BDL	<1.10] BDL
	lb/hr	<3.34E-10] BDL	<3.68E-10] BDL	<3.28E-10] BDL	<3.43E-10] BDL
2,3,3',4,4',5-HexaCB (PCB 156)	pg/dscm	42.7795	52.9123	9.3659	35.0192
	lb/hr	1.33E-08	1.61E-08	2.98E-09	1.08E-08
2,3,3',4,4',5-HexaCB (PCB 157)	pg/dscm	<0.89] BDL	<1.68] BDL	<0.87] BDL	<1.14] BDL
	lb/hr	<2.76E-10] BDL	<5.10E-10] BDL	<2.77E-10] BDL	<3.54E-10] BDL
2,3',4,4',5,5'-HexaCB (PCB 167)	pg/dscm	78.4270	167.5947	16.9147	87.6455
	lb/hr	2.44E-08	5.10E-08	5.39E-09	2.69E-08
3,3',4,4',5,5'-HexaCB (PCB169)	pg/dscm	<0.97] BDL	<1.83] BDL	<0.99] BDL	<1.26] BDL
	lb/hr	<3.01E-10] BDL	<5.56E-10] BDL	<3.16E-10] BDL	<3.91E-10] BDL
2,3,3',4,4',5,5'-HeptaCB (PCB 189)	pg/dscm	<0.80] BDL	<1.66] BDL	<0.81] BDL	<1.09] BDL
	lb/hr	<2.50E-10] BDL	<5.05E-10] BDL	<2.58E-10] BDL	<3.38E-10] BDL
2,3,7,8-TCDF	pg/dscm	<0.71] BDL	3.71 ADL	<0.88] BDL	1.77 DLL
	lb/hr	<2.20E-10] BDL	1.13E-09 ADL	<2.80E-10] BDL	5.44E-10 DLL
1,2,3,7,8-PeCDF	pg/dscm	<1.23] BDL	<2.56] BDL	<1.81] BDL	<1.87] BDL
	lb/hr	<3.82E-10] BDL	<7.79E-10] BDL	<5.77E-10] BDL	<5.80E-10] BDL
2,3,4,7,8-PeCDF	pg/dscm	<1.26] BDL	<2.62] BDL	<1.85] BDL	<1.91] BDL
	lb/hr	<3.91E-10] BDL	<7.98E-10] BDL	<5.91E-10] BDL	<5.93E-10] BDL
1,2,3,4,7,8-HxCDF	pg/dscm	<1.86] BDL	<3.03] BDL	<1.82] BDL	<2.24] BDL
	lb/hr	<5.77E-10] BDL	<9.22E-10] BDL	<5.80E-10] BDL	<6.93E-10] BDL
1,2,3,6,7,8-HxCDF	pg/dscm	<1.72] BDL	<2.81] BDL	<1.69] BDL	<2.07] BDL
	lb/hr	<5.35E-10] BDL	<8.54E-10] BDL	<5.37E-10] BDL	<6.42E-10] BDL
2,3,4,6,7,8-HxCDF	pg/dscm	<1.87] BDL	<3.05] BDL	<1.83] BDL	<2.25] BDL
	lb/hr	<5.81E-10] BDL	<9.28E-10] BDL	<5.83E-10] BDL	<6.97E-10] BDL
1,2,3,7,8,9-HxCDF	pg/dscm	<2.21] BDL	<3.61] BDL	<2.17] BDL	<2.66] BDL
	lb/hr	<6.88E-10] BDL	<1.10E-09] BDL	<6.91E-10] BDL	<8.26E-10] BDL
1,2,3,4,6,7,8-HpCDF	pg/dscm	<1.65] BDL	<2.68] BDL	<1.73] BDL	<2.02] BDL
	lb/hr	<5.12E-10] BDL	<8.14E-10] BDL	<5.50E-10] BDL	<6.25E-10] BDL
1,2,3,4,7,8,9-HpCDF	pg/dscm	<2.17] BDL	<3.53] BDL	5.23 ADL	3.64 DLL
	lb/hr	<6.75E-10] BDL	<1.07E-09] BDL	1.66E-09 ADL	1.14E-09 DLL
OCDF	pg/dscm	7.1629	<4.85] BDL	9.26 ADL	7.09 DLL
	lb/hr	2.23E-09	<1.48E-09] BDL	2.95E-09 ADL	2.22E-09 DLL
2,3,7,8-TCDD	pg/dscm	<0.89] BDL	<1.69] BDL	<1.11] BDL	<1.23] BDL
	lb/hr	<2.78E-10] BDL	<5.15E-10] BDL	<3.52E-10] BDL	<3.82E-10] BDL
1,2,3,7,8-PeCDD	pg/dscm	<1.40] BDL	<2.73] BDL	<1.93] BDL	<2.02] BDL
	lb/hr	<4.35E-10] BDL	<8.30E-10] BDL	<6.15E-10] BDL	<6.27E-10] BDL
1,2,3,4,7,8-HxCDD	pg/dscm	<2.41] BDL	<3.71] BDL	<2.95] BDL	<3.02] BDL
	lb/hr	<7.50E-10] BDL	<1.13E-09] BDL	<9.39E-10] BDL	<9.40E-10] BDL
1,2,3,6,7,8-HxCDD	pg/dscm	<2.28] BDL	<3.51] BDL	<2.79] BDL	<2.86] BDL
	lb/hr	<7.08E-10] BDL	<1.07E-09] BDL	<8.87E-10] BDL	<8.88E-10] BDL
1,2,3,7,8,9-HxCDD	pg/dscm	<2.35] BDL	<3.62] BDL	<2.87] BDL	<2.95] BDL
	lb/hr	<7.30E-10] BDL	<1.10E-09] BDL	<9.15E-10] BDL	<9.16E-10] BDL
1,2,3,4,6,7,8-HpCDD	pg/dscm	<1.93] BDL	<2.89] BDL	<2.06] BDL	<2.29] BDL
	lb/hr	<6.02E-10] BDL	<8.80E-10] BDL	<6.56E-10] BDL	<7.12E-10] BDL
OCDD	pg/dscm	89.2287	31.4766	18.8721	46.5258
	lb/hr	2.78E-08	9.58E-09	6.01E-09	1.45E-08

¹ Laboratory Results provided by Data Analysis Technologies, Inc.

BDL (below detection level) - all analytical values used to calculate and report an in-stack emissions value are less than the laboratory's reported detection level(s)

DLL (detection level limited) - at least one but not all values used to calculate and report an in-stack emissions value are greater than the laboratory's reported detection level(s)

ADL (above detection level) - all analytical values used to calculate and report an in-stack emissions value are greater than the laboratory's reported detection level(s)

	Initials	Date
Data Entry	JP	7/26/2011
Review	RI	8/17/2011

Company: Citgo Petroleum Corporation
Location: Sulphur, LA
Unit: Cat B Wet Gas Scrubber

Test No.	1	2	3	Average
Date	05/23/11	05/23/11	05/24/11	n/a
Start Time	10:25	16:28	8:35	n/a
End Time	14:31	20:35	12:39	n/a
Test Duration, min	240	240	240	240

Unit Operating Parameters

Oxygen Content	vol%	0.63	0.79	0.50	0.64
Carbon Dioxide Content	vol%	18.17	18.06	18.05	18.09
Moisture Content	vol%	19.90	19.97	19.82	19.90
Wet Molecular Weight	lb/lb-mol	28.36	28.34	28.35	28.35
Velocity	ft/sec	39.11	38.33	40.03	39.16
Volumetric Flow Rate	dscfm	83,073	81,248	85,023	83,115

Sampling Parameters

Isokinetic Sampling Rate	%	97.86	99.14	97.63	98.21
Sample Volume	dscf	147.905	132.522	151.010	143.812
	dscm	4.188	3.753	4.276	4.072

Laboratory Results ¹

Acenaphthene	µg	<1.38] BDL	<1.38] BDL	<1.38] BDL	<1.38] BDL
Acenaphthylene	µg	<0.44] BDL	<0.44] BDL	<0.44] BDL	<0.44] BDL
Aniline	µg	<6.64] BDL	<6.64] BDL	<6.64] BDL	<6.64] BDL
Anthracene	µg	<0.44] BDL	<0.44] BDL	<0.44] BDL	<0.44] BDL
Benidine	µg	<0.68] BDL	<0.68] BDL	<0.68] BDL	<0.68] BDL
Benzo[a]anthracene	µg	<1.97] BDL	<1.97] BDL	<1.97] BDL	<1.97] BDL
Benzo[b]fluoranthrene	µg	<0.36] BDL	<0.36] BDL	<0.36] BDL	<0.36] BDL
Benzo[k]fluoranthrene	µg	<0.54] BDL	<0.54] BDL	<0.54] BDL	<0.54] BDL
Benzo[g,h,i]perylene	µg	<1.31] BDL	<1.31] BDL	<1.31] BDL	<1.31] BDL
Benzo[a]pyrene	µg	<1.22] BDL	<1.22] BDL	<1.22] BDL	<1.22] BDL
Benzo[e]pyrene	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL
Biphenyl	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL
Cresol (mixed isomers)	µg	221.60	236.40	244.00	234.00
Chrysene	µg	<1.39] BDL	<1.39] BDL	<1.39] BDL	<1.39] BDL
Dibenz[a,h]anthracene	µg	<1.19] BDL	<1.19] BDL	<1.19] BDL	<1.19] BDL
Dibenzofuran	µg	<1.01] BDL	<1.01] BDL	<1.01] BDL	<1.01] BDL
3,3'-Dimethoxybenzidine	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL
Dimethylaminobenzene	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL
7,12-Dimethylbenz[a]anthracene	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL
3,3'-Dimethylbenzidine	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL
o,o-Dimethylphenylethylamine	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL
2,4-Dimethylphenol	µg	<0.29] BDL	26.65 DLL	4.74 DLL	10.56 DLL
Fluoranthene	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL
Fluorene	µg	<0.52] BDL	<0.52] BDL	<0.52] BDL	<0.52] BDL
Indeno[1,2,3-cd]pyrene	µg	<1.26] BDL	<1.26] BDL	<1.26] BDL	<1.26] BDL
Isophorone	µg	<0.29] BDL	<0.29] BDL	<0.29] BDL	<0.29] BDL
3-Methylcholanthrene	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL
2-Methylnaphthalene	µg	<0.66] BDL	<0.66] BDL	<0.66] BDL	<0.66] BDL
Naphthalene	µg	<1.74] BDL	<1.74] BDL	<1.74] BDL	<1.74] BDL
Perylene	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL
Phenanthrene	µg	<1.58] BDL	<1.58] BDL	<1.58] BDL	<1.58] BDL
Phenol	µg	169.80	152.10	193.09 DLL	171.66 DLL
1,4-Phenylenediamine	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL
Pyrene	µg	<0.48] BDL	<0.48] BDL	<0.48] BDL	<0.48] BDL
o-Toluidine	µg	<0.40] BDL	<0.40] BDL	<0.40] BDL	<0.40] BDL

Pollutants					
Acenaphthene	µg/dscm	[<0.3295] BDL	[<0.3677] BDL	[<0.3227] BDL	[<0.3400] BDL
	lb/hr	[<1.03E-04] BDL	[<1.12E-04] BDL	[<1.03E-04] BDL	[<1.06E-04] BDL
Acenaphthylene	µg/dscm	[<0.1051] BDL	[<0.1173] BDL	[<0.1029] BDL	[<0.1064] BDL
	lb/hr	[<3.27E-05] BDL	[<3.57E-05] BDL	[<3.28E-05] BDL	[<3.37E-05] BDL
Aniline	µg/dscm	[<1.5854] BDL	[<1.7694] BDL	[<1.5528] BDL	[<1.6359] BDL
	lb/hr	[<4.93E-04] BDL	[<5.39E-04] BDL	[<4.95E-04] BDL	[<5.09E-04] BDL
Anthracene	µg/dscm	[<0.1051] BDL	[<0.1173] BDL	[<0.1029] BDL	[<0.1064] BDL
	lb/hr	[<3.27E-05] BDL	[<3.57E-05] BDL	[<3.28E-05] BDL	[<3.37E-05] BDL
Benzidine	µg/dscm	[<0.1624] BDL	[<0.1812] BDL	[<0.1590] BDL	[<0.1675] BDL
	lb/hr	[<5.05E-05] BDL	[<5.52E-05] BDL	[<5.07E-05] BDL	[<5.21E-05] BDL
Benzo[a]anthracene	µg/dscm	[<0.4704] BDL	[<0.5250] BDL	[<0.4607] BDL	[<0.4853] BDL
	lb/hr	[<1.46E-04] BDL	[<1.60E-04] BDL	[<1.47E-04] BDL	[<1.51E-04] BDL
Benzo[b]fluoranthrene	µg/dscm	[<0.0860] BDL	[<0.0959] BDL	[<0.0842] BDL	[<0.0887] BDL
	lb/hr	[<2.68E-05] BDL	[<2.92E-05] BDL	[<2.68E-05] BDL	[<2.76E-05] BDL
Benzo[k]fluoranthrene	µg/dscm	[<0.1289] BDL	[<0.1439] BDL	[<0.1263] BDL	[<0.1330] BDL
	lb/hr	[<4.01E-05] BDL	[<4.38E-05] BDL	[<4.02E-05] BDL	[<4.14E-05] BDL
Benzo[g,h,i]perylene	µg/dscm	[<0.3128] BDL	[<0.3491] BDL	[<0.3064] BDL	[<0.3227] BDL
	lb/hr	[<9.73E-05] BDL	[<1.06E-04] BDL	[<9.76E-05] BDL	[<1.00E-04] BDL
Benzo[a]pyrene	µg/dscm	[<0.2913] BDL	[<0.3251] BDL	[<0.2853] BDL	[<0.3006] BDL
	lb/hr	[<9.07E-05] BDL	[<9.90E-05] BDL	[<9.09E-05] BDL	[<9.35E-05] BDL
Benzo[e]pyrene	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL
Biphenyl	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL
Cresol (mixed isomers)	µg/dscm	52.9102	62.9959	57.0607	57.6556
	lb/hr	1.65E-02	1.92E-02	1.82E-02	1.79E-02
Chrysene	µg/dscm	[<0.3319] BDL	[<0.3704] BDL	[<0.3251] BDL	[<0.3424] BDL
	lb/hr	[<1.03E-04] BDL	[<1.13E-04] BDL	[<1.04E-04] BDL	[<1.07E-04] BDL
Dibenz[a,h]anthracene	µg/dscm	[<0.2841] BDL	[<0.3171] BDL	[<0.2783] BDL	[<0.2932] BDL
	lb/hr	[<8.84E-05] BDL	[<9.65E-05] BDL	[<8.86E-05] BDL	[<9.12E-05] BDL
Dibenzofuran	µg/dscm	[<0.2412] BDL	[<0.2691] BDL	[<0.2362] BDL	[<0.2488] BDL
	lb/hr	[<7.51E-05] BDL	[<8.19E-05] BDL	[<7.52E-05] BDL	[<7.74E-05] BDL
3,3'-Dimethoxybenzidine	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL
Dimethylaminobenzene	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL
7,12-Dimethylbenz[a]anthracene	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL
3,3'-Dimethylbenzidine	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL
o,o-Dimethylphenylethylamine	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL
2,4-Dimethylphenol	µg/dscm	[<0.0692] BDL	7.1017 DLL	1.1085 DLL	2.7598 DLL
	lb/hr	[<2.15E-05] BDL	2.16E-03 DLL	3.53E-04 DLL	8.45E-04 DLL
Fluoranthene	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL
Fluorene	µg/dscm	[<0.1242] BDL	[<0.1386] BDL	[<0.1216] BDL	[<0.1281] BDL
	lb/hr	[<3.86E-05] BDL	[<4.22E-05] BDL	[<3.87E-05] BDL	[<3.96E-05] BDL
Indeno(1,2,3-cd)pyrene	µg/dscm	[<0.3008] BDL	[<0.3358] BDL	[<0.2947] BDL	[<0.3104] BDL
	lb/hr	[<9.36E-05] BDL	[<1.02E-04] BDL	[<9.39E-05] BDL	[<9.66E-05] BDL
Isophorone	µg/dscm	[<0.0692] BDL	[<0.0773] BDL	[<0.0678] BDL	[<0.0714] BDL
	lb/hr	[<2.15E-05] BDL	[<2.35E-05] BDL	[<2.16E-05] BDL	[<2.22E-05] BDL
3-Methylcholanthrene	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL
2-Methylnaphthalene	µg/dscm	[<0.1576] BDL	[<0.1759] BDL	[<0.1543] BDL	[<0.1626] BDL
	lb/hr	[<4.90E-05] BDL	[<5.35E-05] BDL	[<4.92E-05] BDL	[<5.06E-05] BDL
Naphthalene	µg/dscm	[<0.4155] BDL	[<0.4637] BDL	[<0.4069] BDL	[<0.4287] BDL
	lb/hr	[<1.29E-04] BDL	[<1.41E-04] BDL	[<1.30E-04] BDL	[<1.33E-04] BDL
Perylene	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL
Phenanthrene	µg/dscm	[<0.3772] BDL	[<0.4210] BDL	[<0.3695] BDL	[<0.3893] BDL
	lb/hr	[<1.17E-04] BDL	[<1.28E-04] BDL	[<1.18E-04] BDL	[<1.21E-04] BDL
Phenol	µg/dscm	40.5422	40.5316	45.1551 DLL	42.0763 DLL
	lb/hr	1.26E-02	1.23E-02	1.44E-02 DLL	1.31E-02 DLL
1,4-Phenylenediamine	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL
Pyrene	µg/dscm	[<0.1146] BDL	[<0.1279] BDL	[<0.1123] BDL	[<0.1183] BDL
	lb/hr	[<3.57E-05] BDL	[<3.89E-05] BDL	[<3.58E-05] BDL	[<3.68E-05] BDL
o-Toluidine	µg/dscm	[<0.0955] BDL	[<0.1066] BDL	[<0.0935] BDL	[<0.0985] BDL
	lb/hr	[<2.97E-05] BDL	[<3.24E-05] BDL	[<2.98E-05] BDL	[<3.07E-05] BDL

* Dibenz[a,e]pyrene cannot be determined per DAT (Data Analysis Technologies, Inc)

¹ Laboratory Results provided by Data Analysis Technologies, Inc.

BDL (below detection level) - all analytical values used to calculate and report an in-stack emissions value are less than the laboratory's reported detection level(s)

DLL (detection level limited) - at least one but not all values used to calculate and report an in-stack emissions value are greater than the laboratory's reported detection level(s)

	Initials	Date
Data Entry	JP	7/26/2011
Review	RI	8/17/2011

Reference Method 4 - Determination of Moisture Content in Stack Gases

Nomenclature:

H_2O	=	Moisture content of gas stream, vol%.
B_{ws}	=	Proportion of water vapor, by volume, in the gas stream.
M_w	=	Molecular weight of water, 18.0 lb/lb-mole.
P_m	=	Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
R_i	=	Ideal gas constant, 21.85 (in. Hg)(ft ³)/(lb-mole)(°R).
T_{mf}	=	Temperature at meter, °F.
T_m	=	Absolute temperature at meter, °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_f	=	Final volume of condenser water, ml.
V_i	=	Initial volume, if any, of condenser water, ml.
V_m	=	Dry gas volume measured by dry gas meter, dcf.
V_{mstd}	=	Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscf.
V_{wcstd}	=	Volume of water vapor condensed, corrected to standard conditions, scf.
V_{wsgstd}	=	Volume of water vapor collected in silica gel, corrected to standard conditions, scf.
W_f	=	Final weight of silica gel or silica gel plus impinger, g.
W_i	=	Initial weight of silica gel or silica gel plus impinger, g.
Y	=	Dry gas meter calibration factor.
ρ_w	=	Density of water, 0.002201 lb/ml.

Variables:

Run 1:

$V_{m1} := 153.738 \cdot ft^3$	$P_{m1} := 29.72 \cdot in_Hg$
$W_{i1} := 0.0 \cdot g$	$T_{mf1} := 86.8 \cdot ^\circ F$
$W_{f1} := 888.1 \cdot g$	$Y_1 := 1.003$
$V_{f1} := 0$	$V_{i1} := 0$

Run 3:

$V_{m3} := 157.033 \cdot ft^3$	$P_{m3} := 29.67 \cdot in_Hg$
$W_{i3} := 0.0 \cdot g$	$T_{mf3} := 86.1 \cdot ^\circ F$
$W_{f3} := 937.4 \cdot g$	$Y_3 := 1.003$
$V_{f3} := 0$	$V_{i3} := 0$

Run 2:

$V_{m2} := 137.751 \cdot ft^3$	$P_{m2} := 29.69 \cdot in_Hg$
$W_{i2} := 0.0 \cdot g$	$T_{mf2} := 86.3 \cdot ^\circ F$
$W_{f2} := 834.9 \cdot g$	$Y_2 := 1.003$
$V_{f2} := 0$	$V_{i2} := 0$

Constants:

$M_w := 18.0 \cdot \frac{lb}{lb \cdot mol}$	$K_1 := 0.04706 \cdot \frac{ft^3}{ml}$
$P_{std} := 29.92 \cdot in_Hg$	$K_2 := 453.6 \cdot \frac{g}{lb}$
$T_{std} := 528 \cdot ^\circ R$	$K_3 := 0.04715 \cdot \frac{ft^3}{g}$
$\rho_w := 0.002201 \cdot \frac{lb}{ml}$	$K_4 := 17.64 \cdot \frac{^\circ R}{in_Hg}$
$R_i := 21.85 \cdot \frac{in_Hg \cdot ft^3}{lb \cdot mol \cdot ^\circ R}$	

Calculations:

Run 1:

$$V_{wcstd1} := \frac{(V_{f1} - V_{i1}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd1} := \frac{(W_{f1} - W_{i1}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd1} := K_1(V_{f1} - V_{i1})$$

$$V_{wsgstd1} := K_3(W_{f1} - W_{i1})$$

$$V_{wcstd1} = 0.000 \text{ scf}$$

$$V_{wsgstd1} = 41.941 \text{ scf}$$

$$V_{mstd1} := \frac{V_{m1} \cdot Y_1 \cdot P_{m1} \cdot T_{std}}{P_{std} \cdot (T_{mf1} + 460)} \quad Eq. 4-3$$

$$B_{ws1} := \frac{V_{wcstd1} + V_{wsgstd1}}{V_{wcstd1} + V_{wsgstd1} + V_{mstd1}} \quad Eq. 4-4$$

$$V_{mstd1} := K_4 Y_1 (V_{m1} P_{m1}) / T_{m1}$$

$$B_{ws1} = 0.2209$$

$$\boxed{V_{mstd1} = 147.9 \text{ dscf}}$$

$$H2O1 := B_{ws1} \cdot 100 \cdot \text{vol}\%$$

$$\boxed{H2O1 = 22.09 \text{ vol}\%}$$

Run 2:

$$V_{wcstd2} := \frac{(V_{f2} - V_{i2}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd2} := \frac{(W_{f2} - W_{i2}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd2} := K_1(V_{f2} - V_{i2})$$

$$V_{wsgstd2} := K_3(W_{f2} - W_{i2})$$

$$V_{wcstd2} = 0.000 \text{ scf}$$

$$V_{wsgstd2} = 39.429 \text{ scf}$$

$$V_{mstd2} := \frac{V_{m2} \cdot Y_2 \cdot P_{m2} \cdot T_{std}}{P_{std} \cdot (T_{mf2} + 460)} \quad Eq. 4-3$$

$$B_{ws2} := \frac{V_{wcstd2} + V_{wsgstd2}}{V_{wcstd2} + V_{wsgstd2} + V_{mstd2}} \quad Eq. 4-4$$

$$V_{mstd2} := K_4 Y_2 (V_{m2} P_{m2}) / T_{m2}$$

$$B_{ws2} = 0.2293$$

$$\boxed{V_{mstd2} = 132.5 \text{ dscf}}$$

$$H2O2 := B_{ws2} \cdot 100 \cdot \text{vol}\%$$

$$\boxed{H2O2 = 22.93 \text{ vol}\%}$$

Run 3:

$$V_{wcstd3} := \frac{(V_{f3} - V_{i3}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad \text{Eq. 4-1}$$

$$V_{wcstd3} := K_1(V_{f3} - V_{i3})$$

$$V_{wcstd3} = 0.000 \text{ scf}$$

$$V_{mstd3} := \frac{V_{m3} \cdot Y_3 \cdot P_{m3} \cdot T_{std}}{P_{std} \cdot (T_{mf3} + 460)} \quad \text{Eq. 4-3}$$

$$V_{mstd3} := K_4 Y_3 (V_{m3} P_{m3}) / T_{m3}$$

$$V_{mstd3} = 151.0 \text{ dscf}$$

$$V_{wsstd3} := \frac{(W_{f3} - W_{i3}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad \text{Eq. 4-2}$$

$$V_{wsstd3} := K_3(W_{f3} - W_{i3})$$

$$V_{wsstd3} = 44.269 \text{ scf}$$

$$B_{ws3} := \frac{V_{wcstd3} + V_{wsstd3}}{V_{wcstd3} + V_{wsstd3} + V_{mstd3}} \quad \text{Eq. 4-4}$$

$$B_{ws3} = 0.2267$$

$$H_2O_3 := B_{ws3} \cdot 100 \cdot \text{vol\%}$$

$$H_2O_3 = 22.67 \text{ vol\%}$$

Reference Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

Nomenclature:

M_d	=	Dry molecular weight, lb/lb-mole.
M_s	=	Wet molecular weight, lb/lb-mole.
$\%CO_2$	=	Percent CO_2 by volume, dry basis.
$\%O_2$	=	Percent O_2 by volume, dry basis.
$\%CO$	=	Percent CO by volume, dry basis.
$\%N_2$	=	Percent N_2 by volume, dry basis.
Bal	=	$\%N_2 + \%CO$.
28	=	Molecular weight of N_2 or CO, lb/lb-mol.
32	=	Molecular weight of O_2 , lb/lb-mol.
44	=	Molecular weight of CO_2 , lb/lb-mol.

Variables:

$$\%O_2_1 := 0.63 \cdot \text{vol}\%$$

$$\%O_2_2 := 0.79 \cdot \text{vol}\%$$

$$\%O_2_3 := 0.50 \cdot \text{vol}\%$$

$$\%CO_2_1 := 18.17 \cdot \text{vol}\%$$

$$\%CO_2_2 := 18.06 \cdot \text{vol}\%$$

$$\%CO_2_3 := 18.05 \cdot \text{vol}\%$$

$$Bal_1 := 100 \cdot \text{vol}\% - (\%O_2_1 + \%CO_2_1)$$

$$Bal_2 := 100 \cdot \text{vol}\% - (\%O_2_2 + \%CO_2_2)$$

$$Bal_1 = 81.20 \text{ vol}\%$$

$$Bal_2 = 81.15 \text{ vol}\%$$

$$Bal_3 := 100 \cdot \text{vol}\% - (\%O_2_3 + \%CO_2_3)$$

$$Bal_3 = 81.45 \text{ vol}\%$$

Calculations:

$$M_{d1} := 44 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%CO_2_1 + 32 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%O_2_1 + 28 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} (Bal_1) \quad \text{Eq. 3-1}$$

$$M_{d1} = 30.93 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$M_{d2} := 44 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%CO_2_2 + 32 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%O_2_2 + 28 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} (Bal_2) \quad \text{Eq. 3-1}$$

$$M_{d2} = 30.92 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$M_{d3} := 44 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%CO_2_3 + 32 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%O_2_3 + 28 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} (Bal_3) \quad \text{Eq. 3-1}$$

$$M_{d3} = 30.91 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

Reference Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate

Nomenclature:

A_s	=	Cross-sectional area of stack, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
B_{wST}	=	Water vapor in gas stream calculated using steam table.
C_p	=	Pitot tube coefficient, dimensionless.
K_p	=	Velocity equation constant.
M_d	=	Molecular weight of stack gas, dry basis, lb/lb-mol.
M_s	=	Molecular weight of stack gas, wet basis, lb/lb-mol.
P_m	=	Barometric pressure at measurement site, in. Hg.
P_g	=	Stack static pressure, in. H ₂ O.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
Q_{sd}	=	Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr, dscf/min.
T_s	=	Stack temperature, °F.
T_{sabs}	=	Absolute stack temperature (460 + T_s), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
Δp_{avgqrt}	=	Average square root of Δp , in. H ₂ O.
3600	=	Conversion factor, sec/hr.
18.0	=	Molecular weight of water, lb/lb-mol.

Constants:

$$K_p := 85.49 \cdot \frac{ft}{sec} \cdot \left[\frac{\left(\frac{lb}{lb \cdot mol} \right) \cdot (in_Hg)}{(R) \cdot (in_H2O)} \right]^{\frac{1}{2}}$$

Variables:

$A_s := 50.528 \cdot ft^2$	$\Delta p_{avgqrt2} := 0.6322 \cdot in_H2O^{\frac{1}{2}}$
$C_p := 0.84$	$T_{s2} := 140.2 \cdot ^\circ F$
$\Delta p_{avgqrt1} := 0.6457 \cdot in_H2O^{\frac{1}{2}}$	$P_{g2} := 0.36 \cdot in_H2O$
$T_{s1} := 140.1 \cdot ^\circ F$	$\Delta p_{avgqrt3} := 0.6604 \cdot in_H2O^{\frac{1}{2}}$
$P_{g1} := 0.35 \cdot in_H2O$	$T_{s3} := 139.8 \cdot ^\circ F$
$B_{wST1} := 0.1990$	$P_{g3} := 0.36 \cdot in_H2O$
$B_{wST2} := 0.1997$	
$B_{wST3} := 0.1982$	

Note the lower of the two moisture fractions will be used: either the one measured by impinger analysis or calculated by the steam table.

Calculations:

Run 1:

$$T_{sabs1} := T_{s1} + 460 \quad T_{sabs1} = 600.1 \text{ }^{\circ}\text{R} \quad P_{s1} := P_{m1} + \frac{P_{g1}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s1} = 29.75 \text{ in}_{Hg}$$

$$M_{s1} := M_{d1} \cdot (1 - B_{wST1}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST1} \quad \text{Eq. 2-6} \quad M_{s1} = 28.36 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s1} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs1}}{P_{s1} \cdot M_{s1}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s1} = 39.11 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd1} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST1}) \cdot V_{s1} \cdot A_s \cdot \left(\frac{T_{std} P_{s1}}{T_{sabs1} P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd1} = 4984493.83 \frac{\text{dscf}}{\text{hr}}} \quad \boxed{Q_{sd1} = 83074.90 \frac{\text{dscf}}{\text{min}}}$$

Run 2:

$$T_{sabs2} := T_{s2} + 460 \quad T_{sabs2} = 600.2 \text{ }^{\circ}\text{R} \quad P_{s2} := P_{m2} + \frac{P_{g2}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s2} = 29.72 \text{ in}_{Hg}$$

$$M_{s2} := M_{d2} \cdot (1 - B_{wST2}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST2} \quad \text{Eq. 2-6} \quad M_{s2} = 28.34 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s2} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs2}}{P_{s2} \cdot M_{s2}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s2} = 38.33 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd2} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST2}) \cdot V_{s2} \cdot A_s \cdot \left(\frac{T_{std} P_{s2}}{T_{sabs2} P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd2} = 4874758.90 \frac{\text{dscf}}{\text{hr}}} \quad \boxed{Q_{sd2} = 81245.98 \frac{\text{dscf}}{\text{min}}}$$

Run 3:

$$T_{sabs3} := T_{s3} + 460 \quad T_{sabs3} = 599.8 \text{ }^{\circ}\text{R} \quad P_{s3} := P_{m3} + \frac{P_{g3}}{13.6 \cdot \frac{\text{in_H2O}}{\text{in_Hg}}} \quad P_{s3} = 29.70 \text{ in_Hg}$$

$$M_{s3} := M_{d3} \cdot (1 - B_{wST3}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST3} \quad \text{Eq. 2-6} \quad M_{s3} = 28.35 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s3} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs3}}{P_{s3} \cdot M_{s3}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s3} = 40.03 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd3} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST3}) \cdot V_{s3} \cdot A_s \cdot \left(\frac{T_{std} P_{s3}}{T_{sabs3} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd3} = 5100938.86 \frac{\text{dscf}}{\text{hr}}} \quad \boxed{Q_{sd3} = 85015.65 \frac{\text{dscf}}{\text{min}}}$$

Isokinetic Sampling Rate

Nomenclature:

A_n	=	Cross-sectional area of nozzle, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
I	=	Percent of isokinetic sampling.
N_d	=	Nozzle diameter, in.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
V_{mstd}	=	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Θ_t	=	Total sampling time, min.
60	=	Conversion factor, sec/min.
100	=	Conversion to percent.

Variables:

$$\Theta_t := 240 \cdot \text{min}$$

$$N_{d1} := 0.265 \cdot \text{in}$$

$$An1 := \pi \cdot \left(\frac{N_{d1}}{2} \right)^2 \quad An1 = 3.83 \times 10^{-4} \text{ ft}^2$$

$$N_{d2} := 0.252 \cdot \text{in}$$

$$An2 := \pi \cdot \left(\frac{N_{d2}}{2} \right)^2 \quad An2 = 3.46 \times 10^{-4} \text{ ft}^2$$

$$N_{d3} := 0.265 \cdot \text{in}$$

$$An3 := \pi \cdot \left(\frac{N_{d3}}{2} \right)^2 \quad An3 = 3.83 \times 10^{-4} \text{ ft}^2$$

Constants:

$$K_5 := 0.09450 \cdot \frac{\text{in_Hg} \cdot \% \cdot \text{min}}{\text{sec} \cdot \mathcal{R}}$$

$$T_{std} = 528 \mathcal{R}$$

$$P_{std} = 29.92 \text{ in_Hg}$$

Calculations:

$$I_1 := \frac{T_{sabs1} \cdot V_{mstd1} \cdot P_{std} 100 \cdot \%}{T_{std} V_{s1} \cdot \Theta_t \cdot An1 \cdot P_{s1} \cdot 60 \frac{sec}{min} \cdot (1 - B_{wST1})} \quad Eq. 5-8 \quad \boxed{I_1 = 97.86 \%}$$

$$I_2 := \frac{T_{sabs2} \cdot V_{mstd2} \cdot P_{std} 100 \cdot \%}{T_{std} V_{s2} \cdot \Theta_t \cdot An2 \cdot P_{s2} \cdot 60 \frac{sec}{min} \cdot (1 - B_{wST2})} \quad Eq. 5-8 \quad \boxed{I_2 = 99.14 \%}$$

$$I_3 := \frac{T_{sabs3} \cdot V_{mstd3} \cdot P_{std} 100 \cdot \%}{T_{std} V_{s3} \cdot \Theta_t \cdot An3 \cdot P_{s3} \cdot 60 \frac{sec}{min} \cdot (1 - B_{wST3})} \quad Eq. 5-8 \quad \boxed{I_3 = 97.64 \%}$$

RM 23 - Determination of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans From Stationary Sources

Nomenclature:

V_n	=	volume of the samples (Runs 1 to 3), dscf and dscm.
M_{PCB77n}	=	Mass of PCB 77 (Runs 1 to 3), pg.
M_{PCB81n}	=	Mass of PCB 81 (Runs 1 to 3), pg.
$M_{PCB105n}$	=	Mass of PCB 105 (Runs 1 to 3), pg.
$M_{PCB114n}$	=	Mass of PCB 114 (Runs 1 to 3), pg.
$M_{PCB118n}$	=	Mass of PCB 118 (Runs 1 to 3), pg.
$M_{PCB123n}$	=	Mass of PCB 123 (Runs 1 to 3), pg.
$M_{PCB126n}$	=	Mass of PCB 126 (Runs 1 to 3), pg.
$M_{PCB156n}$	=	Mass of PCB 156 (Runs 1 to 3), pg.
$M_{PCB157n}$	=	Mass of PCB 157 (Runs 1 to 3), pg.
$M_{PCB167n}$	=	Mass of PCB 167 (Runs 1 to 3), pg.
$M_{PCB169n}$	=	Mass of PCB 169 (Runs 1 to 3), pg.
$M_{PCB189n}$	=	Mass of PCB 189 (Runs 1 to 3), pg.
M_{TCDFn}	=	Mass of 2,3,7,8-TCDF (Runs 1 to 3), pg.
$M_{PeCDF-an}$	=	Mass of 1,2,3,7,8-PeCDF (Runs 1 to 3), pg.
$M_{PeCDF-bn}$	=	Mass of 2,3,4,7,8-PeCDF (Runs 1 to 3), pg.
$M_{HxCDF-an}$	=	Mass of 1,2,3,4,7,8-HxCDF (Runs 1 to 3), pg.
$M_{HxCDF-bn}$	=	Mass of 1,2,3,6,7,8-HxCDF (Runs 1 to 3), pg.
$M_{HxCDF-cn}$	=	Mass of 2,3,4,6,7,8-HxCDF (Runs 1 to 3), pg.
$M_{HxCDF-dn}$	=	Mass of 1,2,3,7,8,9-HxCDF (Runs 1 to 3), pg.
$M_{HpCDF-an}$	=	Mass of 1,2,3,4,6,7,8-HpCDF (Runs 1 to 3), pg.
$M_{HpCDF-bn}$	=	Mass of 1,2,3,4,7,8,9-HpCDF (Runs 1 to 3), pg.
M_{OCDFn}	=	Mass of OCDF (Runs 1 to 3), pg.
M_{TCDDn}	=	Mass of 2,3,7,8-TCDD (Runs 1 to 3), pg.
M_{PeCDDn}	=	Mass of 1,2,3,7,8-PeCDD (Runs 1 to 3), pg.
$M_{HxCDD-an}$	=	Mass of 1,2,3,4,7,8-HxCDD (Runs 1 to 3), pg.
$M_{HxCDD-bn}$	=	Mass of 1,2,3,6,7,8-HxCDD (Runs 1 to 3), pg.
$M_{HxCDD-cn}$	=	Mass of 1,2,3,7,8,9-HxCDD (Runs 1 to 3), pg.
M_{HpCDDn}	=	Mass of 1,2,3,4,6,7,8-HpCDD (Runs 1 to 3), pg.
M_{OCDDn}	=	Mass of OCDD (Runs 1 to 3), pg.
M_{Aan}	=	Mass of Acenaphthene (Runs 1 to 3), ug.
M_{Abn}	=	Mass of Acenaphthylene (Runs 1 to 3), ug.
M_{Acn}	=	Mass of Aniline (Runs 1 to 3), ug.
M_{Adn}	=	Mass of Anthracene (Runs 1 to 3), ug.
M_{Ban}	=	Mass of Benzidine (Runs 1 to 3), ug.
M_{Bbn}	=	Mass of Benzo[a]anthracene (Runs 1 to 3), ug.
M_{Bcn}	=	Mass of Benzo[b]fluoranthrene (Runs 1 to 3), ug.
M_{Bdn}	=	Mass of Benzo[k]fluoranthrene (Runs 1 to 3), ug.
M_{Ben}	=	Mass of Benzo[g,h,i]perylene (Runs 1 to 3), ug.
M_{Bfn}	=	Mass of Benzo[a]pyrene (Runs 1 to 3), ug.
M_{Bgn}	=	Mass of Benzo[e]pyrene (Runs 1 to 3), ug.
M_{Bhn}	=	Mass of Biphenyl (Runs 1 to 3), ug.
M_{Can}	=	Mass of Cresol (mixed isomers) (Runs 1 to 3), ug.

M _{Cbn}	=	Mass of Chrysene (Runs 1 to 3), ug.
M _{Dan}	=	Mass of Dibenzo[a,h]anthracene (Runs 1 to 3), ug.
M _{Dbn}	=	Mass of Dibenzofuran (Runs 1 to 3), ug.
M _{Dcn}	=	Mass of 3,3'-Dimethoxybenzidine (Runs 1 to 3), ug.
M _{Ddn}	=	Mass of Dimethylaminobenzene (Runs 1 to 3), ug.
M _{Den}	=	Mass of 7,12-Dimethylbenz(a)anthracene (Runs 1 to 3), ug.
M _{Dfn}	=	Mass of 3,3'-Dimethylbenzidine (Runs 1 to 3), ug.
M _{Dgn}	=	Mass of a,a-Dimethylphenylethylamine (Runs 1 to 3), ug.
M _{Dhn}	=	Mass of 2,4-Dimethylphenol (Runs 1 to 3), ug.
M _{Fan}	=	Mass of Fluoranthene (Runs 1 to 3), ug.
M _{Fbn}	=	Mass of Fluorene (Runs 1 to 3), ug.
M _{Ian}	=	Mass of Ideno(1,2,3-cd)pyrene (Runs 1 to 3), ug.
M _{Ibn}	=	Mass of Isophorone (Runs 1 to 3), ug.
M _{Man}	=	Mass of 3-Methylcholanthrene (Runs 1 to 3), ug.
M _{Mbn}	=	Mass of 2-Methylnaphthalene (Runs 1 to 3), ug.
M _{Nn}	=	Mass of Naphthalene (Runs 1 to 3), ug.
M _{Pan}	=	Mass of Perylene (Runs 1 to 3), ug.
M _{Pbn}	=	Mass of Phenanthrene (Runs 1 to 3), ug.
M _{Pcn}	=	Mass of Phenol (Runs 1 to 3), ug.
M _{Pdn}	=	Mass of 1,4-Phenylenediamine (Runs 1 to 3), ug.
M _{Pen}	=	Mass of Pyrene (Runs 1 to 3), ug.
M _{Tn}	=	Mass of o-Toluidine (Runs 1 to 3), ug.
C _{PCB77n}	=	Concentration of PCB 77 (Runs 1 to 3), pg/dscm and lb/hr.
C _{PCB81n}	=	Concentration of PCB 81 (Runs 1 to 3), pg/dscm and lb/hr.
C _{PCB105n}	=	Concentration of PCB 105 (Runs 1 to 3), pg/dscm and lb/hr.
C _{PCB114n}	=	Concentration of PCB 114 (Runs 1 to 3), pg/dscm and lb/hr.
C _{PCB118n}	=	Concentration of PCB 118 (Runs 1 to 3), pg/dscm and lb/hr.
C _{PCB123n}	=	Concentration of PCB 123 (Runs 1 to 3), pg/dscm and lb/hr.
C _{PCB126n}	=	Concentration of PCB 126 (Runs 1 to 3), pg/dscm and lb/hr.
C _{PCB156n}	=	Concentration of PCB 156 (Runs 1 to 3), pg/dscm and lb/hr.
C _{PCB157n}	=	Concentration of PCB 157 (Runs 1 to 3), pg/dscm and lb/hr.
C _{PCB167n}	=	Concentration of PCB 167 (Runs 1 to 3), pg/dscm and lb/hr.
C _{PCB169n}	=	Concentration of PCB 169 (Runs 1 to 3), pg/dscm and lb/hr.
C _{PCB189n}	=	Concentration of PCB 189 (Runs 1 to 3), pg/dscm and lb/hr.
C _{TCDFn}	=	Concentration of 2,3,7,8-TCDF (Runs 1 to 3), pg/dscm and lb/hr.
C _{PeCDF-an}	=	Concentration of 1,2,3,7,8-PeCDF (Runs 1 to 3), pg/dscm and lb/hr.
C _{PeCDF-bn}	=	Concentration of 2,3,4,7,8-PeCDF (Runs 1 to 3), pg/dscm and lb/hr.
C _{HxCDF-an}	=	Concentration of 1,2,3,4,7,8-HxCDF (Runs 1 to 3), pg/dscm and lb/hr.
C _{HxCDF-bn}	=	Concentration of 1,2,3,6,7,8-HxCDF (Runs 1 to 3), pg/dscm and lb/hr.
C _{HxCDF-cn}	=	Concentration of 2,3,4,6,7,8-HxCDF (Runs 1 to 3), pg/dscm and lb/hr.
C _{HxCDF-dn}	=	Concentration of 1,2,3,7,8,9-HxCDF (Runs 1 to 3), pg/dscm and lb/hr.
C _{HpCDF-an}	=	Concentration of 1,2,3,4,6,7,8-HpCDF (Runs 1 to 3), pg/dscm and lb/hr.
C _{HpCDF-bn}	=	Concentration of 1,2,3,4,7,8,9-HpCDF (Runs 1 to 3), pg/dscm and lb/hr.
C _{OCDFn}	=	Concentration of OCDF (Runs 1 to 3), pg/dscm and lb/hr.
C _{TCDDn}	=	Concentration of 2,3,7,8-TCDD (Runs 1 to 3), pg/dscm and lb/hr.

C _{PeCDDn}	=	Concentration of 1,2,3,7,8-PeCDD (Runs 1 to 3), pg/dscm and lb/hr.
C _{HxCDD-an}	=	Concentration of 1,2,3,4,7,8-HxCDD (Runs 1 to 3), pg/dscm and lb/hr.
C _{HxCDD-bn}	=	Concentration of 1,2,3,6,7,8-HxCDD (Runs 1 to 3), pg/dscm and lb/hr.
C _{HxCDD-cn}	=	Concentration of 1,2,3,7,8,9-HxCDD (Runs 1 to 3), pg/dscm and lb/hr.
C _{HpCDDn}	=	Concentration of 1,2,3,4,6,7,8-HpCDD (Runs 1 to 3), pg/dscm and lb/hr.
C _{OCDDn}	=	Concentration of OCDD (Runs 1 to 3), pg/dscm and lb/hr.
C _{Aan}	=	Concentration of Acenaphthene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Abn}	=	Concentration of Acenaphthylene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Acn}	=	Concentration of Aniline (Runs 1 to 3), ug/dscm and lb/hr.
C _{Adn}	=	Concentration of Anthracene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Ban}	=	Concentration of Benzidine (Runs 1 to 3), ug/dscm and lb/hr.
C _{Bbn}	=	Concentration of Benzo[a]anthracene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Bcn}	=	Concentration of Benzo[b]fluoranthrene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Bdn}	=	Concentration of Benzo[k]fluoranthrene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Ben}	=	Concentration of Benzo[g,h,i]perylene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Bfn}	=	Concentration of Benzo[a]pyrene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Bgn}	=	Concentration of Benzo[e]pyrene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Bhn}	=	Concentration of Biphenyl (Runs 1 to 3), ug/dscm and lb/hr.
C _{Can}	=	Concentration of Cresol (mixed isomers) (Runs 1 to 3), ug/dscm and lb/hr.
C _{Cbn}	=	Concentration of Chrysene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Dan}	=	Concentration of Dibenz[a,h]anthracene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Dbn}	=	Concentration of Dibenzofuran (Runs 1 to 3), ug/dscm and lb/hr.
C _{Dcn}	=	Concentration of 3,3'-Dimethoxybenzidine (Runs 1 to 3), ug/dscm and lb/hr.
C _{Ddn}	=	Concentration of Dimethylaminobenzene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Den}	=	Concentration of 7,12-Dimethylbenz(a)anthracene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Dfn}	=	Concentration of 3,3'-Dimethylbenzidine (Runs 1 to 3), ug/dscm and lb/hr.
C _{Dgn}	=	Concentration of a,a-Dimethylphenylethylamine (Runs 1 to 3), ug/dscm and lb/hr.
C _{Dhn}	=	Concentration of 2,4-Dimethylphenol (Runs 1 to 3), ug/dscm and lb/hr.
C _{Fan}	=	Concentration of Fluoranthene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Fbn}	=	Concentration of Fluorene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Ian}	=	Concentration of Ideno(1,2,3-cd)pyrene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Ibn}	=	Concentration of Isophorone (Runs 1 to 3), ug/dscm and lb/hr.
C _{Man}	=	Concentration of 3-Methylcholanthrene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Mbn}	=	Concentration of 2-Methylnaphthalene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Nn}	=	Concentration of Naphthalene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Pan}	=	Concentration of Perylene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Pbn}	=	Concentration of Phenanthrene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Pcn}	=	Concentration of Phenol (Runs 1 to 3), ug/dscm and lb/hr.
C _{Pdn}	=	Concentration of 1,4-Phenylenediamine (Runs 1 to 3), ug/dscm and lb/hr.
C _{Pen}	=	Concentration of Pyrene (Runs 1 to 3), ug/dscm and lb/hr.
C _{Tn}	=	Concentration of o-Toluidine (Runs 1 to 3), ug/dscm and lb/hr.

Variables:

$$v_1 := 147.905 dscf$$

$$v_2 := 132.522 dscf$$

$$v_3 := 151.010 dscf$$

RM 23:

$$M_{PCB77.1} := 49.76 pg$$

$$M_{PCB77.2} := 222.61 pg$$

$$M_{PCB77.3} := 5.51 pg$$

$$M_{PCB81.1} := 56.59 pg$$

$$M_{PCB81.2} := 155.17 pg$$

$$M_{PCB81.3} := 6.09 pg$$

$$M_{PCB105.1} := 982.08 pg$$

$$M_{PCB105.2} := 2289.93 pg$$

$$M_{PCB105.3} := 142.04 pg$$

$$M_{PCB114.1} := 80.55 pg$$

$$M_{PCB114.2} := 228.54 pg$$

$$M_{PCB114.3} := 5.18 pg$$

$$M_{PCB118.1} := 2867.35 pg$$

$$M_{PCB118.2} := 8136.04 pg$$

$$M_{PCB118.3} := 393.95 pg$$

$$M_{PCB123.1} := 2784.94 pg$$

$$M_{PCB123.2} := 7657.04 pg$$

$$M_{PCB123.3} := 362.73 pg$$

$$M_{PCB126.1} := 4.50 pg$$

$$M_{PCB126.2} := 4.54 pg$$

$$M_{PCB126.3} := 4.40 pg$$

$$M_{PCB156.1} := 179.17 pg$$

$$M_{PCB156.2} := 198.56 pg$$

$$M_{PCB156.3} := 40.05 pg$$

$$M_{PCB157.1} := 3.71 pg$$

$$M_{PCB157.2} := 6.29 pg$$

$$M_{PCB157.3} := 3.72 pg$$

$$M_{PCB167.1} := 328.47 pg$$

$$M_{PCB167.2} := 628.92 pg$$

$$M_{PCB167.3} := 72.33 pg$$

$$M_{PCB169.1} := 4.05 pg$$

$$M_{PCB169.2} := 6.86 pg$$

$$M_{PCB169.3} := 4.24 pg$$

$$M_{PCB189.1} := 3.37 pg$$

$$M_{PCB189.2} := 6.23 pg$$

$$M_{PCB189.3} := 3.46 pg$$

$$M_{TCDF.1} := 2.96 pg$$

$$M_{TCDF.2} := 13.94 pg$$

$$M_{TCDF.3} := 3.76 pg$$

$$M_{PeCDFa.1} := 5.14 pg$$

$$M_{PeCDFa.2} := 9.61 pg$$

$$M_{PeCDFa.3} := 7.75 pg$$

$$M_{PeCDFb.1} := 5.26 pg$$

$$M_{PeCDFb.2} := 9.84 pg$$

$$M_{PeCDFb.3} := 7.93 pg$$

$$M_{HxCDFa.1} := 7.77 pg$$

$$M_{HxCDFa.2} := 11.37 pg$$

$$M_{HxCDFa.3} := 7.79 pg$$

$$M_{HxCDFb.1} := 7.20 pg$$

$$M_{HxCDFb.2} := 10.53 pg$$

$$M_{HxCDFb.3} := 7.21 pg$$

$$M_{HxCDFc.1} := 7.82 pg$$

$$M_{HxCDFc.2} := 11.44 pg$$

$$M_{HxCDFc.3} := 7.83 pg$$

Constants:

$$K_6 := 35.31467 \frac{dscf}{m^3}$$

$$K_7 := 453.59 \frac{g}{lb}$$

$$K_8 := 1000 \frac{mg}{g}$$

$$K_9 := 1000000000000 \frac{pg}{g}$$

$$K_{10} := 1000000 \frac{ug}{g}$$

$M_{HxCDFd.1} := 9.26pg$

$M_{HxCDFd.2} := 13.54pg$

$M_{HxCDFd.3} := 9.27pg$

$M_{HpCDFa.1} := 6.89pg$

$M_{HpCDFa.2} := 10.04pg$

$M_{HpCDFa.3} := 7.38pg$

$M_{HpCDFb.1} := 9.09pg$

$M_{HpCDFb.2} := 13.24pg$

$M_{HpCDFb.3} := 22.35pg$

$M_{OCDF.1} := 30.00pg$

$M_{OCDF.2} := 18.19pg$

$M_{OCDF.3} := 39.58pg$

$M_{TCDD.1} := 3.74pg$

$M_{TCDD.2} := 6.35pg$

$M_{TCDD.3} := 4.73pg$

$M_{PeCDD.1} := 5.85pg$

$M_{PeCDD.2} := 10.23pg$

$M_{PeCDD.3} := 8.26pg$

$M_{HxCDDa.1} := 10.09pg$

$M_{HxCDDa.2} := 13.94pg$

$M_{HxCDDa.3} := 12.61pg$

$M_{HxCDDb.1} := 9.53pg$

$M_{HxCDDb.2} := 13.16pg$

$M_{HxCDDb.3} := 11.91pg$

$M_{HxCDDc.1} := 9.83pg$

$M_{HxCDDc.2} := 13.58pg$

$M_{HxCDDc.3} := 12.29pg$

$M_{HpCDD.1} := 8.10pg$

$M_{HpCDD.2} := 10.85pg$

$M_{HpCDD.3} := 8.80pg$

$M_{OCDD.1} := 373.71pg$

$M_{OCDD.2} := 118.12pg$

$M_{OCDD.3} := 80.70pg$

SW-846 0010:

$M_{Aa.1} := 1.38ug$

$M_{Aa.2} := 1.38ug$

$M_{Aa.3} := 1.38ug$

$M_{Ab.1} := 0.44ug$

$M_{Ab.2} := 0.44ug$

$M_{Ab.3} := 0.44ug$

$M_{Ac.1} := 6.64ug$

$M_{Ac.2} := 6.64ug$

$M_{Ac.3} := 6.64ug$

$M_{Ad.1} := 0.44ug$

$M_{Ad.2} := 0.44ug$

$M_{Ad.3} := 0.44ug$

$M_{Ba.1} := 0.68ug$

$M_{Ba.2} := 0.68ug$

$M_{Ba.3} := 0.68ug$

$M_{Bb.1} := 1.97ug$

$M_{Bb.2} := 1.97ug$

$M_{Bb.3} := 1.97ug$

$M_{Bc.1} := 0.36ug$

$M_{Bc.2} := 0.36ug$

$M_{Bc.3} := 0.36ug$

$M_{Bd.1} := 0.54ug$

$M_{Bd.2} := 0.54ug$

$M_{Bd.3} := 0.54ug$

$M_{Be.1} := 1.31ug$

$M_{Be.2} := 1.31ug$

$M_{Be.3} := 1.31ug$

$M_{Bf.1} := 1.22ug$	$M_{Bf.2} := 1.22ug$	$M_{Bf.3} := 1.22ug$
$M_{Bg.1} := 0.40ug$	$M_{Bg.2} := 0.40ug$	$M_{Bg.3} := 0.40ug$
$M_{Bh.1} := 0.40ug$	$M_{Bh.2} := 0.40ug$	$M_{Bh.3} := 0.40ug$
$M_{Ca.1} := 221.60ug$	$M_{Ca.2} := 236.40ug$	$M_{Ca.3} := 244.00ug$
$M_{Cb.1} := 1.39ug$	$M_{Cb.2} := 1.39ug$	$M_{Cb.3} := 1.39ug$
$M_{Da.1} := 1.19ug$	$M_{Da.2} := 1.19ug$	$M_{Da.3} := 1.19ug$
$M_{Db.1} := 1.01ug$	$M_{Db.2} := 1.01ug$	$M_{Db.3} := 1.01ug$
$M_{Dc.1} := 0.40ug$	$M_{Dc.2} := 0.40ug$	$M_{Dc.3} := 0.40ug$
$M_{Dd.1} := 0.40ug$	$M_{Dd.2} := 0.40ug$	$M_{Dd.3} := 0.40ug$
$M_{De.1} := 0.40ug$	$M_{De.2} := 0.40ug$	$M_{De.3} := 0.40ug$
$M_{Df.1} := 0.40ug$	$M_{Df.2} := 0.40ug$	$M_{Df.3} := 0.40ug$
$M_{Dg.1} := 0.40ug$	$M_{Dg.2} := 0.40ug$	$M_{Dg.3} := 0.40ug$
$M_{Dh.1} := 0.29ug$	$M_{Dh.2} := 26.65ug$	$M_{Dh.3} := 4.74ug$
$M_{Fa.1} := 0.40ug$	$M_{Fa.2} := 0.40ug$	$M_{Fa.3} := 0.40ug$
$M_{Fb.1} := 0.52ug$	$M_{Fb.2} := 0.52ug$	$M_{Fb.3} := 0.52ug$
$M_{Ia.1} := 1.26ug$	$M_{Ia.2} := 1.26ug$	$M_{Ia.3} := 1.26ug$
$M_{Ib.1} := 0.29ug$	$M_{Ib.2} := 0.29ug$	$M_{Ib.3} := 0.29ug$
$M_{Ma.1} := 0.40ug$	$M_{Ma.2} := 0.40ug$	$M_{Ma.3} := 0.40ug$
$M_{Mb.1} := 0.66ug$	$M_{Mb.2} := 0.66ug$	$M_{Mb.3} := 0.66ug$
$M_{N.1} := 1.74ug$	$M_{N.2} := 1.74ug$	$M_{N.3} := 1.74ug$
$M_{Pa.1} := 0.40ug$	$M_{Pa.2} := 0.40ug$	$M_{Pa.3} := 0.40ug$

$$M_{Pb.1} := 1.58ug$$

$$M_{Pb.2} := 1.58ug$$

$$M_{Pb.3} := 1.58ug$$

$$M_{Pc.1} := 169.80ug$$

$$M_{Pc.2} := 152.10ug$$

$$M_{Pc.3} := 193.09ug$$

$$M_{Pd.1} := 0.40ug$$

$$M_{Pd.2} := 0.40ug$$

$$M_{Pd.3} := 0.40ug$$

$$M_{Pe.1} := 0.48ug$$

$$M_{Pe.2} := 0.48ug$$

$$M_{Pe.3} := 0.48ug$$

$$M_{T.1} := 0.40ug$$

$$M_{T.2} := 0.40ug$$

$$M_{T.3} := 0.40ug$$

Calculations:

$$v_1 = 4.188 \text{ dscm}$$

$$v_2 = 3.753 \text{ dscm}$$

$$v_3 = 4.276 \text{ dscm}$$

$$c_{PCB77.1} := \frac{M_{PCB77.1}}{v_1}$$

$$c_{PCB77.2} := \frac{M_{PCB77.2}}{v_2}$$

$$c_{PCB77.1} = 11.881 \frac{pg}{dscm}$$

$$c_{PCB77.2} = 59.321 \frac{pg}{dscm}$$

$$C_{PCB77.1} := c_{PCB77.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB77.2} := c_{PCB77.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB77.1} = 3.70 \times 10^{-9} \frac{lb}{hr}$$

$$C_{PCB77.2} = 1.81 \times 10^{-8} \frac{lb}{hr}$$

$$c_{PCB77.3} := \frac{M_{PCB77.3}}{v_3}$$

$$c_{PCB77.3} = 1.289 \frac{pg}{dscm}$$

$$C_{PCB77.3} := c_{PCB77.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB77.3} = 4.10 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PCB81.1} := \frac{M_{PCB81.1}}{v_1}$$

$$c_{PCB81.2} := \frac{M_{PCB81.2}}{v_2}$$

$$c_{PCB81.1} = 13.512 \frac{pg}{dscm}$$

$$c_{PCB81.2} = 41.35 \frac{pg}{dscm}$$

$$C_{PCB81.1} := c_{PCB81.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB81.2} := c_{PCB81.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB81.1} = 4.20 \times 10^{-9} \frac{lb}{hr}$$

$$C_{PCB81.2} = 1.26 \times 10^{-8} \frac{lb}{hr}$$

$$c_{PCB81.3} := \frac{M_{PCB81.3}}{v_3}$$

$$c_{PCB81.3} = 1.424 \frac{pg}{dscm}$$

$$C_{PCB81.3} := c_{PCB81.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB81.3} = 4.54 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PCB105.1} := \frac{M_{PCB105.1}}{v_1}$$

$$c_{PCB105.2} := \frac{M_{PCB105.2}}{v_2}$$

$$c_{PCB105.1} = 234.487 \frac{pg}{dscm}$$

$$c_{PCB105.2} = 610.224 \frac{pg}{dscm}$$

$$C_{PCB105.1} := c_{PCB105.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB105.2} := c_{PCB105.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB105.1} = 7.30 \times 10^{-8} \frac{lb}{hr}$$

$$C_{PCB105.2} = 1.86 \times 10^{-7} \frac{lb}{hr}$$

$$c_{PCB105.3} := \frac{M_{PCB105.3}}{v_3}$$

$$c_{PCB105.3} = 33.217 \frac{pg}{dscm}$$

$$C_{PCB105.3} := c_{PCB105.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB105.3} = 1.06 \times 10^{-8} \frac{lb}{hr}$$

$$c_{PCB114.1} := \frac{M_{PCB114.1}}{v_1}$$

$$c_{PCB114.1} = 19.233 \frac{pg}{dscm}$$

$$C_{PCB114.1} := c_{PCB114.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB114.1} = 5.98 \times 10^{-9} \frac{lb}{hr}$$

$$c_{PCB114.2} := \frac{M_{PCB114.2}}{v_2}$$

$$c_{PCB114.2} = 60.902 \frac{pg}{dscm}$$

$$C_{PCB114.2} := c_{PCB114.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB114.2} = 1.85 \times 10^{-8} \frac{lb}{hr}$$

$$c_{PCB114.3} := \frac{M_{PCB114.3}}{v_3}$$

$$c_{PCB114.3} = 1.211 \frac{pg}{dscm}$$

$$C_{PCB114.3} := c_{PCB114.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB114.3} = 3.86 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PCB118.1} := \frac{M_{PCB118.1}}{v_1}$$

$$c_{PCB118.2} := \frac{M_{PCB118.2}}{v_2}$$

$$c_{PCB118.1} = 684.625 \frac{pg}{dscm}$$

$$c_{PCB118.2} = 2.168 \times 10^3 \frac{pg}{dscm}$$

$$C_{PCB118.1} := c_{PCB118.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB118.2} := c_{PCB118.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB118.1} = 2.13 \times 10^{-7} \frac{lb}{hr}$$

$$C_{PCB118.2} = 6.60 \times 10^{-7} \frac{lb}{hr}$$

$$c_{PCB118.3} := \frac{M_{PCB118.3}}{v_3}$$

$$c_{PCB118.3} = 92.128 \frac{pg}{dscm}$$

$$C_{PCB118.3} := c_{PCB118.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB118.3} = 2.93 \times 10^{-8} \frac{lb}{hr}$$

$$c_{PCB123.1} := \frac{M_{PCB123.1}}{v_1}$$

$$c_{PCB123.2} := \frac{M_{PCB123.2}}{v_2}$$

$$c_{PCB123.1} = 664.949 \frac{pg}{dscm}$$

$$c_{PCB123.2} = 2.04 \times 10^3 \frac{pg}{dscm}$$

$$C_{PCB123.1} := c_{PCB123.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB123.2} := c_{PCB123.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB123.1} = 2.07 \times 10^{-7} \frac{lb}{hr}$$

$$C_{PCB123.2} = 6.21 \times 10^{-7} \frac{lb}{hr}$$

$$c_{PCB123.3} := \frac{M_{PCB123.3}}{v_3}$$

$$c_{PCB123.3} = 84.827 \frac{pg}{dscm}$$

$$C_{PCB123.3} := c_{PCB123.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB123.3} = 2.70 \times 10^{-8} \frac{lb}{hr}$$

$$c_{PCB126.1} := \frac{M_{PCB126.1}}{v_1}$$

$$c_{PCB126.1} = 1.074 \frac{pg}{dscm}$$

$$C_{PCB126.1} := c_{PCB126.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB126.1} = 3.34 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PCB126.2} := \frac{M_{PCB126.2}}{v_2}$$

$$c_{PCB126.2} = 1.21 \frac{pg}{dscm}$$

$$C_{PCB126.2} := c_{PCB126.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB126.2} = 3.68 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PCB126.3} := \frac{M_{PCB126.3}}{v_3}$$

$$c_{PCB126.3} = 1.029 \frac{pg}{dscm}$$

$$C_{PCB126.3} := c_{PCB126.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB126.3} = 3.28 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PCB156.1} := \frac{M_{PCB156.1}}{v_1}$$

$$c_{PCB156.2} := \frac{M_{PCB156.2}}{v_2}$$

$$c_{PCB156.1} = 42.78 \frac{pg}{dscm}$$

$$c_{PCB156.2} = 52.913 \frac{pg}{dscm}$$

$$C_{PCB156.1} := c_{PCB156.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB156.2} := c_{PCB156.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB156.1} = 1.33 \times 10^{-8} \frac{lb}{hr}$$

$$C_{PCB156.2} = 1.61 \times 10^{-8} \frac{lb}{hr}$$

$$c_{PCB156.3} := \frac{M_{PCB156.3}}{v_3}$$

$$c_{PCB156.3} = 9.366 \frac{pg}{dscm}$$

$$C_{PCB156.3} := c_{PCB156.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB156.3} = 2.98 \times 10^{-9} \frac{lb}{hr}$$

$$c_{PCB157.1} := \frac{M_{PCB157.1}}{v_1}$$

$$c_{PCB157.2} := \frac{M_{PCB157.2}}{v_2}$$

$$c_{PCB157.1} = 0.886 \frac{pg}{dscm}$$

$$c_{PCB157.2} = 1.676 \frac{pg}{dscm}$$

$$C_{PCB157.1} := c_{PCB157.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB157.2} := c_{PCB157.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB157.1} = 2.76 \times 10^{-10} \frac{lb}{hr}$$

$$C_{PCB157.2} = 5.10 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PCB157.3} := \frac{M_{PCB157.3}}{v_3}$$

$$c_{PCB157.3} = 0.87 \frac{pg}{dscm}$$

$$C_{PCB157.3} := c_{PCB157.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB157.3} = 2.77 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PCB167.1} := \frac{M_{PCB167.1}}{v_1}$$

$$c_{PCB167.1} = 78.427 \frac{pg}{dscm}$$

$$C_{PCB167.1} := c_{PCB167.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB167.1} = 2.44 \times 10^{-8} \frac{lb}{hr}$$

$$c_{PCB167.2} := \frac{M_{PCB167.2}}{v_2}$$

$$c_{PCB167.2} = 167.596 \frac{pg}{dscm}$$

$$C_{PCB167.2} := c_{PCB167.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB167.2} = 5.10 \times 10^{-8} \frac{lb}{hr}$$

$$c_{PCB167.3} := \frac{M_{PCB167.3}}{v_3}$$

$$c_{PCB167.3} = 16.915 \frac{pg}{dscm}$$

$$C_{PCB167.3} := c_{PCB167.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB167.3} = 5.39 \times 10^{-9} \frac{lb}{hr}$$

$$c_{PCB169.1} := \frac{M_{PCB169.1}}{v_1}$$

$$c_{PCB169.2} := \frac{M_{PCB169.2}}{v_2}$$

$$c_{PCB169.1} = 0.967 \frac{pg}{dscm}$$

$$c_{PCB169.2} = 1.828 \frac{pg}{dscm}$$

$$C_{PCB169.1} := c_{PCB169.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB169.2} := c_{PCB169.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB169.1} = 3.01 \times 10^{-10} \frac{lb}{hr}$$

$$C_{PCB169.2} = 5.56 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PCB169.3} := \frac{M_{PCB169.3}}{v_3}$$

$$c_{PCB169.3} = 0.992 \frac{pg}{dscm}$$

$$C_{PCB169.3} := c_{PCB169.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB169.3} = 3.16 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PCB189.1} := \frac{M_{PCB189.1}}{v_1}$$

$$c_{PCB189.2} := \frac{M_{PCB189.2}}{v_2}$$

$$c_{PCB189.1} = 0.805 \frac{pg}{dscm}$$

$$c_{PCB189.2} = 1.66 \frac{pg}{dscm}$$

$$C_{PCB189.1} := c_{PCB189.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB189.2} := c_{PCB189.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB189.1} = 2.50 \times 10^{-10} \frac{lb}{hr}$$

$$C_{PCB189.2} = 5.05 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PCB189.3} := \frac{M_{PCB189.3}}{v_3}$$

$$c_{PCB189.3} = 0.809 \frac{pg}{dscm}$$

$$C_{PCB189.3} := c_{PCB189.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PCB189.3} = 2.58 \times 10^{-10} \frac{lb}{hr}$$

$$c_{TCDF.1} := \frac{M_{TCDF.1}}{v_1}$$

$$c_{TCDF.1} = 0.707 \frac{pg}{dscm}$$

$$C_{TCDF.1} := c_{TCDF.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{TCDF.1} = 2.20 \times 10^{-10} \frac{lb}{hr}$$

$$c_{TCDF.2} := \frac{M_{TCDF.2}}{v_2}$$

$$c_{TCDF.2} = 3.715 \frac{pg}{dscm}$$

$$C_{TCDF.2} := c_{TCDF.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{TCDF.2} = 1.13 \times 10^{-9} \frac{lb}{hr}$$

$$c_{TCDF.3} := \frac{M_{TCDF.3}}{v_3}$$

$$c_{TCDF.3} = 0.879 \frac{pg}{dscm}$$

$$C_{TCDF.3} := c_{TCDF.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{TCDF.3} = 2.80 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PeCDFa.1} := \frac{M_{PeCDFa.1}}{v_1}$$

$$c_{PeCDFa.2} := \frac{M_{PeCDFa.2}}{v_2}$$

$$c_{PeCDFa.1} = 1.227 \frac{pg}{dscm}$$

$$c_{PeCDFa.2} = 2.561 \frac{pg}{dscm}$$

$$C_{PeCDFa.1} := c_{PeCDFa.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PeCDFa.2} := c_{PeCDFa.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PeCDFa.1} = 3.82 \times 10^{-10} \frac{lb}{hr}$$

$$C_{PeCDFa.2} = 7.79 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PeCDFa.3} := \frac{M_{PeCDFa.3}}{v_3}$$

$$c_{PeCDFa.3} = 1.812 \frac{pg}{dscm}$$

$$C_{PeCDFa.3} := c_{PeCDFa.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PeCDFa.3} = 5.77 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PeCDFb.1} := \frac{M_{PeCDFb.1}}{v_1}$$

$$c_{PeCDFb.2} := \frac{M_{PeCDFb.2}}{v_2}$$

$$c_{PeCDFb.1} = 1.256 \frac{pg}{dscm}$$

$$c_{PeCDFb.2} = 2.622 \frac{pg}{dscm}$$

$$C_{PeCDFb.1} := c_{PeCDFb.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PeCDFb.2} := c_{PeCDFb.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PeCDFb.1} = 3.91 \times 10^{-10} \frac{lb}{hr}$$

$$C_{PeCDFb.2} = 7.98 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PeCDFb.3} := \frac{M_{PeCDFb.3}}{v_3}$$

$$c_{PeCDFb.3} = 1.854 \frac{pg}{dscm}$$

$$C_{PeCDFb.3} := c_{PeCDFb.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PeCDFb.3} = 5.91 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDFa.1} := \frac{M_{HxCDFa.1}}{v_1}$$

$$c_{HxCDFa.1} = 1.855 \frac{pg}{dscm}$$

$$C_{HxCDFa.1} := c_{HxCDFa.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFa.1} = 5.77 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDFa.2} := \frac{M_{HxCDFa.2}}{v_2}$$

$$c_{HxCDFa.2} = 3.03 \frac{pg}{dscm}$$

$$C_{HxCDFa.2} := c_{HxCDFa.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFa.2} = 9.22 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDFa.3} := \frac{M_{HxCDFa.3}}{v_3}$$

$$c_{HxCDFa.3} = 1.822 \frac{pg}{dscm}$$

$$C_{HxCDFa.3} := c_{HxCDFa.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFa.3} = 5.80 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDFb.1} := \frac{M_{HxCDFb.1}}{v_1}$$

$$c_{HxCDFb.1} = 1.719 \frac{pg}{dscm}$$

$$C_{HxCDFb.1} := c_{HxCDFb.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFb.1} = 5.35 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDFb.2} := \frac{M_{HxCDFb.2}}{v_2}$$

$$c_{HxCDFb.2} = 2.806 \frac{pg}{dscm}$$

$$C_{HxCDFb.2} := c_{HxCDFb.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFb.2} = 8.54 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDFb.3} := \frac{M_{HxCDFb.3}}{v_3}$$

$$c_{HxCDFb.3} = 1.686 \frac{pg}{dscm}$$

$$C_{HxCDFb.3} := c_{HxCDFb.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFb.3} = 5.37 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDFc.1} := \frac{M_{HxCDFc.1}}{v_1}$$

$$c_{HxCDFc.1} = 1.867 \frac{pg}{dscm}$$

$$C_{HxCDFc.1} := c_{HxCDFc.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFc.1} = 5.81 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDFc.2} := \frac{M_{HxCDFc.2}}{v_2}$$

$$c_{HxCDFc.2} = 3.049 \frac{pg}{dscm}$$

$$C_{HxCDFc.2} := c_{HxCDFc.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFc.2} = 9.28 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDFc.3} := \frac{M_{HxCDFc.3}}{v_3}$$

$$c_{HxCDFc.3} = 1.831 \frac{pg}{dscm}$$

$$C_{HxCDFc.3} := c_{HxCDFc.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFc.3} = 5.83 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDFd.1} := \frac{M_{HxCDFd.1}}{v_1}$$

$$c_{HxCDFd.1} = 2.211 \frac{pg}{dscm}$$

$$C_{HxCDFd.1} := c_{HxCDFd.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFd.1} = 6.88 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDFd.2} := \frac{M_{HxCDFd.2}}{v_2}$$

$$c_{HxCDFd.2} = 3.608 \frac{pg}{dscm}$$

$$C_{HxCDFd.2} := c_{HxCDFd.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFd.2} = 1.10 \times 10^{-9} \frac{lb}{hr}$$

$$c_{HxCDFd.3} := \frac{M_{HxCDFd.3}}{v_3}$$

$$c_{HxCDFd.3} = 2.168 \frac{pg}{dscm}$$

$$C_{HxCDFd.3} := c_{HxCDFd.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDFd.3} = 6.90 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HpCDFa.1} := \frac{M_{HpCDFa.1}}{v_1}$$

$$c_{HpCDFa.2} := \frac{M_{HpCDFa.2}}{v_2}$$

$$c_{HpCDFa.1} = 1.645 \frac{pg}{dscm}$$

$$c_{HpCDFa.2} = 2.675 \frac{pg}{dscm}$$

$$C_{HpCDFa.1} := c_{HpCDFa.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HpCDFa.2} := c_{HpCDFa.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HpCDFa.1} = 5.12 \times 10^{-10} \frac{lb}{hr}$$

$$C_{HpCDFa.2} = 8.14 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HpCDFa.3} := \frac{M_{HpCDFa.3}}{v_3}$$

$$c_{HpCDFa.3} = 1.726 \frac{pg}{dscm}$$

$$C_{HpCDFa.3} := c_{HpCDFa.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HpCDFa.3} = 5.50 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HpCDFb.1} := \frac{M_{HpCDFb.1}}{v_1}$$

$$c_{HpCDFb.2} := \frac{M_{HpCDFb.2}}{v_2}$$

$$c_{HpCDFb.1} = 2.17 \frac{pg}{dscm}$$

$$c_{HpCDFb.2} = 3.528 \frac{pg}{dscm}$$

$$C_{HpCDFb.1} := c_{HpCDFb.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HpCDFb.2} := c_{HpCDFb.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HpCDFb.1} = 6.75 \times 10^{-10} \frac{lb}{hr}$$

$$C_{HpCDFb.2} = 1.07 \times 10^{-9} \frac{lb}{hr}$$

$$c_{HpCDFb.3} := \frac{M_{HpCDFb.3}}{v_3}$$

$$c_{HpCDFb.3} = 5.227 \frac{pg}{dscm}$$

$$C_{HpCDFb.3} := c_{HpCDFb.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HpCDFb.3} = 1.66 \times 10^{-9} \frac{lb}{hr}$$

$$c_{OCDF.1} := \frac{M_{OCDF.1}}{v_1}$$

$$c_{OCDF.1} = 7.163 \frac{pg}{dscm}$$

$$C_{OCDF.1} := c_{OCDF.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{OCDF.1} = 2.23 \times 10^{-9} \frac{lb}{hr}$$

$$c_{OCDF.2} := \frac{M_{OCDF.2}}{v_2}$$

$$c_{OCDF.2} = 4.847 \frac{pg}{dscm}$$

$$C_{OCDF.2} := c_{OCDF.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{OCDF.2} = 1.48 \times 10^{-9} \frac{lb}{hr}$$

$$c_{OCDF.3} := \frac{M_{OCDF.3}}{v_3}$$

$$c_{OCDF.3} = 9.256 \frac{pg}{dscm}$$

$$C_{OCDF.3} := c_{OCDF.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{OCDF.3} = 2.95 \times 10^{-9} \frac{lb}{hr}$$

$$c_{TCDD.1} := \frac{M_{TCDD.1}}{v_1}$$

$$c_{TCDD.2} := \frac{M_{TCDD.2}}{v_2}$$

$$c_{TCDD.1} = 0.893 \frac{pg}{dscm}$$

$$c_{TCDD.2} = 1.692 \frac{pg}{dscm}$$

$$C_{TCDD.1} := c_{TCDD.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{TCDD.2} := c_{TCDD.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{TCDD.1} = 2.78 \times 10^{-10} \frac{lb}{hr}$$

$$C_{TCDD.2} = 5.15 \times 10^{-10} \frac{lb}{hr}$$

$$c_{TCDD.3} := \frac{M_{TCDD.3}}{v_3}$$

$$c_{TCDD.3} = 1.106 \frac{pg}{dscm}$$

$$C_{TCDD.3} := c_{TCDD.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{TCDD.3} = 3.52 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PeCDD.1} := \frac{M_{PeCDD.1}}{v_1}$$

$$c_{PeCDD.2} := \frac{M_{PeCDD.2}}{v_2}$$

$$c_{PeCDD.1} = 1.397 \frac{pg}{dscm}$$

$$c_{PeCDD.2} = 2.726 \frac{pg}{dscm}$$

$$C_{PeCDD.1} := c_{PeCDD.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PeCDD.2} := c_{PeCDD.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PeCDD.1} = 4.35 \times 10^{-10} \frac{lb}{hr}$$

$$C_{PeCDD.2} = 8.30 \times 10^{-10} \frac{lb}{hr}$$

$$c_{PeCDD.3} := \frac{M_{PeCDD.3}}{v_3}$$

$$c_{PeCDD.3} = 1.932 \frac{pg}{dscm}$$

$$C_{PeCDD.3} := c_{PeCDD.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{PeCDD.3} = 6.15 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDDa.1} := \frac{M_{HxCDDa.1}}{v_1}$$

$$c_{HxCDDa.1} = 2.409 \frac{pg}{dscm}$$

$$C_{HxCDDa.1} := c_{HxCDDa.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDDa.1} = 7.50 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDDa.2} := \frac{M_{HxCDDa.2}}{v_2}$$

$$c_{HxCDDa.2} = 3.715 \frac{pg}{dscm}$$

$$C_{HxCDDa.2} := c_{HxCDDa.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDDa.2} = 1.13 \times 10^{-9} \frac{lb}{hr}$$

$$c_{HxCDDa.3} := \frac{M_{HxCDDa.3}}{v_3}$$

$$c_{HxCDDa.3} = 2.949 \frac{pg}{dscm}$$

$$C_{HxCDDa.3} := c_{HxCDDa.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDDa.3} = 9.39 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDDb.1} := \frac{M_{HxCDDb.1}}{v_1}$$

$$c_{HxCDDb.1} = 2.275 \frac{pg}{dscm}$$

$$C_{HxCDDb.1} := c_{HxCDDb.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDDb.1} = 7.08 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDDb.2} := \frac{M_{HxCDDb.2}}{v_2}$$

$$c_{HxCDDb.2} = 3.507 \frac{pg}{dscm}$$

$$C_{HxCDDb.2} := c_{HxCDDb.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDDb.2} = 1.07 \times 10^{-9} \frac{lb}{hr}$$

$$c_{HxCDDb.3} := \frac{M_{HxCDDb.3}}{v_3}$$

$$c_{HxCDDb.3} = 2.785 \frac{pg}{dscm}$$

$$C_{HxCDDb.3} := c_{HxCDDb.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDDb.3} = 8.87 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDDc.1} := \frac{M_{HxCDDc.1}}{v_1}$$

$$c_{HxCDDc.1} = 2.347 \frac{pg}{dscm}$$

$$C_{HxCDDc.1} := c_{HxCDDc.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDDc.1} = 7.30 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HxCDDc.2} := \frac{M_{HxCDDc.2}}{v_2}$$

$$c_{HxCDDc.2} = 3.619 \frac{pg}{dscm}$$

$$C_{HxCDDc.2} := c_{HxCDDc.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDDc.2} = 1.10 \times 10^{-9} \frac{lb}{hr}$$

$$c_{HxCDDc.3} := \frac{M_{HxCDDc.3}}{v_3}$$

$$c_{HxCDDc.3} = 2.874 \frac{pg}{dscm}$$

$$C_{HxCDDc.3} := c_{HxCDDc.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HxCDDc.3} = 9.15 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HpCDD.1} := \frac{M_{HpCDD.1}}{v_1}$$

$$c_{HpCDD.1} = 1.934 \frac{pg}{dscm}$$

$$C_{HpCDD.1} := c_{HpCDD.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HpCDD.1} = 6.02 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HpCDD.2} := \frac{M_{HpCDD.2}}{v_2}$$

$$c_{HpCDD.2} = 2.891 \frac{pg}{dscm}$$

$$C_{HpCDD.2} := c_{HpCDD.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HpCDD.2} = 8.80 \times 10^{-10} \frac{lb}{hr}$$

$$c_{HpCDD.3} := \frac{M_{HpCDD.3}}{v_3}$$

$$c_{HpCDD.3} = 2.058 \frac{pg}{dscm}$$

$$C_{HpCDD.3} := c_{HpCDD.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{HpCDD.3} = 6.55 \times 10^{-10} \frac{lb}{hr}$$

$$c_{OCDD.1} := \frac{M_{OCDD.1}}{v_1}$$

$$c_{OCDD.2} := \frac{M_{OCDD.2}}{v_2}$$

$$c_{OCDD.1} = 89.229 \frac{pg}{dscm}$$

$$c_{OCDD.2} = 31.477 \frac{pg}{dscm}$$

$$C_{OCDD.1} := c_{OCDD.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{OCDD.2} := c_{OCDD.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{OCDD.1} = 2.78 \times 10^{-8} \frac{lb}{hr}$$

$$C_{OCDD.2} = 9.58 \times 10^{-9} \frac{lb}{hr}$$

$$c_{OCDD.3} := \frac{M_{OCDD.3}}{v_3}$$

$$c_{OCDD.3} = 18.872 \frac{pg}{dscm}$$

$$C_{OCDD.3} := c_{OCDD.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_9}$$

$$C_{OCDD.3} = 6.01 \times 10^{-9} \frac{lb}{hr}$$

$$c_{Aa.1} := \frac{M_{Aa.1}}{v_1}$$

$$c_{Aa.2} := \frac{M_{Aa.2}}{v_2}$$

$$c_{Aa.1} = 0.329 \frac{pg}{dscm}$$

$$c_{Aa.2} = 0.368 \frac{pg}{dscm}$$

$$C_{Aa.1} := c_{Aa.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Aa.2} := c_{Aa.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Aa.1} = 1.03 \times 10^{-4} \frac{lb}{hr}$$

$$C_{Aa.2} = 1.12 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Aa.3} := \frac{M_{Aa.3}}{v_3}$$

$$c_{Aa.3} = 0.323 \frac{pg}{dscm}$$

$$C_{Aa.3} := c_{Aa.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Aa.3} = 1.03 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Ab.1} := \frac{M_{Ab.1}}{v_1}$$

$$c_{Ab.1} = 0.105 \frac{pg}{dscm}$$

$$C_{Ab.1} := c_{Ab.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ab.1} = 3.27 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ab.2} := \frac{M_{Ab.2}}{v_2}$$

$$c_{Ab.2} = 0.117 \frac{pg}{dscm}$$

$$C_{Ab.2} := c_{Ab.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ab.2} = 3.57 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ab.3} := \frac{M_{Ab.3}}{v_3}$$

$$c_{Ab.3} = 0.103 \frac{pg}{dscm}$$

$$C_{Ab.3} := c_{Ab.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ab.3} = 3.28 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ac.1} := \frac{M_{Ac.1}}{v_1}$$

$$c_{Ac.2} := \frac{M_{Ac.2}}{v_2}$$

$$c_{Ac.1} = 1.585 \frac{pg}{dscm}$$

$$c_{Ac.2} = 1.769 \frac{pg}{dscm}$$

$$C_{Ac.1} := c_{Ac.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ac.2} := c_{Ac.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ac.1} = 4.93 \times 10^{-4} \frac{lb}{hr}$$

$$C_{Ac.2} = 5.38 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Ac.3} := \frac{M_{Ac.3}}{v_3}$$

$$c_{Ac.3} = 1.553 \frac{pg}{dscm}$$

$$C_{Ac.3} := c_{Ac.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ac.3} = 4.94 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Ad.1} := \frac{M_{Ad.1}}{v_1}$$

$$c_{Ad.2} := \frac{M_{Ad.2}}{v_2}$$

$$c_{Ad.1} = 0.105 \frac{pg}{dscm}$$

$$c_{Ad.2} = 0.117 \frac{pg}{dscm}$$

$$C_{Ad.1} := c_{Ad.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ad.2} := c_{Ad.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ad.1} = 3.27 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Ad.2} = 3.57 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ad.3} := \frac{M_{Ad.3}}{v_3}$$

$$c_{Ad.3} = 0.103 \frac{pg}{dscm}$$

$$C_{Ad.3} := c_{Ad.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ad.3} = 3.28 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ba.1} := \frac{M_{Ba.1}}{v_1}$$

$$c_{Ba.1} = 0.162 \frac{pg}{dscm}$$

$$C_{Ba.1} := c_{Ba.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ba.1} = 5.05 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ba.2} := \frac{M_{Ba.2}}{v_2}$$

$$c_{Ba.2} = 0.181 \frac{pg}{dscm}$$

$$C_{Ba.2} := c_{Ba.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ba.2} = 5.51 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ba.3} := \frac{M_{Ba.3}}{v_3}$$

$$c_{Ba.3} = 0.159 \frac{pg}{dscm}$$

$$C_{Ba.3} := c_{Ba.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ba.3} = 5.06 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bb.1} := \frac{M_{Bb.1}}{v_1}$$

$$c_{Bb.2} := \frac{M_{Bb.2}}{v_2}$$

$$c_{Bb.1} = 0.47 \frac{pg}{dscm}$$

$$c_{Bb.2} = 0.525 \frac{pg}{dscm}$$

$$C_{Bb.1} := c_{Bb.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bb.2} := c_{Bb.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bb.1} = 1.46 \times 10^{-4} \frac{lb}{hr}$$

$$C_{Bb.2} = 1.60 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Bb.3} := \frac{M_{Bb.3}}{v_3}$$

$$c_{Bb.3} = 0.461 \frac{pg}{dscm}$$

$$C_{Bb.3} := c_{Bb.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bb.3} = 1.47 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Bc.1} := \frac{M_{Bc.1}}{v_1}$$

$$c_{Bc.2} := \frac{M_{Bc.2}}{v_2}$$

$$c_{Bc.1} = 0.086 \frac{pg}{dscm}$$

$$c_{Bc.2} = 0.096 \frac{pg}{dscm}$$

$$C_{Bc.1} := c_{Bc.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bc.2} := c_{Bc.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bc.1} = 2.67 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Bc.2} = 2.92 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bc.3} := \frac{M_{Bc.3}}{v_3}$$

$$c_{Bc.3} = 0.084 \frac{pg}{dscm}$$

$$C_{Bc.3} := c_{Bc.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bc.3} = 2.68 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bd.1} := \frac{M_{Bd.1}}{v_1}$$

$$c_{Bd.1} = 0.129 \frac{pg}{dscm}$$

$$C_{Bd.1} := c_{Bd.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bd.1} = 4.01 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bd.2} := \frac{M_{Bd.2}}{v_2}$$

$$c_{Bd.2} = 0.144 \frac{pg}{dscm}$$

$$C_{Bd.2} := c_{Bd.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bd.2} = 4.38 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bd.3} := \frac{M_{Bd.3}}{v_3}$$

$$c_{Bd.3} = 0.126 \frac{pg}{dscm}$$

$$C_{Bd.3} := c_{Bd.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bd.3} = 4.02 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Be.1} := \frac{M_{Be.1}}{v_1}$$

$$c_{Be.2} := \frac{M_{Be.2}}{v_2}$$

$$c_{Be.1} = 0.313 \frac{pg}{dscm}$$

$$c_{Be.2} = 0.349 \frac{pg}{dscm}$$

$$C_{Be.1} := c_{Be.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Be.2} := c_{Be.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Be.1} = 9.73 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Be.2} = 1.06 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Be.3} := \frac{M_{Be.3}}{v_3}$$

$$c_{Be.3} = 0.306 \frac{pg}{dscm}$$

$$C_{Be.3} := c_{Be.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Be.3} = 9.76 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bf.1} := \frac{M_{Bf.1}}{v_1}$$

$$c_{Bf.2} := \frac{M_{Bf.2}}{v_2}$$

$$c_{Bf.1} = 0.291 \frac{pg}{dscm}$$

$$c_{Bf.2} = 0.325 \frac{pg}{dscm}$$

$$C_{Bf.1} := c_{Bf.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bf.2} := c_{Bf.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bf.1} = 9.06 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Bf.2} = 9.89 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bf.3} := \frac{M_{Bf.3}}{v_3}$$

$$c_{Bf.3} = 0.285 \frac{pg}{dscm}$$

$$C_{Bf.3} := c_{Bf.3} \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bf.3} = 9.09 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bg.1} := \frac{M_{Bg.1}}{v_1}$$

$$c_{Bg.1} = 0.096 \frac{pg}{dscm}$$

$$C_{Bg.1} := c_{Bg.1} \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bg.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bg.2} := \frac{M_{Bg.2}}{v_2}$$

$$c_{Bg.2} = 0.107 \frac{pg}{dscm}$$

$$C_{Bg.2} := c_{Bg.2} \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bg.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bg.3} := \frac{M_{Bg.3}}{v_3}$$

$$c_{Bg.3} = 0.094 \frac{pg}{dscm}$$

$$C_{Bg.3} := c_{Bg.3} \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bg.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bh.1} := \frac{M_{Bh.1}}{v_1}$$

$$c_{Bh.2} := \frac{M_{Bh.2}}{v_2}$$

$$c_{Bh.1} = 0.096 \frac{pg}{dscm}$$

$$c_{Bh.2} = 0.107 \frac{pg}{dscm}$$

$$C_{Bh.1} := c_{Bh.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bh.2} := c_{Bh.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bh.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Bh.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Bh.3} := \frac{M_{Bh.3}}{v_3}$$

$$c_{Bh.3} = 0.094 \frac{pg}{dscm}$$

$$C_{Bh.3} := c_{Bh.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Bh.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ca.1} := \frac{M_{Ca.1}}{v_1}$$

$$c_{Ca.2} := \frac{M_{Ca.2}}{v_2}$$

$$c_{Ca.1} = 52.911 \frac{pg}{dscm}$$

$$c_{Ca.2} = 62.996 \frac{pg}{dscm}$$

$$C_{Ca.1} := c_{Ca.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ca.2} := c_{Ca.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ca.1} = 1.65 \times 10^{-2} \frac{lb}{hr}$$

$$C_{Ca.2} = 1.92 \times 10^{-2} \frac{lb}{hr}$$

$$c_{Ca.3} := \frac{M_{Ca.3}}{v_3}$$

$$c_{Ca.3} = 57.061 \frac{pg}{dscm}$$

$$C_{Ca.3} := c_{Ca.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ca.3} = 1.82 \times 10^{-2} \frac{lb}{hr}$$

$$c_{Cb.1} := \frac{M_{Cb.1}}{v_1}$$

$$c_{Cb.1} = 0.332 \frac{pg}{dscm}$$

$$C_{Cb.1} := c_{Cb.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Cb.1} = 1.03 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Cb.2} := \frac{M_{Cb.2}}{v_2}$$

$$c_{Cb.2} = 0.37 \frac{pg}{dscm}$$

$$C_{Cb.2} := c_{Cb.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Cb.2} = 1.13 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Cb.3} := \frac{M_{Cb.3}}{v_3}$$

$$c_{Cb.3} = 0.325 \frac{pg}{dscm}$$

$$C_{Cb.3} := c_{Cb.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Cb.3} = 1.04 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Da.1} := \frac{M_{Da.1}}{v_1}$$

$$c_{Da.2} := \frac{M_{Da.2}}{v_2}$$

$$c_{Da.1} = 0.284 \frac{pg}{dscm}$$

$$c_{Da.2} = 0.317 \frac{pg}{dscm}$$

$$C_{Da.1} := c_{Da.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Da.2} := c_{Da.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Da.1} = 8.84 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Da.2} = 9.65 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Da.3} := \frac{M_{Da.3}}{v_3}$$

$$c_{Da.3} = 0.278 \frac{pg}{dscm}$$

$$C_{Da.3} := c_{Da.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Da.3} = 8.86 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Db.1} := \frac{M_{Db.1}}{v_1}$$

$$c_{Db.2} := \frac{M_{Db.2}}{v_2}$$

$$c_{Db.1} = 0.241 \frac{pg}{dscm}$$

$$c_{Db.2} = 0.269 \frac{pg}{dscm}$$

$$C_{Db.1} := c_{Db.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Db.2} := c_{Db.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Db.1} = 7.50 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Db.2} = 8.19 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Db.3} := \frac{M_{Db.3}}{v_3}$$

$$c_{Db.3} = 0.236 \frac{pg}{dscm}$$

$$C_{Db.3} := c_{Db.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Db.3} = 7.52 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Dc.1} := \frac{M_{Dc.1}}{v_1}$$

$$c_{Dc.1} = 0.096 \frac{pg}{dscm}$$

$$C_{Dc.1} := c_{Dc.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dc.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Dc.2} := \frac{M_{Dc.2}}{v_2}$$

$$c_{Dc.2} = 0.107 \frac{pg}{dscm}$$

$$C_{Dc.2} := c_{Dc.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dc.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Dc.3} := \frac{M_{Dc.3}}{v_3}$$

$$c_{Dc.3} = 0.094 \frac{pg}{dscm}$$

$$C_{Dc.3} := c_{Dc.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dc.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Dd.1} := \frac{M_{Dd.1}}{v_1}$$

$$c_{Dd.2} := \frac{M_{Dd.2}}{v_2}$$

$$c_{Dd.1} = 0.096 \frac{pg}{dscm}$$

$$c_{Dd.2} = 0.107 \frac{pg}{dscm}$$

$$C_{Dd.1} := c_{Dd.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dd.2} := c_{Dd.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dd.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Dd.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Dd.3} := \frac{M_{Dd.3}}{v_3}$$

$$c_{Dd.3} = 0.094 \frac{pg}{dscm}$$

$$C_{Dd.3} := c_{Dd.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dd.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

$$c_{De.1} := \frac{M_{De.1}}{v_1}$$

$$c_{De.2} := \frac{M_{De.2}}{v_2}$$

$$c_{De.1} = 0.096 \frac{pg}{dscm}$$

$$c_{De.2} = 0.107 \frac{pg}{dscm}$$

$$C_{De.1} := c_{De.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{De.2} := c_{De.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{De.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$C_{De.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{De.3} := \frac{M_{De.3}}{v_3}$$

$$c_{De.3} = 0.094 \frac{pg}{dscm}$$

$$C_{De.3} := c_{De.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{De.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Df.1} := \frac{M_{Df.1}}{v_1}$$

$$c_{Df.1} = 0.096 \frac{pg}{dscm}$$

$$C_{Df.1} := c_{Df.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Df.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Df.2} := \frac{M_{Df.2}}{v_2}$$

$$c_{Df.2} = 0.107 \frac{pg}{dscm}$$

$$C_{Df.2} := c_{Df.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Df.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Df.3} := \frac{M_{Df.3}}{v_3}$$

$$c_{Df.3} = 0.094 \frac{pg}{dscm}$$

$$C_{Df.3} := c_{Df.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Df.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Dg.1} := \frac{M_{Dg.1}}{v_1}$$

$$c_{Dg.2} := \frac{M_{Dg.2}}{v_2}$$

$$c_{Dg.1} = 0.096 \frac{pg}{dscm}$$

$$c_{Dg.2} = 0.107 \frac{pg}{dscm}$$

$$C_{Dg.1} := c_{Dg.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dg.2} := c_{Dg.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dg.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Dg.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Dg.3} := \frac{M_{Dg.3}}{v_3}$$

$$c_{Dg.3} = 0.094 \frac{pg}{dscm}$$

$$C_{Dg.3} := c_{Dg.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dg.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Dh.1} := \frac{M_{Dh.1}}{v_1}$$

$$c_{Dh.2} := \frac{M_{Dh.2}}{v_2}$$

$$c_{Dh.1} = 0.069 \frac{pg}{dscm}$$

$$c_{Dh.2} = 7.102 \frac{pg}{dscm}$$

$$C_{Dh.1} := c_{Dh.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dh.2} := c_{Dh.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dh.1} = 2.15 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Dh.2} = 2.16 \times 10^{-3} \frac{lb}{hr}$$

$$c_{Dh.3} := \frac{M_{Dh.3}}{v_3}$$

$$c_{Dh.3} = 1.108 \frac{pg}{dscm}$$

$$C_{Dh.3} := c_{Dh.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Dh.3} = 3.53 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Fa.1} := \frac{M_{Fa.1}}{v_1}$$

$$c_{Fa.1} = 0.096 \frac{pg}{dscm}$$

$$C_{Fa.1} := c_{Fa.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Fa.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Fa.2} := \frac{M_{Fa.2}}{v_2}$$

$$c_{Fa.2} = 0.107 \frac{pg}{dscm}$$

$$C_{Fa.2} := c_{Fa.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Fa.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Fa.3} := \frac{M_{Fa.3}}{v_3}$$

$$c_{Fa.3} = 0.094 \frac{pg}{dscm}$$

$$C_{Fa.3} := c_{Fa.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Fa.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Fb.1} := \frac{M_{Fb.1}}{v_1}$$

$$c_{Fb.2} := \frac{M_{Fb.2}}{v_2}$$

$$c_{Fb.1} = 0.124 \frac{pg}{dscm}$$

$$c_{Fb.2} = 0.139 \frac{pg}{dscm}$$

$$C_{Fb.1} := c_{Fb.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Fb.2} := c_{Fb.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Fb.1} = 3.86 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Fb.2} = 4.22 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Fb.3} := \frac{M_{Fb.3}}{v_3}$$

$$c_{Fb.3} = 0.122 \frac{pg}{dscm}$$

$$C_{Fb.3} := c_{Fb.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Fb.3} = 3.87 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ia.1} := \frac{M_{Ia.1}}{v_1}$$

$$c_{Ia.2} := \frac{M_{Ia.2}}{v_2}$$

$$c_{Ia.1} = 0.301 \frac{pg}{dscm}$$

$$c_{Ia.2} = 0.336 \frac{pg}{dscm}$$

$$C_{Ia.1} := c_{Ia.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ia.2} := c_{Ia.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ia.1} = 9.36 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Ia.2} = 1.02 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Ia.3} := \frac{M_{Ia.3}}{v_3}$$

$$c_{Ia.3} = 0.295 \frac{pg}{dscm}$$

$$C_{Ia.3} := c_{Ia.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ia.3} = 9.38 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ib.1} := \frac{M_{Ib.1}}{v_1}$$

$$c_{Ib.1} = 0.069 \frac{pg}{dscm}$$

$$C_{Ib.1} := c_{Ib.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ib.1} = 2.15 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ib.2} := \frac{M_{Ib.2}}{v_2}$$

$$c_{Ib.2} = 0.077 \frac{pg}{dscm}$$

$$C_{Ib.2} := c_{Ib.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ib.2} = 2.35 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ib.3} := \frac{M_{Ib.3}}{v_3}$$

$$c_{Ib.3} = 0.068 \frac{pg}{dscm}$$

$$C_{Ib.3} := c_{Ib.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ib.3} = 2.16 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ma.1} := \frac{M_{Ma.1}}{v_1}$$

$$c_{Ma.1} = 0.096 \frac{pg}{dscm}$$

$$C_{Ma.1} := c_{Ma.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ma.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ma.2} := \frac{M_{Ma.2}}{v_2}$$

$$c_{Ma.2} = 0.107 \frac{pg}{dscm}$$

$$C_{Ma.2} := c_{Ma.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ma.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Ma.3} := \frac{M_{Ma.3}}{v_3}$$

$$c_{Ma.3} = 0.094 \frac{pg}{dscm}$$

$$C_{Ma.3} := c_{Ma.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Ma.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Mb.1} := \frac{M_{Mb.1}}{v_1}$$

$$c_{Mb.1} = 0.158 \frac{pg}{dscm}$$

$$C_{Mb.1} := c_{Mb.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Mb.1} = 4.90 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Mb.2} := \frac{M_{Mb.2}}{v_2}$$

$$c_{Mb.2} = 0.176 \frac{pg}{dscm}$$

$$C_{Mb.2} := c_{Mb.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Mb.2} = 5.35 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Mb.3} := \frac{M_{Mb.3}}{v_3}$$

$$c_{Mb.3} = 0.154 \frac{pg}{dscm}$$

$$C_{Mb.3} := c_{Mb.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Mb.3} = 4.92 \times 10^{-5} \frac{lb}{hr}$$

$$c_{N.1} := \frac{M_{N.1}}{v_1}$$

$$c_{N.1} = 0.415 \frac{pg}{dscm}$$

$$C_{N.1} := c_{N.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{N.1} = 1.29 \times 10^{-4} \frac{lb}{hr}$$

$$c_{N.2} := \frac{M_{N.2}}{v_2}$$

$$c_{N.2} = 0.464 \frac{pg}{dscm}$$

$$C_{N.2} := c_{N.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{N.2} = 1.41 \times 10^{-4} \frac{lb}{hr}$$

$$c_{N.3} := \frac{M_{N.3}}{v_3}$$

$$c_{N.3} = 0.407 \frac{pg}{dscm}$$

$$C_{N.3} := c_{N.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{N.3} = 1.30 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Pa.1} := \frac{M_{Pa.1}}{v_1}$$

$$c_{Pa.2} := \frac{M_{Pa.2}}{v_2}$$

$$c_{Pa.1} = 0.096 \frac{pg}{dscm}$$

$$c_{Pa.2} = 0.107 \frac{pg}{dscm}$$

$$C_{Pa.1} := c_{Pa.1} \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pa.2} := c_{Pa.2} \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pa.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Pa.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Pa.3} := \frac{M_{Pa.3}}{v_3}$$

$$c_{Pa.3} = 0.094 \frac{pg}{dscm}$$

$$C_{Pa.3} := c_{Pa.3} \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pa.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Pb.1} := \frac{M_{Pb.1}}{v_1}$$

$$c_{Pb.2} := \frac{M_{Pb.2}}{v_2}$$

$$c_{Pb.1} = 0.377 \frac{pg}{dscm}$$

$$c_{Pb.2} = 0.421 \frac{pg}{dscm}$$

$$C_{Pb.1} := c_{Pb.1} \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pb.2} := c_{Pb.2} \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pb.1} = 1.17 \times 10^{-4} \frac{lb}{hr}$$

$$C_{Pb.2} = 1.28 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Pb.3} := \frac{M_{Pb.3}}{v_3}$$

$$c_{Pb.3} = 0.369 \frac{pg}{dscm}$$

$$C_{Pb.3} := c_{Pb.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pb.3} = 1.18 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Pc.1} := \frac{M_{Pc.1}}{v_1}$$

$$c_{Pc.1} = 40.542 \frac{pg}{dscm}$$

$$C_{Pc.1} := c_{Pc.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pc.1} = 1.26 \times 10^{-2} \frac{lb}{hr}$$

$$c_{Pc.2} := \frac{M_{Pc.2}}{v_2}$$

$$c_{Pc.2} = 40.532 \frac{pg}{dscm}$$

$$C_{Pc.2} := c_{Pc.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pc.2} = 1.23 \times 10^{-2} \frac{lb}{hr}$$

$$c_{Pc.3} := \frac{M_{Pc.3}}{v_3}$$

$$c_{Pc.3} = 45.155 \frac{pg}{dscm}$$

$$C_{Pc.3} := c_{Pc.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pc.3} = 1.44 \times 10^{-2} \frac{lb}{hr}$$

$$c_{Pd.1} := \frac{M_{Pd.1}}{v_1}$$

$$c_{Pd.2} := \frac{M_{Pd.2}}{v_2}$$

$$c_{Pd.1} = 0.096 \frac{pg}{dscm}$$

$$c_{Pd.2} = 0.107 \frac{pg}{dscm}$$

$$C_{Pd.1} := c_{Pd.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pd.2} := c_{Pd.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pd.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Pd.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Pd.3} := \frac{M_{Pd.3}}{v_3}$$

$$c_{Pd.3} = 0.094 \frac{pg}{dscm}$$

$$C_{Pd.3} := c_{Pd.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pd.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Pe.1} := \frac{M_{Pe.1}}{v_1}$$

$$c_{Pe.2} := \frac{M_{Pe.2}}{v_2}$$

$$c_{Pe.1} = 0.115 \frac{pg}{dscm}$$

$$c_{Pe.2} = 0.128 \frac{pg}{dscm}$$

$$C_{Pe.1} := c_{Pe.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pe.2} := c_{Pe.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pe.1} = 3.57 \times 10^{-5} \frac{lb}{hr}$$

$$C_{Pe.2} = 3.89 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Pe.3} := \frac{M_{Pe.3}}{v_3}$$

$$c_{Pe.3} = 0.112 \frac{pg}{dscm}$$

$$C_{Pe.3} := c_{Pe.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{Pe.3} = 3.57 \times 10^{-5} \frac{lb}{hr}$$

$$c_{T.1} := \frac{M_{T.1}}{v_1}$$

$$c_{T.1} = 0.096 \frac{pg}{dscm}$$

$$C_{T.1} := c_{T.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{T.1} = 2.97 \times 10^{-5} \frac{lb}{hr}$$

$$c_{T.2} := \frac{M_{T.2}}{v_2}$$

$$c_{T.2} = 0.107 \frac{pg}{dscm}$$

$$C_{T.2} := c_{T.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{T.2} = 3.24 \times 10^{-5} \frac{lb}{hr}$$

$$c_{T.3} := \frac{M_{T.3}}{v_3}$$

$$c_{T.3} = 0.094 \frac{pg}{dscm}$$

$$C_{T.3} := c_{T.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_{10}}$$

$$C_{T.3} = 2.98 \times 10^{-5} \frac{lb}{hr}$$

Appendix D5
SW-846 Method 0061

Company:	Citgo	Test Date:	05/25/11
Location:	Sulphur, LA	Test Number:	1
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method	SW-846 0061		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.79 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.64 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.283 inches
Nozzle Area (ft ²)	A_n	4.37E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.817 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6517 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	89.7 °F
Sampling Time	Θ	176 min
Moisture Measured by Weight	$(W_f - W_i)$	665.2 g
Dry Gas Meter Volume (actual)	V_m	125.802 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	120.067 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.58 vol%
Carbon Dioxide	%CO ₂	17.92 vol%
Nitrogen	%N ₂	81.50 vol%
Temperature	T_s	139.6 °F
Molecular Weight, dry	M_d	30.89 lb/lb*mol
Molecular Weight, wet	M_s	28.34 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2071
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.1976
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.67 in. Hg
Average Velocity	V_s	39.52 ft/sec
Volumetric Flow Rate	Q_{sd}	7,188,504 acfh
		119,808 acfm
	Q_{sd}	5,036,225 dscfh
		83,937 dscfm
Isokinetic Sampling Rate	I	94.01 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/28/2011
Review	KT	7/27/2011

Company:	Citgo	Test Date:	05/25/11
Location:	Sulphur, LA	Test Number:	2
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	SW-846 0061		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.75 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.60 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.283 inches
Nozzle Area (ft ²)	A_n	4.37E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.817 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6258 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	89.0 °F
Sampling Time	Θ	176 min
Moisture Measured by Weight	$(W_f - W_i)$	735.1 g
Dry Gas Meter Volume (actual)	V_m	127.551 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	121.717 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.67 vol%
Carbon Dioxide	%CO ₂	18.07 vol%
Nitrogen	%N ₂	81.27 vol%
Temperature	T_s	140.0 °F
Molecular Weight, dry	M_d	30.92 lb/lb*mol
Molecular Weight, wet	M_s	28.34 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2216
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.1994
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.63 in. Hg
Average Velocity	V_s	37.99 ft/sec
Volumetric Flow Rate	Q_{sd}	6,910,171 acfh
		115,170 acfm
	Q_{sd}	4,820,467 dscfh
		80,341 dscfm
Isokinetic Sampling Rate	I	99.57 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	KT	7/27/2011

Company:	Citgo	Test Date:	05/26/11
Location:	Sulphur, LA	Test Number:	3
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	SW-846 0061		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.82 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.67 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.286 inches
Nozzle Area (ft ²)	A_n	4.46E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.763 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6125 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	95.3 °F
Sampling Time	Θ	176 min
Moisture Measured by Weight	$(W_f - W_i)$	726.5 g
Dry Gas Meter Volume (actual)	V_m	119.417 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	112.939 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.67 vol%
Carbon Dioxide	%CO ₂	17.98 vol%
Nitrogen	%N ₂	81.35 vol%
Temperature	T_s	139.3 °F
Molecular Weight, dry	M_d	30.90 lb/lb*mol
Molecular Weight, wet	M_s	28.37 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2327
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.1962
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.70 in. Hg
Average Velocity	V_s	37.10 ft/sec
Volumetric Flow Rate	Q_{sd}	6,748,055 acfh
		112,468 acfm
	Q_{sd}	4,742,487 dscfh
		79,041 dscfm
Isokinetic Sampling Rate	I	91.95 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	KT	7/27/2011

TEST 1

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	114.44	2.96
B	139.6	y ₁
C	140.18	5.93

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.115385$$

$$b = y \text{ intercept} \quad -10.2446$$

y₁ = interpolated absolute pressure at stack temperature.

5.8631 in Hg

Moisture content calculated:

19.761 %

TEST 2

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	114.44	2.96
B	140	y ₂
C	140.18	5.93

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.115385$$

$$b = y \text{ intercept} \quad -10.2446$$

y₂ = interpolated absolute pressure at stack temperature.

5.9092 in Hg

Moisture content calculated:

19.943 %

TEST 3

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	114.44	2.96
B	139.3	y ₃
C	140.18	5.93

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.115385$$

$$b = y \text{ intercept} \quad -10.2446$$

y₃ = interpolated absolute pressure at stack temperature.

5.8285 in Hg

Moisture content calculated:

19.624 %

Based on Method 4 - *Determination of Moisture Content in Stack Gases* (4.1), the moisture content of saturated gas streams as measured by method 4 may be positively biased. In cases where this is suspected, a second determination may be made. This determination can be accomplished by using a psychrometric chart or by using a saturation vapor pressure table.

Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

Values

TESTS:	Moisture Content (Steam Table) %	Moisture Content (Impinger) %	Lower of Two Values:
TEST 1	19.76	20.71	19.76
TEST 2	19.94	22.16	19.94
TEST 3	19.62	23.27	19.62

Company: Citgo Petroleum Corporation
 Location: Sulphur, LA
 Unit: Cat B Wet Gas Scrubber

Test No.	1	2	3	Average
Date	05/25/11	05/25/11	05/26/11	n/a
Start Time	11:10	16:06	8:48	n/a
End Time	14:19	19:15	11:58	n/a
Test Duration, min	176	176	176	176

Unit Operating Parameters

Oxygen Content	vol%	0.58	0.67	0.67	0.64
Carbon Dioxide Content	vol%	17.92	18.07	17.98	17.99
Moisture Content	vol%	19.76	19.94	19.62	19.77
Wet Molecular Weight	lb/lb-mol	28.34	28.34	28.37	28.35
Velocity	ft/sec	39.52	37.99	37.10	38.20
Volumetric Flow Rate	dscfm	83,937	80,341	79,041	81,106

Sampling Parameters

Isokinetic Sampling Rate	%	94.01	99.57	91.95	95.18
Sample Volume	dscf	120.067	121.717	112.939	118.241
	dscm	3.400	3.447	3.198	3.348

Laboratory Results ¹

Hexavalent Chromium	µg	[<2.12] BDL	[<2.51] BDL	[<2.11] BDL	[<2.25] BDL
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Pollutants

Hexavalent Chromium	µg/dscm	[<0.6235] BDL	[<0.7282] BDL	[<0.6598] BDL	[<0.6705] BDL
	lb/hr	[<1.96E-04] BDL	[<2.19E-04] BDL	[<1.95E-04] BDL	[<2.04E-04] BDL

¹ Laboratory Results provided by Data Analysis Technologies, Inc.

BDL (below detection level) - all analytical values used to calculate and report an in-stack emissions value are less than the laboratory's reported detection level(s)

	Initials	Date
Data Entry	JP	7/13/2011
Review	RI	8/17/2011

Reference Method 4 - Determination of Moisture Content in Stack Gases

Nomenclature:

H_2O	=	Moisture content of gas stream, vol%.
B_{ws}	=	Proportion of water vapor, by volume, in the gas stream.
M_w	=	Molecular weight of water, 18.0 lb/lb-mole.
P_m	=	Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
R_i	=	Ideal gas constant, 21.85 (in. Hg)(ft ³)/(lb-mole)(°R).
T_{mf}	=	Temperature at meter, °F.
T_m	=	Absolute temperature at meter, °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_f	=	Final volume of condenser water, ml.
V_i	=	Initial volume, if any, of condenser water, ml.
V_m	=	Dry gas volume measured by dry gas meter, dcf.
V_{mstd}	=	Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscf.
V_{wcstd}	=	Volume of water vapor condensed, corrected to standard conditions, scf.
V_{wsgstd}	=	Volume of water vapor collected in silica gel, corrected to standard conditions, scf.
W_f	=	Final weight of silica gel or silica gel plus impinger, g.
W_i	=	Initial weight of silica gel or silica gel plus impinger, g.
Y	=	Dry gas meter calibration factor.
ρ_w	=	Density of water, 0.002201 lb/ml.

Variables:

Run 1:

$V_{m1} := 125.802 \cdot ft^3$	$P_{m1} := 29.64 \cdot in_Hg$
$W_{i1} := 0.0 \cdot g$	$T_{mf1} := 89.7 \cdot ^\circ F$
$W_{f1} := 665.2 \cdot g$	$Y_1 := 1.003$
$V_{f1} := 0$	$V_{i1} := 0$

Run 3:

$V_{m3} := 119.417 \cdot ft^3$	$P_{m3} := 29.67 \cdot in_Hg$
$W_{i3} := 0.0 \cdot g$	$T_{mf3} := 95.3 \cdot ^\circ F$
$W_{f3} := 726.5 \cdot g$	$Y_3 := 1.003$
$V_{f3} := 0$	$V_{i3} := 0$

Run 2:

$V_{m2} := 127.551 \cdot ft^3$	$P_{m2} := 29.60 \cdot in_Hg$
$W_{i2} := 0.0 \cdot g$	$T_{mf2} := 89.0 \cdot ^\circ F$
$W_{f2} := 735.1 \cdot g$	$Y_2 := 1.003$
$V_{f2} := 0$	$V_{i2} := 0$

Constants:

$M_w := 18.0 \cdot \frac{lb}{lb \cdot mol}$	$K_1 := 0.04706 \cdot \frac{ft^3}{ml}$
$P_{std} := 29.92 \cdot in_Hg$	$K_2 := 453.6 \cdot \frac{g}{lb}$
$T_{std} := 528 \cdot ^\circ R$	$K_3 := 0.04715 \cdot \frac{ft^3}{g}$
$\rho_w := 0.002201 \cdot \frac{lb}{ml}$	$K_4 := 17.64 \cdot \frac{^{\circ}R}{in_Hg}$
$R_i := 21.85 \cdot \frac{in_Hg \cdot ft^3}{lb \cdot mol \cdot ^{\circ}R}$	

Calculations:

Run 1:

$$V_{wcstd1} := \frac{(V_{f1} - V_{i1}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd1} := \frac{(W_{f1} - W_{i1}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd1} := K_1(V_{f1} - V_{i1})$$

$$V_{wsgstd1} := K_3(W_{f1} - W_{i1})$$

$$V_{wcstd1} = 0.000 \text{ scf}$$

$$V_{wsgstd1} = 31.415 \text{ scf}$$

$$V_{mstd1} := \frac{V_{m1} \cdot Y_1 \cdot P_{m1} \cdot T_{std}}{P_{std} \cdot (T_{mf1} + 460)} \quad Eq. 4-3$$

$$B_{ws1} := \frac{V_{wcstd1} + V_{wsgstd1}}{V_{wcstd1} + V_{wsgstd1} + V_{mstd1}} \quad Eq. 4-4$$

$$V_{mstd1} := K_4 Y_1 (V_{m1} P_{m1}) / T_{m1}$$

$$B_{ws1} = 0.2074$$

$$V_{mstd1} = 120.1 \text{ dscf}$$

$$H_2O1 := B_{ws1} \cdot 100 \cdot \text{vol\%}$$

$$H_2O1 = 20.74 \text{ vol\%}$$

Run 2:

$$V_{wcstd2} := \frac{(V_{f2} - V_{i2}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd2} := \frac{(W_{f2} - W_{i2}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd2} := K_1(V_{f2} - V_{i2})$$

$$V_{wsgstd2} := K_3(W_{f2} - W_{i2})$$

$$V_{wcstd2} = 0.000 \text{ scf}$$

$$V_{wsgstd2} = 34.716 \text{ scf}$$

$$V_{mstd2} := \frac{V_{m2} \cdot Y_2 \cdot P_{m2} \cdot T_{std}}{P_{std} \cdot (T_{mf2} + 460)} \quad Eq. 4-3$$

$$B_{ws2} := \frac{V_{wcstd2} + V_{wsgstd2}}{V_{wcstd2} + V_{wsgstd2} + V_{mstd2}} \quad Eq. 4-4$$

$$V_{mstd2} := K_4 Y_2 (V_{m2} P_{m2}) / T_{m2}$$

$$B_{ws2} = 0.2219$$

$$V_{mstd2} = 121.7 \text{ dscf}$$

$$H_2O2 := B_{ws2} \cdot 100 \cdot \text{vol\%}$$

$$H_2O2 = 22.19 \text{ vol\%}$$

Run 3:

$$V_{wcstd3} := \frac{(V_{f3} - V_{i3}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad \text{Eq. 4-1}$$

$$V_{wcstd3} := K_1(V_{f3} - V_{i3})$$

$$V_{wcstd3} = 0.000 \text{ scf}$$

$$V_{mstd3} := \frac{V_{m3} \cdot Y_3 \cdot P_{m3} \cdot T_{std}}{P_{std} \cdot (T_{mf3} + 460)} \quad \text{Eq. 4-3}$$

$$V_{mstd3} := K_4 Y_3 (V_{m3} P_{m3}) / T_{m3}$$

$$V_{mstd3} = 112.9 \text{ dscf}$$

$$V_{wsstd3} := \frac{(W_{f3} - W_{i3}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad \text{Eq. 4-2}$$

$$V_{wsstd3} := K_3(W_{f3} - W_{i3})$$

$$V_{wsstd3} = 34.309 \text{ scf}$$

$$B_{ws3} := \frac{V_{wcstd3} + V_{wsstd3}}{V_{wcstd3} + V_{wsstd3} + V_{mstd3}} \quad \text{Eq. 4-4}$$

$$B_{ws3} = 0.2330$$

$$H_2O_3 := B_{ws3} \cdot 100 \cdot \text{vol\%}$$

$$H_2O_3 = 23.30 \text{ vol\%}$$

Reference Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

Nomenclature:

M_d	=	Dry molecular weight, lb/lb-mole.
M_s	=	Wet molecular weight, lb/lb-mole.
$\%CO_2$	=	Percent CO_2 by volume, dry basis.
$\%O_2$	=	Percent O_2 by volume, dry basis.
$\%CO$	=	Percent CO by volume, dry basis.
$\%N_2$	=	Percent N_2 by volume, dry basis.
Bal	=	$\%N_2 + \%CO$.
28	=	Molecular weight of N_2 or CO , lb/lb-mol.
32	=	Molecular weight of O_2 , lb/lb-mol.
44	=	Molecular weight of CO_2 , lb/lb-mol.

Variables:

$$\%O_2_1 := 0.58 \cdot \text{vol}\%$$

$$\%O_2_2 := 0.67 \cdot \text{vol}\%$$

$$\%O_2_3 := 0.67 \cdot \text{vol}\%$$

$$\%CO_2_1 := 17.92 \cdot \text{vol}\%$$

$$\%CO_2_2 := 18.07 \cdot \text{vol}\%$$

$$\%CO_2_3 := 17.98 \cdot \text{vol}\%$$

$$Bal_1 := 100 \cdot \text{vol}\% - (\%O_2_1 + \%CO_2_1)$$

$$Bal_2 := 100 \cdot \text{vol}\% - (\%O_2_2 + \%CO_2_2)$$

$$Bal_1 = 81.50 \text{ vol}\%$$

$$Bal_2 = 81.26 \text{ vol}\%$$

$$Bal_3 := 100 \cdot \text{vol}\% - (\%O_2_3 + \%CO_2_3)$$

$$Bal_3 = 81.35 \text{ vol}\%$$

Calculations:

$$M_{d1} := 44 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%CO_2_1 + 32 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%O_2_1 + 28 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} (Bal_1) \quad \text{Eq. 3-1}$$

$$M_{d1} = 30.89 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$M_{d2} := 44 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%CO_2_2 + 32 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%O_2_2 + 28 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} (Bal_2) \quad \text{Eq. 3-1}$$

$$M_{d2} = 30.92 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$M_{d3} := 44 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%CO_2_3 + 32 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot \%O_2_3 + 28 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} (Bal_3) \quad \text{Eq. 3-1}$$

$$M_{d3} = 30.90 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

Reference Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate

Nomenclature:

A_s	=	Cross-sectional area of stack, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
B_{wST}	=	Water vapor in gas stream calculated using steam table.
C_p	=	Pitot tube coefficient, dimensionless.
K_p	=	Velocity equation constant.
M_d	=	Molecular weight of stack gas, dry basis, lb/lb-mol.
M_s	=	Molecular weight of stack gas, wet basis, lb/lb-mol.
P_m	=	Barometric pressure at measurement site, in. Hg.
P_g	=	Stack static pressure, in. H ₂ O.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
Q_{sd}	=	Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr, dscf/min.
T_s	=	Stack temperature, °F.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
Δp_{avgqrt}	=	Average square root of Δp , in. H ₂ O.
3600	=	Conversion factor, sec/hr.
18.0	=	Molecular weight of water, lb/lb-mol.

Constants:

$$K_p := 85.49 \cdot \frac{ft}{sec} \cdot \left[\frac{\left(\frac{lb}{lb \cdot mol} \right) \cdot (in_Hg)}{(R) \cdot (in_H2O)} \right]^{\frac{1}{2}}$$

Variables:

$A_s := 50.528 \cdot ft^2$	$\Delta p_{avgqrt2} := 0.6258 \cdot in_H2O^{\frac{1}{2}}$
$C_p := 0.84$	$T_{s2} := 140.0 \cdot ^\circ F$
$\Delta p_{avgqrt1} := 0.6517 \cdot in_H2O^{\frac{1}{2}}$	$P_{g2} := 0.36 \cdot in_H2O$
$T_{s1} := 139.6 \cdot ^\circ F$	$\Delta p_{avgqrt3} := 0.6125 \cdot in_H2O^{\frac{1}{2}}$
$P_{g1} := 0.36 \cdot in_H2O$	$T_{s3} := 139.3 \cdot ^\circ F$
$B_{wST1} := 0.1976$	$P_{g3} := 0.36 \cdot in_H2O$
$B_{wST2} := 0.1994$	
$B_{wST3} := 0.1962$	

Note the lower of the two moisture fractions will be used: either the one measured by impinger analysis or calculated by the steam table.

Calculations:

Run 1:

$$T_{sabs1} := T_{s1} + 460 \quad T_{sabs1} = 599.6 \text{ }^{\circ}\text{R} \quad P_{s1} := P_{m1} + \frac{P_{g1}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s1} = 29.67 \text{ in}_{Hg}$$

$$M_{s1} := M_{d1} \cdot (1 - B_{wST1}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST1} \quad \text{Eq. 2-6} \quad M_{s1} = 28.34 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s1} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT1}} \cdot \sqrt{\frac{T_{sabs1}}{P_{s1} \cdot M_{s1}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s1} = 39.52 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd1} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST1}) \cdot V_{s1} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s1}}{T_{sabs1} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd1} = 5036367.80 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd1} = 83939.46 \frac{\text{dscf}}{\text{min}}}$$

Run 2:

$$T_{sabs2} := T_{s2} + 460 \quad T_{sabs2} = 600 \text{ }^{\circ}\text{R} \quad P_{s2} := P_{m2} + \frac{P_{g2}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s2} = 29.63 \text{ in}_{Hg}$$

$$M_{s2} := M_{d2} \cdot (1 - B_{wST2}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST2} \quad \text{Eq. 2-6} \quad M_{s2} = 28.34 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s2} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT2}} \cdot \sqrt{\frac{T_{sabs2}}{P_{s2} \cdot M_{s2}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s2} = 37.99 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd2} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST2}) \cdot V_{s2} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s2}}{T_{sabs2} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd2} = 4820594.72 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd2} = 80343.25 \frac{\text{dscf}}{\text{min}}}$$

Run 3:

$$T_{sabs3} := T_{s3} + 460 \quad T_{sabs3} = 599.3 \text{ }^{\circ}\text{R} \quad P_{s3} := P_{m3} + \frac{P_{g3}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s3} = 29.70 \text{ in}_{Hg}$$

$$M_{s3} := M_{d3} \cdot (1 - B_{wST3}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST3} \quad \text{Eq. 2-6} \quad M_{s3} = 28.37 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s3} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs3}}{P_{s3} \cdot M_{s3}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s3} = 37.10 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd3} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST3}) \cdot V_{s3} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s3}}{T_{sabs3} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd3} = 4742874.19 \frac{\text{dscf}}{\text{hr}}} \quad \boxed{Q_{sd3} = 79047.90 \frac{\text{dscf}}{\text{min}}}$$

Isokinetic Sampling Rate

Nomenclature:

A_n	=	Cross-sectional area of nozzle, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
I	=	Percent of isokinetic sampling.
N_d	=	Nozzle diameter, in.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
V_{mstd}	=	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Θ_t	=	Total sampling time, min.
60	=	Conversion factor, sec/min.
100	=	Conversion to percent.

Variables:

$$\Theta_t := 176 \cdot \text{min}$$

$$N_{d1} := 0.283 \cdot \text{in}$$

$$A_{n1} := \pi \cdot \left(\frac{\frac{N_{d1}}{2}}{12 \cdot \frac{\text{in}}{\text{ft}}} \right)^2 \quad A_{n1} = 4.37 \times 10^{-4} \text{ ft}^2$$

$$N_{d2} := 0.283 \cdot \text{in}$$

$$A_{n2} := \pi \cdot \left(\frac{\frac{N_{d2}}{2}}{12 \cdot \frac{\text{in}}{\text{ft}}} \right)^2 \quad A_{n2} = 4.37 \times 10^{-4} \text{ ft}^2$$

$$N_{d3} := 0.286 \cdot \text{in}$$

$$A_{n3} := \pi \cdot \left(\frac{\frac{N_{d3}}{2}}{12 \cdot \frac{\text{in}}{\text{ft}}} \right)^2 \quad A_{n3} = 4.46 \times 10^{-4} \text{ ft}^2$$

Constants:

$$K_5 := 0.09450 \cdot \frac{\text{in_Hg} \cdot \% \cdot \text{min}}{\text{sec} \cdot \mathcal{R}}$$

$$T_{std} = 528 \mathcal{R}$$

$$P_{std} = 29.92 \text{ in_Hg}$$

Calculations:

$$I_1 := \frac{T_{sabs1} \cdot V_{mstd1} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s1} \cdot \Theta_t \cdot An1 \cdot P_{s1} \cdot 60 \frac{sec}{min} \cdot (1 - B_{wST1})} \quad Eq. 5-8 \quad \boxed{I_1 = 94.01 \%}$$

$$I_2 := \frac{T_{sabs2} \cdot V_{mstd2} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s2} \cdot \Theta_t \cdot An2 \cdot P_{s2} \cdot 60 \frac{sec}{min} \cdot (1 - B_{wST2})} \quad Eq. 5-8 \quad \boxed{I_2 = 99.57 \%}$$

$$I_3 := \frac{T_{sabs3} \cdot V_{mstd3} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s3} \cdot \Theta_t \cdot An3 \cdot P_{s3} \cdot 60 \frac{sec}{min} \cdot (1 - B_{wST3})} \quad Eq. 5-8 \quad \boxed{I_3 = 91.94 \%}$$

SW-846 0061 - Determination of HEXAVALENT CHROMIUM EMISSIONS FROM STATIONARY SOURCES

Nomenclature:

v_n	=	volume of the samples (Runs 1 to 3), dscf and dscm.
M_{HCn}	=	Mass of HC (Runs 1 to 3), ug.
c_{HCn}	=	Concentration of HC (Runs 1 to 3), mg/dscm.
C_{HCn}	=	Concentration of HC (Runs 1 to 3), lb/hr.

Variables:

$$v_1 := 120.067 \text{ dscf}$$

$$v_2 := 121.717 \text{ dscf}$$

$$v_3 := 109.122 \text{ dscf}$$

$$M_{HC.1} := 2.12 \text{ ug}$$

$$M_{HC.2} := 2.51 \text{ ug}$$

$$M_{HC.3} := 2.11 \text{ ug}$$

Constants:

$$K_6 := 35.31467 \frac{\text{dscf}}{\text{m}^3}$$

$$K_7 := 453.59 \frac{\text{g}}{\text{lb}}$$

$$K_8 := 1000 \frac{\text{mg}}{\text{g}}$$

Calculations:

$$v_1 = 3.4 \text{ dscm}$$

$$v_2 = 3.447 \text{ dscm}$$

$$v_3 = 3.09 \text{ dscm}$$

$$c_{HC.1} := \frac{M_{HC.1}}{v_1}$$

$$c_{HC.2} := \frac{M_{HC.2}}{v_2}$$

$$c_{HC.3} := \frac{M_{HC.3}}{v_3}$$

$$c_{HC.1} = 0.624 \frac{\mu\text{g}}{\text{dscm}}$$

$$c_{HC.2} = 0.728 \frac{\mu\text{g}}{\text{dscm}}$$

$$c_{HC.3} = 0.683 \frac{\mu\text{g}}{\text{dscm}}$$

$$C_{HC.1} := c_{HC.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HC.2} := c_{HC.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HC.3} := c_{HC.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{HC.1} = 1.96 \times 10^{-4} \frac{\text{lb}}{\text{hr}}$$

$$C_{HC.2} = 2.19 \times 10^{-4} \frac{\text{lb}}{\text{hr}}$$

$$C_{HC.3} = 2.02 \times 10^{-4} \frac{\text{lb}}{\text{hr}}$$

Appendix D6
ASTM D6784-02 (Hg)

Company:	Citgo	Test Date:	05/25/11
Location:	Sulphur, LA	Test Number:	1
Unit:	B-Cat		
Source:	Wet Gas Scrubber		
Method:	ASTM D6784-02 (Hg)		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.79 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.64 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.282 inches
Nozzle Area (ft ²)	A_n	4.34E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	1.960 in. H ₂ O
Dry Gas Meter Correction Factor	Y	0.996
Average ΔH	ΔH	1.618 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6217 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	91.8 °F
Sampling Time	Θ	176 min
Moisture Measured by Weight	$(W_f - W_i)$	697.9 g
Dry Gas Meter Volume (actual)	V_m	118.089 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	111.488 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.58 vol%
Carbon Dioxide	%CO ₂	17.92 vol%
Nitrogen	%N ₂	81.50 vol%
Temperature	T_s	144.0 °F
Molecular Weight, dry	M_d	30.89 lb/lb*mol
Molecular Weight, wet	M_s	28.02 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2279
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2228
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.67 in. Hg
Average Velocity	V_s	38.06 ft/sec
Volumetric Flow Rate	Q_{sd}	6,922,210 acfh
		115,370 acfm
	Q_{sd}	4,663,324 dscfh
		77,722 dscfm
Isokinetic Sampling Rate	I	94.95 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	KT	7/27/2011

Company:	Citgo	Test Date:	05/25/11
Location:	Sulphur, LA	Test Number:	2
Unit:	B-Cat		
Source:	Wet Gas Scrubber		
Method:	ASTM D6784-02 (Hg)		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.75 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.60 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.282 inches
Nozzle Area (ft ²)	A_n	4.34E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	1.960 in. H ₂ O
Dry Gas Meter Correction Factor	Y	0.996
Average ΔH	ΔH	1.473 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.5927 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	92.2 °F
Sampling Time	Θ	176 min
Moisture Measured by Weight	$(W_f - W_i)$	659.8 g
Dry Gas Meter Volume (actual)	V_m	113.252 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	106.704 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.67 vol%
Carbon Dioxide	%CO ₂	18.07 vol%
Nitrogen	%N ₂	81.27 vol%
Temperature	T_s	143.2 °F
Molecular Weight, dry	M_d	30.92 lb/lb*mol
Molecular Weight, wet	M_s	28.10 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2257
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2183
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.63 in. Hg
Average Velocity	V_s	36.23 ft/sec
Volumetric Flow Rate	Q_{sd}	6,589,998 acfh
		109,833 acfm
	Q_{sd}	4,465,211 dscfh
		74,420 dscfm
Isokinetic Sampling Rate	I	94.90 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	KT	7/27/2011

Company:	Citgo	Test Date:	05/26/11
Location:	Sulphur, LA	Test Number:	3
Unit:	B-Cat		
Source:	Wet Gas Scrubber		
Method:	ASTM D6784-02 (Hg)		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.82 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.67 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.282 inches
Nozzle Area (ft ²)	A_n	4.34E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	1.960 in. H ₂ O
Dry Gas Meter Correction Factor	Y	0.996
Average ΔH	ΔH	1.708 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6378 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	94.0 °F
Sampling Time	Θ	176 min
Moisture Measured by Weight	$(W_f - W_i)$	714.2 g
Dry Gas Meter Volume (actual)	V_m	121.425 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	114.307 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.67 vol%
Carbon Dioxide	%CO ₂	17.98 vol%
Nitrogen	%N ₂	81.35 vol%
Temperature	T_s	143.2 °F
Molecular Weight, dry	M_d	30.90 lb/lb*mol
Molecular Weight, wet	M_s	28.09 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2276
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2178
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.70 in. Hg
Average Velocity	V_s	38.95 ft/sec
Volumetric Flow Rate	Q_{sd}	7,084,333 acfh
		118,072 acfm
	Q_{sd}	4,814,890 dscfh
		80,248 dscfm
Isokinetic Sampling Rate	I	94.28 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	KT	7/27/2011

TEST 1

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	144.0	y_1
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

 y_1 = interpolated absolute pressure at stack temperature.

6.6097 in Hg

Moisture content calculated:

22.277 %

TEST 2

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	143.2	y_2
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

 y_2 = interpolated absolute pressure at stack temperature.

6.4673 in Hg

Moisture content calculated:

21.827 %

TEST 3

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	143.2	y_3
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

 y_3 = interpolated absolute pressure at stack temperature.

6.4673 in Hg

Moisture content calculated:

21.776 %

Based on Method 4 - *Determination of Moisture Content in Stack Gases* (4.1), the moisture content of saturated gas streams as measured by method 4 may be positively biased. In cases where this is suspected, a second determination may be made. This determination can be accomplished by using a psychrometric chart or by using a saturation vapor pressure table.

Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

Values

TESTS:	Moisture Content (Steam Table) %	Moisture Content (Impinger) %	Lower of Two Values:
TEST 1	22.28	22.79	22.28
TEST 2	21.83	22.57	21.83
TEST 3	21.78	22.76	21.78

Company: Citgo Petroleum Corporation
Location: Sulphur, LA
Unit: Cat B Wet Gas Scrubber

Test No.	1	2	3	Average
Date	05/25/11	05/25/11	05/26/11	n/a
Start Time	11:10	16:06	8:45	n/a
End Time	14:19	19:15	11:58	n/a
Test Duration, min	176	176	176	176

Unit Operating Parameters

Oxygen Content	vol%	0.58	0.67	0.67	0.64
Carbon Dioxide Content	vol%	17.92	18.07	17.98	17.99
Moisture Content	vol%	22.28	21.83	21.78	21.96
Wet Molecular Weight	lb/lb-mol	28.02	28.10	28.09	28.07
Velocity	ft/sec	38.06	36.23	38.95	37.75
Volumetric Flow Rate	dscfm	77,722	74,420	80,248	77,463

Sampling Parameters

Isokinetic Sampling Rate	%	94.95	94.90	94.28	94.71
Sample Volume	dscf	111.488	106.704	114.307	110.833
	dscm	3.157	3.022	3.237	3.138

Laboratory Results ¹

Organic Mercury	µg	[<0.015] BDL	[<0.012] BDL	0.023	0.017 DLL
Elemental Mercury	µg	0.411	0.413 DLL	0.427	0.417 DLL

Pollutants

Organic Mercury	µg/dscm	[<4.75E-03] BDL	[<3.97E-03] BDL	7.11E-03	5.28E-03 DLL
	lb/hr	[<1.38E-06] BDL	[<1.11E-06] BDL	2.14E-06	1.54E-06 DLL
Elemental Mercury	µg/dscm	0.130	0.137 DLL	0.132	0.133 DLL
	lb/hr	3.79E-05	3.81E-05 DLL	3.96E-05	3.86E-05 DLL

¹ Laboratory Results provided by Data Analysis Technologies, Inc.

BDL (below detection level) - all analytical values used to calculate and report an in-stack emissions value are less than the laboratory's reported detection level(s)

DLL (detection level limited) - at least one but not all values used to calculate and report an in-stack emissions value are greater than the laboratory's reported detection level(s)

	Initials	Date
Data Entry	JP	7/13/2011
Review	RI	8/17/2011

Reference Method 4 - Determination of Moisture Content in Stack Gases

Nomenclature:

H_2O	=	Moisture content of gas stream, vol%.
B_{ws}	=	Proportion of water vapor, by volume, in the gas stream.
M_w	=	Molecular weight of water, 18.0 lb/lb-mole.
P_m	=	Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
R_i	=	Ideal gas constant, 21.85 (in. Hg)(ft ³)/(lb-mole)(°R).
T_{mf}	=	Temperature at meter, °F.
T_m	=	Absolute temperature at meter, °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_f	=	Final volume of condenser water, ml.
V_i	=	Initial volume, if any, of condenser water, ml.
V_m	=	Dry gas volume measured by dry gas meter, dcf.
V_{mstd}	=	Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscf.
V_{wcstd}	=	Volume of water vapor condensed, corrected to standard conditions, scf.
V_{wsgstd}	=	Volume of water vapor collected in silica gel, corrected to standard conditions, scf.
W_f	=	Final weight of silica gel or silica gel plus impinger, g.
W_i	=	Initial weight of silica gel or silica gel plus impinger, g.
Y	=	Dry gas meter calibration factor.
ρ_w	=	Density of water, 0.002201 lb/ml.

Variables:

Run 1:

$V_{m1} := 118.089 \cdot ft^3$	$P_{m1} := 29.64 \cdot in_Hg$
$W_{i1} := 0.0 \cdot g$	$T_{mf1} := 91.8 \cdot ^\circ F$
$W_{f1} := 697.9 \cdot g$	$Y_1 := 0.996$
$V_{f1} := 0$	$V_{i1} := 0$

Run 3:

$V_{m3} := 121.425 \cdot ft^3$	$P_{m3} := 29.67 \cdot in_Hg$
$W_{i3} := 0.0 \cdot g$	$T_{mf3} := 94.0 \cdot ^\circ F$
$W_{f3} := 714.2 \cdot g$	$Y_3 := 0.996$
$V_{f3} := 0$	$V_{i3} := 0$

Run 2:

$V_{m2} := 113.252 \cdot ft^3$	$P_{m2} := 29.60 \cdot in_Hg$
$W_{i2} := 0.0 \cdot g$	$T_{mf2} := 92.2 \cdot ^\circ F$
$W_{f2} := 659.8 \cdot g$	$Y_2 := 0.996$
$V_{f2} := 0$	$V_{i2} := 0$

Constants:

$M_w := 18.0 \cdot \frac{lb}{lb \cdot mol}$	$K_1 := 0.04706 \cdot \frac{ft^3}{ml}$
$P_{std} := 29.92 \cdot in_Hg$	$K_2 := 453.6 \cdot \frac{g}{lb}$
$T_{std} := 528 \cdot ^\circ R$	$K_3 := 0.04715 \cdot \frac{ft^3}{g}$
$\rho_w := 0.002201 \cdot \frac{lb}{ml}$	$K_4 := 17.64 \cdot \frac{^{\circ}R}{in_Hg}$
$R_i := 21.85 \cdot \frac{in_Hg \cdot ft^3}{lb \cdot mol \cdot ^{\circ}R}$	

Calculations:
Run 1:

$$V_{wcstd1} := \frac{(V_{f1} - V_{i1}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd1} := \frac{(W_{f1} - W_{i1}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd1} := K_1(V_{f1} - V_{i1})$$

$$V_{wsgstd1} := K_3(W_{f1} - W_{i1})$$

$$V_{wcstd1} = 0.000 \text{ scf}$$

$$V_{wsgstd1} = 32.959 \text{ scf}$$

$$V_{mstd1} := \frac{V_{m1} \cdot Y_1 \cdot P_{m1} \cdot T_{std}}{P_{std} \cdot (T_{mf1} + 460)} \quad Eq. 4-3$$

$$B_{ws1} := \frac{V_{wcstd1} + V_{wsgstd1}}{V_{wcstd1} + V_{wsgstd1} + V_{mstd1}} \quad Eq. 4-4$$

$$V_{mstd1} := K_4 Y_1 (V_{m1} P_{m1}) / T_{m1}$$

$$B_{ws1} = 0.2282$$

$$\boxed{V_{mstd1} = 111.5 \text{ dscf}}$$

$$H_2O1 := B_{ws1} \cdot 100 \cdot \text{vol}\%$$

$$\boxed{H_2O1 = 22.82 \text{ vol}\%}$$

Run 2:

$$V_{wcstd2} := \frac{(V_{f2} - V_{i2}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd2} := \frac{(W_{f2} - W_{i2}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd2} := K_1(V_{f2} - V_{i2})$$

$$V_{wsgstd2} := K_3(W_{f2} - W_{i2})$$

$$V_{wcstd2} = 0.000 \text{ scf}$$

$$V_{wsgstd2} = 31.160 \text{ scf}$$

$$V_{mstd2} := \frac{V_{m2} \cdot Y_2 \cdot P_{m2} \cdot T_{std}}{P_{std} \cdot (T_{mf2} + 460)} \quad Eq. 4-3$$

$$B_{ws2} := \frac{V_{wcstd2} + V_{wsgstd2}}{V_{wcstd2} + V_{wsgstd2} + V_{mstd2}} \quad Eq. 4-4$$

$$V_{mstd2} := K_4 Y_2 (V_{m2} P_{m2}) / T_{m2}$$

$$B_{ws2} = 0.2260$$

$$\boxed{V_{mstd2} = 106.7 \text{ dscf}}$$

$$H_2O2 := B_{ws2} \cdot 100 \cdot \text{vol}\%$$

$$\boxed{H_2O2 = 22.60 \text{ vol}\%}$$

Run 3:

$$V_{wcstd3} := \frac{(V_{f3} - V_{i3}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad \text{Eq. 4-1}$$

$$V_{wcstd3} := K_1(V_{f3} - V_{i3})$$

$$V_{wcstd3} = 0.000 \text{ scf}$$

$$V_{mstd3} := \frac{V_{m3} \cdot Y_3 \cdot P_{m3} \cdot T_{std}}{P_{std} \cdot (T_{mf3} + 460)} \quad \text{Eq. 4-3}$$

$$V_{mstd3} := K_4 Y_3 (V_{m3} P_{m3}) / T_{m3}$$

$$V_{mstd3} = 114.3 \text{ dscf}$$

$$V_{wsstd3} := \frac{(W_{f3} - W_{i3}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad \text{Eq. 4-2}$$

$$V_{wsstd3} := K_3(W_{f3} - W_{i3})$$

$$V_{wsstd3} = 33.729 \text{ scf}$$

$$B_{ws3} := \frac{V_{wcstd3} + V_{wsstd3}}{V_{wcstd3} + V_{wsstd3} + V_{mstd3}} \quad \text{Eq. 4-4}$$

$$B_{ws3} = 0.2279$$

$$H_2O_3 := B_{ws3} \cdot 100 \cdot \text{vol\%}$$

$$H_2O_3 = 22.79 \text{ vol\%}$$

Reference Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

Nomenclature:

M_d	=	Dry molecular weight, lb/lb-mole.
M_s	=	Wet molecular weight, lb/lb-mole.
%CO ₂	=	Percent CO ₂ by volume, dry basis.
%O ₂	=	Percent O ₂ by volume, dry basis.
%CO	=	Percent CO by volume, dry basis.
%N ₂	=	Percent N ₂ by volume, dry basis.
Bal	=	%N ₂ +%CO.
28	=	Molecular weight of N ₂ or CO, lb/lb-mol.
32	=	Molecular weight of O ₂ , lb/lb-mol.
44	=	Molecular weight of CO ₂ , lb/lb-mol.

Variables:

$$\%O_2 I := 0.58 \cdot \text{vol\%}$$

$$\%O_2 2 := 0.67 \cdot \text{vol\%}$$

$$\%O_2 3 := 0.67 \cdot \text{vol\%}$$

$$\%CO_2 I := 17.92 \cdot \text{vol\%}$$

$$\%CO_2 2 := 18.07 \cdot \text{vol\%}$$

$$\%CO_2 3 := 17.98 \cdot \text{vol\%}$$

$$Bal I := 100 \cdot \text{vol\%} - (\%O_2 I + \%CO_2 I)$$

$$Bal_2 := 100 \cdot \text{vol\%} - (\%O_2 2 + \%CO_2 2)$$

$$Bal I = 81.50 \text{ vol\%}$$

$$Bal_2 = 81.26 \text{ vol\%}$$

$$Bal_3 := 100 \cdot \text{vol\%} - (\%O_2 3 + \%CO_2 3)$$

$$Bal_3 = 81.35 \text{ vol\%}$$

Calculations:

$$M_{d1} := 44 \cdot \frac{\text{lb}}{\text{lb-mol}} \cdot \%CO_2 I + 32 \cdot \frac{\text{lb}}{\text{lb-mol}} \cdot \%O_2 I + 28 \cdot \frac{\text{lb}}{\text{lb-mol}} (Bal I) \quad \text{Eq. 3-1}$$

$$M_{d1} = 30.89 \frac{\text{lb}}{\text{lb-mol}}$$

$$M_{d2} := 44 \cdot \frac{\text{lb}}{\text{lb-mol}} \cdot \%CO_2 2 + 32 \cdot \frac{\text{lb}}{\text{lb-mol}} \cdot \%O_2 2 + 28 \cdot \frac{\text{lb}}{\text{lb-mol}} (Bal_2) \quad \text{Eq. 3-1}$$

$$M_{d2} = 30.92 \frac{\text{lb}}{\text{lb-mol}}$$

$$M_{d3} := 44 \cdot \frac{\text{lb}}{\text{lb-mol}} \cdot \%CO_2 3 + 32 \cdot \frac{\text{lb}}{\text{lb-mol}} \cdot \%O_2 3 + 28 \cdot \frac{\text{lb}}{\text{lb-mol}} (Bal_3) \quad \text{Eq. 3-1}$$

$$M_{d3} = 30.90 \frac{\text{lb}}{\text{lb-mol}}$$

Reference Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate

Nomenclature:

A_s	=	Cross-sectional area of stack, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
B_{wST}	=	Water vapor in gas stream calculated using steam table.
C_p	=	Pitot tube coefficient, dimensionless.
K_p	=	Velocity equation constant.
M_d	=	Molecular weight of stack gas, dry basis, lb/lb-mol.
M_s	=	Molecular weight of stack gas, wet basis, lb/lb-mol.
P_m	=	Barometric pressure at measurement site, in. Hg.
P_g	=	Stack static pressure, in. H ₂ O.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
Q_{sd}	=	Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr, dscf/min.
T_s	=	Stack temperature, °F.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
Δp_{avgqrt}	=	Average square root of Δp , in. H ₂ O.
3600	=	Conversion factor, sec/hr.
18.0	=	Molecular weight of water, lb/lb-mol.

Constants:

$$K_p := 85.49 \cdot \frac{ft}{sec} \cdot \left[\frac{\left(\frac{lb}{lb \cdot mol} \right) \cdot (in_Hg)}{(R) \cdot (in_H2O)} \right]^{\frac{1}{2}}$$

Variables:

$A_s := 50.528 \cdot ft^2$	$\Delta p_{avgqrt2} := 0.5927 \cdot in_H2O^{\frac{1}{2}}$
$C_p := 0.84$	$T_{s2} := 143.2 \cdot ^\circ F$
$\Delta p_{avgqrt1} := 0.6217 \cdot in_H2O^{\frac{1}{2}}$	$P_{g2} := 0.36 \cdot in_H2O$
$T_{s1} := 144.0 \cdot ^\circ F$	$\Delta p_{avgqrt3} := 0.6378 \cdot in_H2O^{\frac{1}{2}}$
$P_{g1} := 0.36 \cdot in_H2O$	$T_{s3} := 143.2 \cdot ^\circ F$
$B_{wST1} := 0.2228$	$P_{g3} := 0.36 \cdot in_H2O$
$B_{wST2} := 0.2183$	
$B_{wST3} := 0.2178$	

Note the lower of the two moisture fractions will be used: either the one measured by impinger analysis or calculated by the steam table.

Calculations:

Run 1:

$$T_{sabs1} := T_{s1} + 460 \quad T_{sabs1} = 604 \text{ }^{\circ}\text{R} \quad P_{s1} := P_{m1} + \frac{P_{g1}}{13.6 \cdot \frac{\text{in_H2O}}{\text{in_Hg}}} \quad P_{s1} = 29.67 \text{ in_Hg}$$

$$M_{s1} := M_{d1} \cdot (1 - B_{wST1}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST1} \quad \text{Eq. 2-6} \quad M_{s1} = 28.02 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s1} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT1}} \cdot \sqrt{\frac{T_{sabs1}}{P_{s1} \cdot M_{s1}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s1} = 38.06 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd1} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST1}) \cdot V_{s1} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s1}}{T_{sabs1} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd1} = 4663455.79 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd1} = 77724.26 \frac{\text{dscf}}{\text{min}}}$$

Run 2:

$$T_{sabs2} := T_{s2} + 460 \quad T_{sabs2} = 603.2 \text{ }^{\circ}\text{R} \quad P_{s2} := P_{m2} + \frac{P_{g2}}{13.6 \cdot \frac{\text{in_H2O}}{\text{in_Hg}}} \quad P_{s2} = 29.63 \text{ in_Hg}$$

$$M_{s2} := M_{d2} \cdot (1 - B_{wST2}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST2} \quad \text{Eq. 2-6} \quad M_{s2} = 28.10 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s2} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT2}} \cdot \sqrt{\frac{T_{sabs2}}{P_{s2} \cdot M_{s2}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s2} = 36.23 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd2} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST2}) \cdot V_{s2} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s2}}{T_{sabs2} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd2} = 4465274.56 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd2} = 74421.24 \frac{\text{dscf}}{\text{min}}}$$

Run 3:

$$T_{sabs3} := T_{s3} + 460 \quad T_{sabs3} = 603.2 \text{ }^{\circ}\text{R} \quad P_{s3} := P_{m3} + \frac{P_{g3}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s3} = 29.70 \text{ in}_{Hg}$$

$$M_{s3} := M_{d3} \cdot (1 - B_{wST3}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST3} \quad \text{Eq. 2-6} \quad M_{s3} = 28.09 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s3} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs3}}{P_{s3} \cdot M_{s3}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s3} = 38.95 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd3} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST3}) \cdot V_{s3} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s3}}{T_{sabs3} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd3} = 4814210.21 \frac{\text{dscf}}{\text{hr}}} \quad \boxed{Q_{sd3} = 80236.84 \frac{\text{dscf}}{\text{min}}}$$

Isokinetic Sampling Rate

Nomenclature:

A_n	=	Cross-sectional area of nozzle, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
I	=	Percent of isokinetic sampling.
N_d	=	Nozzle diameter, in.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
V_{mstd}	=	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Θ_t	=	Total sampling time, min.
60	=	Conversion factor, sec/min.
100	=	Conversion to percent.

Variables:

$$\Theta_t := 176 \cdot \text{min}$$

$$N_d := 0.282 \cdot \text{in}$$

$$A_n := \pi \cdot \left(\frac{N_d}{12 \cdot \frac{\text{in}}{\text{ft}}} \right)^2 \quad A_n = 4.34 \times 10^{-4} \text{ ft}^2$$

Constants:

$$K_5 := 0.09450 \cdot \frac{\text{in}_\text{Hg} \cdot \% \cdot \text{min}}{\text{sec} \cdot \text{R}}$$

$$T_{std} = 528 \text{ R}$$

$$P_{std} = 29.92 \text{ in}_\text{Hg}$$

Calculations:

$$I_1 := \frac{T_{sabs1} \cdot V_{mstd1} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s1} \cdot \Theta_t \cdot A_n \cdot P_{s1} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST1})} \quad \text{Eq. 5-8}$$

$$I_1 = 94.95 \%$$

$$I_2 := \frac{T_{sabs2} \cdot V_{mstd2} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s2} \cdot \Theta_t \cdot A_n \cdot P_{s2} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST2})} \quad \text{Eq. 5-8}$$

$$I_2 = 94.90 \%$$

$$I_3 := \frac{T_{sabs3} \cdot V_{mstd3} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s3} \cdot \Theta_t \cdot A_n \cdot P_{s3} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST3})} \quad \text{Eq. 5-8}$$

$$I_3 = 94.29 \%$$

ASTM D6784 - 02 - Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method)

Nomenclature:

v_n	=	volume of the samples (Runs 1 to 3), dscf and dscm.
M_{OHgn}	=	Mass of OHg (Runs 1 to 3), ug.
M_{EHgn}	=	Mass of EHg (Runs 1 to 3), ug.
c_{OHgn}	=	Concentration of OHg (Runs 1 to 3), mg/dscm.
C_{OHgn}	=	Concentration of OHg (Runs 1 to 3), lb/hr.
c_{EHgn}	=	Concentration of EHg (Runs 1 to 3), mg/dscm.
C_{EHgn}	=	Concentration of EHg (Runs 1 to 3), lb/hr.

Variables:

$$v_1 := 111.488 dscf$$

$$v_2 := 106.704 dscf$$

$$v_3 := 114.307 dscf$$

$$M_{OHg.1} := 0.015 ug$$

$$M_{OHg.2} := 0.012 ug$$

$$M_{OHg.3} := 0.023 ug$$

$$M_{EHg.1} := 0.411 ug$$

$$M_{EHg.2} := 0.4133 ug$$

$$M_{EHg.3} := 0.4265 ug$$

Constants:

$$K_6 := 35.31467 \frac{dscf}{m^3}$$

$$K_7 := 453.59 \frac{g}{lb}$$

$$K_8 := 1000 \frac{mg}{g}$$

Calculations:

$$v_1 = 3.157 \text{ dscm}$$

$$v_2 = 3.022 \text{ dscm}$$

$$v_3 = 3.237 \text{ dscm}$$

$$c_{OHg.1} := \frac{M_{OHg.1}}{v_1}$$

$$c_{OHg.2} := \frac{M_{OHg.2}}{v_2}$$

$$c_{OHg.3} := \frac{M_{OHg.3}}{v_3}$$

$$c_{OHg.1} = 4.751 \times 10^{-6} \frac{\text{mg}}{\text{dscm}}$$

$$c_{OHg.2} = 3.972 \times 10^{-6} \frac{\text{mg}}{\text{dscm}}$$

$$c_{OHg.3} = 7.106 \times 10^{-6} \frac{\text{mg}}{\text{dscm}}$$

$$C_{OHg.1} := c_{OHg.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{OHg.2} := c_{OHg.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{OHg.3} := c_{OHg.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{OHg.1} = 1.38 \times 10^{-6} \frac{\text{lb}}{\text{hr}}$$

$$C_{OHg.2} = 1.11 \times 10^{-6} \frac{\text{lb}}{\text{hr}}$$

$$C_{OHg.3} = 2.14 \times 10^{-6} \frac{\text{lb}}{\text{hr}}$$

$$c_{EHg.1} := \frac{M_{EHg.1}}{v_1}$$

$$c_{EHg.2} := \frac{M_{EHg.2}}{v_2}$$

$$c_{EHg.3} := \frac{M_{EHg.3}}{v_3}$$

$$c_{EHg.1} = 1.302 \times 10^{-4} \frac{\text{mg}}{\text{dscm}}$$

$$c_{EHg.2} = 1.368 \times 10^{-4} \frac{\text{mg}}{\text{dscm}}$$

$$c_{EHg.3} = 1.318 \times 10^{-4} \frac{\text{mg}}{\text{dscm}}$$

$$C_{EHg.1} := c_{EHg.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{EHg.2} := c_{EHg.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{EHg.3} := c_{EHg.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{EHg.1} = 3.79 \times 10^{-5} \frac{\text{lb}}{\text{hr}}$$

$$C_{EHg.2} = 3.81 \times 10^{-5} \frac{\text{lb}}{\text{hr}}$$

$$C_{EHg.3} = 3.96 \times 10^{-5} \frac{\text{lb}}{\text{hr}}$$

Appendix D7
U.S. EPA Method 5B/202 and ASTM D5907

Company:	Citgo	Test Date:	05/26/11
Location:	Sulphur, LA	Test Number:	1
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method	5B / 202		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.75 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.60 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.283 inches
Nozzle Area (ft ²)	A_n	4.37E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.756 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6482 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	98.4 °F
Sampling Time	Θ	120 min
Moisture Measured by Weight	$(W_f - W_i)$	596.6 g
Dry Gas Meter Volume (actual)	V_m	84.323 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	79.111 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.50 vol%
Carbon Dioxide	%CO ₂	18.45 vol%
Nitrogen	%N ₂	81.05 vol%
Temperature	T_s	139.6 °F
Molecular Weight, dry	M_d	30.97 lb/lb*mol
Molecular Weight, wet	M_s	28.41 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2623
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.1979
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.63 in. Hg
Average Velocity	V_s	39.29 ft/sec
Volumetric Flow Rate	Q_{sd}	7,147,184 acfh
		119,120 acfm
	Q_{sd}	4,999,103 dscfh
		83,318 dscfm
Isokinetic Sampling Rate	I	91.53 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	PH	7/25/2011

Company: Citgo
 Location: Sulphur, LA
 Unit: B-Cat
 Source: Wet Gas Scrubber Stack
 Method: 5B / 202

Test Date: 05/27/11
 Test Number: 2

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.84 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.69 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.283 inches
Nozzle Area (ft ²)	A_n	4.37E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.636 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6433 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	93.1 °F
Sampling Time	Θ	128 min
Moisture Measured by Weight	$(W_f - W_i)$	502.6 g
Dry Gas Meter Volume (actual)	V_m	88.403 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	83.999 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.66 vol%
Carbon Dioxide	%CO ₂	18.19 vol%
Nitrogen	%N ₂	81.15 vol%
Temperature	T_s	139.5 °F
Molecular Weight, dry	M_d	30.94 lb/lb*mol
Molecular Weight, wet	M_s	28.39 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2200
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.1969
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.72 in. Hg
Average Velocity	V_s	38.94 ft/sec
Volumetric Flow Rate	Q_{sd}	7,082,932 acfh
		118,049 acfm
	Q_{sd}	4,976,123 dscfh
		82,935 dscfm
Isokinetic Sampling Rate	I	91.53 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	PH	7/25/2011

Company:	Citgo	Test Date:	05/27/11
Location:	Sulphur, LA	Test Number:	3
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method	5B / 202		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.78 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.63 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.283 inches
Nozzle Area (ft ²)	A_n	4.37E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	2.069 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.003
Average ΔH	ΔH	1.569 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6317 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	87.6 °F
Sampling Time	Θ	128 min
Moisture Measured by Weight	$(W_f - W_i)$	481.2 g
Dry Gas Meter Volume (actual)	V_m	84.407 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	80.840 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.62 vol%
Carbon Dioxide	%CO ₂	18.01 vol%
Nitrogen	%N ₂	81.37 vol%
Temperature	T_s	140.3 °F
Molecular Weight, dry	M_d	30.91 lb/lb*mol
Molecular Weight, wet	M_s	28.32 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2192
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2007
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.66 in. Hg
Average Velocity	V_s	38.35 ft/sec
Volumetric Flow Rate	Q_{sd}	6,976,218 acfh
		116,270 acfm
	Q_{sd}	4,861,512 dscfh
		81,025 dscfm
Isokinetic Sampling Rate	I	90.16 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	PH	7/25/2011

TEST 1

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	114.44	2.96
B	139.6	y_1
C	140.18	5.93

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.115385$$

$$b = y \text{ intercept} \quad -10.2446$$

y_1 = interpolated absolute pressure at stack temperature.

5.8631 in Hg

Moisture content calculated:

19.788 %

TEST 2

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	114.44	2.96
B	139.5	y_2
C	140.18	5.93

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.115385$$

$$b = y \text{ intercept} \quad -10.2446$$

y_2 = interpolated absolute pressure at stack temperature.

5.8515 in Hg

Moisture content calculated:

19.689 %

TEST 3

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	140.3	y_3
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

y_3 = interpolated absolute pressure at stack temperature.

5.9514 in Hg

Moisture content calculated:

20.065 %

Based on Method 4 - *Determination of Moisture Content in Stack Gases* (4.1), the moisture content of saturated gas streams as measured by method 4 may be positively biased. In cases where this is suspected, a second determination may be made. This determination can be accomplished by using a psychrometric chart or by using a saturation vapor pressure table.

Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

Values

TESTS:	Moisture Content (Steam Table) %	Moisture Content (Impinger) %	Lower of Two Values:
TEST 1	19.79	26.23	19.79
TEST 2	19.69	22.00	19.69
TEST 3	20.07	22.08	20.07

Company: Citgo Petroleum Corporation
 Location: Sulphur, LA
 Unit: Cat B Wet Gas Scrubber

Test No.	1	2	3	Average
Date	05/26/11	05/27/11	05/27/11	n/a
Start Time	16:15	10:42	14:58	n/a
End Time	18:49	13:06	17:16	n/a
Test Duration, min	120	128	128	125.33

Unit Operating Parameters

Oxygen Content	vol%	0.50	0.66	0.62	0.59
Carbon Dioxide Content	vol%	18.45	18.19	18.01	18.22
Moisture Content	vol%	19.79	19.69	20.07	19.85
Wet Molecular Weight	lb/lb-mol	28.41	28.39	28.32	28.37
Velocity	ft/sec	39.29	38.94	38.35	38.86
Volumetric Flow Rate	dscfm	83,318	82,935	81,025	82,426

Sampling Parameters

Isokinetic Sampling Rate	%	91.53	91.53	90.16	91.07
Sample Volume	dscf	79.111	83.999	80.840	81.317
	dscm	2.240	2.379	2.289	2.303

Laboratory Results ¹

Particulate Matter (PM)	mg	28.1	34.5	32.3	31.6
Condensable Particulate Matter (CPM)	mg	23.1	16.0	19.0	19.4
Particulate Matter (PM) Non-sulfate	mg	18.9	26.4	24.8	23.4
Particulate Catch Weight	mg	10,551.4	10,391.4	10,860.4	10,601.1
Sample Final Volume	L	0.500	0.470	0.490	0.487

Pollutants

Particulate Matter (PM)	gr/dscf	0.0055	0.0063	0.0062	0.0060
	lb/hr	3.91	4.50	4.28	4.23
Condensable Particulate Matter (CPM)	gr/dscf	0.0045	0.0029	0.0036	0.0037
	lb/hr	3.22	2.09	2.52	2.61
Particulate Matter (PM) Non-sulfate	gr/dscf	0.0037	0.0049	0.0047	0.0044
	lb/hr	2.63	3.45	3.29	3.12
Particulate Catch Weight ²	mg/L	21,103	22,109	22,164	21,792

¹ Laboratory Results provided by Enthalpy Analytical, Inc.

² Particulate Catch Weight is per method ASTM D5907 and is represented as mg solids per liter of scrubber recirculation liquid

	Initials	Date
Data Entry	JP	7/11/2011
Review	RI	8/17/2011

Reference Method 4 - Determination of Moisture Content in Stack Gases

Nomenclature:

H_2O	=	Moisture content of gas stream, vol%.
B_{ws}	=	Proportion of water vapor, by volume, in the gas stream.
M_w	=	Molecular weight of water, 18.0 lb/lb-mole.
P_m	=	Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
R_i	=	Ideal gas constant, 21.85 (in. Hg)(ft ³)/(lb-mole)(°R).
T_{mf}	=	Temperature at meter, °F.
T_m	=	Absolute temperature at meter, °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_f	=	Final volume of condenser water, ml.
V_i	=	Initial volume, if any, of condenser water, ml.
V_m	=	Dry gas volume measured by dry gas meter, dcf.
V_{mstd}	=	Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscf.
V_{wcstd}	=	Volume of water vapor condensed, corrected to standard conditions, scf.
V_{wsgstd}	=	Volume of water vapor collected in silica gel, corrected to standard conditions, scf.
W_f	=	Final weight of silica gel or silica gel plus impinger, g.
W_i	=	Initial weight of silica gel or silica gel plus impinger, g.
Y	=	Dry gas meter calibration factor.
ρ_w	=	Density of water, 0.002201 lb/ml.

Variables:

Run 1:

$V_{m1} := 84.323 \cdot ft^3$	$P_{m1} := 29.60 \cdot in_Hg$
$W_{i1} := 0.0 \cdot g$	$T_{mf1} := 98.4 \cdot ^\circ F$
$W_{f1} := 596.6 \cdot g$	$Y_1 := 1.003$
$V_{f1} := 0$	$V_{i1} := 0$

Run 3:

$V_{m3} := 84.407 \cdot ft^3$	$P_{m3} := 29.63 \cdot in_Hg$
$W_{i3} := 0.0 \cdot g$	$T_{mf3} := 87.6 \cdot ^\circ F$
$W_{f3} := 481.2 \cdot g$	$Y_3 := 1.003$
$V_{f3} := 0$	$V_{i3} := 0$

Run 2:

$V_{m2} := 88.403 \cdot ft^3$	$P_{m2} := 29.69 \cdot in_Hg$
$W_{i2} := 0.0 \cdot g$	$T_{mf2} := 93.1 \cdot ^\circ F$
$W_{f2} := 502.6 \cdot g$	$Y_2 := 1.003$
$V_{f2} := 0$	$V_{i2} := 0$

Constants:

$M_w := 18.0 \cdot \frac{lb}{lb \cdot mol}$	$K_1 := 0.04706 \cdot \frac{ft^3}{ml}$
$P_{std} := 29.92 \cdot in_Hg$	$K_2 := 453.6 \cdot \frac{g}{lb}$
$T_{std} := 528 \cdot ^\circ R$	$K_3 := 0.04715 \cdot \frac{ft^3}{g}$
$\rho_w := 0.002201 \cdot \frac{lb}{ml}$	$K_4 := 17.64 \cdot \frac{^{\circ}R}{in_Hg}$
$R_i := 21.85 \cdot \frac{in_Hg \cdot ft^3}{lb \cdot mol \cdot ^{\circ}R}$	

Calculations:
Run 1:

$$V_{wcstd1} := \frac{(V_{f1} - V_{i1}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad \text{Eq. 4-1} \quad V_{wsgstd1} := \frac{(W_{f1} - W_{i1}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad \text{Eq. 4-2}$$

$$V_{wcstd1} := K_1(V_{f1} - V_{i1}) \quad V_{wsgstd1} := K_3(W_{f1} - W_{i1})$$

$$V_{wcstd1} = 0.000 \text{ scf} \quad V_{wsgstd1} = 28.175 \text{ scf}$$

$$V_{mstd1} := \frac{V_{m1} \cdot Y_1 \cdot P_{m1} \cdot T_{std}}{P_{std} \cdot (T_{mf1} + 460)} \quad \text{Eq. 4-3} \quad B_{ws1} := \frac{V_{wcstd1} + V_{wsgstd1}}{V_{wcstd1} + V_{wsgstd1} + V_{mstd1}} \quad \text{Eq. 4-4}$$

$$V_{mstd1} := K_4 Y_1 (V_{m1} P_{m1}) / T_{m1} \quad B_{ws1} = 0.2626$$

$$V_{mstd1} = 79.1 \text{ dscf} \quad H_2O1 := B_{ws1} \cdot 100 \cdot \text{vol\%}$$

$$H_2O1 = 26.26 \text{ vol\%}$$

Run 2:

$$V_{wcstd2} := \frac{(V_{f2} - V_{i2}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad \text{Eq. 4-1} \quad V_{wsgstd2} := \frac{(W_{f2} - W_{i2}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad \text{Eq. 4-2}$$

$$V_{wcstd2} := K_1(V_{f2} - V_{i2}) \quad V_{wsgstd2} := K_3(W_{f2} - W_{i2})$$

$$V_{wcstd2} = 0.000 \text{ scf} \quad V_{wsgstd2} = 23.736 \text{ scf}$$

$$V_{mstd2} := \frac{V_{m2} \cdot Y_2 \cdot P_{m2} \cdot T_{std}}{P_{std} \cdot (T_{mf2} + 460)} \quad \text{Eq. 4-3} \quad B_{ws2} := \frac{V_{wcstd2} + V_{wsgstd2}}{V_{wcstd2} + V_{wsgstd2} + V_{mstd2}} \quad \text{Eq. 4-4}$$

$$V_{mstd2} := K_4 Y_2 (V_{m2} P_{m2}) / T_{m2} \quad B_{ws2} = 0.2203$$

$$V_{mstd2} = 84.0 \text{ dscf} \quad H_2O2 := B_{ws2} \cdot 100 \cdot \text{vol\%}$$

$$H_2O2 = 22.03 \text{ vol\%}$$

Run 3:

$$V_{wcstd3} := \frac{(V_{f3} - V_{i3}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad \text{Eq. 4-1}$$

$$V_{wcstd3} := K_1(V_{f3} - V_{i3})$$

$$V_{wcstd3} = 0.000 \text{ scf}$$

$$V_{mstd3} := \frac{V_{m3} \cdot Y_3 \cdot P_{m3} \cdot T_{std}}{P_{std} \cdot (T_{mf3} + 460)} \quad \text{Eq. 4-3}$$

$$V_{mstd3} := K_4 Y_3 (V_{m3} P_{m3}) / T_{m3}$$

$$\boxed{V_{mstd3} = 80.8 \text{ dscf}}$$

$$V_{wsstd3} := \frac{(W_{f3} - W_{i3}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad \text{Eq. 4-2}$$

$$V_{wsstd3} := K_3(W_{f3} - W_{i3})$$

$$V_{wsstd3} = 22.725 \text{ scf}$$

$$B_{ws3} := \frac{V_{wcstd3} + V_{wsstd3}}{V_{wcstd3} + V_{wsstd3} + V_{mstd3}} \quad \text{Eq. 4-4}$$

$$B_{ws3} = 0.2194$$

$$H_2O_3 := B_{ws3} \cdot 100 \cdot \text{vol\%}$$

$$\boxed{H_2O_3 = 21.94 \text{ vol\%}}$$

Reference Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

Nomenclature:

M_d	=	Dry molecular weight, lb/lb-mole.
M_s	=	Wet molecular weight, lb/lb-mole.
$\%CO_2$	=	Percent CO_2 by volume, dry basis.
$\%O_2$	=	Percent O_2 by volume, dry basis.
$\%CO$	=	Percent CO by volume, dry basis.
$\%N_2$	=	Percent N_2 by volume, dry basis.
Bal	=	$\%N_2 + \%CO$.
28	=	Molecular weight of N_2 or CO , lb/lb-mol.
32	=	Molecular weight of O_2 , lb/lb-mol.
44	=	Molecular weight of CO_2 , lb/lb-mol.

Variables:

$$\%O_2_1 := 0.50 \cdot vol\%$$

$$\%O_2_2 := 0.66 \cdot vol\%$$

$$\%O_2_3 := 0.62 \cdot vol\%$$

$$\%CO_2_1 := 18.45 \cdot vol\%$$

$$\%CO_2_2 := 18.19 \cdot vol\%$$

$$\%CO_2_3 := 18.01 \cdot vol\%$$

$$Bal_1 := 100 \cdot vol\% - (\%O_2_1 + \%CO_2_1)$$

$$Bal_2 := 100 \cdot vol\% - (\%O_2_2 + \%CO_2_2)$$

$$Bal_1 = 81.05 \text{ vol}\%$$

$$Bal_2 = 81.15 \text{ vol}\%$$

$$Bal_3 := 100 \cdot vol\% - (\%O_2_3 + \%CO_2_3)$$

$$Bal_3 = 81.37 \text{ vol}\%$$

Calculations:

$$M_{d1} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_1 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_1 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_1) \quad Eq. 3-1$$

$$M_{d1} = 30.97 \frac{lb}{lb \cdot mol}$$

$$M_{d2} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_2 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_2 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_2) \quad Eq. 3-1$$

$$M_{d2} = 30.94 \frac{lb}{lb \cdot mol}$$

$$M_{d3} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_3 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_3 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_3) \quad Eq. 3-1$$

$$M_{d3} = 30.91 \frac{lb}{lb \cdot mol}$$

Reference Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate

Nomenclature:

A_s	=	Cross-sectional area of stack, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
B_{wST}	=	Water vapor in gas stream calculated using steam table.
C_p	=	Pitot tube coefficient, dimensionless.
K_p	=	Velocity equation constant.
M_d	=	Molecular weight of stack gas, dry basis, lb/lb-mol.
M_s	=	Molecular weight of stack gas, wet basis, lb/lb-mol.
P_m	=	Barometric pressure at measurement site, in. Hg.
P_g	=	Stack static pressure, in. H ₂ O.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
Q_{sd}	=	Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr, dscf/min.
T_s	=	Stack temperature, °F.
T_{sabs}	=	Absolute stack temperature (460 + T_s), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
Δp_{avgqrt}	=	Average square root of Δp , in. H ₂ O.
3600	=	Conversion factor, sec/hr.
18.0	=	Molecular weight of water, lb/lb-mol.

Constants:

$$K_p := 85.49 \cdot \frac{ft}{sec} \cdot \left[\frac{\left(\frac{lb}{lb \cdot mol} \right) \cdot (in_Hg)}{(R) \cdot (in_H2O)} \right]^{\frac{1}{2}}$$

Variables:

$A_s := 50.528 \cdot ft^2$	$\Delta p_{avgqrt2} := 0.6433 \cdot in_H2O^{\frac{1}{2}}$
$C_p := 0.84$	$T_{s2} := 139.5 \cdot ^\circ F$
$\Delta p_{avgqrt1} := 0.6482 \cdot in_H2O^{\frac{1}{2}}$	$P_{g2} := 0.36 \cdot in_H2O$
$T_{s1} := 139.6 \cdot ^\circ F$	$\Delta p_{avgqrt3} := 0.6317 \cdot in_H2O^{\frac{1}{2}}$
$P_{g1} := 0.36 \cdot in_H2O$	$T_{s3} := 140.3 \cdot ^\circ F$
$B_{wST1} := 0.1979$	$P_{g3} := 0.36 \cdot in_H2O$
$B_{wST2} := 0.1969$	
$B_{wST3} := 0.2007$	

Note the lower of the two moisture fractions will be used: either the one measured by impinger analysis or calculated by the steam table.

Calculations:

Run 1:

$$T_{sabs1} := T_{s1} + 460 \quad T_{sabs1} = 599.6 \text{ }^{\circ}\text{R} \quad P_{s1} := P_{m1} + \frac{P_{g1}}{13.6 \cdot \frac{\text{in_H2O}}{\text{in_Hg}}} \quad P_{s1} = 29.63 \text{ in_Hg}$$

$$M_{s1} := M_{d1} \cdot (1 - B_{wST1}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST1} \quad \text{Eq. 2-6} \quad M_{s1} = 28.40 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s1} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT1}} \cdot \sqrt{\frac{T_{sabs1}}{P_{s1} \cdot M_{s1}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s1} = 39.29 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd1} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST1}) \cdot V_{s1} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s1}}{T_{sabs1} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd1} = 4998642.21 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd1} = 83310.70 \frac{\text{dscf}}{\text{min}}}$$

Run 2:

$$T_{sabs2} := T_{s2} + 460 \quad T_{sabs2} = 599.5 \text{ }^{\circ}\text{R} \quad P_{s2} := P_{m2} + \frac{P_{g2}}{13.6 \cdot \frac{\text{in_H2O}}{\text{in_Hg}}} \quad P_{s2} = 29.72 \text{ in_Hg}$$

$$M_{s2} := M_{d2} \cdot (1 - B_{wST2}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST2} \quad \text{Eq. 2-6} \quad M_{s2} = 28.39 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s2} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT2}} \cdot \sqrt{\frac{T_{sabs2}}{P_{s2} \cdot M_{s2}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s2} = 38.94 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd2} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST2}) \cdot V_{s2} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s2}}{T_{sabs2} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd2} = 4976334.14 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd2} = 82938.90 \frac{\text{dscf}}{\text{min}}}$$

Run 3:

$$T_{sabs3} := T_{s3} + 460 \quad T_{sabs3} = 600.3 \text{ }^{\circ}\text{R} \quad P_{s3} := P_{m3} + \frac{P_{g3}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s3} = 29.66 \text{ in}_{Hg}$$

$$M_{s3} := M_{d3} \cdot (1 - B_{wST3}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST3} \quad \text{Eq. 2-6} \quad M_{s3} = 28.32 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s3} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs3}}{P_{s3} \cdot M_{s3}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s3} = 38.35 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd3} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST3}) \cdot V_{s3} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s3}}{T_{sabs3} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd3} = 4861622.00 \frac{\text{dscf}}{\text{hr}}} \quad \boxed{Q_{sd3} = 81027.03 \frac{\text{dscf}}{\text{min}}}$$

Isokinetic Sampling Rate

Nomenclature:

A_n	=	Cross-sectional area of nozzle, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
I	=	Percent of isokinetic sampling.
N_d	=	Nozzle diameter, in.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
V_{mstd}	=	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Θ_t	=	Total sampling time, min.
60	=	Conversion factor, sec/min.
100	=	Conversion to percent.

Variables:

$$\Theta_{t1} := 120 \cdot \text{min}$$

$$N_d := 0.283 \cdot \text{in}$$

$$\Theta_{t2} := 128 \cdot \text{min}$$

$$\Theta_{t3} := 128 \cdot \text{min}$$

Constants:

$$K_5 := 0.09450 \cdot \frac{\text{in_Hg} \cdot \% \cdot \text{min}}{\text{sec} \cdot \mathcal{R}}$$

$$T_{std} = 528 \mathcal{R}$$

$$P_{std} = 29.92 \text{ in_Hg}$$

$$A_n := \pi \cdot \left(\frac{N_d}{12 \cdot \frac{\text{in}}{\text{ft}}} \right)^2 \quad A_n = 4.37 \times 10^{-4} \text{ ft}^2$$

Calculations:

$$I_1 := \frac{T_{sabs1} \cdot V_{mstd1} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s1} \cdot \Theta_{t1} \cdot A_n \cdot P_{s1} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST1})}$$

Eq. 5-8

$$I_1 = 91.54 \%$$

$$I_2 := \frac{T_{sabs2} \cdot V_{mstd2} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s2} \cdot \Theta_{t2} \cdot A_n \cdot P_{s2} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST2})}$$

Eq. 5-8

$$I_2 = 91.52 \%$$

$$I_3 := \frac{T_{sabs3} \cdot V_{mstd3} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s3} \cdot \Theta_{I3} \cdot An \cdot P_{s3} \cdot 60 \frac{sec}{min} \cdot (1 - B_{wST3})}$$

Eq. 5-8

$I_3 = 90.16 \%$

RM 5B - Determination of Nonsulfuric Acid Particulate Matter Emissions from Stationary Sources

Nomenclature:

v_n	=	volume of the samples (Runs 1 to 3), dscf and dscm.
M_{PMn}	=	Mass of Particulate Matter (Runs 1 to 3), ug.
M_{PMCn}	=	Mass of Particulate Matter w/ condensables (Runs 1 to 3), ug.
M_{PMNn}	=	Mass of Particulate Matter Non-Sulfate (Runs 1 to 3), ug.
M_{PCn}	=	Mass of Particulate Catch Weight (Runs 1 to 3), ug.
c_{PMn}	=	Concentration of Particulate Matter (Runs 1 to 3), mg/dscm.
C_{PMn}	=	Concentration of Particulate Matter (Runs 1 to 3), lb/hr.
c_{PMCn}	=	Concentration of Particulate Matter w/ condensable (Runs 1 to 3), mg/dscm.
C_{PMCn}	=	Concentration of Particulate Matter w/ condensable (Runs 1 to 3), lb/hr.
c_{PMNn}	=	Concentration of Particulate Matter Non-Sulfate (Runs 1 to 3), mg/dscm.
C_{PMNn}	=	Concentration of Particulate Matter Non-Sulfate (Runs 1 to 3), lb/hr.

Variables:

$$v_1 := 79.111 dscf$$

$$v_2 := 83.999 dscf$$

$$v_3 := 80.840 dscf$$

$$M_{PM.1} := 28.1 mg$$

$$M_{PM.2} := 34.5 mg$$

$$M_{PM.3} := 32.3 mg$$

$$M_{PMC.1} := 23.1 mg$$

$$M_{PMC.2} := 16.0 mg$$

$$M_{PMC.3} := 19.0 mg$$

$$M_{PMN.1} := 18.9 mg$$

$$M_{PMN.2} := 26.4 mg$$

$$M_{PMN.3} := 24.8 mg$$

$$M_{PMcw.1} := 10551.4 mg$$

$$M_{PMcw.2} := 10391.4 mg$$

$$M_{PMcw.3} := 10860.4 mg$$

$$fv_1 := 0.500 l$$

$$fv_2 := 0.470 l$$

$$fv_3 := 0.490 l$$

Constants:

$$K_6 := 35.31467 \frac{dscf}{m^3}$$

$$K_7 := 453.59 \frac{g}{lb}$$

$$K_8 := 1000 \frac{mg}{g}$$

$$K_9 := 15.432 \frac{gr}{g}$$

Calculations:

$$v_1 = 2.24 \text{ dscm}$$

$$v_2 = 2.379 \text{ dscm}$$

$$v_3 = 2.289 \text{ dscm}$$

$$c_{PM.1} := \frac{M_{PM.1} \cdot K_9}{v_1}$$

$$c_{PM.2} := \frac{M_{PM.2} \cdot K_9}{v_2}$$

$$c_{PM.3} := \frac{M_{PM.3} \cdot K_9}{v_3}$$

$$c_{PM.1} = 0.0055 \frac{gr}{dscf}$$

$$c_{PM.2} = 0.0063 \frac{gr}{dscf}$$

$$c_{PM.3} = 0.0062 \frac{gr}{dscf}$$

$$C_{PM.1} := c_{PM.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{PM.2} := c_{PM.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{PM.3} := c_{PM.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{PM.1} = 3.92 \frac{lb}{hr}$$

$$C_{PM.2} = 4.52 \frac{lb}{hr}$$

$$C_{PM.3} = 4.29 \frac{lb}{hr}$$

$$c_{PMC.1} := \frac{M_{PMC.1} \cdot K_9}{v_1}$$

$$c_{PMC.2} := \frac{M_{PMC.2} \cdot K_9}{v_2}$$

$$c_{PMC.3} := \frac{M_{PMC.3} \cdot K_9}{v_3}$$

$$c_{PMC.1} = 0.0045 \frac{gr}{dscf}$$

$$c_{PMC.2} = 0.0029 \frac{gr}{dscf}$$

$$c_{PMC.3} = 0.0036 \frac{gr}{dscf}$$

$$C_{PMC.1} := c_{PMC.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{PMC.2} := c_{PMC.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{PMC.3} := c_{PMC.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{PMC.1} = 3.22 \frac{lb}{hr}$$

$$C_{PMC.2} = 2.09 \frac{lb}{hr}$$

$$C_{PMC.3} = 2.52 \frac{lb}{hr}$$

$$c_{PMN.1} := \frac{M_{PMN.1} \cdot K_9}{v_1}$$

$$c_{PMN.2} := \frac{M_{PMN.2} \cdot K_9}{v_2}$$

$$c_{PMN.3} := \frac{M_{PMN.3} \cdot K_9}{v_3}$$

$$c_{PMN.1} = 0.0037 \frac{gr}{dscf}$$

$$c_{PMN.2} = 0.0049 \frac{gr}{dscf}$$

$$c_{PMN.3} = 0.0047 \frac{gr}{dscf}$$

$$C_{PMN.1} := c_{PMN.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{PMN.2} := c_{PMN.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{PMN.3} := c_{PMN.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{PMN.1} = 2.64 \frac{lb}{hr}$$

$$C_{PMN.2} = 3.46 \frac{lb}{hr}$$

$$C_{PMN.3} = 3.29 \frac{lb}{hr}$$

$$c_{PMcw.1} := \frac{M_{PMcw.1}}{fv_1}$$

$$c_{PMcw.2} := \frac{M_{PMcw.2}}{fv_2}$$

$$c_{PMcw.3} := \frac{M_{PMcw.3}}{fv_3}$$

$$c_{PMcw.1} = 21103 \frac{mg}{l}$$

$$c_{PMcw.2} = 22109 \frac{mg}{l}$$

$$c_{PMcw.3} = 22164 \frac{mg}{l}$$

Appendix D8
U.S. EPA Conditional Test Method 027 (CTM-027)

Company:	Citgo	Test Date:	05/26/11
Location:	Sulphur, LA	Test Number:	1
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	CTM-027		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.75 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.60 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.280 inches
Nozzle Area (ft ²)	A_n	4.28E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	1.096 in. H ₂ O
Dry Gas Meter Correction Factor	Y	0.996
Average ΔH	ΔH	1.353 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.5514 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	100.6 °F
Sampling Time	Θ	120 min
Moisture Measured by Weight	$(W_f - W_i)$	396.4 g
Dry Gas Meter Volume (actual)	V_m	74.335 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	68.991 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.50 vol%
Carbon Dioxide	%CO ₂	18.45 vol%
Nitrogen	%N ₂	81.05 vol%
Temperature	T_s	141.1 °F
Molecular Weight, dry	M_d	30.97 lb/lb*mol
Molecular Weight, wet	M_s	28.30 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2132
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2057
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.63 in. Hg
Average Velocity	V_s	33.53 ft/sec
Volumetric Flow Rate	Q_{sd}	6,098,452 acfh
		101,641 acfm
	Q_{sd}	4,213,214 dscfh
		70,220 dscfm
Isokinetic Sampling Rate	I	96.75 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	PH	7/25/2011

Company:	Citgo	Test Date:	05/27/11
Location:	Sulphur, LA	Test Number:	2
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	CTM-027		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.84 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.69 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.280 inches
Nozzle Area (ft ²)	A_n	4.28E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	1.096 in. H ₂ O
Dry Gas Meter Correction Factor	Y	0.996
Average ΔH	ΔH	1.625 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6188 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	93.6 °F
Sampling Time	Θ	128 min
Moisture Measured by Weight	$(W_f - W_i)$	535.6 g
Dry Gas Meter Volume (actual)	V_m	87.767 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	82.734 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.66 vol%
Carbon Dioxide	%CO ₂	18.19 vol%
Nitrogen	%N ₂	81.15 vol%
Temperature	T_s	143.9 °F
Molecular Weight, dry	M_d	30.94 lb/lb*mol
Molecular Weight, wet	M_s	28.07 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2339
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2218
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.72 in. Hg
Average Velocity	V_s	37.81 ft/sec
Volumetric Flow Rate	Q_{sd}	6,877,544 acfh
		114,626 acfm
	Q_{sd}	4,647,797 dscfh
		77,463 dscfm
Isokinetic Sampling Rate	I	98.60 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	PH	7/25/2011

Company:	Citgo	Test Date:	05/27/11
Location:	Sulphur, LA	Test Number:	3
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method:	CTM-027		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.78 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.63 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.280 inches
Nozzle Area (ft ²)	A_n	4.28E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	1.096 in. H ₂ O
Dry Gas Meter Correction Factor	Y	0.996
Average ΔH	ΔH	1.609 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6158 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	92.1 °F
Sampling Time	Θ	128 min
Moisture Measured by Weight	$(W_f - W_i)$	523.2 g
Dry Gas Meter Volume (actual)	V_m	86.317 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	81.428 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.62 vol%
Carbon Dioxide	%CO ₂	18.01 vol%
Nitrogen	%N ₂	81.37 vol%
Temperature	T_s	143.5 °F
Molecular Weight, dry	M_d	30.91 lb/lb*mol
Molecular Weight, wet	M_s	28.07 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2325
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2199
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.66 in. Hg
Average Velocity	V_s	37.65 ft/sec
Volumetric Flow Rate	Q_{sd}	6,848,927 acfh
		114,149 acfm
	Q_{sd}	4,633,324 dscfh
		77,222 dscfm
Isokinetic Sampling Rate	I	97.34 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	PH	7/25/2011

TEST 1

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	141.1	y_1
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

 y_1 = interpolated absolute pressure at stack temperature.

6.0937 in Hg

Moisture content calculated:

20.566 %

TEST 2

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	143.9	y_2
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

 y_2 = interpolated absolute pressure at stack temperature.

6.5919 in Hg

Moisture content calculated:

22.180 %

TEST 3

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	143.5	y_3
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

 y_3 = interpolated absolute pressure at stack temperature.

6.5207 in Hg

Moisture content calculated:

21.985 %

Based on Method 4 - *Determination of Moisture Content in Stack Gases* (4.1), the moisture content of saturated gas streams as measured by method 4 may be positively biased. In cases where this is suspected, a second determination may be made. This determination can be accomplished by using a psychrometric chart or by using a saturation vapor pressure table.

Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

Values

TESTS:	Moisture Content (Steam Table) %	Moisture Content (Impinger) %	Lower of Two Values:
TEST 1	20.57	21.32	20.57
TEST 2	22.18	23.39	22.18
TEST 3	21.98	23.25	21.98

Reference Method 4 - Determination of Moisture Content in Stack Gases

Nomenclature:

H_2O	=	Moisture content of gas stream, vol%.
B_{ws}	=	Proportion of water vapor, by volume, in the gas stream.
M_w	=	Molecular weight of water, 18.0 lb/lb-mole.
P_m	=	Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
R_i	=	Ideal gas constant, 21.85 (in. Hg)(ft ³)/(lb-mole)(°R).
T_{mf}	=	Temperature at meter, °F.
T_m	=	Absolute temperature at meter, °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_f	=	Final volume of condenser water, ml.
V_i	=	Initial volume, if any, of condenser water, ml.
V_m	=	Dry gas volume measured by dry gas meter, dcf.
V_{mstd}	=	Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscf.
V_{wcstd}	=	Volume of water vapor condensed, corrected to standard conditions, scf.
V_{wsgstd}	=	Volume of water vapor collected in silica gel, corrected to standard conditions, scf.
W_f	=	Final weight of silica gel or silica gel plus impinger, g.
W_i	=	Initial weight of silica gel or silica gel plus impinger, g.
Y	=	Dry gas meter calibration factor.
ρ_w	=	Density of water, 0.002201 lb/ml.

Variables:

Run 1:

$V_{m1} := 74.335 \cdot ft^3$	$P_{m1} := 29.60 \cdot in_Hg$
$W_{i1} := 0.0 \cdot g$	$T_{mf1} := 100.6 \cdot ^\circ F$
$W_{f1} := 396.4 \cdot g$	$Y_1 := 0.996$
$V_{f1} := 0$	$V_{i1} := 0$

Run 3:

$V_{m3} := 86.317 \cdot ft^3$	$P_{m3} := 29.63 \cdot in_Hg$
$W_{i3} := 0.0 \cdot g$	$T_{mf3} := 92.1 \cdot ^\circ F$
$W_{f3} := 523.2 \cdot g$	$Y_3 := 0.996$
$V_{f3} := 0$	$V_{i3} := 0$

Run 2:

$V_{m2} := 87.767 \cdot ft^3$	$P_{m2} := 29.69 \cdot in_Hg$
$W_{i2} := 0.0 \cdot g$	$T_{mf2} := 93.6 \cdot ^\circ F$
$W_{f2} := 535.6 \cdot g$	$Y_2 := 0.996$
$V_{f2} := 0$	$V_{i2} := 0$

Constants:

$M_w := 18.0 \cdot \frac{lb}{lb \cdot mol}$	$K_1 := 0.04706 \cdot \frac{ft^3}{ml}$
$P_{std} := 29.92 \cdot in_Hg$	$K_2 := 453.6 \cdot \frac{g}{lb}$
$T_{std} := 528 \cdot ^\circ R$	$K_3 := 0.04715 \cdot \frac{ft^3}{g}$
$\rho_w := 0.002201 \cdot \frac{lb}{ml}$	$K_4 := 17.64 \cdot \frac{^{\circ}R}{in_Hg}$
$R_i := 21.85 \cdot \frac{in_Hg \cdot ft^3}{lb \cdot mol \cdot ^{\circ}R}$	

Calculations:

Run 1:

$$V_{wcstd1} := \frac{(V_{f1} - V_{i1}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd1} := \frac{(W_{f1} - W_{i1}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd1} := K_1(V_{f1} - V_{i1})$$

$$V_{wsgstd1} := K_3(W_{f1} - W_{i1})$$

$$V_{wcstd1} = 0.000 \text{ scf}$$

$$V_{wsgstd1} = 18.720 \text{ scf}$$

$$V_{mstd1} := \frac{V_{m1} \cdot Y_1 \cdot P_{m1} \cdot T_{std}}{P_{std} \cdot (T_{mf1} + 460)} \quad Eq. 4-3$$

$$B_{ws1} := \frac{V_{wcstd1} + V_{wsgstd1}}{V_{wcstd1} + V_{wsgstd1} + V_{mstd1}} \quad Eq. 4-4$$

$$V_{mstd1} := K_4 Y_1 (V_{m1} P_{m1}) / T_{m1}$$

$$B_{ws1} = 0.2134$$

$$\boxed{V_{mstd1} = 69.0 \text{ dscf}}$$

$$H_2O_1 := B_{ws1} \cdot 100 \cdot \text{vol}\%$$

$$\boxed{H_2O_1 = 21.34 \text{ vol}\%}$$

Run 2:

$$V_{wcstd2} := \frac{(V_{f2} - V_{i2}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w}$$

$$Eq. 4-1 \quad V_{wsgstd2} := \frac{(W_{f2} - W_{i2}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wcstd2} := K_1(V_{f2} - V_{i2})$$

$$V_{wsgstd2} := K_3(W_{f2} - W_{i2})$$

$$V_{wcstd2} = 0.000 \text{ scf}$$

$$V_{wsgstd2} = 25.294 \text{ scf}$$

$$V_{mstd2} := \frac{V_{m2} \cdot Y_2 \cdot P_{m2} \cdot T_{std}}{P_{std} \cdot (T_{mf2} + 460)} \quad Eq. 4-3$$

$$B_{ws2} := \frac{V_{wcstd2} + V_{wsgstd2}}{V_{wcstd2} + V_{wsgstd2} + V_{mstd2}} \quad Eq. 4-4$$

$$V_{mstd2} := K_4 Y_2 (V_{m2} P_{m2}) / T_{m2}$$

$$B_{ws2} = 0.2341$$

$$\boxed{V_{mstd2} = 82.7 \text{ dscf}}$$

$$H_2O_2 := B_{ws2} \cdot 100 \cdot \text{vol}\%$$

$$\boxed{H_2O_2 = 23.41 \text{ vol}\%}$$

Run 3:

$$V_{wcstd3} := \frac{(V_{f3} - V_{i3}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad Eq. 4-1$$

$$V_{wcstd3} := K_1(V_{f3} - V_{i3})$$

$$V_{wcstd3} = 0.000 \text{ scf}$$

$$V_{mstd3} := \frac{V_{m3} \cdot Y_3 \cdot P_{m3} \cdot T_{std}}{P_{std} \cdot (T_{mf3} + 460)} \quad Eq. 4-3$$

$$V_{mstd3} := K_4 Y_3 (V_{m3} P_{m3}) / T_{m3}$$

$$\boxed{V_{mstd3} = 81.4 \text{ dscf}}$$

$$V_{wsstd3} := \frac{(W_{f3} - W_{i3}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad Eq. 4-2$$

$$V_{wsstd3} := K_3(W_{f3} - W_{i3})$$

$$V_{wsstd3} = 24.708 \text{ scf}$$

$$B_{ws3} := \frac{V_{wcstd3} + V_{wsstd3}}{V_{wcstd3} + V_{wsstd3} + V_{mstd3}} \quad Eq. 4-4$$

$$B_{ws3} = 0.2328$$

$$H_2O_3 := B_{ws3} \cdot 100 \cdot \text{vol\%}$$

$$\boxed{H_2O_3 = 23.28 \text{ vol\%}}$$

Reference Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

Nomenclature:

M_d	=	Dry molecular weight, lb/lb-mole.
M_s	=	Wet molecular weight, lb/lb-mole.
$\%CO_2$	=	Percent CO_2 by volume, dry basis.
$\%O_2$	=	Percent O_2 by volume, dry basis.
$\%CO$	=	Percent CO by volume, dry basis.
$\%N_2$	=	Percent N_2 by volume, dry basis.
Bal	=	$\%N_2 + \%CO$.
28	=	Molecular weight of N_2 or CO, lb/lb-mol.
32	=	Molecular weight of O_2 , lb/lb-mol.
44	=	Molecular weight of CO_2 , lb/lb-mol.

Variables:

$$\%O_2_1 := 0.50 \cdot vol\%$$

$$\%O_2_2 := 0.66 \cdot vol\%$$

$$\%O_2_3 := 0.62 \cdot vol\%$$

$$\%CO_2_1 := 18.45 \cdot vol\%$$

$$\%CO_2_2 := 18.19 \cdot vol\%$$

$$\%CO_2_3 := 18.01 \cdot vol\%$$

$$Bal_1 := 100 \cdot vol\% - (\%O_2_1 + \%CO_2_1)$$

$$Bal_2 := 100 \cdot vol\% - (\%O_2_2 + \%CO_2_2)$$

$$Bal_1 = 81.05 \text{ vol}\%$$

$$Bal_2 = 81.15 \text{ vol}\%$$

$$Bal_3 := 100 \cdot vol\% - (\%O_2_3 + \%CO_2_3)$$

$$Bal_3 = 81.37 \text{ vol}\%$$

Calculations:

$$M_{d1} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_1 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_1 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_1) \quad Eq. 3-1$$

$$M_{d1} = 30.97 \frac{lb}{lb \cdot mol}$$

$$M_{d2} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_2 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_2 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_2) \quad Eq. 3-1$$

$$M_{d2} = 30.94 \frac{lb}{lb \cdot mol}$$

$$M_{d3} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_3 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_3 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_3) \quad Eq. 3-1$$

$$M_{d3} = 30.91 \frac{lb}{lb \cdot mol}$$

Reference Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate

Nomenclature:

A_s	=	Cross-sectional area of stack, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
B_{wST}	=	Water vapor in gas stream calculated using steam table.
C_p	=	Pitot tube coefficient, dimensionless.
K_p	=	Velocity equation constant.
M_d	=	Molecular weight of stack gas, dry basis, lb/lb-mol.
M_s	=	Molecular weight of stack gas, wet basis, lb/lb-mol.
P_m	=	Barometric pressure at measurement site, in. Hg.
P_g	=	Stack static pressure, in. H ₂ O.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
Q_{sd}	=	Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr, dscf/min.
T_s	=	Stack temperature, °F.
T_{sabs}	=	Absolute stack temperature (460 + T_s), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
Δp_{avgqrt}	=	Average square root of Δp , in. H ₂ O.
3600	=	Conversion factor, sec/hr.
18.0	=	Molecular weight of water, lb/lb-mol.

Constants:

$$K_p := 85.49 \cdot \frac{ft}{sec} \cdot \left[\frac{\left(\frac{lb}{lb \cdot mol} \right) \cdot (in_Hg)}{(R) \cdot (in_H2O)} \right]^{\frac{1}{2}}$$

Variables:

$A_s := 50.528 \cdot ft^2$	$\Delta p_{avgqrt2} := 0.6188 \cdot in_H2O^{\frac{1}{2}}$
$C_p := 0.84$	$T_{s2} := 143.9 \cdot ^\circ F$
$\Delta p_{avgqrt1} := 0.5514 \cdot in_H2O^{\frac{1}{2}}$	$P_{g2} := 0.36 \cdot in_H2O$
$T_{s1} := 141.1 \cdot ^\circ F$	$\Delta p_{avgqrt3} := 0.6158 \cdot in_H2O^{\frac{1}{2}}$
$P_{g1} := 0.36 \cdot in_H2O$	$T_{s3} := 143.5 \cdot ^\circ F$
$B_{wST1} := 0.2057$	$P_{g3} := 0.36 \cdot in_H2O$
$B_{wST2} := 0.2218$	
$B_{wST3} := 0.2199$	

Note the lower of the two moisture fractions will be used: either the one measured by impinger analysis or calculated by the steam table.

Calculations:

Run 1:

$$T_{sabs1} := T_{s1} + 460 \quad T_{sabs1} = 601.1 \text{ }^{\circ}\text{R} \quad P_{s1} := P_{m1} + \frac{P_{g1}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s1} = 29.63 \text{ in}_{Hg}$$

$$M_{s1} := M_{d1} \cdot (1 - B_{wST1}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST1} \quad \text{Eq. 2-6} \quad M_{s1} = 28.30 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s1} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT1}} \cdot \sqrt{\frac{T_{sabs1}}{P_{s1} \cdot M_{s1}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s1} = 33.53 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd1} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST1}) \cdot V_{s1} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s1}}{T_{sabs1} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd1} = 4213065.08 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd1} = 70217.75 \frac{\text{dscf}}{\text{min}}}$$

Run 2:

$$T_{sabs2} := T_{s2} + 460 \quad T_{sabs2} = 603.9 \text{ }^{\circ}\text{R} \quad P_{s2} := P_{m2} + \frac{P_{g2}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s2} = 29.72 \text{ in}_{Hg}$$

$$M_{s2} := M_{d2} \cdot (1 - B_{wST2}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST2} \quad \text{Eq. 2-6} \quad M_{s2} = 28.07 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s2} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT2}} \cdot \sqrt{\frac{T_{sabs2}}{P_{s2} \cdot M_{s2}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s2} = 37.81 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd2} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST2}) \cdot V_{s2} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s2}}{T_{sabs2} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd2} = 4647912.53 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd2} = 77465.21 \frac{\text{dscf}}{\text{min}}}$$

Run 3:

$$T_{sabs3} := T_{s3} + 460 \quad T_{sabs3} = 603.5 \text{ }^{\circ}\text{R} \quad P_{s3} := P_{m3} + \frac{P_{g3}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s3} = 29.66 \text{ in}_{Hg}$$

$$M_{s3} := M_{d3} \cdot (1 - B_{wST3}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST3} \quad \text{Eq. 2-6} \quad M_{s3} = 28.07 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s3} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs3}}{P_{s3} \cdot M_{s3}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s3} = 37.65 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd3} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST3}) \cdot V_{s3} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s3}}{T_{sabs3} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd3} = 4633452.15 \frac{\text{dscf}}{\text{hr}}} \quad \boxed{Q_{sd3} = 77224.20 \frac{\text{dscf}}{\text{min}}}$$

Isokinetic Sampling Rate

Nomenclature:

A_n	=	Cross-sectional area of nozzle, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
I	=	Percent of isokinetic sampling.
N_d	=	Nozzle diameter, in.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
V_{mstd}	=	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Θ_t	=	Total sampling time, min.
60	=	Conversion factor, sec/min.
100	=	Conversion to percent.

Variables:

$$\Theta_{t1} := 120 \cdot \text{min}$$

$$N_d := 0.280 \cdot \text{in}$$

$$\Theta_{t2} := 128 \cdot \text{min}$$

$$\Theta_{t3} := 128 \cdot \text{min}$$

$$A_n := \pi \cdot \left(\frac{N_d}{2} \right)^2 \cdot \left(\frac{12 \cdot \frac{\text{in}}{\text{ft}}}{1} \right)^2 \quad A_n = 4.28 \times 10^{-4} \text{ ft}^2$$

Constants:

$$K_5 := 0.09450 \cdot \frac{\text{in_Hg} \cdot \% \cdot \text{min}}{\text{sec} \cdot \mathcal{R}}$$

$$T_{std} = 528 \mathcal{R}$$

$$P_{std} = 29.92 \text{ in_Hg}$$

Calculations:

$$I_1 := \frac{T_{sabs1} \cdot V_{mstd1} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s1} \cdot \Theta_{t1} \cdot A_n \cdot P_{s1} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST1})} \quad \text{Eq. 5-8}$$

$$I_1 = 96.74 \%$$

$$I_2 := \frac{T_{sabs2} \cdot V_{mstd2} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s2} \cdot \Theta_{t2} \cdot A_n \cdot P_{s2} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST2})} \quad \text{Eq. 5-8}$$

$$I_2 = 98.59 \%$$

$$I_3 := \frac{T_{sabs3} \cdot V_{mstd3} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s3} \cdot \Theta_{t3} \cdot A_n \cdot P_{s3} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST3})} \quad \text{Eq. 5-8}$$

$$I_3 = 97.33 \%$$

Conditional Test Method 027 - Procedure for Collection and Analysis of Ammonia in Stationary Sources

Nomenclature:

v_n	=	volume of the samples (Runs 1 to 3), dscf and dscm.
M_{NH3n}	=	Mass of NH_3 (Runs 1 to 3), ug.
c_{NH3n}	=	Concentration of NH_3 (Runs 1 to 3), mg/dscm.
C_{NH3n}	=	Concentration of NH_3 (Runs 1 to 3), lb/hr.

Variables:

$$v_1 := 68.991 dscf$$

$$v_2 := 82.734 dscf$$

$$v_3 := 81.428 dscf$$

$$M_{NH3.1} := 4088 ug$$

$$M_{NH3.2} := 5577 ug$$

$$M_{NH3.3} := 5390 ug$$

Constants:

$$MW_{NH3} := 17.0305 \frac{g}{mol} \quad K_6 := 35.31467 \frac{dscf}{m^3}$$

$$K_7 := 453.59 \frac{g}{lb} \quad K_9 := 24.0551 \frac{l}{mol}$$

$$K_8 := 1000000 \frac{ug}{g} \quad K_{10} := 28.3166 \frac{l}{scf}$$

Calculations:

$$v_1 = 68.991 dscf$$

$$v_2 = 82.734 dscf$$

$$v_3 = 81.428 dscf$$

$$c_{NH3.1} := \frac{M_{NH3.1} \cdot K_9}{v_1 \cdot MW_{NH3} \cdot K_{10}}$$

$$c_{NH3.2} := \frac{M_{NH3.2} \cdot K_9}{v_2 \cdot MW_{NH3} \cdot K_{10}}$$

$$c_{NH3.3} := \frac{M_{NH3.3} \cdot K_9}{v_3 \cdot MW_{NH3} \cdot K_{10}}$$

$$c_{NH3.1} = 2.96 ppmv$$

$$c_{NH3.2} = 3.36 ppmv$$

$$c_{NH3.3} = 3.3 ppmv$$

$$C_{NH3.1} := \frac{M_{NH3.1} \cdot Q_{sd1}}{v_1 \cdot K_8 \cdot K_7}$$

$$C_{NH3.2} := \frac{M_{NH3.2} \cdot Q_{sd2}}{v_2 \cdot K_8 \cdot K_7}$$

$$C_{NH3.3} := \frac{M_{NH3.3} \cdot Q_{sd3}}{v_3 \cdot K_8 \cdot K_7}$$

$$C_{NH3.1} = 0.55 \frac{lb}{hr}$$

$$C_{NH3.2} = 0.691 \frac{lb}{hr}$$

$$C_{NH3.3} = 0.676 \frac{lb}{hr}$$

Appendix D9

U.S. EPA Method 29

Company:	Citgo	Test Date:	05/26/11
Location:	Sulphur, LA	Test Number:	1
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method	29		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.74 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.59 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.282 inches
Nozzle Area (ft ²)	A_n	4.34E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H@$	1.962 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.024
Average ΔH	ΔH	1.719 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6128 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	103.3 °F
Sampling Time	Θ	176 min
Moisture Measured by Weight	$(W_f - W_i)$	628.2 g
Dry Gas Meter Volume (actual)	V_m	117.975 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	111.991 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.50 vol%
Carbon Dioxide	%CO ₂	18.45 vol%
Nitrogen	%N ₂	81.05 vol%
Temperature	T_s	139.3 °F
Molecular Weight, dry	M_d	30.97 lb/lb*mol
Molecular Weight, wet	M_s	28.42 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2092
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.1968
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.62 in. Hg
Average Velocity	V_s	37.13 ft/sec
Volumetric Flow Rate	Q_{sd}	6,753,804 acfh
		112,563 acfm
	Q_{sd}	4,731,113 dscfh
		78,852 dscfm
Isokinetic Sampling Rate	I	94.01 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	KT	7/26/2011

Company:	Citgo	Test Date:	05/27/11
Location:	Sulphur, LA	Test Number:	2
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method	29		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.84 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.69 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.282 inches
Nozzle Area (ft ²)	A_n	4.34E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	1.962 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.024
Average ΔH	ΔH	1.783 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6285 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	97.1 °F
Sampling Time	Θ	176 min
Moisture Measured by Weight	$(W_f - W_i)$	702.9 g
Dry Gas Meter Volume (actual)	V_m	119.576 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	115.159 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.66 vol%
Carbon Dioxide	%CO ₂	18.19 vol%
Nitrogen	%N ₂	81.15 vol%
Temperature	T_s	140.8 °F
Molecular Weight, dry	M_d	30.94 lb/lb*mol
Molecular Weight, wet	M_s	28.31 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2235
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2032
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.72 in. Hg
Average Velocity	V_s	38.14 ft/sec
Volumetric Flow Rate	Q_{sd}	6,938,506 acfh
		115,642 acfm
	Q_{sd}	4,825,298 dscfh
		80,422 dscfm
Isokinetic Sampling Rate	I	94.78 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	KT	7/26/2011

Company:	Citgo	Test Date:	05/27/11
Location:	Sulphur, LA	Test Number:	3
Unit:	B-Cat		
Source:	Wet Gas Scrubber Stack		
Method	29		

Source Parameters

Sampling Elevation		150.0 feet
Barometric Pressure (@ grade)	P_{bar}	29.78 in. Hg
Barometric Pressure (@ dry gas meter)	P_m	29.63 in. Hg
Stack Internal Diameter	D	96.250 inches
Cross-sectional Area at Sampling Plane	A_r	50.528 ft ²

Sampling Parameters

Nozzle Diameter (inches)		0.282 inches
Nozzle Area (ft ²)	A_n	4.34E-04 ft ²
Pitot Tube Coefficient	C_p	0.84
Control Box ΔH Standard	$\Delta H_{@}$	1.962 in. H ₂ O
Dry Gas Meter Correction Factor	Y	1.024
Average ΔH	ΔH	1.811 in. H ₂ O
Average Square Root ΔP	$\sqrt{\Delta P_{avg}}$	0.6277 in. H ₂ O ^{1/2}
Average Meter Temperature	T_m	107.9 °F
Sampling Time	Θ	176 min
Moisture Measured by Weight	$(W_f - W_i)$	675.1 g
Dry Gas Meter Volume (actual)	V_m	116.882 dcf
Dry Gas Meter Volume (@ dry std conditions)	$V_{m(std)}$	110.192 dscf

Effluent Parameters

Excess Oxygen	%O ₂	0.62 vol%
Carbon Dioxide	%CO ₂	18.01 vol%
Nitrogen	%N ₂	81.37 vol%
Temperature	T_s	140.4 °F
Molecular Weight, dry	M_d	30.91 lb/lb*mol
Molecular Weight, wet	M_s	28.31 lb/lb*mol
Moisture Fraction (Impinger Analysis) ¹	B_{ws}	0.2241
Moisture Fraction (based on Steam Table) ¹	B_{ws}	0.2013
Stack Static Pressure	P_g	0.36 in. H ₂ O
Absolute Stack Pressure	P_s	29.66 in. Hg
Average Velocity	V_s	38.12 ft/sec
Volumetric Flow Rate	Q_{sd}	6,934,171 acfh
		115,570 acfm
	Q_{sd}	4,827,831 dscfh
		80,464 dscfm
Isokinetic Sampling Rate	I	90.64 %

¹ Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

	Initials	Date
Data Entry	JP	6/29/2011
Review	KT	7/26/2011

TEST 1

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	114.44	2.96
B	139.3	y_1
C	140.18	5.93

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.115385$$

$$b = y \text{ intercept} \quad -10.2446$$

y_1 = interpolated absolute pressure at stack temperature.

5.8285 in Hg

Moisture content calculated:

19.677 %

TEST 2

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	140.8	y_2
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

y_2 = interpolated absolute pressure at stack temperature.

6.0403 in Hg

Moisture content calculated:

20.324 %

TEST 3

Interpolation based on Steam Table:

Points	Temperature (°F)	Absolute pressure in Hg
A	140.18	5.93
B	140.4	y_3
C	153.5	8.30

It is assumed that between points A and C that the curve is linear for interpolation purposes.

linear equation:

$$y = mx + b$$

$$m = \text{slope} \quad 0.177928$$

$$b = y \text{ intercept} \quad -19.0119$$

y_3 = interpolated absolute pressure at stack temperature.

5.9691 in Hg

Moisture content calculated:

20.125 %

Based on Method 4 - *Determination of Moisture Content in Stack Gases* (4.1), the moisture content of saturated gas streams as measured by method 4 may be positively biased. In cases where this is suspected, a second determination may be made. This determination can be accomplished by using a psychrometric chart or by using a saturation vapor pressure table.

Section 12.1.7 of Method 4, states that when calculating the moisture content of the stack using the two different methods - one based on impinger analysis and the other based on saturated conditions - the lower of the two values, B_{ws} , shall be considered correct.

Values

TESTS:	Moisture Content (Steam Table) %	Moisture Content (Impinger) %	Lower of Two Values:
TEST 1	19.68	21.21	19.68
TEST 2	20.32	22.66	20.32
TEST 3	20.13	22.72	20.13

Company: Citgo Petroleum Corporation
Location: Sulphur, LA
Unit: Cat B Wet Gas Scrubber

Test No.	1	2	3	Average
Date	05/26/11	05/27/11	05/27/11	n/a
Start Time	16:15	10:42	14:58	n/a
End Time	19:30	13:48	18:00	n/a
Test Duration, min	176	176	176	176

Unit Operating Parameters

Oxygen Content	vol%	0.50	0.66	0.62	0.59
Carbon Dioxide Content	vol%	18.45	18.19	18.01	18.22
Moisture Content	vol%	19.68	20.32	20.13	20.04
Wet Molecular Weight	lb/lb-mol	28.42	28.31	28.31	28.35
Velocity	ft/sec	37.13	38.14	38.12	37.80
Volumetric Flow Rate	dscfm	78,852	80,422	80,464	79,913

Sampling Parameters

Isokinetic Sampling Rate	%	94.01	94.78	90.64	93.14
Sample Volume	dscf	111.991	115.159	110.192	112.447
	dscm	3.171	3.261	3.120	3.184

Laboratory Results ¹

Antimony (Sb)	µg	[<3.650] BDL	[<3.640] BDL	[<3.640] BDL	[<3.643] BDL
Arsenic (As)	µg	[<5.790] BDL	[<5.780] BDL	[<5.780] BDL	[<5.783] BDL
Beryllium (Be)	µg	0.058 DLL	0.048 DLL	[<0.035] BDL	0.047 DLL
Cadmium (Cd)	µg	[<0.181] BDL	0.798 DLL	0.730	0.570 DLL
Chromium (Cr)	µg	13.040 DLL	9.910 DLL	12.360	11.770 DLL
Cobalt (Co)	µg	[<1.800] BDL	[<1.790] BDL	[<1.790] BDL	[<1.793] BDL
Lead (Pb)	µg	8.520 DLL	5.130 DLL	6.360 DLL	6.670 DLL
Manganese (Mn)	µg	10.420	6.560	7.600	8.193
Nickel (Ni)	µg	25.710	18.260	25.560	23.177
Selenium (Se)	µg	10.740 DLL	10.240	9.440	10.140 DLL

Pollutants

Antimony (Sb)	mg/dscm	[<1.15E-03] BDL	[<1.12E-03] BDL	[<1.17E-03] BDL	[<1.14E-03] BDL
	lb/hr	[<3.40E-04] BDL	[<3.36E-04] BDL	[<3.52E-04] BDL	[<3.43E-04] BDL
Arsenic (As)	mg/dscm	[<1.83E-03] BDL	[<1.77E-03] BDL	[<1.85E-03] BDL	[<1.82E-03] BDL
	lb/hr	[<5.39E-04] BDL	[<5.34E-04] BDL	[<5.58E-04] BDL	[<5.44E-04] BDL
Beryllium (Be)	mg/dscm	5.18E-07 DLL	4.17E-07 DLL	[<3.18E-07] BDL	4.17E-07 DLL
	lb/hr	5.40E-06 DLL	4.43E-06 DLL	[<3.38E-06] BDL	4.41E-06 DLL
Cadmium (Cd)	mg/dscm	[<5.71E-05] BDL	2.45E-04 DLL	2.34E-04	1.79E-04 DLL
	lb/hr	[<1.69E-05] BDL	7.37E-05 DLL	7.05E-05	5.37E-05 DLL
Chromium (Cr)	mg/dscm	4.11E-03 DLL	3.04E-03 DLL	3.96E-03	3.70E-03 DLL
	lb/hr	1.21E-03 DLL	9.16E-04 DLL	1.19E-03	1.11E-03 DLL
Cobalt (Co)	mg/dscm	[<5.68E-04] BDL	[<5.49E-04] BDL	[<5.74E-04] BDL	[<5.63E-04] BDL
	lb/hr	[<1.68E-04] BDL	[<1.65E-04] BDL	[<1.73E-04] BDL	[<1.69E-04] BDL
Lead (Pb)	mg/dscm	2.69E-03 DLL	1.57E-03 DLL	2.04E-03 DLL	2.10E-03 DLL
	lb/hr	7.94E-04 DLL	4.74E-04 DLL	6.14E-04 DLL	6.27E-04 DLL
Manganese (Mn)	mg/dscm	3.29E-03	2.01E-03	2.44E-03	2.58E-03
	lb/hr	9.71E-04	6.06E-04	7.34E-04	7.70E-04
Nickel (Ni)	mg/dscm	8.11E-03	5.60E-03	8.19E-03	7.30E-03
	lb/hr	2.39E-03	1.69E-03	2.47E-03	2.18E-03
Selenium (Se)	mg/dscm	3.39E-03 DLL	3.14E-03	3.03E-03	3.18E-03 DLL
	lb/hr	1.00E-03 DLL	9.46E-04	9.12E-04	9.53E-04 DLL

¹ Laboratory Results provided by Data Analysis Technologies, Inc.

BDL (below detection level) - all analytical values used to calculate and report an in-stack emissions value are less than the laboratory's reported detection level(s)

DLL (detection level limited) - at least one but not all values used to calculate and report an in-stack emissions value are greater than the laboratory's reported detection level(s)

	Initials	Date
Data Entry	JP	7/14/2011
Review	RI	8/17/2011

Reference Method 4 - Determination of Moisture Content in Stack Gases

Nomenclature:

H_2O	=	Moisture content of gas stream, vol%.
B_{ws}	=	Proportion of water vapor, by volume, in the gas stream.
M_w	=	Molecular weight of water, 18.0 lb/lb-mole.
P_m	=	Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
R_i	=	Ideal gas constant, 21.85 (in. Hg)(ft ³)/(lb-mole)(°R).
T_{mf}	=	Temperature at meter, °F.
T_m	=	Absolute temperature at meter, °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_f	=	Final volume of condenser water, ml.
V_i	=	Initial volume, if any, of condenser water, ml.
V_m	=	Dry gas volume measured by dry gas meter, dcf.
V_{mstd}	=	Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscf.
V_{wcstd}	=	Volume of water vapor condensed, corrected to standard conditions, scf.
V_{wsgstd}	=	Volume of water vapor collected in silica gel, corrected to standard conditions, scf.
W_f	=	Final weight of silica gel or silica gel plus impinger, g.
W_i	=	Initial weight of silica gel or silica gel plus impinger, g.
Y	=	Dry gas meter calibration factor.
ρ_w	=	Density of water, 0.002201 lb/ml.

Variables:

Run 1:

$V_{m1} := 117.975 \cdot ft^3$	$P_{m1} := 29.59 \cdot in_Hg$
$W_{i1} := 0.0 \cdot g$	$T_{mf1} := 103.3 \cdot ^\circ F$
$W_{f1} := 628.2 \cdot g$	$Y_1 := 1.024$
$V_{f1} := 0$	$V_{i1} := 0$

Run 3:

$V_{m3} := 116.882 \cdot ft^3$	$P_{m3} := 29.63 \cdot in_Hg$
$W_{i3} := 0.0 \cdot g$	$T_{mf3} := 107.9 \cdot ^\circ F$
$W_{f3} := 675.1 \cdot g$	$Y_3 := 1.024$
$V_{f3} := 0$	$V_{i3} := 0$

Run 2:

$V_{m2} := 119.576 \cdot ft^3$	$P_{m2} := 29.69 \cdot in_Hg$
$W_{i2} := 0.0 \cdot g$	$T_{mf2} := 97.1 \cdot ^\circ F$
$W_{f2} := 702.9 \cdot g$	$Y_2 := 1.024$
$V_{f2} := 0$	$V_{i2} := 0$

Constants:

$M_w := 18.0 \cdot \frac{lb}{lb \cdot mol}$	$K_1 := 0.04706 \cdot \frac{ft^3}{ml}$
$P_{std} := 29.92 \cdot in_Hg$	$K_2 := 453.6 \cdot \frac{g}{lb}$
$T_{std} := 528 \cdot ^\circ R$	$K_3 := 0.04715 \cdot \frac{ft^3}{g}$
$\rho_w := 0.002201 \cdot \frac{lb}{ml}$	$K_4 := 17.64 \cdot \frac{^{\circ}R}{in_Hg}$
$R_i := 21.85 \cdot \frac{in_Hg \cdot ft^3}{lb \cdot mol \cdot ^{\circ}R}$	

Calculations:

Run 1:

$$V_{wcstd1} := \frac{(V_{f1} - V_{i1}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad \text{Eq. 4-1} \quad V_{wsgstd1} := \frac{(W_{f1} - W_{i1}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad \text{Eq. 4-2}$$

$$V_{wcstd1} := K_1(V_{f1} - V_{i1}) \quad V_{wsgstd1} := K_3(W_{f1} - W_{i1})$$

$$V_{wcstd1} = 0.000 \text{ scf} \quad V_{wsgstd1} = 29.667 \text{ scf}$$

$$V_{mstd1} := \frac{V_{m1} \cdot Y_1 \cdot P_{m1} \cdot T_{std}}{P_{std} \cdot (T_{mf1} + 460)} \quad \text{Eq. 4-3} \quad B_{ws1} := \frac{V_{wcstd1} + V_{wsgstd1}}{V_{wcstd1} + V_{wsgstd1} + V_{mstd1}} \quad \text{Eq. 4-4}$$

$$V_{mstd1} := K_4 Y_1 (V_{m1} P_{m1}) / T_{m1} \quad B_{ws1} = 0.2094$$

$$V_{mstd1} = 112.0 \text{ dscf} \quad H2O1 := B_{ws1} \cdot 100 \cdot \text{vol\%}$$

$$H2O1 = 20.94 \text{ vol\%}$$

Run 2:

$$V_{wcstd2} := \frac{(V_{f2} - V_{i2}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad \text{Eq. 4-1} \quad V_{wsgstd2} := \frac{(W_{f2} - W_{i2}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad \text{Eq. 4-2}$$

$$V_{wcstd2} := K_1(V_{f2} - V_{i2}) \quad V_{wsgstd2} := K_3(W_{f2} - W_{i2})$$

$$V_{wcstd2} = 0.000 \text{ scf} \quad V_{wsgstd2} = 33.195 \text{ scf}$$

$$V_{mstd2} := \frac{V_{m2} \cdot Y_2 \cdot P_{m2} \cdot T_{std}}{P_{std} \cdot (T_{mf2} + 460)} \quad \text{Eq. 4-3} \quad B_{ws2} := \frac{V_{wcstd2} + V_{wsgstd2}}{V_{wcstd2} + V_{wsgstd2} + V_{mstd2}} \quad \text{Eq. 4-4}$$

$$V_{mstd2} := K_4 Y_2 (V_{m2} P_{m2}) / T_{m2} \quad B_{ws2} = 0.2238$$

$$V_{mstd2} = 115.2 \text{ dscf} \quad H2O2 := B_{ws2} \cdot 100 \cdot \text{vol\%}$$

$$H2O2 = 22.38 \text{ vol\%}$$

Run 3:

$$V_{wcstd3} := \frac{(V_{f3} - V_{i3}) \cdot \rho_w \cdot R \cdot T_{std}}{P_{std} \cdot M_w} \quad \text{Eq. 4-1}$$

$$V_{wcstd3} := K_1(V_{f3} - V_{i3})$$

$$V_{wcstd3} = 0.000 \text{ scf}$$

$$V_{mstd3} := \frac{V_{m3} \cdot Y_3 \cdot P_{m3} \cdot T_{std}}{P_{std} \cdot (T_{mf3} + 460)} \quad \text{Eq. 4-3}$$

$$V_{mstd3} := K_4 Y_3 (V_{m3} P_{m3}) / T_{m3}$$

$$V_{mstd3} = 110.2 \text{ dscf}$$

$$V_{wsstd3} := \frac{(W_{f3} - W_{i3}) \cdot R_i \cdot T_{std}}{P_{std} \cdot M_w \cdot K_2} \quad \text{Eq. 4-2}$$

$$V_{wsstd3} := K_3(W_{f3} - W_{i3})$$

$$V_{wsstd3} = 31.882 \text{ scf}$$

$$B_{ws3} := \frac{V_{wcstd3} + V_{wsstd3}}{V_{wcstd3} + V_{wsstd3} + V_{mstd3}} \quad \text{Eq. 4-4}$$

$$B_{ws3} = 0.2244$$

$$H_2O_3 := B_{ws3} \cdot 100 \cdot \text{vol\%}$$

$$H_2O_3 = 22.44 \text{ vol\%}$$

Reference Method 3 - Gas Analysis for the Determination of Dry Molecular Weight

Nomenclature:

M_d	=	Dry molecular weight, lb/lb-mole.
M_s	=	Wet molecular weight, lb/lb-mole.
$\%CO_2$	=	Percent CO_2 by volume, dry basis.
$\%O_2$	=	Percent O_2 by volume, dry basis.
$\%CO$	=	Percent CO by volume, dry basis.
$\%N_2$	=	Percent N_2 by volume, dry basis.
Bal	=	$\%N_2 + \%CO$.
28	=	Molecular weight of N_2 or CO , lb/lb-mol.
32	=	Molecular weight of O_2 , lb/lb-mol.
44	=	Molecular weight of CO_2 , lb/lb-mol.

Variables:

$$\%O_2_1 := 0.50 \cdot vol\%$$

$$\%O_2_2 := 0.66 \cdot vol\%$$

$$\%O_2_3 := 0.62 \cdot vol\%$$

$$\%CO_2_1 := 18.45 \cdot vol\%$$

$$\%CO_2_2 := 18.19 \cdot vol\%$$

$$\%CO_2_3 := 18.01 \cdot vol\%$$

$$Bal_1 := 100 \cdot vol\% - (\%O_2_1 + \%CO_2_1)$$

$$Bal_2 := 100 \cdot vol\% - (\%O_2_2 + \%CO_2_2)$$

$$Bal_1 = 81.05 \text{ vol}\%$$

$$Bal_2 = 81.15 \text{ vol}\%$$

$$Bal_3 := 100 \cdot vol\% - (\%O_2_3 + \%CO_2_3)$$

$$Bal_3 = 81.37 \text{ vol}\%$$

Calculations:

$$M_{d1} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_1 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_1 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_1) \quad Eq. 3-1$$

$$M_{d1} = 30.97 \frac{lb}{lb \cdot mol}$$

$$M_{d2} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_2 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_2 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_2) \quad Eq. 3-1$$

$$M_{d2} = 30.94 \frac{lb}{lb \cdot mol}$$

$$M_{d3} := 44 \cdot \frac{lb}{lb \cdot mol} \cdot \%CO_2_3 + 32 \cdot \frac{lb}{lb \cdot mol} \cdot \%O_2_3 + 28 \cdot \frac{lb}{lb \cdot mol} (Bal_3) \quad Eq. 3-1$$

$$M_{d3} = 30.91 \frac{lb}{lb \cdot mol}$$

Reference Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate

Nomenclature:

A_s	=	Cross-sectional area of stack, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
B_{wST}	=	Water vapor in gas stream calculated using steam table.
C_p	=	Pitot tube coefficient, dimensionless.
K_p	=	Velocity equation constant.
M_d	=	Molecular weight of stack gas, dry basis, lb/lb-mol.
M_s	=	Molecular weight of stack gas, wet basis, lb/lb-mol.
P_m	=	Barometric pressure at measurement site, in. Hg.
P_g	=	Stack static pressure, in. H ₂ O.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
Q_{sd}	=	Dry volumetric stack gas flow rate corrected to standard conditions, dscf/hr, dscf/min.
T_s	=	Stack temperature, °F.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
Δp_{avgqrt}	=	Average square root of Δp , in. H ₂ O.
3600	=	Conversion factor, sec/hr.
18.0	=	Molecular weight of water, lb/lb-mol.

Constants:

$$K_p := 85.49 \cdot \frac{ft}{sec} \cdot \left[\frac{\left(\frac{lb}{lb \cdot mol} \right) \cdot (in_Hg)}{(R) \cdot (in_H2O)} \right]^{\frac{1}{2}}$$

Variables:

$$A_s := 50.528 \cdot ft^2$$

$$C_p := 0.84$$

$$\Delta p_{avgqrt1} := 0.6128 \cdot in_H2O^{\frac{1}{2}}$$

$$T_{s1} := 139.3 \cdot ^\circ F$$

$$P_{g1} := 0.36 \cdot in_H2O$$

$$B_{wST1} := 0.1968$$

$$B_{wST2} := 0.2032$$

$$B_{wST3} := 0.2013$$

$$\Delta p_{avgqrt2} := 0.6285 \cdot in_H2O^{\frac{1}{2}}$$

$$T_{s2} := 140.8 \cdot ^\circ F$$

$$P_{g2} := 0.36 \cdot in_H2O$$

$$\Delta p_{avgqrt3} := 0.6277 \cdot in_H2O^{\frac{1}{2}}$$

$$T_{s3} := 140.4 \cdot ^\circ F$$

$$P_{g3} := 0.36 \cdot in_H2O$$

Note the lower of the two moisture fractions will be used: either the one measured by impinger analysis or calculated by the steam table.

Calculations:

Run 1:

$$T_{sabs1} := T_{s1} + 460 \quad T_{sabs1} = 599.3 \text{ }^{\circ}\text{R} \quad P_{s1} := P_{m1} + \frac{P_{g1}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s1} = 29.62 \text{ in}_{Hg}$$

$$M_{s1} := M_{d1} \cdot (1 - B_{wST1}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST1} \quad \text{Eq. 2-6} \quad M_{s1} = 28.42 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s1} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs1}}{P_{s1} \cdot M_{s1}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s1} = 37.13 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd1} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST1}) \cdot V_{s1} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s1}}{T_{sabs1} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd1} = 4731330.38 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd1} = 78855.51 \frac{\text{dscf}}{\text{min}}}$$

Run 2:

$$T_{sabs2} := T_{s2} + 460 \quad T_{sabs2} = 600.8 \text{ }^{\circ}\text{R} \quad P_{s2} := P_{m2} + \frac{P_{g2}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s2} = 29.72 \text{ in}_{Hg}$$

$$M_{s2} := M_{d2} \cdot (1 - B_{wST2}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST2} \quad \text{Eq. 2-6} \quad M_{s2} = 28.31 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s2} := K_p \cdot C_p \cdot \Delta p_{avg} \sqrt{\frac{T_{sabs2}}{P_{s2} \cdot M_{s2}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s2} = 38.14 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd2} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST2}) \cdot V_{s2} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s2}}{T_{sabs2} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd2} = 4825417.41 \frac{\text{dscf}}{\text{hr}}}$$

$$\boxed{Q_{sd2} = 80423.62 \frac{\text{dscf}}{\text{min}}}$$

Run 3:

$$T_{sabs3} := T_{s3} + 460 \quad T_{sabs3} = 600.4 \text{ }^{\circ}\text{R} \quad P_{s3} := P_{m3} + \frac{P_{g3}}{13.6 \cdot \frac{\text{in}_{H2O}}{\text{in}_{Hg}}} \quad P_{s3} = 29.66 \text{ in}_{Hg}$$

$$M_{s3} := M_{d3} \cdot (1 - B_{wST3}) + 18.0 \cdot \frac{\text{lb}}{\text{lb} \cdot \text{mol}} \cdot B_{wST3} \quad \text{Eq. 2-6} \quad M_{s3} = 28.31 \frac{\text{lb}}{\text{lb} \cdot \text{mol}}$$

$$V_{s3} := K_p \cdot C_p \cdot \Delta p_{avg\sqrt{rT3}} \cdot \sqrt{\frac{T_{sabs3}}{P_{s3} \cdot M_{s3}}} \quad \text{Eq. 2-7} \quad \boxed{V_{s3} = 38.12 \frac{\text{ft}}{\text{sec}}}$$

$$Q_{sd3} := 3600 \frac{\text{sec}}{\text{hr}} (1 - B_{wST3}) \cdot V_{s3} \cdot A_s \cdot \left(\frac{T_{std} \cdot P_{s3}}{T_{sabs3} \cdot P_{std}} \right) \quad \text{Eq. 2-8}$$

$$\boxed{Q_{sd3} = 4827469.46 \frac{\text{dscf}}{\text{hr}}} \quad \boxed{Q_{sd3} = 80457.82 \frac{\text{dscf}}{\text{min}}}$$

Isokinetic Sampling Rate

Nomenclature:

A_n	=	Cross-sectional area of nozzle, ft ² .
B_{ws}	=	Water vapor in the gas stream from Method 4, proportion by volume.
I	=	Percent of isokinetic sampling.
N_d	=	Nozzle diameter, in.
P_s	=	Absolute stack pressure ($P_{bar} + P_g$), in. Hg.
P_{std}	=	Standard absolute pressure, 29.92 in. Hg.
T_{sabs}	=	Absolute stack temperature ($460 + T_s$), °R.
T_{std}	=	Standard absolute temperature, 528 °R.
V_s	=	Average stack gas velocity, ft/sec.
V_{mstd}	=	Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscf.
Θ_t	=	Total sampling time, min.
60	=	Conversion factor, sec/min.
100	=	Conversion to percent.

Variables:

$$\Theta_t := 176 \cdot \text{min}$$

$$N_d := 0.282 \cdot \text{in}$$

$$A_n := \pi \cdot \left(\frac{N_d}{12 \cdot \frac{\text{in}}{\text{ft}}} \right)^2 \quad A_n = 4.34 \times 10^{-4} \text{ ft}^2$$

Constants:

$$K_5 := 0.09450 \cdot \frac{\text{in}_\text{Hg} \cdot \% \cdot \text{min}}{\text{sec} \cdot \text{R}}$$

$$T_{std} = 528 \text{ R}$$

$$P_{std} = 29.92 \text{ in}_\text{Hg}$$

Calculations:

$$I_1 := \frac{T_{sabs1} \cdot V_{mstd1} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s1} \cdot \Theta_t \cdot A_n \cdot P_{s1} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST1})} \quad \text{Eq. 5-8}$$

$$I_1 = 94.00 \%$$

$$I_2 := \frac{T_{sabs2} \cdot V_{mstd2} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s2} \cdot \Theta_t \cdot A_n \cdot P_{s2} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST2})} \quad \text{Eq. 5-8}$$

$$I_2 = 94.78 \%$$

$$I_3 := \frac{T_{sabs3} \cdot V_{mstd3} \cdot P_{std} \cdot 100 \cdot \%}{T_{std} \cdot V_{s3} \cdot \Theta_t \cdot A_n \cdot P_{s3} \cdot 60 \cdot \frac{\text{sec}}{\text{min}} \cdot (1 - B_{wST3})} \quad \text{Eq. 5-8}$$

$$I_3 = 90.66 \%$$

RM 29 - Determination of Metals Emissions from Stationary Sources

Nomenclature:

V_n	=	volume of the samples (Runs 1 to 3), dscf and dscm.
M_{Sbn}	=	Mass of Antimony (Sb) (Runs 1 to 3), ug.
M_{Asn}	=	Mass of Arsenic (As) (Runs 1 to 3), ug.
M_{Ben}	=	Mass of Beryllium (Be) (Runs 1 to 3), ug.
M_{Cdn}	=	Mass of Cadmium (Cd) (Runs 1 to 3), ug.
M_{Crm}	=	Mass of Chromium (Cr) (Runs 1 to 3), ug.
M_{Con}	=	Mass of Cobalt (Co) (Runs 1 to 3), ug.
M_{Pbn}	=	Mass of Lead (Pb) (Runs 1 to 3), ug.
M_{Mnn}	=	Mass of Manganese (Mn) (Runs 1 to 3), ug.
M_{Nin}	=	Mass of Nickel (Ni) (Runs 1 to 3), ug.
M_{Sen}	=	Mass of Selenium (Se) (Runs 1 to 3), ug.
c_{Sbn}	=	Concentration of Antimony (Sb) (Runs 1 to 3), mg/dscm.
C_{Sbn}	=	Concentration of Antimony (Sb) (Runs 1 to 3), lb/hr.
c_{Asn}	=	Concentration of Arsenic (As) (Runs 1 to 3), mg/dscm.
C_{Asn}	=	Concentration of Arsenic (As) (Runs 1 to 3), lb/hr.
c_{Ben}	=	Concentration of Beryllium (Be) (Runs 1 to 3), mg/dscm.
C_{Ben}	=	Concentration of Beryllium (Be) (Runs 1 to 3), lb/hr.
c_{Cdn}	=	Concentration of Cadmium (Cd) (Runs 1 to 3), mg/dscm.
C_{Cdn}	=	Concentration of Cadmium (Cd) (Runs 1 to 3), lb/hr.
c_{Crm}	=	Concentration of Chromium (Cr) (Runs 1 to 3), mg/dscm.
C_{Crm}	=	Concentration of Chromium (Cr) (Runs 1 to 3), lb/hr.
c_{Con}	=	Concentration of Cobalt (Co) (Runs 1 to 3), mg/dscm.
C_{Con}	=	Concentration of Cobalt (Co) (Runs 1 to 3), lb/hr.
c_{Pbn}	=	Concentration of Lead (Pb) (Runs 1 to 3), mg/dscm.
C_{Pbn}	=	Concentration of Lead (Pb) (Runs 1 to 3), lb/hr.
c_{Mnn}	=	Concentration of Manganese (Mn) (Runs 1 to 3), mg/dscm.
C_{Mnn}	=	Concentration of Manganese (Mn) (Runs 1 to 3), lb/hr.
c_{Nin}	=	Concentration of Nickel (Ni) (Runs 1 to 3), mg/dscm.
C_{Nin}	=	Concentration of Nickel (Ni) (Runs 1 to 3), lb/hr.
c_{Sen}	=	Concentration of Selenium (Se) (Runs 1 to 3), mg/dscm.
C_{Sen}	=	Concentration of Selenium (Se) (Runs 1 to 3), lb/hr.

Variables:

$$v_1 := 111.991 \text{ dscf}$$

$$v_2 := 115.159 \text{ dscf}$$

$$v_3 := 110.192 \text{ dscf}$$

$$M_{Sb.1} := 3.65 \text{ ug}$$

$$M_{Sb.2} := 3.64 \text{ ug}$$

$$M_{Sb.3} := 3.64 \text{ ug}$$

$$M_{As.1} := 5.79 \text{ ug}$$

$$M_{As.2} := 5.78 \text{ ug}$$

$$M_{As.3} := 5.78 \text{ ug}$$

$$M_{Be.1} := 0.058 \text{ ug}$$

$$M_{Be.2} := 0.048 \text{ ug}$$

$$M_{Be.3} := 0.035 \text{ ug}$$

$$M_{Cd.1} := 0.181 \text{ ug}$$

$$M_{Cd.2} := 0.798 \text{ ug}$$

$$M_{Cd.3} := 0.730 \text{ ug}$$

$$M_{Cr.1} := 13.040 \text{ ug}$$

$$M_{Cr.2} := 9.910 \text{ ug}$$

$$M_{Cr.3} := 12.360 \text{ ug}$$

$$M_{Co.1} := 1.800 \text{ ug}$$

$$M_{Co.2} := 1.790 \text{ ug}$$

$$M_{Co.3} := 1.790 \text{ ug}$$

$$M_{Pb.1} := 8.520 \text{ ug}$$

$$M_{Pb.2} := 5.130 \text{ ug}$$

$$M_{Pb.3} := 6.360 \text{ ug}$$

$$M_{Mn.1} := 10.420 \text{ ug}$$

$$M_{Mn.2} := 6.560 \text{ ug}$$

$$M_{Mn.3} := 7.600 \text{ ug}$$

$$M_{Ni.1} := 25.710 \text{ ug}$$

$$M_{Ni.2} := 18.260 \text{ ug}$$

$$M_{Ni.3} := 25.560 \text{ ug}$$

$$M_{Se.1} := 10.740 \text{ ug}$$

$$M_{Se.2} := 10.240 \text{ ug}$$

$$M_{Se.3} := 9.440 \text{ ug}$$

Calculations:

$$v_1 = 3.171 \text{ dscm}$$

$$v_2 = 3.261 \text{ dscm}$$

$$v_3 = 3.12 \text{ dscm}$$

$$c_{Sb.1} := \frac{M_{Sb.1}}{v_1}$$

$$c_{Sb.2} := \frac{M_{Sb.2}}{v_2}$$

$$c_{Sb.3} := \frac{M_{Sb.3}}{v_3}$$

$$c_{Sb.1} = 1.151 \times 10^{-3} \frac{\text{mg}}{\text{dscm}}$$

$$c_{Sb.2} = 1.116 \times 10^{-3} \frac{\text{mg}}{\text{dscm}}$$

$$c_{Sb.3} = 1.167 \times 10^{-3} \frac{\text{mg}}{\text{dscm}}$$

$$C_{Sb.1} := c_{Sb.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Sb.2} := c_{Sb.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Sb.3} := c_{Sb.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Sb.1} = 3.4 \times 10^{-4} \frac{\text{lb}}{\text{hr}}$$

$$C_{Sb.2} = 3.36 \times 10^{-4} \frac{\text{lb}}{\text{hr}}$$

$$C_{Sb.3} = 3.52 \times 10^{-4} \frac{\text{lb}}{\text{hr}}$$

$$c_{As.1} := \frac{M_{As.1}}{v_1}$$

$$c_{As.1} = 1.826 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{As.1} := c_{As.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{As.1} = 5.39 \times 10^{-4} \frac{lb}{hr}$$

$$c_{As.2} := \frac{M_{As.2}}{v_2}$$

$$c_{As.2} = 1.772 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{As.2} := c_{As.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{As.2} = 5.34 \times 10^{-4} \frac{lb}{hr}$$

$$c_{As.3} := \frac{M_{As.3}}{v_3}$$

$$c_{As.3} = 1.852 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{As.3} := c_{As.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{As.3} = 5.58 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Be.1} := \frac{M_{Be.1}}{v_1}$$

$$c_{Be.1} = 1.829 \times 10^{-5} \frac{mg}{dscm}$$

$$C_{Be.1} := c_{Be.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Be.1} = 5.4 \times 10^{-6} \frac{lb}{hr}$$

$$c_{Be.2} := \frac{M_{Be.2}}{v_2}$$

$$c_{Be.2} = 1.472 \times 10^{-5} \frac{mg}{dscm}$$

$$C_{Be.2} := c_{Be.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Be.2} = 4.43 \times 10^{-6} \frac{lb}{hr}$$

$$c_{Be.3} := \frac{M_{Be.3}}{v_3}$$

$$c_{Be.3} = 1.122 \times 10^{-5} \frac{mg}{dscm}$$

$$C_{Be.3} := c_{Be.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Be.3} = 3.38 \times 10^{-6} \frac{lb}{hr}$$

$$c_{Cd.1} := \frac{M_{Cd.1}}{v_1}$$

$$c_{Cd.1} = 5.708 \times 10^{-5} \frac{mg}{dscm}$$

$$C_{Cd.1} := c_{Cd.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Cd.1} = 1.69 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Cd.2} := \frac{M_{Cd.2}}{v_2}$$

$$c_{Cd.2} = 2.447 \times 10^{-4} \frac{mg}{dscm}$$

$$C_{Cd.2} := c_{Cd.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Cd.2} = 7.37 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Cd.3} := \frac{M_{Cd.3}}{v_3}$$

$$c_{Cd.3} = 2.34 \times 10^{-4} \frac{mg}{dscm}$$

$$C_{Cd.3} := c_{Cd.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Cd.3} = 7.05 \times 10^{-5} \frac{lb}{hr}$$

$$c_{Cr.1} := \frac{M_{Cr.1}}{v_1}$$

$$c_{Cr.1} = 4.112 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Cr.1} := c_{Cr.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Cr.1} = 1.21 \times 10^{-3} \frac{lb}{hr}$$

$$c_{Cr.2} := \frac{M_{Cr.2}}{v_2}$$

$$c_{Cr.2} = 3.039 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Cr.2} := c_{Cr.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Cr.2} = 9.15 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Cr.3} := \frac{M_{Cr.3}}{v_3}$$

$$c_{Cr.3} = 3.961 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Cr.3} := c_{Cr.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Cr.3} = 1.19 \times 10^{-3} \frac{lb}{hr}$$

$$c_{Co.1} := \frac{M_{Co.1}}{v_1}$$

$$c_{Co.1} = 5.676 \times 10^{-4} \frac{mg}{dscm}$$

$$C_{Co.1} := c_{Co.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Co.1} = 1.68 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Co.2} := \frac{M_{Co.2}}{v_2}$$

$$c_{Co.2} = 5.489 \times 10^{-4} \frac{mg}{dscm}$$

$$C_{Co.2} := c_{Co.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Co.2} = 1.65 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Co.3} := \frac{M_{Co.3}}{v_3}$$

$$c_{Co.3} = 5.737 \times 10^{-4} \frac{mg}{dscm}$$

$$C_{Co.3} := c_{Co.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Co.3} = 1.73 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Pb.1} := \frac{M_{Pb.1}}{v_1}$$

$$c_{Pb.1} = 2.687 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Pb.1} := c_{Pb.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Pb.1} = 7.94 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Pb.2} := \frac{M_{Pb.2}}{v_2}$$

$$c_{Pb.2} = 1.573 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Pb.2} := c_{Pb.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Pb.2} = 4.74 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Pb.3} := \frac{M_{Pb.3}}{v_3}$$

$$c_{Pb.3} = 2.038 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Pb.3} := c_{Pb.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Pb.3} = 6.14 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Mn.1} := \frac{M_{Mn.1}}{v_1}$$

$$c_{Mn.1} = 3.286 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Mn.1} := c_{Mn.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Mn.1} = 9.71 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Mn.2} := \frac{M_{Mn.2}}{v_2}$$

$$c_{Mn.2} = 2.012 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Mn.2} := c_{Mn.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Mn.2} = 6.06 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Mn.3} := \frac{M_{Mn.3}}{v_3}$$

$$c_{Mn.3} = 2.436 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Mn.3} := c_{Mn.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Mn.3} = 7.34 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Ni.1} := \frac{M_{Ni.1}}{v_1}$$

$$c_{Ni.1} = 8.107 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Ni.1} := c_{Ni.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Ni.1} = 2.39 \times 10^{-3} \frac{lb}{hr}$$

$$c_{Ni.2} := \frac{M_{Ni.2}}{v_2}$$

$$c_{Ni.2} = 5.6 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Ni.2} := c_{Ni.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Ni.2} = 1.69 \times 10^{-3} \frac{lb}{hr}$$

$$c_{Ni.3} := \frac{M_{Ni.3}}{v_3}$$

$$c_{Ni.3} = 8.192 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Ni.3} := c_{Ni.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Ni.3} = 2.47 \times 10^{-3} \frac{lb}{hr}$$

$$c_{Se.1} := \frac{M_{Se.1}}{v_1}$$

$$c_{Se.1} = 3.387 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Se.1} := c_{Se.1} \cdot \frac{Q_{sd1}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Se.1} = 1 \times 10^{-3} \frac{lb}{hr}$$

$$c_{Se.2} := \frac{M_{Se.2}}{v_2}$$

$$c_{Se.2} = 3.14 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Se.2} := c_{Se.2} \cdot \frac{Q_{sd2}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Se.2} = 9.46 \times 10^{-4} \frac{lb}{hr}$$

$$c_{Se.3} := \frac{M_{Se.3}}{v_3}$$

$$c_{Se.3} = 3.025 \times 10^{-3} \frac{mg}{dscm}$$

$$C_{Se.3} := c_{Se.3} \cdot \frac{Q_{sd3}}{K_6 \cdot K_7 \cdot K_8}$$

$$C_{Se.3} = 9.12 \times 10^{-4} \frac{lb}{hr}$$

Appendix D10
U.S. EPA Method 18 (Methane and Ethane)

ICR Test Summary
Cat B Wet Gas Scrubber
Reference Method 18 (Methane, Ethane)

Company: Citgo Petroleum Corporation
 Location: Sulphur, LA
 Unit: Cat B Wet Gas Scrubber

Test No.	1	2	3	Average
Date	05/18/11	05/18/11	05/19/11	n/a
Start Time	12:50	19:18	9:46	n/a
End Time	18:15	21:35	12:10	n/a
Test Duration, min	128	128	128	128

Unit Operating Parameters

Oxygen Content	vol%	0.75	0.76	0.63	0.71
Carbon Dioxide Content	vol%	17.80	17.50	18.08	17.79
Moisture Content	vol%	20.25	20.35	19.93	20.18
Wet Molecular Weight	lb/lb-mol	28.27	28.22	28.34	28.28
Velocity	ft/sec	40.92	41.29	39.25	40.49
Volumetric Flow Rate	dscfm	86,182	86,677	83,106	85,322

Sampling Parameters

Sample Volume	dscf	87.860	88.000	82.440	86.100
	dscm	2.488	2.492	2.334	2.438

Pollutants

Methane	ppmvd	0.27	4.10	6.63	3.67
	lb/hr	0.06	0.89	1.38	0.77
Ethane	ppmvd	0.93	3.33	5.20	3.16
	lb/hr	0.38	1.35	2.02	1.25

Reference Method 26A Sampling and Unit Operating Parameters were used for calculations

	Initials	Date
Data Entry	JP	7/14/2011
Review	RI	8/17/2011

Appendix D11
U.S. EPA Method 18 and Method 308

Meter Calibration Factor (Y) = 0.9760
Barometric Pressure (in Hg) = 29.66

Test No.	Initial Meter Volume (L)	Final Meter Volume (L)	V _m (L)	Avg. Meter Temp (°F)	V _m (std) (L)
1	0.000	61.226	61.226	95	56.364
2	0.000	60.048	60.048	95	55.279
3	0.000	60.591	60.591	99	55.334

Meter Calibration Factor (Y) = 1.0500
Barometric Pressure (in Hg) = 29.66

Test No.	Initial Meter Volume (L)	Final Meter Volume (L)	V _m (L)	Avg. Meter Temp (°F)	V _m (std) (L)
1	0.000	61.136	61.136	97	60.272
2	0.000	60.411	60.411	99	59.426
3	0.000	60.381	60.381	101	59.192

Meter Calibration Factor (Y) = 1.0210
Barometric Pressure (in Hg) = 29.66

Test No.	Initial Meter Volume (L)	Final Meter Volume (L)	V _m (L)	Avg. Meter Temp (°F)	V _m (std) (L)
1	0.000	60.307	60.307	99	57.645
2	0.000	60.271	60.271	102	57.327
3	0.000	61.033	61.033	105	57.681

Company: Citgo Petroleum Corporation
 Location: Sulphur, LA
 Unit: Cat B Wet Gas Scrubber
 Source ID: RM 18
 LDEQ Permit No.

Test No.	1	2	3	Average
Date	05/20/11	05/20/11	05/20/11	n/a
Start Time	11:40	13:50	15:40	n/a
End Time	12:40	14:50	16:40	n/a
Test Duration, min	60	60	60	60

Bag Laboratory Results ¹

Acetone	ppmv	[<0.396] BDL	[<0.396] BDL	[<0.396] BDL	[<0.396] BDL
	µg/dscm	[<956.527] BDL	[<956.527] BDL	[<956.527] BDL	[<956.527] BDL
Acetonitrile	ppmv	[<1.120] BDL	[<1.120] BDL	[<1.120] BDL	[<1.120] BDL
	µg/dscm	[<2705.328] BDL	[<2705.328] BDL	[<2705.328] BDL	[<2705.328] BDL
Acrolein	ppmv	[<0.290] BDL	[<0.290] BDL	[<0.290] BDL	[<0.290] BDL
	µg/dscm	[<700.487] BDL	[<700.487] BDL	[<700.487] BDL	[<700.487] BDL
Acrylonitrile	ppmv	[<0.365] BDL	[<0.365] BDL	[<0.365] BDL	[<0.365] BDL
	µg/dscm	[<881.647] BDL	[<881.647] BDL	[<881.647] BDL	[<881.647] BDL
Benzene	ppmv	[<0.251] BDL	[<0.251] BDL	[<0.251] BDL	[<0.251] BDL
	µg/dscm	[<606.283] BDL	[<606.283] BDL	[<606.283] BDL	[<606.283] BDL
1,3-Butadiene	ppmv	[<0.282] BDL	[<0.282] BDL	[<0.282] BDL	[<0.282] BDL
	µg/dscm	[<681.163] BDL	[<681.163] BDL	[<681.163] BDL	[<681.163] BDL
Carbon disulfide	ppmv	0.138	0.132	0.118	0.129
	µg/dscm	333.335	318.842	285.026	312.401
1,2-Dibromoethane	ppmv	[<0.287] BDL	[<0.287] BDL	[<0.287] BDL	[<0.287] BDL
	µg/dscm	[<693.240] BDL	[<693.240] BDL	[<693.240] BDL	[<693.240] BDL
Hexane	ppmv	[<0.242] BDL	[<0.242] BDL	[<0.242] BDL	[<0.242] BDL
	µg/dscm	[<584.544] BDL	[<584.544] BDL	[<584.544] BDL	[<584.544] BDL
Methylene chloride	ppmv	[<0.981] BDL	[<0.981] BDL	[<0.981] BDL	[<0.981] BDL
	µg/dscm	[<2369.577] BDL	[<2369.577] BDL	[<2369.577] BDL	[<2369.577] BDL
Pentane	ppmv	[<0.242] BDL	[<0.242] BDL	[<0.242] BDL	[<0.242] BDL
	µg/dscm	[<584.544] BDL	[<584.544] BDL	[<584.544] BDL	[<584.544] BDL
Tetrachloroethene	ppmv	[<0.272] BDL	[<0.272] BDL	[<0.272] BDL	[<0.272] BDL
	µg/dscm	[<657.008] BDL	[<657.008] BDL	[<657.008] BDL	[<657.008] BDL
Toluene	ppmv	[<0.240] BDL	[<0.240] BDL	[<0.240] BDL	[<0.240] BDL
	µg/dscm	[<579.713] BDL	[<579.713] BDL	[<579.713] BDL	[<579.713] BDL
Trichloroethene	ppmv	[<0.368] BDL	[<0.368] BDL	[<0.368] BDL	[<0.368] BDL
	µg/dscm	[<888.893] BDL	[<888.893] BDL	[<888.893] BDL	[<888.893] BDL

¹ Laboratory Results provided by Enthalpy Analytical, Inc.

BDL (below detection level) - all analytical values used to calculate and report an in-stack emissions value are less than the laboratory's reported detection level(s)

	Initials	Date
Data Entry	JP	7/26/2011
Review	RI	8/17/2011

Company: Citgo Petroleum Corporation
 Location: Sulphur, LA
 Unit: Cat B Wet Gas Scrubber
 Source ID: RM 18
 LDEQ Permit No.

Test No.	1	2	3	Average
Date	05/20/11	05/20/11	05/20/11	n/a
Start Time	11:40	13:50	15:40	n/a
End Time	12:40	14:50	16:40	n/a
Test Duration, min	60	60	60	60

Sampling Parameters

Sample Volume	L	60.272	59.426	59.192	59.630
	dscf	2.128	2.099	2.090	2.106
	dscm	0.060	0.059	0.059	0.060

Bag Condensate Laboratory Results ¹

Acetone	µg	49.100	48.300	[<6.720] BDL	34.707 DLL
	µg/dscm	814.640	812.776	[<113.529] BDL	580.315 DLL
Acrolein	µg	[<7.010] BDL	[<7.010] BDL	[<7.010] BDL	[<7.010] BDL
	µg/dscm	[<116.306] BDL	[<117.962] BDL	[<118.428] BDL	[<117.565] BDL
Benzene	µg	[<7.400] BDL	[<7.400] BDL	[<7.400] BDL	[<7.400] BDL
	µg/dscm	[<122.777] BDL	[<124.525] BDL	[<125.017] BDL	[<124.106] BDL
1,3-Butadiene	µg	[<9.350] BDL	[<9.350] BDL	[<9.350] BDL	[<9.350] BDL
	µg/dscm	[<155.130] BDL	[<157.339] BDL	[<157.961] BDL	[<156.810] BDL
Carbon disulfide	µg	[<5.360] BDL	[<5.360] BDL	[<5.360] BDL	[<5.360] BDL
	µg/dscm	[<88.930] BDL	[<90.196] BDL	[<90.553] BDL	[<89.893] BDL
1,2-Dibromoethane	µg	[<18.300] BDL	[<18.300] BDL	[<18.300] BDL	[<18.300] BDL
	µg/dscm	[<303.624] BDL	[<307.946] BDL	[<309.163] BDL	[<306.911] BDL
Hexane	µg	[<5.570] BDL	[<5.570] BDL	[<5.570] BDL	[<5.570] BDL
	µg/dscm	[<92.414] BDL	[<93.730] BDL	[<94.101] BDL	[<93.415] BDL
Methylene chloride	µg	[<11.200] BDL	59.000	[<11.200] BDL	27.133 DLL
	µg/dscm	[<185.824] BDL	992.831	[<189.215] BDL	455.957 DLL
Pentane	µg	[<5.310] BDL	[<5.310] BDL	[<5.310] BDL	[<5.310] BDL
	µg/dscm	[<88.101] BDL	[<89.355] BDL	[<89.708] BDL	[<89.055] BDL
Tetrachloroethene	µg	[<13.700] BDL	[<13.700] BDL	[<13.700] BDL	[<13.700] BDL
	µg/dscm	[<227.303] BDL	[<230.539] BDL	[<231.450] BDL	[<229.764] BDL
Toluene	µg	9.380	[<7.310] BDL	[<7.310] BDL	8.000 DLL
	µg/dscm	155.628	[<123.010] BDL	[<123.496] BDL	134.045 DLL
Trichloroethene	µg	[<12.400] BDL	[<12.400] BDL	[<12.400] BDL	[<12.400] BDL
	µg/dscm	[<205.734] BDL	[<208.663] BDL	[<209.488] BDL	[<207.962] BDL

¹ Laboratory Results provided by Enthalpy Analytical, Inc.

BDL (below detection level) - all analytical values used to calculate and report an in-stack emissions value are less than the laboratory's reported detection level(s)

DLL (detection level limited) - at least one but not all values used to calculate and report an in-stack emissions value are greater than the laboratory's reported detection level(s)

	Initials	Date
Data Entry	JP	7/26/2011
Review	RI	8/17/2011

Company: Citgo Petroleum Corporation
 Location: Sulphur, LA
 Unit: Cat B Wet Gas Scrubber
 Source ID: RM 18 and RM 308
 LDEQ Permit No.

Test No.	1	2	3	Average
Date	05/20/11	05/20/11	05/20/11	n/a
Start Time	11:40	13:50	15:40	n/a
End Time	12:40	14:50	16:40	n/a
Test Duration, min	60	60	60	60

Sampling Parameters

Sample Volume (RM 18)	L	60.272	59.426	59.192	59.630
	dscf	2.128	2.099	2.090	2.106
	dscm	0.060	0.059	0.059	0.060
Sample Volume (RM 308)	L	57.645	57.327	57.681	57.551
	dscf	2.036	2.024	2.037	2.032
	dscm	0.058	0.057	0.058	0.058

Adsorbent Tube Laboratory Results ¹

Chlorobenzene	µg	[<1.370] BDL	[<1.370] BDL	[<1.370] BDL	[<1.370] BDL
	µg/dscm	[<22.730] BDL	[<23.054] BDL	[<23.145] BDL	[<22.976] BDL
Cumene (isopropylbenzene)	µg	[<1.030] BDL	[<1.030] BDL	[<1.030] BDL	[<1.030] BDL
	µg/dscm	[<17.089] BDL	[<17.332] BDL	[<17.401] BDL	[<17.274] BDL
Ethylbenzene	µg	[<1.040] BDL	[<1.040] BDL	[<1.040] BDL	[<1.040] BDL
	µg/dscm	[<17.255] BDL	[<17.501] BDL	[<17.570] BDL	[<17.442] BDL
Methanol	µg	[<3.440] BDL	310.000	1.950	105.130 DLL
	µg/dscm	[<59.676] BDL	5407.574	33.807	1833.685 DLL
Methyl isobutyl ketone	µg	[<1.010] BDL	[<1.010] BDL	[<1.010] BDL	[<1.010] BDL
	µg/dscm	[<16.757] BDL	[<16.996] BDL	[<17.063] BDL	[<16.939] BDL
Methyl t-butyl ether	µg	[<0.982] BDL	[<0.982] BDL	[<0.982] BDL	[<0.982] BDL
	µg/dscm	[<16.293] BDL	[<16.525] BDL	[<16.590] BDL	[<16.469] BDL
Nitrobenzene	µg	1.400	1.390	1.280	1.357 DLL
	µg/dscm	23.228	23.390	21.625	22.748 DLL
2-Nitropropane	µg	[<1.420] BDL	[<1.420] BDL	1.670	1.503 DLL
	µg/dscm	[<23.560] BDL	[<23.895] BDL	28.213	25.223 DLL
Styrene	µg	[<1.160] BDL	[<1.160] BDL	[<1.160] BDL	[<1.160] BDL
	µg/dscm	[<19.246] BDL	[<19.520] BDL	[<19.597] BDL	[<19.454] BDL
2,2,4 Trimethylpentane (Isooctane)	µg	[<0.830] BDL	[<0.830] BDL	[<0.830] BDL	[<0.830] BDL
	µg/dscm	[<13.771] BDL	[<13.967] BDL	[<14.022] BDL	[<13.920] BDL
Xylenes (mixed isomers)	µg	[<2.110] BDL	[<2.110] BDL	[<2.110] BDL	[<2.110] BDL
	µg/dscm	[<35.008] BDL	[<35.506] BDL	[<35.647] BDL	[<35.387] BDL

¹ Laboratory Results provided by Enthalpy Analytical, Inc.

BDL (below detection level) - all analytical values used to calculate and report an in-stack emissions value are less than the laboratory's reported detection level(s)

DLL (detection level limited) - at least one but not all values used to calculate and report an in-stack emissions value are greater than the laboratory's reported detection level(s)

	Initials	Date
Data Entry	JP	7/26/2011
Review	RI	8/17/2011

Company: Citgo Petroleum Corporation
Location: Sulphur, LA
Unit: Cat B Wet Gas Scrubber

Test No.	1	2	3	Average
Date	05/20/11	05/20/11	05/20/11	n/a
Start Time	11:40	13:50	15:40	n/a
End Time	12:40	14:50	16:40	n/a
Test Duration, min	60	60	60	60

Unit Operating Parameters

Oxygen Content	vol%	0.64	0.69	0.50	0.61
Carbon Dioxide Content	vol%	17.41	17.32	17.42	17.38
Moisture Content	vol%	20.23	20.11	20.15	20.16
Wet Molecular Weight	lb/lb-mol	28.22	28.23	28.23	28.23
Velocity	ft/sec	40.48	40.34	39.50	40.11
Volumetric Flow Rate	dscfm	85,402	85,252	83,347	84,667

Sampling Parameters

Sample Volume (RM 18)	L	60.272	59.426	59.192	59.630
	dscf	2.128	2.099	2.090	2.106
	dscm	0.060	0.059	0.059	0.060
Sample Volume (RM 308)	L	57.645	57.327	57.681	57.551
	dscf	2.036	2.024	2.037	2.032
	dscm	0.058	0.057	0.058	0.058

Pollutants

Acetone	µg/dscm	1771.167 DLL	1769.302 DLL	[<1070.055] BDL	1536.841 DLL
	lb/hr	0.567 DLL	0.565 DLL	[<0.334] BDL	0.489 DLL
Acetonitrile	µg/dscm	[<2705.328] BDL	[<2705.328] BDL	[<2705.328] BDL	[<2705.328] BDL
	lb/hr	[<0.612] BDL	[<0.611] BDL	[<0.597] BDL	[<0.606] BDL
Acrolein	µg/dscm	[<816.793] BDL	[<818.448] BDL	[<818.915] BDL	[<818.052] BDL
	lb/hr	[<0.261] BDL	[<0.261] BDL	[<0.256] BDL	[<0.259] BDL
Acrylonitrile	µg/dscm	[<881.647] BDL	[<881.647] BDL	[<881.647] BDL	[<881.647] BDL
	lb/hr	[<0.258] BDL	[<0.257] BDL	[<0.251] BDL	[<0.255] BDL
Benzene	µg/dscm	[<729.060] BDL	[<730.808] BDL	[<731.300] BDL	[<730.389] BDL
	lb/hr	[<0.233] BDL	[<0.233] BDL	[<0.228] BDL	[<0.232] BDL
1,3-Butadiene	µg/dscm	[<836.293] BDL	[<838.501] BDL	[<839.123] BDL	[<837.973] BDL
	lb/hr	[<0.268] BDL	[<0.268] BDL	[<0.262] BDL	[<0.266] BDL
Carbon disulfide	µg/dscm	422.265 DLL	409.038 DLL	375.578 DLL	402.294 DLL
	lb/hr	0.135 DLL	0.131 DLL	0.117 DLL	0.128 DLL
Chlorobenzene	µg/dscm	[<22.730] BDL	[<23.054] BDL	[<23.145] BDL	[<22.976] BDL
	lb/hr	[<0.007] BDL	[<0.007] BDL	[<0.007] BDL	[<0.007] BDL
Cumene (isopropylbenzene)	µg/dscm	[<17.089] BDL	[<17.332] BDL	[<17.401] BDL	[<17.274] BDL
	lb/hr	[<0.005] BDL	[<0.006] BDL	[<0.005] BDL	[<0.005] BDL

1,2-Dibromoethane	µg/dscm	[<996.864] BDL	[<1001.186] BDL	[<1002.404] BDL	[<1000.151] BDL
	lb/hr	[<0.319] BDL	[<0.320] BDL	[<0.313] BDL	[<0.317] BDL
Ethylbenzene	µg/dscm	[<17.255] BDL	[<17.501] BDL	[<17.570] BDL	[<17.442] BDL
	lb/hr	[<0.006] BDL	[<0.006] BDL	[<0.005] BDL	[<0.006] BDL
Hexane	µg/dscm	[<676.958] BDL	[<678.274] BDL	[<678.645] BDL	[<677.959] BDL
	lb/hr	[<0.217] BDL	[<0.217] BDL	[<0.212] BDL	[<0.215] BDL
Methanol	µg/dscm	[<59.676] BDL	5407.574	33.807	1833.685 DLL
	lb/hr	[<0.019] BDL	1.727	0.011	0.586 DLL
Methyl isobutyl ketone	µg/dscm	[<16.757] BDL	[<16.996] BDL	[<17.063] BDL	[<16.939] BDL
	lb/hr	[<0.005] BDL	[<0.005] BDL	[<0.005] BDL	[<0.005] BDL
Methyl t-butyl ether	µg/dscm	[<16.293] BDL	[<16.525] BDL	[<16.590] BDL	[<16.469] BDL
	lb/hr	[<0.005] BDL	[<0.005] BDL	[<0.005] BDL	[<0.005] BDL
Methylene chloride	µg/dscm	[<2555.401] BDL	3362.408 DLL	[<2558.792] BDL	2825.534 DLL
	lb/hr	[<0.818] BDL	1.074 DLL	[<0.799] BDL	0.897 DLL
Nitrobenzene	µg/dscm	23.228	23.390	21.625	22.748
	lb/hr	0.007	0.007	0.007	0.007
2-Nitropropane	µg/dscm	[<23.560] BDL	[<23.895] BDL	28.213	25.223 DLL
	lb/hr	[<0.008] BDL	[<0.008] BDL	0.009	0.008 DLL
Pentane	µg/dscm	[<672.645] BDL	[<673.899] BDL	[<674.252] BDL	[<673.598] BDL
	lb/hr	[<0.215] BDL	[<0.215] BDL	[<0.211] BDL	[<0.214] BDL
Styrene	µg/dscm	[<19.246] BDL	[<19.520] BDL	[<19.597] BDL	[<19.454] BDL
	lb/hr	[<0.006] BDL	[<0.006] BDL	[<0.006] BDL	[<0.006] BDL
Tetrachloroethene	µg/dscm	[<884.311] BDL	[<887.547] BDL	[<888.458] BDL	[<886.772] BDL
	lb/hr	[<0.283] BDL	[<0.283] BDL	[<0.277] BDL	[<0.281] BDL
Toluene	µg/dscm	735.341 DLL	[<702.723] BDL	[<703.209] BDL	713.758 DLL
	lb/hr	0.235 DLL	[<0.224] BDL	[<0.220] BDL	0.226 DLL
Trichloroethene	µg/dscm	[<1094.627] BDL	[<1097.556] BDL	[<1098.381] BDL	[<1096.855] BDL
	lb/hr	[<0.350] BDL	[<0.351] BDL	[<0.343] BDL	[<0.348] BDL
2,2,4 Trimethylpentane (Isooctane)	µg/dscm	[<13.771] BDL	[<13.967] BDL	[<14.022] BDL	[<13.920] BDL
	lb/hr	[<0.004] BDL	[<0.004] BDL	[<0.004] BDL	[<0.004] BDL
Xylenes (mixed isomers)	µg/dscm	[<35.008] BDL	[<35.506] BDL	[<35.647] BDL	[<35.387] BDL
	lb/hr	[<0.011] BDL	[<0.011] BDL	[<0.011] BDL	[<0.011] BDL

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DLL (detection level limited) - at least one but not all values used to calculate and report an in-stack emissions value are greater than the laboratory's reported detection level(s)

	Initials	Date
Data Entry	JP	7/26/2011
Review	RI	8/17/2011

Appendix E

Process Data

B Cat WGS ICR Performance Test
May 17-18, 2011

Run No.	Pump Pressure		Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	WGS Liquid to Gas Ratio		Vol Reg FG		EPA Coke Make		Cat Feed Rate		CO2 (WGS CEMS)		CO (WGS CEMS)		O2 (WGS CEMS)		Total Corrected Air (M lb/hr)
	317P1108	Lower Circulation (psig)		317C_WGS_L_G_RATIO	Qr	Rc	317C_B Cat Feed	(% by vol. dry)	(ppmv. dry)	(% by vol. dry)	317A1107	317A111	317C_Tot_Corr_Air					
1	42.07		22.12	182.01	78913	78913	27177	52446	17.26	101.85	0.80	373.32						
2	42.41		22.19	179.77	79288	79288	26929	52043	16.98	50.73	1.03	375.55						
3	42.48		22.11	180.85	78715	78715	27033	51631	17.14	70.59	0.76	373.24						
Average	42.32		22.14	180.88	78972	78972	27046	52040	17.13	74.39	0.86	374.04						

Sulfuric Acid

5/17/2011 18:10
5/17/2011 19:56

1m

Run 2	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
17-May-11 18:10:00	77.65	42.88	22.04	119	258.46	91.70	1143.48
17-May-11 18:11:00	77.76	42.94	21.99	117	258.33	91.49	1144.22
17-May-11 18:12:00	77.69	42.89	22.06	119	257.66	91.97	1143.86
17-May-11 18:13:00	77.66	42.77	22.22	121	258.25	91.84	1144.80
17-May-11 18:14:00	77.57	42.71	21.94	121	258.74	91.45	1143.01
17-May-11 18:15:00	77.46	42.80	21.87	122	258.98	91.26	1141.58
17-May-11 18:16:00	77.54	42.77	22.16	121	257.92	91.60	1143.71
17-May-11 18:17:00	77.67	42.79	22.14	121	259.85	90.80	1144.29
17-May-11 18:18:00	77.46	42.70	21.95	121	260.11	90.90	1146.33
17-May-11 18:19:00	77.55	42.63	22.09	122	259.73	90.79	1141.97
17-May-11 18:20:00	77.50	42.64	21.91	122	258.76	91.23	1138.79
17-May-11 18:21:00	77.44	42.80	22.06	123	259.43	91.13	1144.74
17-May-11 18:22:00	77.48	42.73	22.16	123	258.88	91.32	1144.18
17-May-11 18:23:00	77.44	42.76	22.22	123	259.34	91.04	1144.88
17-May-11 18:24:00	77.50	42.79	22.19	124	258.29	91.41	1145.10
17-May-11 18:25:00	77.47	42.77	22.27	122	258.41	91.75	1146.74
17-May-11 18:26:00	77.33	42.64	22.15	120	259.22	91.53	1140.99
17-May-11 18:27:00	77.48	42.56	22.09	119	259.27	91.16	1139.26
17-May-11 18:28:00	77.53	42.63	21.97	119	258.60	91.24	1143.72
17-May-11 18:29:00	77.47	42.69	22.02	121	258.42	91.06	1145.22
17-May-11 18:30:00	77.78	42.78	22.02	121	258.50	91.41	1148.63
17-May-11 18:31:00	77.87	42.78	22.11	119	257.28	91.65	1142.82
17-May-11 18:32:00	77.61	42.70	22.10	119	258.44	90.98	1137.74
17-May-11 18:33:00	77.47	42.58	22.07	122	258.02	91.31	1144.23
17-May-11 18:34:00	77.38	42.53	21.93	121	256.77	91.80	1140.30
17-May-11 18:35:00	77.42	42.64	22.06	120	258.16	91.34	1141.06
17-May-11 18:36:00	77.42	42.75	22.18	118	258.96	90.92	1138.96
17-May-11 18:37:00	77.62	42.71	22.20	118	258.17	91.33	1140.51
17-May-11 18:38:00	77.62	42.65	22.19	119	258.02	91.53	1139.71
17-May-11 18:39:00	77.45	42.67	22.14	120	257.96	91.32	1138.19
17-May-11 18:40:00	77.30	42.63	22.08	121	259.30	91.12	1140.19
17-May-11 18:41:00	77.34	42.62	22.25	122	258.78	91.10	1141.13
17-May-11 18:42:00	77.36	42.67	22.17	122	258.58	91.30	1144.58
17-May-11 18:43:00	77.38	42.54	22.16	120	258.61	91.32	1142.79
17-May-11 18:44:00	77.55	42.50	22.21	119	259.71	90.86	1140.44
17-May-11 18:45:00	77.78	42.56	21.91	121	259.14	91.46	1146.56
17-May-11 18:46:00	77.74	42.67	22.08	121	259.76	91.27	1142.82
17-May-11 18:47:00	77.65	42.59	22.11	120	259.69	91.13	1141.55
17-May-11 18:48:00	77.56	42.55	22.07	117	259.56	91.31	1143.39
17-May-11 18:49:00	77.47	42.46	22.07	118	259.83	91.08	1144.13
17-May-11 18:50:00	77.38	42.42	22.25	118	259.13	91.32	1141.76
17-May-11 18:51:00	77.54	42.51	22.27	120	259.54	91.25	1139.39
17-May-11 18:52:00	77.64	42.54	22.20	122	261.13	90.69	1143.61
17-May-11 18:53:00	77.68	42.57	22.22	121	260.69	90.95	1146.85
17-May-11 18:54:00	77.63	42.53	22.05	122	259.84	91.18	1146.86
17-May-11 18:55:00	77.50	42.52	22.00	121	259.13	91.31	1143.34
17-May-11 18:56:00	77.61	42.54	22.06	122	260.41	90.96	1139.84
17-May-11 18:57:00	77.45	42.54	22.13	120	259.79	91.55	1146.44
17-May-11 18:58:00	77.55	42.47	22.18	121	258.51	92.09	1147.13
17-May-11 18:59:00	77.57	42.41	22.22	122	260.68	91.31	1145.05
17-May-11 19:00:00	77.47	42.43	22.34	122	260.37	91.41	1144.09

Sulfuric Acid

Run 2	#2 Stand Pipe Aeration Air to Regen (lbs/min)	Air to Regen Temp B-1 Outlet (oF)	Tempered Air Temp (oF)	Ambient Air Temp (oF)	Air to Regen Pressure Blower Discharge (psig)	Plant Air to 45lb Air (psig)	CO2 (WGS CEMS) (% by vol. dry)	CO (WGS CEMS) (ppmv, dry)
	317FI106	317TI1112	317TI1120	DWS AT	317PC039	317PC088	317AI109	317AI111
17-May-11 18:10:00	1167.76	243.44	201.30	77.30	15.86	80.11	17.10	80.27
17-May-11 18:11:00	1167.67	243.12	200.94	77.30	15.82	80.14	17.01	58.73
17-May-11 18:12:00	1166.98	242.76	200.84	77.30	15.87	80.00	17.01	52.56
17-May-11 18:13:00	1168.22	242.84	200.65	77.37	15.89	80.00	17.00	48.04
17-May-11 18:14:00	1166.58	242.82	200.35	77.40	15.85	80.09	16.94	41.97
17-May-11 18:15:00	1165.34	242.77	200.27	77.42	15.84	80.01	16.95	42.57
17-May-11 18:16:00	1167.74	242.75	200.26	77.50	15.84	80.25	16.97	43.76
17-May-11 18:17:00	1168.40	242.75	200.31	77.50	15.79	80.21	16.95	42.29
17-May-11 18:18:00	1169.76	242.91	200.33	77.50	15.82	79.91	16.97	42.50
17-May-11 18:19:00	1164.39	242.93	200.57	77.43	15.83	79.59	16.93	41.73
17-May-11 18:20:00	1162.87	242.61	200.49	77.38	15.86	79.68	16.92	41.05
17-May-11 18:21:00	1169.74	242.52	200.39	77.30	15.85	80.17	17.03	59.76
17-May-11 18:22:00	1167.39	242.81	200.27	77.28	15.84	80.24	17.13	87.71
17-May-11 18:23:00	1167.99	242.57	200.30	77.18	15.83	80.32	17.08	73.64
17-May-11 18:24:00	1168.52	242.25	200.46	77.08	15.84	80.42	17.02	52.66
17-May-11 18:25:00	1170.13	242.31	200.32	76.93	15.88	80.41	16.99	46.68
17-May-11 18:26:00	1164.30	242.36	200.26	76.83	15.86	79.99	16.98	44.88
17-May-11 18:27:00	1162.04	242.46	200.43	76.73	15.82	79.66	16.95	42.59
17-May-11 18:28:00	1167.67	242.74	200.58	76.63	15.83	80.08	16.96	43.28
17-May-11 18:29:00	1169.65	242.82	200.49	76.60	15.81	80.28	16.96	43.42
17-May-11 18:30:00	1172.55	242.63	200.55	76.58	15.89	80.17	16.97	43.11
17-May-11 18:31:00	1165.32	242.41	200.67	76.50	15.87	79.76	16.97	43.13
17-May-11 18:32:00	1161.19	242.27	200.26	76.48	15.84	79.50	16.98	44.06
17-May-11 18:33:00	1168.41	242.22	200.07	76.40	15.87	79.73	17.08	64.90
17-May-11 18:34:00	1164.14	242.24	199.89	76.35	15.86	79.87	17.16	89.47
17-May-11 18:35:00	1164.76	242.17	199.96	76.35	15.85	79.94	17.09	72.31
17-May-11 18:36:00	1162.77	242.27	200.10	76.40	15.86	79.69	17.05	54.58
17-May-11 18:37:00	1163.58	242.31	200.03	76.40	15.87	79.54	17.00	48.50
17-May-11 18:38:00	1162.55	242.51	199.88	76.40	15.89	79.41	16.97	44.91
17-May-11 18:39:00	1160.86	242.40	199.45	76.47	15.85	79.29	16.98	45.66
17-May-11 18:40:00	1163.54	242.21	199.32	76.48	15.88	79.56	16.98	45.06
17-May-11 18:41:00	1164.12	241.88	199.35	76.40	15.87	79.57	17.00	45.95
17-May-11 18:42:00	1167.11	241.66	199.32	76.33	15.88	79.49	16.95	43.05
17-May-11 18:43:00	1163.22	241.66	199.29	76.23	15.89	79.28	16.97	43.07
17-May-11 18:44:00	1162.22	241.65	199.04	76.20	15.87	79.61	16.99	42.70
17-May-11 18:45:00	1169.46	241.78	198.94	76.11	15.87	80.19	17.03	51.83
17-May-11 18:46:00	1165.05	241.66	199.00	75.98	15.85	80.06	17.10	68.31
17-May-11 18:47:00	1163.43	241.65	198.94	75.88	15.84	79.79	17.08	65.79
17-May-11 18:48:00	1165.04	241.44	199.16	75.71	15.84	79.73	17.03	54.68
17-May-11 18:49:00	1166.74	241.26	199.47	75.53	15.82	79.89	17.00	47.24
17-May-11 18:50:00	1164.89	241.26	199.48	75.48	15.83	79.81	16.99	45.37
17-May-11 18:51:00	1162.36	241.05	199.54	75.40	15.82	79.58	16.99	46.20
17-May-11 18:52:00	1166.51	241.15	199.60	75.33	15.82	79.81	17.00	48.20
17-May-11 18:53:00	1170.18	241.05	199.43	75.28	15.86	80.07	17.03	48.27
17-May-11 18:54:00	1171.08	241.12	199.41	75.18	15.85	80.06	16.99	44.60
17-May-11 18:55:00	1165.74	241.26	198.98	75.08	15.85	79.75	16.96	42.58
17-May-11 18:56:00	1162.61	241.20	198.84	74.98	15.84	79.57	16.97	42.98
17-May-11 18:57:00	1170.52	241.06	198.97	74.88	15.87	80.16	17.05	64.05
17-May-11 18:58:00	1169.85	240.69	198.76	74.78	15.87	80.37	17.12	86.03
17-May-11 18:59:00	1168.15	240.62	198.55	74.70	15.85	80.37	16.99	59.98
17-May-11 19:00:00	1167.42	240.67	198.49	74.63	15.87	80.16	16.99	51.70

Sulfuric Acid

5/17/2011 18:10
5/17/2011 19:56

1m

O ₂ (WGS CEMS) (% by vol, dry) 317AI07	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dflair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2						
17-May-11 18:10:00	0.98	374.31	81813.90	79155.74	27002.24	52134.84
17-May-11 18:11:00	0.86	373.74	82030.66	78877.88	26892.39	52291.58
17-May-11 18:12:00	0.99	373.30	81906.04	78919.65	26821.58	52151.03
17-May-11 18:13:00	0.94	373.57	81809.30	78913.92	26844.47	52033.23
17-May-11 18:14:00	1.03	373.98	81869.19	78765.79	26768.34	52048.93
17-May-11 18:15:00	1.13	373.95	81958.20	78848.31	26748.19	52083.30
17-May-11 18:16:00	1.11	373.86	81951.82	79050.28	26780.16	52086.67
17-May-11 18:17:00	1.03	373.15	81931.41	79032.17	26728.42	52072.99
17-May-11 18:18:00	1.05	374.10	81775.73	78928.43	26807.11	52088.21
17-May-11 18:19:00	1.13	374.54	81985.07	78801.55	26775.93	52072.04
17-May-11 18:20:00	1.16	374.02	82081.53	79054.64	26712.15	52037.29
17-May-11 18:21:00	1.06	373.90	81966.42	79148.93	26862.13	52043.10
17-May-11 18:22:00	0.91	374.34	81940.96	79068.06	27068.09	52034.08
17-May-11 18:23:00	0.72	373.89	82035.81	78961.89	27021.45	52045.60
17-May-11 18:24:00	0.96	373.99	81937.70	78861.36	26891.31	52051.39
17-May-11 18:25:00	0.96	373.56	81960.08	78925.03	26820.04	52043.05
17-May-11 18:26:00	0.93	374.28	81864.81	78921.72	26866.74	52222.21
17-May-11 18:27:00	0.99	374.54	82023.60	78774.72	26833.46	52312.91
17-May-11 18:28:00	1.11	374.06	82081.49	78984.28	26774.74	52191.15
17-May-11 18:29:00	0.98	373.25	81975.06	79134.73	26761.80	52116.24
17-May-11 18:30:00	1.01	373.15	81798.06	78931.24	26755.57	52123.34
17-May-11 18:31:00	0.97	373.87	81775.03	78784.05	26819.58	52124.73
17-May-11 18:32:00	1.01	372.75	81933.34	78737.78	26730.48	51930.49
17-May-11 18:33:00	0.94	373.24	81687.47	78931.00	26914.23	51871.00
17-May-11 18:34:00	0.81	373.22	81795.93	78724.19	27050.35	52005.26
17-May-11 18:35:00	0.83	372.48	81791.93	78776.15	26907.03	52039.60
17-May-11 18:36:00	0.98	373.43	81630.26	78751.79	26874.05	52109.96
17-May-11 18:37:00	0.95	373.66	81838.00	78671.41	26849.92	52119.29
17-May-11 18:38:00	1.06	373.56	81888.31	78907.10	26766.24	52062.23
17-May-11 18:39:00	1.04	373.43	81865.28	78922.38	26780.72	52024.41
17-May-11 18:40:00	1.02	373.25	81837.27	78897.43	26766.93	52014.59
17-May-11 18:41:00	1.01	374.45	81797.25	78847.38	26885.74	52016.64
17-May-11 18:42:00	1.05	373.97	82061.76	78825.80	26777.89	52012.44
17-May-11 18:43:00	1.06	374.08	81956.82	79065.07	26808.95	52061.05
17-May-11 18:44:00	1.07	374.18	81980.30	78998.38	26829.55	51874.86
17-May-11 18:45:00	0.95	374.75	82000.81	79025.77	26954.86	51748.99
17-May-11 18:46:00	0.92	374.87	82127.77	78995.38	27061.26	51972.92
17-May-11 18:47:00	0.84	375.07	82153.93	79143.93	27073.97	52115.56
17-May-11 18:48:00	0.88	374.87	82197.37	79072.91	26990.48	52119.36
17-May-11 18:49:00	1.02	374.93	82153.74	79114.76	26912.01	51955.00
17-May-11 18:50:00	1.04	374.86	82166.11	79173.77	26895.22	51803.39
17-May-11 18:51:00	0.97	374.45	82151.75	79185.51	26875.29	51818.13
17-May-11 18:52:00	1.01	374.82	82060.92	79114.41	26913.99	51956.86
17-May-11 18:53:00	0.97	375.89	82142.49	79083.43	27030.15	52071.74
17-May-11 18:54:00	0.99	375.89	82375.46	79126.93	26982.21	52050.68
17-May-11 18:55:00	1.15	375.14	82376.98	79358.37	26848.32	52077.60
17-May-11 18:56:00	1.12	374.56	82211.52	79476.13	26819.99	52068.45
17-May-11 18:57:00	1.04	375.66	82084.40	79285.53	27024.74	52043.89
17-May-11 18:58:00	0.90	375.69	82325.13	79178.88	27145.45	51882.74
17-May-11 18:59:00	0.91	375.17	82332.71	79320.83	26954.89	51703.96
17-May-11 19:00:00	1.03	376.40	82218.64	79245.60	27002.94	51848.26

Run 2	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B	317P1108	317P1177A	317FC202	317FC115	317F1113	317F1105
17-May-11 19:01:00	77.56		42.55	22.16	122	260.27	91.51	1142.64
17-May-11 19:02:00	77.52		42.58	22.28	122	261.20	90.84	1140.64
17-May-11 19:03:00	77.36		42.49	22.38	121	260.31	91.39	1139.31
17-May-11 19:04:00	77.63		42.41	22.15	118	259.39	91.80	1142.31
17-May-11 19:05:00	77.58		42.34	22.11	119	260.40	91.55	1144.97
17-May-11 19:06:00	77.56		42.35	22.17	121	261.67	91.05	1144.24
17-May-11 19:07:00	77.51		42.43	22.16	122	260.65	91.42	1139.88
17-May-11 19:08:00	77.45		42.34	22.29	121	260.98	91.08	1136.98
17-May-11 19:09:00	77.49		42.26	22.20	120	262.14	90.76	1143.26
17-May-11 19:10:00	77.50		42.18	22.26	120	261.21	91.31	1143.03
17-May-11 19:11:00	77.55		42.18	22.15	122	259.74	91.94	1142.23
17-May-11 19:12:00	77.58		42.06	22.45	122	262.02	90.89	1141.16
17-May-11 19:13:00	77.57		42.31	22.37	122	261.70	90.99	1142.07
17-May-11 19:14:00	77.48		42.34	22.38	121	260.81	91.48	1136.07
17-May-11 19:15:00	77.53		42.32	22.40	120	261.71	91.34	1134.30
17-May-11 19:16:00	77.48		42.33	22.27	120	261.36	91.24	1136.80
17-May-11 19:17:00	77.56		42.38	22.36	120	261.70	91.07	1140.01
17-May-11 19:18:00	77.28		42.37	22.43	122	261.73	91.26	1144.38
17-May-11 19:19:00	77.42		42.40	22.55	122	261.37	91.32	1139.21
17-May-11 19:20:00	77.56		42.33	22.42	120	261.03	91.33	1138.03
17-May-11 19:21:00	77.48		42.27	22.40	121	259.90	91.85	1143.49
17-May-11 19:22:00	77.40		42.31	22.32	121	260.17	91.85	1139.43
17-May-11 19:23:00	77.56		42.34	22.24	120	260.85	91.36	1141.32
17-May-11 19:24:00	77.42		42.18	22.34	120	261.70	90.77	1141.23
17-May-11 19:25:00	77.43		42.16	22.32	119	260.87	91.57	1142.23
17-May-11 19:26:00	77.56		42.24	22.10	118	258.15	92.65	1139.12
17-May-11 19:27:00	77.62		42.26	22.27	118	259.37	92.23	1138.10
17-May-11 19:28:00	77.55		42.20	22.03	120	259.29	92.16	1140.73
17-May-11 19:29:00	77.48		42.23	22.23	123	259.62	91.90	1141.65
17-May-11 19:30:00	77.44		42.11	22.41	121	261.20	91.23	1144.21
17-May-11 19:31:00	77.44		42.09	22.13	118	262.08	91.04	1137.88
17-May-11 19:32:00	77.45		42.19	22.12	119	260.45	91.59	1133.92
17-May-11 19:33:00	77.29		42.20	22.19	118	260.09	91.84	1141.45
17-May-11 19:34:00	77.41		42.15	22.25	119	261.21	91.58	1137.62
17-May-11 19:35:00	77.39		42.20	22.38	118	260.10	92.18	1138.96
17-May-11 19:36:00	77.36		42.16	22.40	118	260.64	91.77	1138.55
17-May-11 19:37:00	77.51		41.99	22.09	119	259.29	92.22	1139.55
17-May-11 19:38:00	77.37		41.99	22.37	119	260.01	91.97	1139.29
17-May-11 19:39:00	77.43		42.04	22.37	118	260.59	91.54	1138.15
17-May-11 19:40:00	77.44		42.08	22.14	120	259.28	92.25	1142.28
17-May-11 19:41:00	77.50		42.15	22.23	121	260.36	91.76	1142.37
17-May-11 19:42:00	77.52		42.10	22.21	120	260.18	91.60	1144.48
17-May-11 19:43:00	77.20		42.07	22.06	120	259.65	91.84	1136.99
17-May-11 19:44:00	77.29		41.97	22.05	120	259.38	91.88	1132.06
17-May-11 19:45:00	77.39		41.86	22.31	121	260.62	91.15	1139.44
17-May-11 19:46:00	77.46		41.98	22.14	122	260.19	91.53	1137.09
17-May-11 19:47:00	77.66		42.02	22.27	122	259.92	91.55	1138.00
17-May-11 19:48:00	77.66		41.97	21.91	122	259.12	92.01	1138.92
17-May-11 19:49:00	77.46		42.01	22.08	121	259.91	92.08	1138.93
17-May-11 19:50:00	77.37		42.09	22.42	120	259.18	92.24	1137.48

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FE1106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317A1109	CO (WGS CEMS) (ppmv, dry) 317A111
Run 2							
17-May-11 19:01:00	1165.12	240.55	74.58	15.88	79.77	16.96	46.05
17-May-11 19:02:00	1163.39	240.37	74.48	15.81	79.49	16.95	44.25
17-May-11 19:03:00	1163.28	240.14	74.08	15.84	79.39	16.94	43.10
17-May-11 19:04:00	1166.52	240.15	74.33	15.89	79.78	16.90	41.32
17-May-11 19:05:00	1168.32	240.14	74.30	15.87	79.83	16.88	40.33
17-May-11 19:06:00	1167.31	240.01	74.30	15.86	79.32	16.92	41.72
17-May-11 19:07:00	1161.60	240.02	74.32	15.89	78.84	16.94	42.14
17-May-11 19:08:00	1159.79	239.98	74.38	15.86	78.80	16.87	40.43
17-May-11 19:09:00	1167.40	240.16	74.30	15.83	79.27	16.95	51.96
17-May-11 19:10:00	1166.18	240.24	74.28	15.87	79.72	17.08	74.65
17-May-11 19:11:00	1164.61	240.21	74.20	15.87	79.69	17.00	67.60
17-May-11 19:12:00	1163.70	240.14	74.13	15.82	79.48	16.90	47.99
17-May-11 19:13:00	1164.77	240.13	74.10	15.84	79.30	16.92	46.25
17-May-11 19:14:00	1158.82	240.09	74.08	15.85	78.87	16.92	45.09
17-May-11 19:15:00	1156.40	239.94	74.00	15.85	78.57	16.84	40.35
17-May-11 19:16:00	1159.67	239.77	74.00	15.81	78.82	16.87	41.18
17-May-11 19:17:00	1162.69	239.79	74.00	15.80	78.99	16.88	40.64
17-May-11 19:18:00	1166.07	240.23	73.93	15.84	78.93	16.88	39.76
17-May-11 19:19:00	1160.25	240.41	73.88	15.83	78.87	16.85	39.43
17-May-11 19:20:00	1160.70	240.20	73.80	15.85	79.01	16.83	39.01
17-May-11 19:21:00	1167.28	240.20	73.80	15.86	79.35	16.95	49.40
17-May-11 19:22:00	1162.63	239.99	73.78	15.85	79.33	17.01	65.03
17-May-11 19:23:00	1163.79	240.16	73.70	15.83	79.45	16.97	59.70
17-May-11 19:24:00	1164.08	240.21	73.70	15.81	79.66	16.92	48.13
17-May-11 19:25:00	1165.24	240.00	73.70	15.88	79.61	16.88	43.07
17-May-11 19:26:00	1162.30	239.67	73.68	15.90	79.42	16.85	41.12
17-May-11 19:27:00	1161.06	239.64	73.60	15.85	79.22	16.81	39.32
17-May-11 19:28:00	1163.91	239.57	73.51	15.86	79.44	16.86	40.45
17-May-11 19:29:00	1163.33	239.64	73.38	15.86	79.34	16.90	40.98
17-May-11 19:30:00	1164.35	239.78	73.30	15.81	79.03	16.87	39.61
17-May-11 19:31:00	1158.64	239.67	73.28	15.84	78.79	16.91	41.05
17-May-11 19:32:00	1157.41	239.99	73.18	15.87	78.75	16.91	41.39
17-May-11 19:33:00	1165.75	240.25	73.10	15.85	79.23	16.92	50.35
17-May-11 19:34:00	1161.60	240.12	73.10	15.86	79.36	17.04	72.49
17-May-11 19:35:00	1160.95	240.11	73.10	15.91	79.23	17.03	71.47
17-May-11 19:36:00	1160.53	240.16	73.10	15.85	79.13	16.97	54.33
17-May-11 19:37:00	1162.02	240.01	73.10	15.88	79.07	16.95	46.99
17-May-11 19:38:00	1162.06	239.89	73.10	15.88	79.15	16.96	46.76
17-May-11 19:39:00	1160.26	239.56	73.03	15.88	79.18	16.95	43.83
17-May-11 19:40:00	1164.86	239.67	72.93	15.89	79.55	16.96	44.86
17-May-11 19:41:00	1165.61	239.53	72.90	15.92	79.54	16.98	45.46
17-May-11 19:42:00	1165.03	239.43	72.90	15.90	79.07	16.98	44.51
17-May-11 19:43:00	1157.93	239.37	72.90	15.92	78.59	16.96	43.23
17-May-11 19:44:00	1154.73	239.47	72.90	15.95	78.46	16.97	42.89
17-May-11 19:45:00	1164.15	239.34	72.90	15.89	79.08	17.06	71.51
17-May-11 19:46:00	1160.83	238.98	72.90	15.92	79.09	17.18	109.98
17-May-11 19:47:00	1160.82	238.89	72.85	15.91	79.09	17.11	77.89
17-May-11 19:48:00	1161.90	238.89	72.83	15.94	79.20	17.02	50.97
17-May-11 19:49:00	1161.74	238.92	72.80	15.96	79.11	16.98	46.86
17-May-11 19:50:00	1160.39	239.06	72.80	15.95	78.98	16.98	46.69

	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B_Cat_Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2							
17-May-11 19:01:00	1.00	376.33	82488.16	79234.43	26976.44	52013.87	179.30
17-May-11 19:02:00	1.02	376.30	82473.69	79444.48	26949.48	52012.84	178.63
17-May-11 19:03:00	0.99	376.24	82467.39	79423.45	26945.94	51955.19	179.17
17-May-11 19:04:00	1.03	376.16	82452.61	79381.24	26886.03	51940.56	179.35
17-May-11 19:05:00	1.16	375.93	82434.82	79376.13	26806.40	51986.10	179.82
17-May-11 19:06:00	1.17	376.71	82385.31	79479.33	26907.96	52000.02	179.54
17-May-11 19:07:00	1.01	377.42	82555.66	79452.87	27020.39	51984.86	179.19
17-May-11 19:08:00	1.08	376.82	82710.97	79485.31	26881.25	51951.85	179.70
17-May-11 19:09:00	1.11	376.67	82579.85	79651.02	26950.52	51940.30	179.57
17-May-11 19:10:00	0.96	377.43	82547.09	79633.03	27210.94	51941.69	180.02
17-May-11 19:11:00	0.87	377.15	82713.25	79553.61	27126.62	51954.18	180.04
17-May-11 19:12:00	1.05	376.31	82653.48	79569.40	26887.00	51961.23	180.68
17-May-11 19:13:00	1.10	377.27	82469.53	79588.33	26968.76	51814.71	179.42
17-May-11 19:14:00	1.11	377.10	82679.07	79483.63	26946.81	51812.10	179.74
17-May-11 19:15:00	1.16	376.92	82641.75	79679.51	26820.81	51992.74	179.34
17-May-11 19:16:00	1.13	377.55	82602.00	79613.18	26909.47	52042.04	179.29
17-May-11 19:17:00	1.15	376.90	82740.06	79584.56	26879.51	52008.25	179.25
17-May-11 19:18:00	1.20	377.16	82598.58	79747.21	26877.31	51992.28	179.04
17-May-11 19:19:00	1.26	377.43	82654.14	79666.87	26845.60	51987.19	179.00
17-May-11 19:20:00	1.25	377.04	82714.34	79740.38	26797.33	51906.44	179.09
17-May-11 19:21:00	1.15	376.81	82629.25	79775.69	26951.80	51869.45	179.26
17-May-11 19:22:00	1.04	376.26	82578.26	79703.45	27020.01	51902.39	179.38
17-May-11 19:23:00	1.05	376.54	82457.49	79615.11	26988.56	51912.71	179.27
17-May-11 19:24:00	1.06	376.44	82518.63	79457.77	26919.19	51911.64	180.39
17-May-11 19:25:00	1.13	376.87	82496.53	79492.47	26882.94	51887.73	180.54
17-May-11 19:26:00	1.14	377.08	82590.64	79498.84	26854.34	51873.96	180.00
17-May-11 19:27:00	1.18	375.65	82638.28	79553.23	26690.55	52094.64	179.87
17-May-11 19:28:00	1.21	376.17	82323.43	79625.34	26778.62	52268.71	179.79
17-May-11 19:29:00	1.09	376.18	82438.27	79365.20	26860.47	52175.34	180.38
17-May-11 19:30:00	1.19	376.15	82440.50	79417.68	26792.76	52099.98	180.84
17-May-11 19:31:00	1.14	376.90	82432.83	79485.58	26910.26	52103.99	180.77
17-May-11 19:32:00	1.12	377.69	82597.82	79463.28	26976.44	52118.25	180.40
17-May-11 19:33:00	1.15	376.60	82770.30	79601.24	26903.49	52098.89	180.24
17-May-11 19:34:00	1.08	376.48	82531.54	79832.04	27059.85	52098.94	179.81
17-May-11 19:35:00	0.86	377.42	82505.74	79624.03	27180.21	52107.89	179.84
17-May-11 19:36:00	0.92	377.10	82711.36	79380.42	27067.70	52137.78	180.85
17-May-11 19:37:00	1.07	376.85	82641.34	79606.51	26975.05	52014.39	180.97
17-May-11 19:38:00	1.00	376.18	82586.31	79633.03	26964.52	51900.21	180.95
17-May-11 19:39:00	1.10	376.75	82439.63	79541.58	26957.32	52017.84	180.81
17-May-11 19:40:00	1.04	376.85	82565.23	79477.31	27002.29	52218.52	180.87
17-May-11 19:41:00	0.92	376.51	82585.92	79536.78	27037.72	52353.62	180.41
17-May-11 19:42:00	1.01	377.16	82512.53	79489.24	27051.08	52272.05	180.59
17-May-11 19:43:00	0.95	376.79	82655.19	79475.28	27025.86	52172.21	181.10
17-May-11 19:44:00	1.00	376.61	82573.51	79550.32	27005.84	52176.51	181.17
17-May-11 19:45:00	1.02	376.47	82534.23	79535.75	27097.03	52174.53	181.75
17-May-11 19:46:00	0.87	376.79	82502.60	79611.54	27310.08	52207.16	180.97
17-May-11 19:47:00	0.83	376.95	82574.52	79515.41	27250.74	52219.90	180.76
17-May-11 19:48:00	1.14	376.61	82608.54	79527.69	27023.76	52164.67	181.08
17-May-11 19:49:00	1.17	376.68	82533.23	79742.27	26972.49	52127.10	180.60
17-May-11 19:50:00	1.11	377.55	82549.92	79660.97	27056.62	52130.02	180.35

Run 2	Scrubbing Liquid Upper Circulation (psig) 317P1105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
17-May-11 19:51:00	77.30	42.01	22.52	120	260.36	91.63	1134.56
17-May-11 19:52:00	77.51	42.01	22.40	120	261.01	91.69	1140.00
17-May-11 19:53:00	77.34	41.96	22.40	120	260.43	91.84	1143.56
17-May-11 19:54:00	77.32	41.94	22.41	120	259.91	92.16	1145.65
17-May-11 19:55:00	77.40	41.85	22.38	121	259.92	92.24	1137.70
	77.50	42.41	22.19	120.42	259.77	91.46	1141.44

Run 2	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
	17-May-11 19:51:00	17-May-11 19:52:00	17-May-11 19:53:00	17-May-11 19:54:00	17-May-11 19:55:00	17-May-11 19:56:00	17-May-11 19:57:00	17-May-11 19:58:00
	1158.16	239.14	195.92	72.80	15.89	78.83	17.01	48.58
	1163.18	238.84	195.94	72.80	15.87	79.20	17.04	49.80
	1165.82	238.67	195.89	72.73	15.87	79.29	17.01	46.62
	1165.62	238.69	195.78	72.63	15.89	79.06	16.98	44.67
	1159.10	238.78	195.47	72.60	15.95	78.85	16.99	45.41
	1164.36	240.88	198.75	74.89	15.86	79.54	16.98	50.73

	O ₂ (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2							
17-May-11 19:51:00	1.00	376.80	82739.84	79618.70	27064.03	52142.10	181.05
17-May-11 19:52:00	0.96	377.14	82576.54	79731.23	27141.23	52113.05	180.44
17-May-11 19:53:00	0.94	377.84	82650.00	79556.86	27157.89	52127.50	181.17
17-May-11 19:54:00	1.01	377.33	82803.74	79590.77	27060.51	52179.71	181.30
17-May-11 19:55:00	0.98	377.46	82691.51	79763.15	27091.37	52190.06	181.17
	1.03	375.55	82293.99	79288.17	26928.88	52042.92	179.77

HC1C12/HF/HCN/THC/Methane/Ethane/CO/NOx/SO2 Run 1
Sulfuric Acid Run 3

5/18/2011 12:50
5/18/2011 18:15

1m

Run 3	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
18-May-11 12:50:00	77.36	42.90	22.35	123	260.74	90.10	1135.63
18-May-11 12:51:00	77.59	42.98	22.12	121	260.87	90.34	1132.96
18-May-11 12:52:00	77.58	42.93	22.23	118	261.59	90.21	1136.87
18-May-11 12:53:00	77.49	42.95	22.12	119	260.65	90.49	1139.26
18-May-11 12:54:00	77.50	43.01	21.90	118	259.75	90.99	1141.10
18-May-11 12:55:00	77.65	42.99	22.12	118	261.23	90.56	1139.75
18-May-11 12:56:00	77.56	42.91	22.28	121	260.80	90.50	1137.78
18-May-11 12:57:00	77.56	42.88	22.18	122	260.19	90.60	1138.72
18-May-11 12:58:00	77.57	42.88	22.30	122	260.74	90.44	1139.73
18-May-11 12:59:00	77.56	42.85	22.22	122	261.64	89.95	1142.71
18-May-11 13:00:00	77.57	42.96	22.19	121	260.32	90.32	1141.84
18-May-11 13:01:00	77.43	42.94	22.35	120	260.23	90.41	1135.68
18-May-11 13:02:00	77.52	42.86	22.13	122	261.14	90.23	1136.78
18-May-11 13:03:00	77.53	42.88	21.98	120	259.67	91.03	1134.96
18-May-11 13:04:00	77.42	42.85	21.96	121	260.77	90.27	1138.23
18-May-11 13:05:00	77.42	42.77	22.08	121	260.99	89.94	1139.44
18-May-11 13:06:00	77.62	42.73	22.09	120	259.33	90.76	1138.12
18-May-11 13:07:00	77.65	42.73	22.14	119	260.19	90.13	1138.44
18-May-11 13:08:00	77.53	42.64	22.14	118	260.00	90.09	1140.26
18-May-11 13:09:00	77.29	42.74	21.99	118	259.77	90.59	1139.58
18-May-11 13:10:00	77.56	42.71	22.10	119	258.76	90.78	1141.60
18-May-11 13:11:00	77.59	42.72	22.14	119	258.89	90.69	1143.89
18-May-11 13:12:00	77.58	42.64	22.10	119	258.30	90.83	1140.91
18-May-11 13:13:00	77.68	42.57	22.03	118	258.96	90.25	1137.67
18-May-11 13:14:00	77.56	42.55	21.97	119	259.89	89.98	1139.96
18-May-11 13:15:00	77.42	42.55	22.18	122	259.60	90.01	1136.54
18-May-11 13:16:00	77.43	42.47	22.25	120	258.85	90.49	1133.52
18-May-11 13:17:00	77.43	42.56	22.13	121	258.03	90.79	1125.31
18-May-11 13:18:00	77.53	42.45	22.15	122	259.77	89.99	1129.17
18-May-11 13:19:00	77.63	42.51	22.01	123	259.94	89.90	1135.97
18-May-11 13:20:00	77.59	42.56	21.93	122	258.17	90.53	1139.40
18-May-11 13:21:00	77.31	42.45	22.17	118	258.02	90.56	1135.41
18-May-11 13:22:00	77.17	42.43	22.12	117	258.98	90.63	1144.16
18-May-11 13:23:00	77.17	42.51	21.97	119	259.56	90.71	1140.69
18-May-11 13:24:00	77.37	42.39	21.91	123	259.28	90.70	1136.42
18-May-11 13:25:00	77.49	42.39	22.13	122	259.21	90.42	1134.87
18-May-11 13:26:00	77.52	42.38	22.08	122	258.57	90.70	1137.72
18-May-11 13:27:00	77.56	42.37	22.09	121	259.08	90.70	1135.68
18-May-11 13:28:00	77.49	42.35	22.07	120	260.25	90.19	1138.96
18-May-11 13:29:00	77.39	42.43	22.12	119	259.27	90.52	1134.11
18-May-11 13:30:00	77.40	42.43	22.15	119	258.66	90.34	1128.26
18-May-11 13:31:00	77.56	42.45	22.03	119	257.10	90.96	1135.88
18-May-11 13:32:00	77.72	42.39	21.94	121	257.84	90.96	1138.39
18-May-11 13:33:00	77.55	42.26	22.18	124	259.13	90.47	1139.21
18-May-11 13:34:00	77.26	42.32	22.15	122	259.86	90.32	1139.59
18-May-11 13:35:00	77.48	42.32	22.11	118	260.00	90.16	1138.30
18-May-11 13:36:00	77.57	42.33	22.01	118	258.16	90.65	1130.30
18-May-11 13:37:00	77.56	42.32	22.12	117	258.88	90.52	1140.09
18-May-11 13:38:00	77.59	42.25	22.02	118	259.14	90.52	1150.68
18-May-11 13:39:00	77.52	42.25	21.91	117	258.99	90.68	1138.71
18-May-11 13:40:00	77.49	42.27	21.95	117	259.09	90.53	1141.61

HC1C12/HF/HCN/THC/
Sulfuric Acid Run 3

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 3							
18-May-11 12:50:00	241.51	201.21	79.47	15.73	78.23	17.28	92.58
18-May-11 12:51:00	241.75	201.29	79.57	15.74	78.24	17.36	150.33
18-May-11 12:52:00	241.87	201.20	79.74	15.76	78.61	17.29	111.78
18-May-11 12:53:00	241.93	201.25	79.80	15.78	78.86	17.23	71.39
18-May-11 12:54:00	242.03	201.13	79.66	15.80	79.02	17.20	60.46
18-May-11 12:55:00	241.95	201.02	79.60	15.78	79.17	17.21	56.47
18-May-11 12:56:00	242.08	201.19	79.62	15.78	79.07	17.23	58.38
18-May-11 12:57:00	241.77	201.22	79.72	15.80	79.10	17.20	55.56
18-May-11 12:58:00	241.51	201.04	79.89	15.75	79.16	17.20	50.95
18-May-11 12:59:00	241.48	200.90	80.00	15.73	78.92	17.24	53.68
18-May-11 13:00:00	241.62	200.96	80.00	15.75	78.53	17.27	58.08
18-May-11 13:01:00	241.71	201.06	80.00	15.79	78.22	17.22	50.87
18-May-11 13:02:00	241.66	201.10	80.00	15.77	78.36	17.29	118.09
18-May-11 13:03:00	242.01	200.95	80.00	15.80	78.33	15.52	186.36
18-May-11 13:04:00	242.17	200.97	80.00	15.74	78.74	14.09	94.85
18-May-11 13:05:00	241.69	201.07	80.00	15.78	78.96	17.17	62.90
18-May-11 13:06:00	241.61	201.13	80.00	15.81	78.96	17.20	54.00
18-May-11 13:07:00	241.66	200.88	80.07	15.76	78.96	17.17	50.01
18-May-11 13:08:00	241.59	200.74	80.17	15.75	79.01	17.20	54.85
18-May-11 13:09:00	241.65	200.74	80.20	15.82	79.04	17.21	53.94
18-May-11 13:10:00	241.68	200.48	80.27	15.80	79.17	17.22	54.39
18-May-11 13:11:00	241.66	200.39	80.30	15.81	79.10	17.22	52.65
18-May-11 13:12:00	241.66	200.21	80.30	15.83	78.80	17.24	55.26
18-May-11 13:13:00	241.61	199.63	80.28	15.80	78.80	17.28	70.33
18-May-11 13:14:00	241.70	199.56	80.20	15.80	78.97	17.39	197.10
18-May-11 13:15:00	241.67	199.44	80.15	15.80	78.74	17.45	293.70
18-May-11 13:16:00	241.55	199.11	80.22	15.82	78.53	17.34	112.64
18-May-11 13:17:00	241.41	198.97	80.35	15.82	77.82	17.29	73.78
18-May-11 13:18:00	241.18	198.86	80.30	15.76	77.86	17.29	75.88
18-May-11 13:19:00	241.34	198.61	80.30	15.77	78.43	17.31	77.84
18-May-11 13:20:00	241.48	198.81	80.28	15.80	78.69	17.27	62.62
18-May-11 13:21:00	241.65	199.16	80.20	15.79	78.30	17.24	53.81
18-May-11 13:22:00	241.96	199.29	80.20	15.79	78.58	17.26	60.82
18-May-11 13:23:00	242.18	199.40	80.27	15.82	78.56	17.29	69.64
18-May-11 13:24:00	242.22	199.23	80.30	15.82	78.11	17.28	66.34
18-May-11 13:25:00	242.26	199.28	80.37	15.80	78.27	17.26	62.08
18-May-11 13:26:00	242.31	199.37	80.42	15.81	78.54	17.33	115.69
18-May-11 13:27:00	242.24	199.30	80.52	15.81	78.49	17.40	172.65
18-May-11 13:28:00	242.31	199.24	80.52	15.79	78.78	17.33	115.92
18-May-11 13:29:00	242.26	199.15	80.52	15.80	78.75	17.33	93.03
18-May-11 13:30:00	242.36	199.31	80.67	15.77	78.69	17.29	75.90
18-May-11 13:31:00	242.20	199.31	80.72	15.83	78.56	17.29	78.57
18-May-11 13:32:00	242.22	199.20	80.80	15.83	78.75	17.30	71.61
18-May-11 13:33:00	242.22	199.29	80.82	15.80	78.97	17.32	85.33
18-May-11 13:34:00	242.21	199.30	80.88	15.80	78.95	17.34	90.97
18-May-11 13:35:00	242.26	199.30	80.71	15.78	78.49	17.33	82.68
18-May-11 13:36:00	242.45	199.44	80.55	15.81	77.83	17.33	81.87
18-May-11 13:37:00	242.58	199.76	80.62	15.83	77.88	17.35	94.62
18-May-11 13:38:00	242.74	199.74	80.79	15.83	78.04	17.45	291.73
18-May-11 13:39:00	242.74	199.83	80.90	15.82	78.56	17.50	435.97
18-May-11 13:40:00	242.84	199.85	80.81	15.81	79.05	17.41	195.10

HC/IC12/HF/HCN/THC/
Sulfuric Acid Run 3

5/18/2011 12:50
5/18/2011 18:15

1m

O ₂ (WGS CEMS) (% by vol, dry) 317AI07	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3						
18-May-11 12:50:00	0.66	374.13	79144.03	27292.71	51746.38	178.14
18-May-11 12:51:00	0.60	373.94	79037.19	27401.80	51730.38	177.83
18-May-11 12:52:00	0.55	374.44	78962.83	27370.99	51715.54	178.18
18-May-11 12:53:00	0.59	375.10	78806.24	27323.75	51719.66	178.48
18-May-11 12:54:00	0.76	374.45	78896.84	27194.15	51691.44	178.20
18-May-11 12:55:00	0.79	374.32	79174.66	27185.98	51681.23	177.44
18-May-11 12:56:00	0.77	375.16	79068.91	27271.57	51678.88	177.93
18-May-11 12:57:00	0.80	374.67	79031.95	27199.95	51759.88	178.38
18-May-11 12:58:00	0.76	374.31	79215.23	27184.95	51913.74	177.87
18-May-11 12:59:00	0.67	374.52	79066.82	27275.87	51933.57	178.32
18-May-11 13:00:00	0.73	374.75	78956.55	27310.05	51852.90	178.09
18-May-11 13:01:00	0.77	373.88	79084.02	27174.40	51799.95	178.12
18-May-11 13:02:00	0.74	374.11	79119.08	27284.09	51792.66	178.19
18-May-11 13:03:00	0.66	374.77	78984.70	25314.92	51810.14	178.42
18-May-11 13:04:00	1.95	374.05	77076.96	23250.36	51704.89	181.66
18-May-11 13:05:00	2.88	374.16	78472.32	26512.04	51588.05	184.39
18-May-11 13:06:00	0.74	374.41	81998.45	80931.97	51713.16	174.19
18-May-11 13:07:00	0.78	373.67	78925.21	27094.19	51850.78	179.00
18-May-11 13:08:00	0.71	373.51	79015.62	27143.55	51837.39	179.32
18-May-11 13:09:00	0.64	373.51	81854.66	78804.80	51823.71	179.59
18-May-11 13:10:00	0.75	373.97	81855.06	78734.30	51888.08	179.67
18-May-11 13:11:00	0.75	373.10	81955.78	78840.38	51836.32	179.48
18-May-11 13:12:00	0.81	373.26	81764.08	78941.03	51805.22	179.44
18-May-11 13:13:00	0.74	372.78	81800.02	78824.38	51803.13	180.05
18-May-11 13:14:00	0.51	372.84	81694.02	78823.09	51788.66	180.21
18-May-11 13:15:00	0.38	373.42	81707.09	78623.23	51755.61	180.62
18-May-11 13:16:00	0.53	373.23	81835.01	78575.37	51651.74	181.33
18-May-11 13:17:00	0.71	373.06	81793.02	78738.05	51493.08	180.47
18-May-11 13:18:00	0.65	372.54	81755.39	78909.27	51640.47	180.70
18-May-11 13:19:00	0.54	373.21	81642.11	78702.89	51788.81	180.48
18-May-11 13:20:00	0.60	373.34	81790.00	78518.99	51803.39	180.77
18-May-11 13:21:00	0.70	372.29	81816.80	78687.06	51807.23	181.14
18-May-11 13:22:00	0.70	372.14	81586.84	78784.91	51782.43	181.07
18-May-11 13:23:00	0.52	373.25	81555.79	78558.48	51781.66	181.13
18-May-11 13:24:00	0.50	373.93	81798.11	78380.87	51771.89	182.09
18-May-11 13:25:00	0.63	373.53	81946.97	78601.20	51756.21	181.62
18-May-11 13:26:00	0.64	373.07	81858.84	78853.27	51743.29	180.97
18-May-11 13:27:00	0.52	372.84	81759.43	78853.00	51745.85	180.92
18-May-11 13:28:00	0.46	373.37	81707.42	78692.18	51763.24	181.32
18-May-11 13:29:00	0.52	373.93	81825.25	78539.45	51899.53	181.52
18-May-11 13:30:00	0.51	373.22	81945.99	78685.73	51967.73	181.20
18-May-11 13:31:00	0.55	372.25	81792.14	78769.65	51908.48	180.76
18-May-11 13:32:00	0.60	371.76	81578.42	78655.01	51808.30	181.03
18-May-11 13:33:00	0.64	372.47	81470.37	78512.47	51729.17	182.13
18-May-11 13:34:00	0.49	373.12	81626.03	78450.97	51729.40	182.27
18-May-11 13:35:00	0.52	373.75	81770.35	78491.59	51723.91	182.12
18-May-11 13:36:00	0.55	373.44	81908.21	78332.15	51731.44	181.60
18-May-11 13:37:00	0.60	372.26	81839.19	78802.38	51716.03	181.40
18-May-11 13:38:00	0.44	372.98	81581.67	78806.12	51732.63	181.42
18-May-11 13:39:00	0.28	373.27	81738.83	78509.03	51771.84	182.24
18-May-11 13:40:00	0.35	373.19	81802.34	78575.60	51730.11	182.05

Run 3	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B						
18-May-11 13:41:00	77.62	42.26	21.98	118	258.22	90.84	1141.41	
18-May-11 13:42:00	77.54	42.43	22.18	120	258.89	90.60	1141.56	
18-May-11 13:43:00	77.42	42.36	22.24	120	259.93	90.28	1139.64	
18-May-11 13:44:00	77.32	42.37	22.07	117	259.13	90.55	1137.87	
18-May-11 13:45:00	77.30	42.36	21.85	119	258.31	90.63	1138.42	
18-May-11 13:46:00	77.52	42.32	21.82	122	260.32	89.86	1137.37	
18-May-11 13:47:00	77.52	42.32	22.19	122	259.34	90.38	1137.62	
18-May-11 13:48:00	77.50	42.36	22.05	121	258.60	90.74	1137.78	
18-May-11 13:49:00	77.38	42.29	21.82	118	259.17	90.38	1133.59	
18-May-11 13:50:00	77.27	42.27	22.06	120	259.25	90.43	1138.81	
18-May-11 13:51:00	77.50	42.23	22.14	121	259.41	90.47	1134.94	
18-May-11 13:52:00	77.55	42.22	22.20	120	260.03	90.41	1137.51	
18-May-11 13:53:00	77.51	42.32	22.16	121	261.80	89.72	1138.78	
18-May-11 13:54:00	77.39	42.35	22.03	121	260.54	90.14	1139.36	
18-May-11 13:55:00	77.40	42.34	21.88	119	258.80	90.46	1139.06	
18-May-11 13:56:00	77.44	42.27	21.92	118	257.68	90.24	1137.52	
18-May-11 13:57:00	77.39	42.26	22.39	120	258.23	90.62	1137.87	
18-May-11 13:58:00	77.22	42.23	22.32	122	259.30	90.90	1138.27	
18-May-11 13:59:00	77.24	42.29	22.17	123	260.01	90.16	1137.13	
18-May-11 14:00:00	77.31	42.35	22.29	121	260.22	90.50	1131.76	
18-May-11 14:01:00	77.32	42.34	22.14	122	259.09	90.04	1129.58	
18-May-11 14:02:00	77.31	42.24	22.39	122	260.56	89.88	1134.12	
18-May-11 14:03:00	77.48	42.19	22.31	120	262.43	90.10	1131.80	
18-May-11 14:04:00	77.53	42.37	22.28	121	262.93	89.68	1135.67	
18-May-11 14:05:00	77.74	42.28	22.44	121	262.07	89.90	1133.19	
18-May-11 14:06:00	77.40	42.28	22.57	118	262.67	90.09	1128.05	
18-May-11 14:07:00	77.06	42.33	22.62	118	263.71	89.87	1130.73	
18-May-11 14:08:00	77.24	42.38	22.39	120	262.43	90.05	1131.34	
18-May-11 14:09:00	77.56	42.27	22.36	123	263.43	89.48	1133.93	
18-May-11 14:10:00	77.56	42.25	22.25	119	261.97	89.89	1134.39	
18-May-11 14:11:00	77.58	42.38	22.37	118	261.23	89.99	1131.13	
18-May-11 14:12:00	77.59	42.30	22.28	121	261.23	89.96	1124.41	
18-May-11 14:13:00	77.32	42.24	22.33	122	260.80	90.01	1123.47	
18-May-11 14:14:00	77.37	42.15	22.07	120	261.56	89.65	1127.23	
18-May-11 14:15:00	77.65	42.16	22.26	122	261.66	89.73	1124.56	
18-May-11 14:16:00	77.55	42.19	22.28	122	261.40	89.83	1122.10	
18-May-11 14:17:00	77.37	42.22	22.06	122	261.87	89.68	1115.98	
18-May-11 14:18:00	77.34	42.24	22.02	121	260.69	90.21	1120.49	
18-May-11 14:19:00	77.37	42.27	22.07	120	260.09	90.47	1123.55	
18-May-11 14:20:00	77.41	42.22	21.98	121	260.61	90.14	1130.44	
18-May-11 14:21:00	77.63	42.23	22.02	118	261.26	89.58	1125.86	
18-May-11 14:22:00	77.49	42.25	22.08	118	259.73	90.37	1126.64	
18-May-11 14:23:00	77.41	42.30	22.04	121	259.85	90.51	1130.32	
18-May-11 14:24:00	77.62	42.34	22.23	122	260.58	90.12	1127.46	
18-May-11 14:25:00	77.58	42.29	22.12	121	260.25	89.87	1124.38	
18-May-11 14:26:00	77.32	42.31	21.97	120	259.85	90.11	1127.96	
18-May-11 14:27:00	77.49	42.31	22.02	120	259.66	90.24	1124.78	
18-May-11 14:28:00	77.60	42.26	21.98	122	259.69	90.22	1128.73	
18-May-11 14:29:00	77.57	42.27	22.06	121	260.09	89.86	1129.47	
18-May-11 14:30:00	77.46	42.28	22.07	119	260.75	89.54	1132.13	

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 3							
18-May-11 13:41:00	1164.90	199.79	80.61	15.83	79.23	17.37	128.85
18-May-11 13:42:00	1164.95	199.80	80.35	15.81	79.25	17.35	101.86
18-May-11 13:43:00	1163.33	199.96	80.03	15.80	79.14	17.36	115.03
18-May-11 13:44:00	1162.14	200.41	79.73	15.81	78.89	17.33	101.18
18-May-11 13:45:00	1163.53	200.39	79.70	15.79	78.84	17.29	82.85
18-May-11 13:46:00	1162.61	200.36	79.70	15.75	78.71	17.32	87.48
18-May-11 13:47:00	1160.59	200.65	79.79	15.80	78.29	17.33	102.56
18-May-11 13:48:00	1160.98	200.90	79.97	15.81	78.25	17.32	90.78
18-May-11 13:49:00	1157.01	200.93	79.98	15.81	77.86	17.28	78.89
18-May-11 13:50:00	1161.46	201.11	79.79	15.81	78.30	17.37	166.77
18-May-11 13:51:00	1156.46	201.14	79.51	15.83	78.18	17.43	242.45
18-May-11 13:52:00	1160.23	201.41	79.33	15.82	78.45	17.33	141.65
18-May-11 13:53:00	1162.39	201.42	79.32	15.82	78.85	17.28	82.55
18-May-11 13:54:00	1163.08	201.44	79.54	15.81	79.01	17.26	75.97
18-May-11 13:55:00	1163.64	201.51	79.74	15.82	79.10	17.22	62.74
18-May-11 13:56:00	1161.74	201.43	79.82	15.88	78.94	17.19	58.00
18-May-11 13:57:00	1161.38	201.18	79.97	15.81	78.79	17.23	66.11
18-May-11 13:58:00	1161.58	201.27	80.00	15.80	78.55	17.24	59.59
18-May-11 13:59:00	1160.40	200.99	79.91	15.78	77.95	17.25	62.14
18-May-11 14:00:00	1154.43	200.79	79.75	15.76	77.57	17.28	64.75
18-May-11 14:01:00	1152.88	201.01	79.82	15.81	77.52	17.23	55.76
18-May-11 14:02:00	1158.04	201.11	79.99	15.73	77.67	17.26	93.77
18-May-11 14:03:00	1153.73	201.34	80.26	15.76	77.71	17.34	160.33
18-May-11 14:04:00	1157.86	201.51	80.49	15.71	77.91	17.26	124.23
18-May-11 14:05:00	1156.89	201.96	80.69	15.68	78.09	17.16	62.57
18-May-11 14:06:00	1152.64	202.24	80.87	15.71	77.95	17.14	53.54
18-May-11 14:07:00	1154.89	202.75	80.90	15.74	77.96	17.13	50.57
18-May-11 14:08:00	1157.13	203.05	80.88	15.71	78.21	17.10	50.62
18-May-11 14:09:00	1157.61	203.14	80.78	15.68	78.27	17.06	42.69
18-May-11 14:10:00	1158.18	203.16	80.61	15.71	78.18	17.07	40.20
18-May-11 14:11:00	1154.91	203.27	80.52	15.74	77.46	17.04	38.79
18-May-11 14:12:00	1146.34	203.30	80.58	15.76	76.78	17.07	40.06
18-May-11 14:13:00	1141.83	203.08	80.43	15.79	76.51	17.10	41.66
18-May-11 14:14:00	1144.24	203.06	80.26	15.75	76.68	17.12	58.60
18-May-11 14:15:00	1147.63	202.97	80.20	15.74	76.77	17.24	85.76
18-May-11 14:16:00	1145.21	202.75	80.20	15.76	76.41	17.17	69.97
18-May-11 14:17:00	1136.33	202.59	80.11	15.75	75.75	17.08	45.97
18-May-11 14:18:00	1142.28	202.47	80.02	15.78	76.42	17.04	40.51
18-May-11 14:19:00	1144.66	202.19	80.10	15.79	76.57	17.02	38.73
18-May-11 14:20:00	1151.53	202.40	80.17	15.76	77.26	17.03	40.66
18-May-11 14:21:00	1148.11	202.48	80.20	15.71	77.24	17.08	42.97
18-May-11 14:22:00	1149.65	202.76	80.11	15.80	77.17	17.08	42.01
18-May-11 14:23:00	1151.33	203.05	80.00	15.80	76.96	17.05	39.44
18-May-11 14:24:00	1147.69	203.12	80.02	15.79	76.59	17.02	38.68
18-May-11 14:25:00	1145.77	203.06	80.08	15.77	76.68	17.07	42.09
18-May-11 14:26:00	1149.16	202.97	79.93	15.76	77.04	17.15	57.67
18-May-11 14:27:00	1145.86	202.88	79.83	15.78	76.87	17.21	77.15
18-May-11 14:28:00	1151.85	202.97	79.82	15.79	77.21	17.15	64.17
18-May-11 14:29:00	1153.80	202.82	79.99	15.74	77.47	17.15	57.05
18-May-11 14:30:00	1154.82	202.83	80.19	15.74	77.83	17.20	57.37

Run 3	O ₂ (WGS CEMS) (% by vol, dry) 317A1107		Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air		Volume Air to Reg (dscfm) - Qa 317C_dvair		Vol Reg FG (dscfm) - Qr 317C_fluegas		EPA Coke Make (lbs/hr) Rc		Cat Feed Rate (BPD) 317C_B_Cat_Feed		L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO	
18-May-11 13:41:00	0.40		373.05		81783.80		78596.03		27399.27		51653.56		181.93	
18-May-11 13:42:00	0.52		372.63		81753.64		78589.41		27307.31		51629.57		181.35	
18-May-11 13:43:00	0.51		372.92		81662.26		78643.54		27352.65		51622.16		181.51	
18-May-11 13:44:00	0.52		373.61		81726.30		78563.37		27365.67		51584.56		181.72	
18-May-11 13:45:00	0.62		372.94		81877.24		78604.24		27233.76		51421.79		181.75	
18-May-11 13:46:00	0.65		372.12		81730.35		78821.03		27207.18		51270.29		181.32	
18-May-11 13:47:00	0.49		373.18		81549.99		78709.35		27340.47		51294.40		181.24	
18-May-11 13:48:00	0.52		372.91		81781.70		78408.93		27295.54		51334.97		182.05	
18-May-11 13:49:00	0.54		372.53		81722.42		78651.82		27217.61		51432.41		181.97	
18-May-11 13:50:00	0.41		372.70		81639.24		78560.60		27377.59		51364.49		182.15	
18-May-11 13:51:00	0.46		372.96		81677.67		78465.50		27472.85		51157.24		182.52	
18-May-11 13:52:00	0.54		373.20		81734.42		78605.94		27334.16		51128.46		182.13	
18-May-11 13:53:00	0.62		373.82		81787.32		78632.91		27278.23		51281.23		181.71	
18-May-11 13:54:00	0.65		374.86		81922.69		78709.94		27322.48		51417.11		181.43	
18-May-11 13:55:00	0.65		373.92		82150.55		78840.74		27213.89		51408.99		181.28	
18-May-11 13:56:00	0.71		372.50		81945.46		79023.36		27057.59		51369.81		181.07	
18-May-11 13:57:00	0.75		371.45		81634.34		78859.85		27019.81		51336.30		181.36	
18-May-11 13:58:00	0.71		372.30		81404.59		78643.60		27095.58		51257.62		182.18	
18-May-11 13:59:00	0.59		373.37		81586.06		78368.88		27221.92		51177.60		182.54	
18-May-11 14:00:00	0.60		373.43		81824.68		78458.57		27263.75		51186.01		182.36	
18-May-11 14:01:00	0.60		373.68		81841.07		78714.76		27216.93		51281.66		181.49	
18-May-11 14:02:00	0.71		372.20		81892.45		78704.37		27115.48		51444.71		182.22	
18-May-11 14:03:00	0.54		373.35		81567.38		78868.40		27360.79		51394.35		181.65	
18-May-11 14:04:00	0.53		375.45		81819.30		78481.14		27418.25		51290.76		181.69	
18-May-11 14:05:00	0.69		375.17		82280.76		78640.21		27218.67		51301.27		181.85	
18-May-11 14:06:00	0.81		374.38		82219.64		79136.00		27099.69		51300.78		180.85	
18-May-11 14:07:00	0.87		375.48		82044.52		79173.57		27146.85		51302.27		180.68	
18-May-11 14:08:00	0.80		376.14		82286.88		79040.79		27189.05		51307.33		180.59	
18-May-11 14:09:00	0.74		374.94		82430.90		79172.84		27062.81		51310.00		180.64	
18-May-11 14:10:00	0.75		375.21		82167.37		79233.07		27095.98		51313.75		180.38	
18-May-11 14:11:00	0.81		374.30		82227.38		78991.04		26981.08		51315.30		180.45	
18-May-11 14:12:00	0.94		373.77		82028.79		79096.23		26933.03		51137.92		180.61	
18-May-11 14:13:00	0.82		373.82		81910.94		79045.95		27012.38		51017.69		181.05	
18-May-11 14:14:00	0.80		373.61		81922.70		78830.68		27028.56		51147.65		181.90	
18-May-11 14:15:00	0.83		373.91		81876.26		78872.12		27182.14		51237.28		181.72	
18-May-11 14:16:00	0.75		374.08		81943.35		78939.85		27130.72		51362.54		181.34	
18-May-11 14:17:00	0.85		374.04		81979.72		78870.72		26996.22		51353.27		181.60	
18-May-11 14:18:00	0.92		374.28		81970.01		78914.42		26943.84		51242.08		181.41	
18-May-11 14:19:00	1.00		373.80		82024.60		78942.39		26855.53		51249.12		181.27	
18-May-11 14:20:00	1.00		373.55		81917.53		79048.60		26858.54		51252.72		181.13	
18-May-11 14:21:00	0.93		373.41		81864.50		78958.97		26921.09		51249.73		181.13	
18-May-11 14:22:00	0.85		373.28		81834.12		78878.88		26939.70		51259.34		181.34	
18-May-11 14:23:00	0.88		373.04		81804.55		78771.68		26878.32		51290.02		181.44	
18-May-11 14:24:00	0.93		373.31		81752.78		78756.61		26852.40		51299.52		181.15	
18-May-11 14:25:00	0.84		373.46		81810.68		78711.32		26944.42		51291.40		181.45	
18-May-11 14:26:00	0.86		372.80		81842.94		78741.61		26989.56		51283.37		181.69	
18-May-11 14:27:00	0.78		372.63		81699.45		78872.06		27069.59		51282.66		181.11	
18-May-11 14:28:00	0.76		372.68		81661.17		78895.47		27004.14		51295.07		181.60	
18-May-11 14:29:00	0.75		372.67		81673.58		78885.83		27002.13		51330.01		181.89	
18-May-11 14:30:00	0.70		372.49		81669.88		78591.84		27069.32		51324.18		182.01	

Run 3	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B	317P1108	317P1177A	317FC202	317FC115	317F1113	317F1105
18-May-11 14:31:00	77.53		42.32	22.02	120	260.81	89.57	1131.65
18-May-11 14:32:00	77.47		42.36	21.96	121	260.16	89.87	1130.52
18-May-11 14:33:00	77.39		42.38	22.07	121	260.38	89.76	1129.34
18-May-11 14:34:00	77.24		42.30	22.13	121	260.26	89.66	1125.37
18-May-11 14:35:00	77.43		42.34	21.92	119	259.77	89.88	1132.00
18-May-11 14:36:00	77.51		42.36	22.05	117	260.59	89.67	1129.87
18-May-11 14:37:00	77.43		42.37	22.15	120	261.05	89.31	1126.66
18-May-11 14:38:00	77.33		42.35	22.21	121	261.12	89.32	1130.95
18-May-11 14:39:00	77.35		42.31	21.96	120	260.97	89.51	1128.77
18-May-11 14:40:00	77.40		42.26	21.92	121	261.36	89.53	1131.75
18-May-11 14:41:00	77.45		42.39	21.91	122	261.23	89.60	1130.13
18-May-11 14:42:00	77.43		42.30	21.95	121	260.93	89.71	1129.39
18-May-11 14:43:00	77.44		42.24	21.97	118	261.27	89.57	1132.16
18-May-11 14:44:00	77.42		42.26	21.98	119	260.82	89.61	1134.64
18-May-11 14:45:00	77.53		42.25	22.09	118	261.53	89.32	1132.83
18-May-11 14:46:00	77.58		42.18	22.06	119	260.60	89.63	1135.00
18-May-11 14:47:00	77.27		42.12	21.95	122	260.15	89.86	1138.04
18-May-11 14:48:00	77.35		42.28	21.79	121	259.92	89.81	1129.49
18-May-11 14:49:00	77.32		42.27	22.08	122	260.43	89.56	1125.50
18-May-11 14:50:00	77.24		42.19	21.96	122	260.01	89.90	1133.05
18-May-11 14:51:00	77.26		42.21	22.18	121	260.21	89.85	1132.26
18-May-11 14:52:00	77.19		42.27	22.08	119	259.81	90.17	1134.86
18-May-11 14:53:00	77.22		42.18	22.07	121	261.41	89.45	1134.87
18-May-11 14:54:00	77.38		42.16	22.06	122	260.89	89.49	1134.69
18-May-11 14:55:00	77.51		42.26	21.97	122	261.02	89.45	1137.07
18-May-11 14:56:00	77.59		42.14	22.05	120	260.67	89.71	1135.77
18-May-11 14:57:00	77.62		42.08	22.10	120	260.69	89.81	1136.31
18-May-11 14:58:00	77.71		42.34	22.07	121	261.74	89.42	1139.06
18-May-11 14:59:00	77.64		42.25	22.02	119	261.11	89.66	1140.82
18-May-11 15:00:00	77.49		42.10	22.17	120	260.30	89.99	1130.83
18-May-11 15:01:00	77.27		42.20	22.16	120	261.45	89.75	1131.15
18-May-11 15:02:00	77.34		42.23	21.97	121	261.75	90.10	1135.51
18-May-11 15:03:00	77.39		42.21	21.90	118	260.88	90.57	1131.64
18-May-11 15:04:00	77.40		42.23	22.09	118	261.20	90.15	1134.08
18-May-11 15:05:00	77.38		42.24	22.23	120	261.52	89.87	1135.70
18-May-11 15:06:00	77.33		42.10	22.23	122	260.64	90.26	1134.43
18-May-11 15:07:00	77.24		42.19	21.99	122	260.01	90.63	1135.80
18-May-11 15:08:00	77.17		42.31	21.96	121	260.20	90.64	1136.98
18-May-11 15:09:00	77.25		42.26	22.12	119	261.85	89.89	1136.59
18-May-11 15:10:00	77.36		42.31	22.14	122	263.00	89.52	1138.44
18-May-11 15:11:00	77.40		42.28	22.06	120	259.92	90.46	1139.58
18-May-11 15:12:00	77.18		42.25	22.00	118	259.04	90.51	1129.97
18-May-11 15:13:00	77.43		42.25	21.98	118	260.10	89.77	1127.34
18-May-11 15:14:00	77.49		42.31	22.01	121	259.27	90.13	1133.65
18-May-11 15:15:00	77.49		42.25	22.03	118	259.22	90.35	1131.41
18-May-11 15:16:00	77.53		42.17	22.05	117	259.78	89.99	1129.84
18-May-11 15:17:00	77.47		42.19	22.05	118	258.67	90.64	1125.25
18-May-11 15:18:00	77.44		42.18	22.12	119	259.19	90.37	1127.80
18-May-11 15:19:00	77.48		42.20	21.98	118	260.06	89.80	1129.14
18-May-11 15:20:00	77.39		42.22	21.89	116	258.81	90.56	1124.84

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317E1106	Air to Regen Temp B-1 Outlet (oF) 317T11112	Tempered Air Temp (oF) 317T11120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317A109	CO (WGS CEMS) (ppmv. dry) 317A111
Run 3							
18-May-11 14:31:00	243.46	202.94	80.39	15.76	77.87	17.20	54.58
18-May-11 14:32:00	243.50	203.01	80.50	15.75	77.67	17.15	46.12
18-May-11 14:33:00	243.48	202.93	80.34	15.74	77.49	17.13	46.44
18-May-11 14:34:00	243.58	202.99	80.11	15.73	77.49	17.16	53.29
18-May-11 14:35:00	243.53	202.85	80.00	15.76	77.50	17.19	55.71
18-May-11 14:36:00	243.53	202.79	80.02	15.78	77.18	17.18	51.59
18-May-11 14:37:00	243.59	202.82	80.12	15.76	76.97	17.17	48.78
18-May-11 14:38:00	243.56	202.67	80.22	15.73	77.43	17.25	86.26
18-May-11 14:39:00	243.65	202.67	80.37	15.76	77.50	17.33	128.17
18-May-11 14:40:00	243.71	202.67	80.42	15.78	77.78	17.26	89.82
18-May-11 14:41:00	243.58	202.66	80.52	15.79	77.82	17.22	68.01
18-May-11 14:42:00	243.48	202.61	80.62	15.76	77.85	17.18	56.74
18-May-11 14:43:00	243.45	202.56	80.63	15.78	77.94	17.17	54.68
18-May-11 14:44:00	243.50	202.37	80.53	15.76	77.96	17.18	53.65
18-May-11 14:45:00	243.48	201.97	80.55	15.76	77.96	17.15	50.88
18-May-11 14:46:00	243.39	202.03	80.50	15.77	77.72	17.14	47.76
18-May-11 14:47:00	243.38	201.75	80.52	15.78	77.31	17.15	43.86
18-May-11 14:48:00	243.49	201.36	80.69	15.78	77.16	17.14	42.55
18-May-11 14:49:00	243.22	201.47	80.91	15.78	77.16	17.13	45.72
18-May-11 14:50:00	243.23	201.39	81.10	15.79	77.49	17.20	62.52
18-May-11 14:51:00	243.23	201.26	81.10	15.77	77.74	17.25	85.63
18-May-11 14:52:00	243.16	201.13	81.19	15.78	78.11	17.21	76.85
18-May-11 14:53:00	243.26	201.02	81.30	15.75	78.31	17.16	57.34
18-May-11 14:54:00	243.27	201.15	81.23	15.74	78.32	17.14	49.05
18-May-11 14:55:00	243.40	201.51	81.18	15.74	78.51	17.10	45.80
18-May-11 14:56:00	243.38	201.55	81.12	15.75	78.54	17.06	41.01
18-May-11 14:57:00	243.38	201.48	81.20	15.77	78.57	17.07	40.61
18-May-11 14:58:00	243.29	201.53	81.27	15.76	78.52	17.05	39.59
18-May-11 14:59:00	243.32	201.40	81.30	15.77	78.11	17.07	40.94
18-May-11 15:00:00	243.36	201.47	81.37	15.77	77.96	17.06	39.20
18-May-11 15:01:00	243.24	201.48	81.40	15.78	77.94	17.03	38.19
18-May-11 15:02:00	243.16	201.57	81.40	15.79	77.92	17.10	49.90
18-May-11 15:03:00	242.86	201.35	81.40	15.80	77.97	17.23	68.88
18-May-11 15:04:00	242.80	200.94	81.40	15.75	78.17	17.22	61.80
18-May-11 15:05:00	242.74	200.73	81.36	15.71	78.39	17.11	46.40
18-May-11 15:06:00	242.80	200.40	81.11	15.71	78.40	17.02	40.45
18-May-11 15:07:00	242.72	200.46	80.91	15.74	78.41	16.96	36.41
18-May-11 15:08:00	242.80	200.67	80.73	15.75	78.54	16.93	35.61
18-May-11 15:09:00	242.88	200.96	80.65	15.70	78.63	16.98	36.69
18-May-11 15:10:00	242.92	200.90	80.63	15.72	78.54	16.99	37.12
18-May-11 15:11:00	243.00	200.92	80.60	15.77	78.05	16.95	35.62
18-May-11 15:12:00	242.95	200.88	80.69	15.78	77.66	16.89	34.06
18-May-11 15:13:00	243.01	200.86	80.80	15.76	77.61	16.93	34.98
18-May-11 15:14:00	243.08	200.85	80.64	15.78	77.73	17.06	46.26
18-May-11 15:15:00	242.89	200.87	80.48	15.79	77.81	17.17	62.56
18-May-11 15:16:00	242.90	200.91	80.42	15.74	77.56	17.08	55.36
18-May-11 15:17:00	243.04	200.97	80.50	15.77	77.14	17.03	45.20
18-May-11 15:18:00	243.31	200.92	80.59	15.75	77.34	17.01	41.45
18-May-11 15:19:00	243.42	201.15	80.70	15.72	77.54	17.01	39.39
18-May-11 15:20:00	243.37	201.48	80.70	15.76	77.16	17.00	38.83

Run 3	O ₂ (WGS CEMS) (% by vol, dry) 317A1107		Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air		Volume Air to Reg (dscfm) - Q _a 317C_dvair		Vol Reg FG (dscfm) - Q _r 317C_fluegas		EPA Coke Make (lbs/hr) Rc		Cat Feed Rate (BPD) 317C_B Cat Feed		L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO	
18-May-11 14:31:00	0.70		372.93		81630.99		78597.94		27095.28		51334.41		181.75	
18-May-11 14:32:00	0.78		373.09		81727.94		78547.28		27025.18		51366.00		181.73	
18-May-11 14:33:00	0.89		372.66		81762.95		78679.92		26937.83		51366.93		181.49	
18-May-11 14:34:00	0.80		372.69		81668.89		78785.11		27001.33		51383.35		181.54	
18-May-11 14:35:00	0.72		372.37		81675.77		78644.77		27038.37		51505.25		181.61	
18-May-11 14:36:00	0.59		372.43		81605.13		78592.76		27075.24		51585.51		181.54	
18-May-11 14:37:00	0.61		373.04		81617.76		78399.88		27101.78		51449.08		181.98	
18-May-11 14:38:00	0.69		373.01		81751.70		78440.50		27176.71		51388.60		182.24	
18-May-11 14:39:00	0.62		373.01		81746.28		78728.44		27288.17		51394.82		181.67	
18-May-11 14:40:00	0.56		373.19		81745.74		78697.95		27234.57		51295.03		181.78	
18-May-11 14:41:00	0.64		373.78		81785.65		78599.54		27208.68		51212.87		181.53	
18-May-11 14:42:00	0.58		373.66		81914.40		78652.36		27166.86		51242.80		181.76	
18-May-11 14:43:00	0.75		373.46		81887.94		78708.04		27093.00		51284.93		182.00	
18-May-11 14:44:00	0.78		373.66		81844.99		78839.21		27108.83		51295.47		181.52	
18-May-11 14:45:00	0.70		373.26		81887.27		78808.56		27069.59		51397.14		181.59	
18-May-11 14:46:00	0.74		373.59		81799.52		78760.75		27065.72		51500.88		181.78	
18-May-11 14:47:00	0.69		373.13		81872.48		78691.91		27054.85		51488.19		182.62	
18-May-11 14:48:00	0.71		372.89		81772.32		78728.81		27021.87		51476.08		181.74	
18-May-11 14:49:00	0.75		372.66		81719.19		78645.27		26978.35		51469.15		182.01	
18-May-11 14:50:00	0.75		372.95		81668.16		78618.94		27083.24		51479.52		182.47	
18-May-11 14:51:00	0.67		372.99		81733.11		78638.32		27170.77		51384.61		182.46	
18-May-11 14:52:00	0.65		372.99		81740.10		78663.04		27129.18		51246.44		181.97	
18-May-11 14:53:00	0.79		373.04		81740.80		78622.31		27040.54		51255.79		182.57	
18-May-11 14:54:00	0.85		373.66		81752.26		78721.42		27037.89		51271.38		182.24	
18-May-11 14:55:00	0.82		373.15		81887.22		78751.69		26959.54		51420.17		181.73	
18-May-11 14:56:00	0.92		373.25		81776.80		78823.68		26895.40		51557.22		181.89	
18-May-11 14:57:00	0.90		373.21		81797.38		78779.48		26906.39		51555.31		182.37	
18-May-11 14:58:00	0.88		373.45		81790.08		78770.23		26905.66		51517.98		181.14	
18-May-11 14:59:00	0.89		374.10		81837.46		78740.21		26976.12		51486.25		181.59	
18-May-11 15:00:00	0.83		373.75		81983.28		78802.30		26958.83		51491.35		182.31	
18-May-11 15:01:00	0.93		373.26		81898.85		78889.16		26860.15		51413.27		181.83	
18-May-11 15:02:00	1.03		374.32		81800.56		78888.40		26991.12		51311.04		181.58	
18-May-11 15:03:00	0.79		375.09		82032.15		78942.87		27268.14		51311.85		181.59	
18-May-11 15:04:00	0.62		374.70		82200.47		79036.54		27269.36		51361.28		181.26	
18-May-11 15:05:00	0.77		374.30		82116.14		79042.51		27067.20		51400.06		181.16	
18-May-11 15:06:00	0.91		374.20		82028.81		78994.05		26918.69		51508.24		181.90	
18-May-11 15:07:00	1.02		373.71		82005.37		78978.79		26772.95		51618.34		181.72	
18-May-11 15:08:00	1.01		373.74		81899.46		78986.28		26745.17		51618.52		181.14	
18-May-11 15:09:00	0.98		373.82		81904.53		78849.88		26820.07		51607.69		181.62	
18-May-11 15:10:00	0.97		374.53		81923.65		78874.82		26887.48		51627.86		181.35	
18-May-11 15:11:00	0.99		375.38		82078.98		78892.41		26896.89		51632.96		181.26	
18-May-11 15:12:00	1.08		373.42		82264.46		79026.11		26657.68		51522.92		181.53	
18-May-11 15:13:00	1.06		372.57		81835.15		79236.13		26654.58		51436.94		180.64	
18-May-11 15:14:00	0.93		372.75		81648.53		78832.43		26854.16		51474.11		181.12	
18-May-11 15:15:00	0.81		372.54		81688.60		78664.64		27000.96		51502.43		182.00	
18-May-11 15:16:00	0.80		372.63		81642.93		78673.99		26908.98		51664.40		182.15	
18-May-11 15:17:00	0.91		372.63		81662.35		78545.96		26810.65		51838.26		182.54	
18-May-11 15:18:00	0.95		372.30		81662.57		78619.70		26756.02		51737.03		182.35	
18-May-11 15:19:00	0.98		372.32		81588.91		78648.46		26744.15		51619.24		182.23	
18-May-11 15:20:00	0.84		372.49		81595.21		78589.14		26792.91		51609.47		182.22	

Run 3	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B						
18-May-11 15:21:00	77.36		42.22	22.12	119	259.64	90.40	1129.29
18-May-11 15:22:00	77.45		42.21	22.01	122	260.57	90.10	1132.87
18-May-11 15:23:00	77.38		42.17	21.98	122	259.67	90.55	1136.31
18-May-11 15:24:00	77.38		42.19	22.03	120	258.77	90.73	1128.85
18-May-11 15:25:00	77.44		42.19	21.85	120	258.55	90.84	1124.84
18-May-11 15:26:00	77.32		42.23	21.81	119	257.92	91.10	1130.33
18-May-11 15:27:00	77.46		42.13	22.03	122	258.90	90.57	1130.31
18-May-11 15:28:00	77.52		42.20	22.25	122	258.68	90.71	1130.19
18-May-11 15:29:00	77.48		42.20	22.03	121	257.44	91.19	1128.89
18-May-11 15:30:00	77.43		42.22	21.95	122	256.90	91.40	1134.09
18-May-11 15:31:00	77.29		42.24	21.91	122	256.82	91.27	1135.96
18-May-11 15:32:00	77.56		42.21	22.12	122	258.10	90.61	1136.49
18-May-11 15:33:00	77.60		42.16	21.90	122	258.60	90.66	1136.79
18-May-11 15:34:00	77.48		42.09	21.73	120	258.83	90.55	1139.42
18-May-11 15:35:00	77.15		42.04	21.84	118	257.20	90.95	1143.15
18-May-11 15:36:00	77.31		42.13	21.95	119	254.58	91.87	1133.16
18-May-11 15:37:00	77.53		42.27	22.05	121	256.47	91.09	1129.36
18-May-11 15:38:00	77.50		42.32	21.94	121	256.61	91.22	1133.42
18-May-11 15:39:00	77.39		42.29	21.90	120	256.08	91.71	1133.25
18-May-11 15:40:00	77.07		42.31	21.82	121	256.88	91.56	1134.34
18-May-11 15:41:00	77.18		42.28	21.88	122	258.47	90.87	1136.90
18-May-11 15:42:00	77.41		42.16	21.74	119	257.61	91.17	1137.05
18-May-11 15:43:00	77.46		42.17	21.88	119	256.42	91.37	1136.37
18-May-11 15:44:00	77.49		42.21	21.99	121	256.78	90.98	1134.52
18-May-11 15:45:00	77.43		42.27	22.03	120	258.56	90.47	1132.65
18-May-11 15:46:00	77.42		42.23	21.91	121	256.51	91.13	1139.59
18-May-11 15:47:00	77.44		42.10	21.77	117	256.10	91.28	1137.80
18-May-11 15:48:00	77.46		42.13	21.89	119	256.44	91.03	1130.52
18-May-11 15:49:00	77.44		42.26	21.84	122	256.13	91.17	1135.66
18-May-11 15:50:00	77.42		42.22	21.81	121	256.84	90.95	1145.88
18-May-11 15:51:00	77.29		42.14	22.01	119	257.15	90.70	1137.13
18-May-11 15:52:00	77.21		42.11	22.06	119	257.49	90.69	1142.08
18-May-11 15:53:00	77.33		42.26	21.97	118	257.54	90.79	1141.12
18-May-11 15:54:00	77.31		42.28	21.82	119	256.39	91.32	1136.62
18-May-11 15:55:00	77.38		42.33	21.92	119	257.44	90.60	1133.96
18-May-11 15:56:00	77.38		42.25	21.92	119	257.73	90.29	1132.37
18-May-11 15:57:00	77.23		42.28	21.83	121	256.77	90.58	1130.03
18-May-11 15:58:00	77.24		42.29	21.87	121	257.95	90.63	1141.41
18-May-11 15:59:00	77.27		42.30	21.92	120	258.26	90.54	1140.15
18-May-11 16:00:00	77.24		42.24	21.80	118	257.03	90.69	1120.57
18-May-11 16:01:00	77.44		42.38	21.86	119	257.03	90.60	1117.28
18-May-11 16:02:00	77.42		42.50	22.00	119	256.89	90.67	1138.32
18-May-11 16:03:00	77.37		42.47	22.04	120	256.89	90.89	1132.34
18-May-11 16:04:00	77.55		42.47	22.06	117	257.46	91.07	1132.05
18-May-11 16:05:00	77.42		42.49	22.17	117	258.36	90.48	1133.82
18-May-11 16:06:00	77.35		42.62	22.07	119	258.07	90.25	1131.45
18-May-11 16:07:00	77.50		42.59	22.03	123	258.15	90.19	1138.53
18-May-11 16:08:00	77.52		42.62	21.94	122	257.93	90.51	1139.61
18-May-11 16:09:00	77.40		42.60	22.03	120	258.30	90.30	1142.48
18-May-11 16:10:00	77.56		42.59	22.11	122	258.38	90.22	1145.25

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 3							
18-May-11 15:21:00	1148.96	201.47	80.77	15.76	77.17	16.97	37.11
18-May-11 15:22:00	1153.61	201.44	80.78	15.78	77.61	17.01	38.72
18-May-11 15:23:00	1154.36	201.54	80.68	15.80	77.31	17.07	41.41
18-May-11 15:24:00	1148.28	201.83	80.58	15.79	76.99	17.03	38.34
18-May-11 15:25:00	1145.23	202.15	80.48	15.81	76.77	17.02	38.68
18-May-11 15:26:00	1151.18	202.02	80.31	15.78	76.87	17.12	63.22
18-May-11 15:27:00	1149.40	201.99	80.20	15.76	76.84	17.20	90.17
18-May-11 15:28:00	1152.28	202.00	80.31	15.78	77.28	17.16	68.30
18-May-11 15:29:00	1151.14	202.13	80.60	15.81	77.61	17.13	53.41
18-May-11 15:30:00	1158.00	201.92	80.84	15.84	77.89	17.08	46.22
18-May-11 15:31:00	1158.86	201.45	81.07	15.81	77.76	17.08	45.38
18-May-11 15:32:00	1158.32	201.40	81.08	15.81	78.16	17.12	49.95
18-May-11 15:33:00	1157.97	201.37	80.96	15.82	78.36	17.21	58.08
18-May-11 15:34:00	1156.62	200.67	80.65	15.80	78.16	17.17	50.22
18-May-11 15:35:00	1158.31	200.69	80.35	15.83	77.96	17.15	47.29
18-May-11 15:36:00	1153.62	200.69	80.13	15.83	77.71	17.15	49.90
18-May-11 15:37:00	1151.44	200.60	80.12	15.81	77.63	17.16	54.73
18-May-11 15:38:00	1157.48	200.35	80.31	15.85	77.80	17.28	91.37
18-May-11 15:39:00	1156.14	200.36	80.59	15.87	77.88	17.32	124.06
18-May-11 15:40:00	1157.78	200.41	80.74	15.85	78.22	17.28	110.06
18-May-11 15:41:00	1159.54	200.04	80.90	15.86	78.36	17.25	92.04
18-May-11 15:42:00	1159.44	199.77	80.81	15.85	78.41	17.24	85.92
18-May-11 15:43:00	1159.25	199.54	80.61	15.84	78.45	17.20	63.69
18-May-11 15:44:00	1157.82	199.22	80.41	15.82	78.40	17.21	62.88
18-May-11 15:45:00	1156.87	199.05	80.23	15.83	78.40	17.22	71.24
18-May-11 15:46:00	1160.17	199.01	80.20	15.85	78.09	17.25	80.77
18-May-11 15:47:00	1153.88	198.52	80.31	15.82	77.35	17.21	59.56
18-May-11 15:48:00	1148.41	198.47	80.59	15.83	77.25	17.23	67.19
18-May-11 15:49:00	1153.65	198.33	80.77	15.83	77.59	17.24	74.68
18-May-11 15:50:00	1161.17	198.22	80.82	15.82	77.64	17.28	120.61
18-May-11 15:51:00	1159.40	198.19	80.97	15.79	78.07	17.37	224.13
18-May-11 15:52:00	1164.42	198.63	81.09	15.78	78.37	17.33	180.86
18-May-11 15:53:00	1162.54	198.47	81.22	15.81	78.60	17.26	89.93
18-May-11 15:54:00	1160.58	198.68	81.37	15.84	78.75	17.23	69.49
18-May-11 15:55:00	1161.99	198.72	81.47	15.78	78.84	17.15	57.69
18-May-11 15:56:00	1159.32	198.82	81.57	15.79	78.52	17.21	79.98
18-May-11 15:57:00	1153.59	198.93	81.44	15.77	78.51	17.24	88.47
18-May-11 15:58:00	1161.33	199.26	81.15	15.79	78.70	17.17	54.49
18-May-11 15:59:00	1157.08	199.44	80.91	15.82	77.96	17.20	59.21
18-May-11 16:00:00	1147.19	199.70	80.78	15.79	77.51	17.27	66.05
18-May-11 16:01:00	1144.37	200.02	80.61	15.81	77.59	17.23	61.19
18-May-11 16:02:00	1161.98	199.89	80.57	15.78	78.10	17.28	113.50
18-May-11 16:03:00	1156.00	200.04	80.67	15.82	78.20	17.36	192.68
18-May-11 16:04:00	1156.40	200.45	80.70	15.85	78.11	17.30	152.63
18-May-11 16:05:00	1156.38	200.58	80.79	15.81	78.00	17.23	86.79
18-May-11 16:06:00	1153.19	200.71	80.90	15.78	77.94	17.20	68.21
18-May-11 16:07:00	1160.99	200.81	80.83	15.77	78.74	17.19	66.36
18-May-11 16:08:00	1162.26	200.98	80.87	15.82	78.96	17.13	52.50
18-May-11 16:09:00	1164.34	201.14	80.92	15.80	79.20	17.12	51.23
18-May-11 16:10:00	1163.79	201.25	81.00	15.79	79.16	17.11	49.94

Run 3	O ₂ (WGS CEMS) (% by vol, dry) 317A1107		Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air		Volume Air to Reg (dscfm) - Qa 317C_dvair		Vol Reg FG (dscfm) - Qr 317C_fluegas		EPA Coke Make (lbs/hr) Rc		Cat Feed Rate (BPD) 317C_B Cat Feed		L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO	
18-May-11 15:21:00	0.92		372.24		81631.59		78462.24		26715.12		51600.28		182.62	
18-May-11 15:22:00	1.02		372.88		81575.61		78553.06		26775.75		51633.54		182.35	
18-May-11 15:23:00	0.93		373.72		81716.80		78612.60		26932.36		51660.59		182.45	
18-May-11 15:24:00	0.99		373.23		81900.04		78730.78		26827.83		51698.47		182.20	
18-May-11 15:25:00	0.87		372.37		81793.10		78920.89		26794.46		51699.57		181.67	
18-May-11 15:26:00	0.76		372.35		81604.20		78685.04		26946.36		51836.44		181.88	
18-May-11 15:27:00	0.74		371.75		81600.74		78525.29		27011.46		51889.70		182.85	
18-May-11 15:28:00	0.68		372.16		81469.41		78560.20		26999.82		51793.34		182.18	
18-May-11 15:29:00	0.73		372.16		81558.55		78337.45		26946.48		51804.49		182.83	
18-May-11 15:30:00	0.83		371.62		81558.69		78438.25		26820.50		51661.10		182.57	
18-May-11 15:31:00	0.93		371.45		81441.63		78502.15		26787.82		51602.37		182.46	
18-May-11 15:32:00	0.82		371.04		81404.34		78474.69		26833.45		51722.53		182.43	
18-May-11 15:33:00	0.68		371.82		81313.64		78377.71		27031.63		51831.07		182.80	
18-May-11 15:34:00	0.66		372.38		81484.24		78228.42		27032.77		51905.06		183.49	
18-May-11 15:35:00	0.82		372.46		81607.16		78358.10		26965.19		51830.33		183.91	
18-May-11 15:36:00	0.81		371.35		81625.61		78597.29		26891.82		51767.21		182.73	
18-May-11 15:37:00	0.80		369.60		81382.31		78598.00		26783.01		51764.29		181.99	
18-May-11 15:38:00	0.71		370.65		80997.09		78379.78		27031.91		51717.09		182.03	
18-May-11 15:39:00	0.58		371.30		81228.97		78026.58		27170.70		51704.01		183.31	
18-May-11 15:40:00	0.60		371.34		81370.21		78173.22		27114.96		51723.90		183.18	
18-May-11 15:41:00	0.64		371.96		81380.31		78283.78		27111.29		51738.62		182.93	
18-May-11 15:42:00	0.63		372.92		81516.05		78310.09		27172.01		51705.77		183.17	
18-May-11 15:43:00	0.58		372.38		81725.94		78416.94		27098.95		51696.02		182.92	
18-May-11 15:44:00	0.65		371.19		81607.65		78537.21		26999.34		51742.65		182.35	
18-May-11 15:45:00	0.73		371.24		81347.19		78497.69		26997.56		51745.69		182.32	
18-May-11 15:46:00	0.64		372.57		81356.69		78334.26		27151.79		51742.52		182.63	
18-May-11 15:47:00	0.67		371.23		81648.21		78279.89		27001.07		51752.71		183.68	
18-May-11 15:48:00	0.70		370.87		81355.03		78555.86		26979.44		51736.24		182.77	
18-May-11 15:49:00	0.63		370.97		81275.39		78313.92		27029.07		51708.43		182.64	
18-May-11 15:50:00	0.67		370.86		81297.64		78189.03		27057.63		51701.65		183.25	
18-May-11 15:51:00	0.55		371.20		81273.26		78294.00		27245.18		51720.64		183.40	
18-May-11 15:52:00	0.43		371.04		81347.84		78233.22		27203.31		51722.71		183.73	
18-May-11 15:53:00	0.60		371.39		81312.88		78158.15		27095.68		51711.20		183.18	
18-May-11 15:54:00	0.56		371.75		81389.43		78215.94		27089.05		51724.80		182.97	
18-May-11 15:55:00	0.63		371.11		81468.48		78203.49		26931.99		51761.48		182.70	
18-May-11 15:56:00	0.76		371.15		81328.55		78303.82		26967.73		51779.89		182.95	
18-May-11 15:57:00	0.59		371.06		81338.04		78316.98		27042.59		51941.25		182.70	
18-May-11 15:58:00	0.75		370.40		81317.24		78213.33		26863.49		51997.02		183.10	
18-May-11 15:59:00	0.78		371.83		81168.42		78282.88		26994.94		51844.43		182.64	
18-May-11 16:00:00	0.70		372.02		81483.81		78180.76		27119.42		51816.29		183.39	
18-May-11 16:01:00	0.68		370.76		81517.43		78491.99		26988.20		51859.37		182.05	
18-May-11 16:02:00	0.59		370.70		81252.13		78451.11		27073.50		52002.01		181.23	
18-May-11 16:03:00	0.52		370.50		81238.17		78173.61		27178.97		51823.12		182.22	
18-May-11 16:04:00	0.43		371.00		81194.95		78168.59		27168.63		51629.62		181.96	
18-May-11 16:05:00	0.48		371.83		81303.91		77977.43		27122.72		51742.03		182.51	
18-May-11 16:06:00	0.60		371.78		81490.75		78075.54		27043.24		51860.48		181.89	
18-May-11 16:07:00	0.62		371.10		81476.65		78323.98		26973.19		51848.78		181.31	
18-May-11 16:08:00	0.74		371.20		81327.68		78318.76		26885.10		51723.32		181.01	
18-May-11 16:09:00	0.78		371.55		81349.08		78238.93		26878.86		51708.55		181.45	
18-May-11 16:10:00	0.77		371.54		81424.44		78278.05		26871.10		51686.90		181.25	

Run 3	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B	317P1108	317P1177A	317FC202	317FC115	317F1113	317F1105
18-May-11 16:11:00	77.55		42.64	22.04	121	259.25	89.85	1146.26
18-May-11 16:12:00	77.53		42.65	21.99	118	258.23	90.20	1143.30
18-May-11 16:13:00	77.42		42.52	22.05	120	258.61	89.90	1141.76
18-May-11 16:14:00	77.22		42.66	21.86	122	259.29	89.85	1133.65
18-May-11 16:15:00	77.31		42.72	21.88	120	258.69	90.12	1126.64
18-May-11 16:16:00	77.39		42.71	21.93	119	258.67	90.00	1127.96
18-May-11 16:17:00	77.42		42.73	21.99	118	258.90	90.15	1126.73
18-May-11 16:18:00	77.43		42.75	22.06	121	260.05	89.86	1130.52
18-May-11 16:19:00	77.48		42.78	22.13	122	260.00	89.79	1128.24
18-May-11 16:20:00	77.45		42.81	22.25	120	261.32	89.32	1131.40
18-May-11 16:21:00	77.50		42.78	22.22	121	259.39	90.13	1140.91
18-May-11 16:22:00	77.67		42.76	22.20	120	259.46	90.29	1139.68
18-May-11 16:23:00	77.65		42.67	22.28	119	259.42	90.48	1128.17
18-May-11 16:24:00	77.61		42.68	22.30	120	259.36	90.21	1131.77
18-May-11 16:25:00	77.28		42.79	21.92	119	259.86	89.95	1136.05
18-May-11 16:26:00	77.40		42.74	21.93	119	260.37	89.87	1145.20
18-May-11 16:27:00	77.48		42.70	21.96	122	259.44	90.29	1131.70
18-May-11 16:28:00	77.48		42.71	21.91	122	259.11	90.56	1130.40
18-May-11 16:29:00	77.43		42.86	22.03	120	260.20	89.77	1136.38
18-May-11 16:30:00	77.61		42.85	22.30	117	260.73	89.63	1135.96
18-May-11 16:31:00	77.58		42.70	22.19	117	259.46	90.49	1129.02
18-May-11 16:32:00	77.36		42.87	22.16	119	260.03	89.96	1134.29
18-May-11 16:33:00	77.44		42.91	22.18	119	261.95	89.29	1135.00
18-May-11 16:34:00	77.27		42.76	22.15	119	261.37	89.59	1139.32
18-May-11 16:35:00	77.21		42.72	21.91	121	259.63	90.31	1133.70
18-May-11 16:36:00	77.39		42.77	21.96	120	260.49	89.78	1121.53
18-May-11 16:37:00	77.40		42.87	21.96	122	259.32	90.10	1131.00
18-May-11 16:38:00	77.40		42.89	22.16	122	260.75	89.69	1135.84
18-May-11 16:39:00	77.49		42.90	22.20	120	260.13	89.69	1139.05
18-May-11 16:40:00	77.33		42.87	22.28	119	258.67	90.32	1141.11
18-May-11 16:41:00	77.36		42.84	22.11	121	259.76	90.06	1131.05
18-May-11 16:42:00	77.21		42.77	22.17	120	261.99	89.19	1129.79
18-May-11 16:43:00	77.27		42.82	22.07	118	260.19	89.96	1141.07
18-May-11 16:44:00	77.44		42.85	22.09	118	260.12	89.86	1142.87
18-May-11 16:45:00	77.29		42.89	21.96	121	261.50	89.33	1145.21
18-May-11 16:46:00	77.17		42.86	22.18	119	260.02	89.89	1144.58
18-May-11 16:47:00	77.42		42.96	22.28	118	261.00	89.72	1139.67
18-May-11 16:48:00	77.47		43.00	22.16	120	260.88	89.56	1137.72
18-May-11 16:49:00	77.60		43.00	21.99	119	260.02	89.44	1131.62
18-May-11 16:50:00	77.59		43.04	22.17	119	259.70	89.53	1133.78
18-May-11 16:51:00	77.62		42.97	22.30	123	259.68	89.68	1134.20
18-May-11 16:52:00	77.45		42.91	22.29	121	260.51	89.72	1134.31
18-May-11 16:53:00	77.34		42.91	22.04	117	258.96	90.52	1128.22
18-May-11 16:54:00	77.47		42.89	22.14	118	259.32	90.30	1144.05
18-May-11 16:55:00	77.54		42.91	22.18	118	260.43	89.88	1144.10
18-May-11 16:56:00	77.43		42.85	22.01	121	260.85	89.60	1142.92
18-May-11 16:57:00	77.28		42.89	22.05	122	261.27	89.38	1141.88
18-May-11 16:58:00	77.19		42.86	22.05	123	261.80	89.38	1139.35
18-May-11 16:59:00	77.27		42.83	22.03	121	260.25	90.08	1132.92
18-May-11 17:00:00	77.43		42.88	22.25	118	261.08	89.63	1136.64

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 3							
18-May-11 16:11:00	1159.94	244.30	81.07	15.78	78.59	17.15	54.73
18-May-11 16:12:00	1159.89	244.20	81.12	15.81	78.26	17.15	51.41
18-May-11 16:13:00	1156.39	244.19	81.20	15.79	77.77	17.13	48.84
18-May-11 16:14:00	1157.25	244.14	81.18	15.81	77.97	17.19	128.86
18-May-11 16:15:00	1151.61	244.07	81.03	15.80	77.77	17.33	220.74
18-May-11 16:16:00	1152.73	244.09	80.91	15.75	77.84	17.28	122.22
18-May-11 16:17:00	1150.21	244.23	80.73	15.71	77.65	17.22	78.45
18-May-11 16:18:00	1151.73	244.14	80.63	15.71	77.67	17.23	71.49
18-May-11 16:19:00	1148.31	244.25	80.62	15.70	77.55	17.21	66.16
18-May-11 16:20:00	1154.11	244.60	80.63	15.72	77.70	17.16	61.74
18-May-11 16:21:00	1162.23	244.55	80.55	15.76	78.31	17.19	67.00
18-May-11 16:22:00	1158.93	244.63	80.60	15.76	77.98	17.15	53.50
18-May-11 16:23:00	1150.79	244.57	80.60	15.79	77.89	17.14	52.65
18-May-11 16:24:00	1152.50	244.54	80.55	15.77	77.78	17.18	58.51
18-May-11 16:25:00	1155.76	244.25	80.60	15.78	77.89	17.17	56.36
18-May-11 16:26:00	1160.70	244.38	80.58	15.77	77.70	17.23	95.94
18-May-11 16:27:00	1154.20	244.35	80.43	15.78	77.93	17.30	143.57
18-May-11 16:28:00	1154.68	244.16	80.37	15.78	77.89	17.24	107.47
18-May-11 16:29:00	1161.07	244.34	80.37	15.73	78.44	17.20	76.03
18-May-11 16:30:00	1162.12	244.03	80.47	15.75	78.66	17.20	69.00
18-May-11 16:31:00	1156.43	243.99	80.57	15.83	78.57	17.19	65.70
18-May-11 16:32:00	1158.86	243.83	80.67	15.72	78.34	17.12	50.81
18-May-11 16:33:00	1156.76	243.50	80.70	15.73	78.14	17.13	52.63
18-May-11 16:34:00	1158.79	243.47	80.70	15.77	78.33	17.17	59.35
18-May-11 16:35:00	1148.56	243.74	80.72	15.78	77.61	17.10	48.20
18-May-11 16:36:00	1143.18	243.72	80.80	15.75	77.64	17.08	47.54
18-May-11 16:37:00	1153.61	243.62	80.78	15.78	78.04	17.12	51.77
18-May-11 16:38:00	1159.30	243.50	80.61	15.74	78.34	17.19	73.30
18-May-11 16:39:00	1162.54	243.33	80.41	15.73	78.83	17.29	113.67
18-May-11 16:40:00	1163.32	243.64	80.30	15.74	78.66	17.27	96.31
18-May-11 16:41:00	1151.29	243.78	80.30	15.73	77.97	17.19	66.43
18-May-11 16:42:00	1151.68	243.88	80.32	15.70	78.42	17.17	64.36
18-May-11 16:43:00	1164.19	244.01	80.42	15.78	79.25	17.15	57.83
18-May-11 16:44:00	1165.88	244.32	80.50	15.74	79.43	17.10	50.73
18-May-11 16:45:00	1169.14	244.64	80.50	15.74	79.60	17.11	50.56
18-May-11 16:46:00	1165.92	244.57	80.57	15.75	79.26	17.13	53.71
18-May-11 16:47:00	1158.62	244.40	80.67	15.75	78.83	17.10	48.38
18-May-11 16:48:00	1157.78	244.18	80.68	15.74	78.78	17.11	49.73
18-May-11 16:49:00	1154.65	244.29	80.60	15.74	78.74	17.12	50.91
18-May-11 16:50:00	1158.49	244.49	80.60	15.75	78.63	17.20	82.17
18-May-11 16:51:00	1161.02	244.31	80.58	15.77	79.14	17.27	138.27
18-May-11 16:52:00	1161.99	244.16	80.50	15.77	79.27	17.26	136.49
18-May-11 16:53:00	1162.03	244.36	80.48	15.80	79.77	17.21	86.83
18-May-11 16:54:00	1168.40	244.04	80.31	15.76	79.81	17.17	62.27
18-May-11 16:55:00	1167.67	243.92	80.04	15.77	79.69	17.17	59.78
18-May-11 16:56:00	1165.68	243.97	79.81	15.75	79.38	17.16	57.37
18-May-11 16:57:00	1165.73	243.87	79.63	15.74	79.24	17.10	48.00
18-May-11 16:58:00	1163.73	244.05	79.60	15.77	79.05	17.12	49.17
18-May-11 16:59:00	1155.81	244.45	79.60	15.79	78.68	17.09	46.84
18-May-11 17:00:00	1158.87	244.22	79.67	15.78	78.82	17.06	44.45

Run 3	O ₂ (WGS CEMS) (% by vol, dry) 317A1107		Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air		Volume Air to Reg (scfm) - Q _a 317C_dryair		Vol Reg FG (dscfm) - Q _r 317C_fluegas		EPA Coke Make (lbs/hr) R _c		Cat Feed Rate (BPD) 317C_B Cat Feed		L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO	
	18-May-11 16:11:00	0.79	371.48	81424.11	78343.37	26908.63	51779.19	180.98	180.98	180.98	180.98	180.98	180.98	180.98
18-May-11 16:12:00		0.73	371.98	81409.57	78392.34	26963.33	51898.55	180.68	180.68	180.68	180.68	180.68	180.68	180.68
18-May-11 16:13:00		0.75	371.36	81520.42	78319.19	26888.04	51875.76	181.64	181.64	181.64	181.64	181.64	181.64	181.64
18-May-11 16:14:00		0.78	371.45	81383.22	78431.51	26969.19	51866.23	180.93	180.93	180.93	180.93	180.93	180.93	180.93
18-May-11 16:15:00		0.57	372.15	81402.41	78398.79	27258.41	51795.09	180.55	180.55	180.55	180.55	180.55	180.55	180.55
18-May-11 16:16:00		0.50	371.73	81557.81	78332.54	27168.39	51734.69	180.71	180.71	180.71	180.71	180.71	180.71	180.71
18-May-11 16:17:00		0.69	371.23	81464.29	78380.76	27011.47	51813.26	180.53	180.53	180.53	180.53	180.53	180.53	180.53
18-May-11 16:18:00		0.66	371.52	81355.01	78404.43	27048.71	51841.83	180.37	180.37	180.37	180.37	180.37	180.37	180.37
18-May-11 16:19:00		0.68	372.27	81417.96	78286.89	27076.13	51826.26	180.36	180.36	180.36	180.36	180.36	180.36	180.36
18-May-11 16:20:00		0.71	372.11	81583.92	78337.02	26994.25	51814.93	180.33	180.33	180.33	180.33	180.33	180.33	180.33
18-May-11 16:21:00		0.78	373.02	81548.08	78490.19	27068.48	51734.70	179.92	179.92	179.92	179.92	179.92	179.92	179.92
18-May-11 16:22:00		0.73	372.14	81746.57	78536.23	26977.27	51601.24	179.94	179.94	179.94	179.94	179.94	179.94	179.94
18-May-11 16:23:00		0.71	372.41	81555.71	78650.52	26992.49	51609.01	179.87	179.87	179.87	179.87	179.87	179.87	179.87
18-May-11 16:24:00		0.64	372.59	81614.42	78429.06	27067.64	51693.21	180.43	180.43	180.43	180.43	180.43	180.43	180.43
18-May-11 16:25:00		0.69	372.19	81654.32	78464.51	27018.52	51806.10	180.25	180.25	180.25	180.25	180.25	180.25	180.25
18-May-11 16:26:00		0.66	372.61	81565.92	78545.61	27132.86	51930.17	180.07	180.07	180.07	180.07	180.07	180.07	180.07
18-May-11 16:27:00		0.48	372.91	81657.69	78485.07	27295.14	51852.22	180.32	180.32	180.32	180.32	180.32	180.32	180.32
18-May-11 16:28:00		0.51	372.53	81722.75	78467.73	27177.71	51718.84	180.32	180.32	180.32	180.32	180.32	180.32	180.32
18-May-11 16:29:00		0.71	372.38	81640.24	78518.33	27061.69	51722.06	179.63	179.63	179.63	179.63	179.63	179.63	179.63
18-May-11 16:30:00		0.71	372.38	81606.74	78580.18	27060.58	51741.06	179.39	179.39	179.39	179.39	179.39	179.39	179.39
18-May-11 16:31:00		0.69	373.14	81606.90	78546.13	27106.25	51744.33	180.12	180.12	180.12	180.12	180.12	180.12	180.12
18-May-11 16:32:00		0.81	372.94	81774.56	78506.98	26972.96	51722.97	179.72	179.72	179.72	179.72	179.72	179.72	179.72
18-May-11 16:33:00		0.83	372.51	81728.98	78729.46	26944.85	51719.39	179.01	179.01	179.01	179.01	179.01	179.01	179.01
18-May-11 16:34:00		0.63	374.03	81635.38	78685.94	27162.95	51757.70	179.60	179.60	179.60	179.60	179.60	179.60	179.60
18-May-11 16:35:00		0.75	373.83	81969.03	78452.77	27027.98	51850.68	180.61	180.61	180.61	180.61	180.61	180.61	180.61
18-May-11 16:36:00		0.91	372.81	81925.60	78833.18	26884.80	51937.25	179.57	179.57	179.57	179.57	179.57	179.57	179.57
18-May-11 16:37:00		0.81	372.93	81700.83	78920.06	26975.65	51926.47	178.61	178.61	178.61	178.61	178.61	178.61	178.61
18-May-11 16:38:00		0.66	372.31	81728.68	78636.18	27051.25	51890.38	179.35	179.35	179.35	179.35	179.35	179.35	179.35
18-May-11 16:39:00		0.65	373.12	81591.48	78605.91	27243.70	51804.17	179.18	179.18	179.18	179.18	179.18	179.18	179.18
18-May-11 16:40:00		0.60	372.46	81769.73	78562.37	27183.52	51736.30	179.65	179.65	179.65	179.65	179.65	179.65	179.65
18-May-11 16:41:00		0.67	371.69	81624.79	78655.83	27005.03	51747.61	179.37	179.37	179.37	179.37	179.37	179.37	179.37
18-May-11 16:42:00		0.78	372.33	81456.76	78513.06	27002.29	51755.24	180.17	180.17	180.17	180.17	180.17	180.17	180.17
18-May-11 16:43:00		0.76	373.66	81596.13	78436.28	27074.34	51755.45	180.15	180.15	180.15	180.15	180.15	180.15	180.15
18-May-11 16:44:00		0.78	372.92	81888.58	78518.29	26956.60	51764.29	179.76	179.76	179.76	179.76	179.76	179.76	179.76
18-May-11 16:45:00		0.88	372.60	81725.44	78795.70	26917.38	51764.16	179.14	179.14	179.14	179.14	179.14	179.14	179.14
18-May-11 16:46:00		0.73	373.27	81656.05	78719.10	27032.10	51737.47	179.21	179.21	179.21	179.21	179.21	179.21	179.21
18-May-11 16:47:00		0.81	372.45	81801.91	78538.45	26916.34	51731.53	179.36	179.36	179.36	179.36	179.36	179.36	179.36
18-May-11 16:48:00		0.81	373.25	81623.70	78728.04	26978.97	51906.91	178.50	178.50	178.50	178.50	178.50	178.50	178.50
18-May-11 16:49:00		0.75	372.65	81797.74	78558.39	26973.52	52017.16	178.88	178.88	178.88	178.88	178.88	178.88	178.88
18-May-11 16:50:00		0.80	371.85	81665.81	78697.02	26990.41	51926.09	178.44	178.44	178.44	178.44	178.44	178.44	178.44
18-May-11 16:51:00		0.61	371.67	81490.95	78684.89	27130.56	51862.99	178.55	178.55	178.55	178.55	178.55	178.55	178.55
18-May-11 16:52:00		0.46	372.06	81452.09	78391.51	27190.17	51867.06	179.58	179.58	179.58	179.58	179.58	179.58	179.58
18-May-11 16:53:00		0.64	373.00	81536.41	78230.07	27141.06	51708.55	180.13	180.13	180.13	180.13	180.13	180.13	180.13
18-May-11 16:54:00		0.68	372.31	81744.06	78422.52	27023.78	51647.92	179.91	179.91	179.91	179.91	179.91	179.91	179.91
18-May-11 16:55:00		0.73	372.33	81590.94	78621.17	27019.37	51772.94	179.13	179.13	179.13	179.13	179.13	179.13	179.13
18-May-11 16:56:00		0.71	373.10	81595.98	78511.96	27060.97	51863.39	179.68	179.68	179.68	179.68	179.68	179.68	179.68
18-May-11 16:57:00		0.81	373.04	81765.35	78488.47	26963.12	51928.02	179.76	179.76	179.76	179.76	179.76	179.76	179.76
18-May-11 16:58:00		0.82	373.35	81751.29	78696.46	27001.35	51921.01	179.52	179.52	179.52	179.52	179.52	179.52	179.52
18-May-11 16:59:00		0.82	373.97	81820.84	78714.93	27011.12	51831.77	179.42	179.42	179.42	179.42	179.42	179.42	179.42
18-May-11 17:00:00		0.82	373.08	81955.02	78740.75	26905.26	51724.61	179.20	179.20	179.20	179.20	179.20	179.20	179.20

Run 3	Scrubbing Liquid		Pump Pressure	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air	Air to Rings	#1 Stand Pipe Aeration
	Upper Circulation (psig)	Lower Circulation (psig)	Lower Circulation (psig)					
317P1105B	317P1108	317P1177A	317FC202	317FC115	317F1113	317F1105		
18-May-11 17:01:00	77.43	42.90	22.05	117	260.50	89.80	1139.51	
18-May-11 17:02:00	77.46	42.89	22.10	121	259.39	90.26	1150.09	
18-May-11 17:03:00	77.61	42.99	22.22	121	260.07	90.02	1142.20	
18-May-11 17:04:00	77.59	42.92	22.13	118	261.16	89.71	1146.11	
18-May-11 17:05:00	77.57	42.84	21.98	120	259.67	90.29	1148.11	
18-May-11 17:06:00	77.44	42.85	21.86	120	259.26	90.29	1147.85	
18-May-11 17:07:00	77.42	42.82	21.79	118	258.33	90.32	1149.54	
18-May-11 17:08:00	77.33	42.83	21.77	118	256.56	90.63	1148.88	
18-May-11 17:09:00	77.41	42.95	22.17	120	256.54	91.00	1147.72	
18-May-11 17:10:00	77.42	42.92	22.11	119	257.15	91.59	1144.52	
18-May-11 17:11:00	77.48	42.88	22.08	120	255.95	91.55	1139.84	
18-May-11 17:12:00	77.45	42.82	22.40	120	258.59	90.61	1142.71	
18-May-11 17:13:00	77.40	42.82	22.34	121	259.89	89.32	1142.27	
18-May-11 17:14:00	77.35	42.84	22.55	118	259.10	90.01	1152.10	
18-May-11 17:15:00	77.48	42.77	22.67	117	261.26	89.71	1145.30	
18-May-11 17:16:00	77.53	42.69	22.52	119	261.74	89.76	1145.35	
18-May-11 17:17:00	77.47	42.71	22.52	121	262.98	89.39	1138.03	
18-May-11 17:18:00	77.53	42.66	22.39	119	262.41	89.77	1141.33	
18-May-11 17:19:00	77.31	42.48	22.35	118	262.58	89.69	1143.47	
18-May-11 17:20:00	77.22	42.58	22.38	119	261.68	89.94	1145.66	
18-May-11 17:21:00	77.32	42.63	22.41	119	261.74	89.62	1152.00	
18-May-11 17:22:00	77.31	42.56	22.51	119	262.31	89.28	1145.76	
18-May-11 17:23:00	77.37	42.49	22.38	121	262.48	89.59	1139.17	
18-May-11 17:24:00	77.26	42.54	22.42	121	262.83	89.62	1139.88	
18-May-11 17:25:00	77.45	42.50	22.23	122	261.52	89.81	1134.17	
18-May-11 17:26:00	77.61	42.56	22.24	119	261.55	89.72	1138.47	
18-May-11 17:27:00	77.67	42.44	22.29	118	262.58	89.64	1142.79	
18-May-11 17:28:00	77.54	42.42	22.02	119	262.35	89.84	1146.32	
18-May-11 17:29:00	77.53	42.39	22.09	122	261.53	89.79	1147.09	
18-May-11 17:30:00	77.16	42.35	22.29	122	262.61	89.12	1148.79	
18-May-11 17:31:00	77.12	42.33	22.32	120	263.53	88.67	1146.27	
18-May-11 17:32:00	77.41	42.31	22.24	118	260.58	89.91	1147.70	
18-May-11 17:33:00	77.43	42.32	22.13	117	260.94	89.71	1148.30	
18-May-11 17:34:00	77.47	42.42	22.14	118	261.97	89.56	1145.23	
18-May-11 17:35:00	77.27	42.42	22.13	120	262.64	89.29	1139.40	
18-May-11 17:36:00	77.25	42.47	22.24	123	261.64	89.50	1137.60	
18-May-11 17:37:00	77.46	42.48	22.32	121	260.26	89.99	1138.11	
18-May-11 17:38:00	77.44	42.45	22.14	120	261.66	89.57	1145.71	
18-May-11 17:39:00	77.46	42.42	22.10	121	262.50	89.28	1141.91	
18-May-11 17:40:00	77.51	42.36	22.50	122	262.13	89.50	1147.10	
18-May-11 17:41:00	77.54	42.35	22.18	119	260.95	89.91	1145.95	
18-May-11 17:42:00	77.48	42.49	22.03	117	261.23	89.72	1146.68	
18-May-11 17:43:00	77.44	42.46	22.19	119	261.54	89.41	1146.84	
18-May-11 17:44:00	77.52	42.33	22.24	119	260.83	89.82	1148.48	
18-May-11 17:45:00	77.55	42.47	22.18	119	261.14	89.76	1148.48	
18-May-11 17:46:00	77.64	42.50	22.10	122	261.98	89.36	1144.44	
18-May-11 17:47:00	77.47	42.61	22.17	123	261.30	89.54	1139.83	
18-May-11 17:48:00	77.39	42.65	22.19	121	261.03	89.65	1140.99	
18-May-11 17:49:00	77.26	42.60	22.23	119	261.16	89.45	1137.91	
18-May-11 17:50:00	77.29	42.57	22.17	120	261.06	89.77	1140.10	

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 3							
18-May-11 17:01:00	1161.25	243.90	79.70	15.80	78.87	17.12	48.51
18-May-11 17:02:00	1170.85	243.96	79.70	15.80	78.97	17.21	74.13
18-May-11 17:03:00	1165.14	244.01	79.70	15.76	79.26	15.40	109.46
18-May-11 17:04:00	1169.61	243.88	79.70	15.78	79.55	14.10	87.07
18-May-11 17:05:00	1172.11	243.69	79.77	15.79	80.12	17.08	62.14
18-May-11 17:06:00	1172.23	243.96	79.80	15.76	80.28	17.10	50.12
18-May-11 17:07:00	1173.47	243.89	79.69	15.80	80.41	17.13	53.02
18-May-11 17:08:00	1173.52	243.92	79.41	15.92	80.48	17.14	55.18
18-May-11 17:09:00	1172.49	243.87	79.21	15.85	80.29	17.14	47.70
18-May-11 17:10:00	1168.06	243.91	79.08	15.81	80.08	17.16	49.07
18-May-11 17:11:00	1161.79	243.94	78.91	15.85	79.53	17.19	52.99
18-May-11 17:12:00	1164.57	243.70	78.73	15.75	79.32	17.21	58.40
18-May-11 17:13:00	1163.58	243.54	78.70	15.81	79.16	17.26	71.17
18-May-11 17:14:00	1172.63	243.65	78.79	15.75	79.28	17.32	97.73
18-May-11 17:15:00	1168.43	243.78	79.05	15.67	79.56	17.34	123.37
18-May-11 17:16:00	1167.92	243.40	79.29	15.70	79.39	17.28	108.35
18-May-11 17:17:00	1160.98	243.29	79.49	15.70	79.12	17.21	75.36
18-May-11 17:18:00	1164.88	243.23	79.67	15.72	79.34	17.17	59.48
18-May-11 17:19:00	1168.08	243.20	79.70	15.72	79.78	17.12	48.17
18-May-11 17:20:00	1170.17	243.19	79.68	15.74	79.70	17.08	44.14
18-May-11 17:21:00	1176.83	242.67	79.58	15.71	80.11	17.08	46.23
18-May-11 17:22:00	1169.14	242.64	79.50	15.69	80.06	17.10	48.45
18-May-11 17:23:00	1161.19	242.44	79.43	15.73	79.47	17.07	45.06
18-May-11 17:24:00	1160.94	242.18	79.42	15.74	79.11	17.04	42.80
18-May-11 17:25:00	1156.87	242.06	79.62	15.75	78.90	17.02	41.29
18-May-11 17:26:00	1159.90	242.14	79.43	15.70	78.74	17.11	64.95
18-May-11 17:27:00	1165.67	242.22	79.40	15.74	79.26	17.24	106.96
18-May-11 17:28:00	1169.72	242.21	79.38	15.75	79.50	17.19	90.54
18-May-11 17:29:00	1170.42	242.23	79.28	15.73	79.78	17.07	50.72
18-May-11 17:30:00	1172.29	242.31	79.13	15.71	79.95	17.03	45.54
18-May-11 17:31:00	1170.40	242.20	79.01	15.72	79.97	17.02	43.36
18-May-11 17:32:00	1171.08	242.21	78.90	15.77	80.04	17.00	41.59
18-May-11 17:33:00	1172.66	242.18	78.88	15.75	80.25	16.94	38.39
18-May-11 17:34:00	1169.35	242.18	78.80	15.78	80.23	17.00	41.60
18-May-11 17:35:00	1162.72	242.23	78.80	15.77	79.88	17.06	43.80
18-May-11 17:36:00	1161.47	242.25	78.80	15.79	79.39	17.00	39.29
18-May-11 17:37:00	1158.57	242.07	78.80	15.80	78.92	17.00	39.88
18-May-11 17:38:00	1161.28	242.30	78.80	15.77	78.75	17.07	54.95
18-May-11 17:39:00	1164.20	242.32	78.80	15.75	79.15	17.18	79.19
18-May-11 17:40:00	1169.19	242.21	78.82	15.77	79.43	17.11	65.68
18-May-11 17:41:00	1169.28	242.12	78.90	15.77	79.73	17.03	47.23
18-May-11 17:42:00	1169.82	242.06	78.88	15.75	79.80	16.99	42.56
18-May-11 17:43:00	1170.41	242.21	78.71	15.74	79.86	17.00	42.12
18-May-11 17:44:00	1171.49	242.04	78.53	15.77	79.88	17.01	41.52
18-May-11 17:45:00	1171.35	242.08	78.50	15.76	80.00	16.98	40.80
18-May-11 17:46:00	1167.25	242.14	78.50	15.74	79.85	17.02	42.82
18-May-11 17:47:00	1161.80	242.08	78.48	15.75	79.60	17.05	43.99
18-May-11 17:48:00	1164.09	241.99	78.40	15.76	79.68	17.02	41.54
18-May-11 17:49:00	1163.91	241.54	78.38	15.76	79.69	17.00	40.18
18-May-11 17:50:00	1163.27	241.52	78.28	15.75	79.25	17.04	47.83

	O2 (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3							
18-May-11 17:01:00	0.82	373.49	81761.69	78846.26	27005.68	51693.19	178.67
18-May-11 17:02:00	0.72	373.28	81850.52	78707.33	27137.39	51688.11	179.13
18-May-11 17:03:00	0.73	372.57	81805.62	78801.08	25005.81	51713.74	178.41
18-May-11 17:04:00	1.89	372.87	81648.45	76926.70	23199.50	51726.31	181.61
18-May-11 17:05:00	2.66	373.81	81715.66	77265.70	26438.23	51831.65	184.98
18-May-11 17:06:00	0.84	372.97	81921.12	80349.09	26950.10	51918.48	175.34
18-May-11 17:07:00	0.81	372.30	81737.31	78854.96	26940.48	51895.05	178.88
18-May-11 17:08:00	0.72	371.77	81590.27	78683.96	26940.84	51843.27	179.43
18-May-11 17:09:00	0.74	370.80	81472.91	78481.15	26859.01	51834.20	179.37
18-May-11 17:10:00	0.74	371.01	81261.77	78378.87	26904.70	51849.94	179.73
18-May-11 17:11:00	0.71	371.89	81306.59	78200.76	27005.63	51802.80	180.23
18-May-11 17:12:00	0.61	370.82	81499.16	78233.70	26985.43	51819.40	180.68
18-May-11 17:13:00	0.58	372.01	81264.77	78351.23	27136.20	51827.74	180.20
18-May-11 17:14:00	0.60	372.35	81527.13	78147.85	27227.66	51809.19	180.75
18-May-11 17:15:00	0.65	371.99	81601.74	78488.25	27221.94	51830.52	180.33
18-May-11 17:16:00	0.58	373.46	81522.54	78615.58	27277.57	51738.17	179.94
18-May-11 17:17:00	0.59	374.23	81844.84	78418.00	27243.16	51662.21	180.63
18-May-11 17:18:00	0.66	375.14	82013.38	78667.97	27231.75	51678.91	180.05
18-May-11 17:19:00	0.74	375.05	82211.48	78860.66	27149.22	51665.51	180.73
18-May-11 17:20:00	0.74	375.20	82193.45	79078.56	27114.63	51734.61	179.73
18-May-11 17:21:00	0.77	374.60	82224.89	79016.69	27057.79	51828.42	179.60
18-May-11 17:22:00	0.81	374.27	82094.45	79083.58	27043.01	51806.97	179.68
18-May-11 17:23:00	0.79	374.50	82020.68	79008.09	27034.83	51782.63	179.93
18-May-11 17:24:00	0.89	375.29	82071.61	78892.32	27020.93	51764.77	179.92
18-May-11 17:25:00	0.91	375.77	82245.49	79003.04	27026.46	51726.23	180.11
18-May-11 17:26:00	0.79	374.56	82350.13	79159.49	27084.49	51716.29	179.35
18-May-11 17:27:00	0.74	374.38	82084.34	79252.05	27246.57	51699.04	179.57
18-May-11 17:28:00	0.73	375.60	82044.52	79071.15	27276.97	51674.95	179.97
18-May-11 17:29:00	0.87	375.54	82313.62	78970.64	27084.04	51563.88	180.61
18-May-11 17:30:00	0.86	374.52	82300.88	79251.38	26965.26	51468.57	180.37
18-May-11 17:31:00	0.89	374.84	82075.66	79187.91	26969.79	51578.72	180.52
18-May-11 17:32:00	0.94	375.43	82146.59	78999.45	26972.66	51665.06	180.84
18-May-11 17:33:00	0.98	373.88	82275.15	79084.57	26774.71	51619.74	180.79
18-May-11 17:34:00	0.98	374.04	81936.54	79200.82	26860.46	51743.56	179.82
18-May-11 17:35:00	0.86	375.06	81971.76	78919.37	27038.30	51765.85	180.56
18-May-11 17:36:00	0.93	375.35	82195.15	78899.07	26972.01	51633.86	180.66
18-May-11 17:37:00	0.89	374.61	82257.30	79122.52	26928.56	51629.84	179.89
18-May-11 17:38:00	0.88	373.85	82096.20	79147.60	26960.39	51627.97	179.97
18-May-11 17:39:00	0.76	374.61	81929.08	79050.34	27182.52	51639.12	180.18
18-May-11 17:40:00	0.77	375.11	82096.48	78872.97	27131.64	51654.13	180.91
18-May-11 17:41:00	0.89	375.10	82206.30	78983.92	26996.07	51656.00	180.77
18-May-11 17:42:00	0.93	374.34	82202.32	79123.48	26884.38	51628.78	179.83
18-May-11 17:43:00	0.97	374.25	82035.93	79122.57	26881.43	51638.78	179.90
18-May-11 17:44:00	0.91	374.26	82016.25	79012.74	26907.41	51666.12	180.71
18-May-11 17:45:00	1.04	374.15	82018.23	78944.77	26833.39	51635.38	180.31
18-May-11 17:46:00	1.05	374.37	81995.18	79050.70	26885.55	51620.72	179.97
18-May-11 17:47:00	0.92	374.67	82042.33	79050.97	26978.52	51606.55	179.46
18-May-11 17:48:00	0.98	374.25	82109.03	79011.39	26902.33	51602.88	179.55
18-May-11 17:49:00	1.00	374.12	82016.10	79109.20	26857.04	51650.18	179.54
18-May-11 17:50:00	0.94	374.14	81987.54	79017.97	26928.61	51670.93	179.90

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#2 Stand Pipe Aeration Air to Regen (lbs/min) 317E1106	Air to Regen Temp B-1 Outlet (oF) 317T11112	Tempered Air Temp (oF) 317T11120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317A1109	CO (WGS CEMS) (ppmv, dry) 317A111
Run 3							
18-May-11 17:51:00	1167.10	198.18	78.22	15.70	79.44	17.14	70.40
18-May-11 17:52:00	1170.49	197.78	78.30	15.73	79.43	17.16	80.28
18-May-11 17:53:00	1170.01	197.78	78.30	15.73	79.70	17.06	61.60
18-May-11 17:54:00	1171.16	197.70	78.32	15.72	79.85	16.99	45.29
18-May-11 17:55:00	1172.24	197.30	78.40	15.75	79.99	17.03	44.92
18-May-11 17:56:00	1171.48	197.15	78.40	15.71	79.96	17.00	43.84
18-May-11 17:57:00	1172.39	197.09	78.33	15.70	79.96	16.98	42.14
18-May-11 17:58:00	1168.76	196.72	78.30	15.73	79.87	17.04	44.47
18-May-11 17:59:00	1160.33	196.75	78.32	15.74	79.47	17.02	42.05
18-May-11 18:00:00	1162.87	196.96	78.40	15.76	79.39	17.01	41.72
18-May-11 18:01:00	1161.79	197.14	78.31	15.75	79.39	17.02	42.11
18-May-11 18:02:00	1163.27	197.12	78.18	15.79	79.19	17.05	52.26
18-May-11 18:03:00	1169.50	197.13	78.08	15.75	79.77	17.16	71.32
18-May-11 18:04:00	1172.31	196.98	77.96	15.76	79.81	17.11	64.94
18-May-11 18:05:00	1171.24	196.88	77.80	15.77	79.98	17.04	51.78
18-May-11 18:06:00	1167.98	196.90	77.78	15.75	79.72	17.01	45.20
18-May-11 18:07:00	1168.14	196.83	77.70	15.73	79.65	16.98	42.18
18-May-11 18:08:00	1169.04	196.92	77.63	15.79	79.75	17.01	43.03
18-May-11 18:09:00	1169.23	196.85	77.53	15.72	79.75	17.00	41.71
18-May-11 18:10:00	1165.97	196.84	77.43	15.74	79.74	16.98	42.26
18-May-11 18:11:00	1158.67	196.84	77.42	15.75	79.23	17.04	45.80
18-May-11 18:12:00	1160.01	196.85	77.50	15.75	78.95	17.03	43.38
18-May-11 18:13:00	1157.57	196.90	77.52	15.79	78.97	17.04	43.21
18-May-11 18:14:00	1161.51	196.90	77.60	15.75	78.90	17.08	52.11
1159.49	243.01	200.64	80.08	15.77	78.48	17.14	70.59

O ₂ (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B_Cat_Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3						
18-May-11 17:51:00	0.78	81992.10	78976.11	27106.78	51648.86	179.91
18-May-11 17:52:00	0.68	82025.63	78922.67	27202.58	51603.93	180.17
18-May-11 17:53:00	0.71	82165.80	78862.96	27093.14	51592.08	179.99
18-May-11 17:54:00	0.92	82212.61	78949.85	26943.55	51600.82	180.04
18-May-11 17:55:00	0.93	82198.20	79140.51	27041.84	51615.75	179.52
18-May-11 17:56:00	0.87	82383.96	79146.55	27047.76	51639.35	179.76
18-May-11 17:57:00	1.02	82424.40	79259.69	26897.93	51626.05	180.17
18-May-11 17:58:00	0.95	82192.81	79419.66	26987.56	51608.28	179.55
18-May-11 17:59:00	0.90	82183.29	79178.26	26983.37	51607.51	179.71
18-May-11 18:00:00	0.93	82178.47	79101.97	26965.82	51595.29	179.27
18-May-11 18:01:00	1.00	82193.84	79124.87	26932.62	51556.02	179.18
18-May-11 18:02:00	0.99	82147.83	79209.44	27011.83	51547.67	178.14
18-May-11 18:03:00	0.85	82261.77	79191.63	27255.39	51536.78	178.82
18-May-11 18:04:00	0.79	82475.89	79261.16	27169.69	51520.71	179.29
18-May-11 18:05:00	0.83	82352.59	79364.23	27054.79	51530.09	178.89
18-May-11 18:06:00	0.90	82262.35	79221.35	26995.29	51680.03	179.02
18-May-11 18:07:00	0.98	82273.55	79174.28	26925.55	51742.10	179.20
18-May-11 18:08:00	1.02	82229.29	79240.46	26983.17	51568.10	179.44
18-May-11 18:09:00	1.03	82326.69	79256.10	26960.32	51526.86	179.21
18-May-11 18:10:00	0.99	82319.70	79344.41	26907.31	51559.35	179.15
18-May-11 18:11:00	0.91	82206.16	79279.92	27050.72	51552.17	179.06
18-May-11 18:12:00	0.91	82352.59	79155.66	27036.72	51435.80	179.58
18-May-11 18:13:00	0.91	82351.07	79284.44	27068.53	51315.71	179.74
18-May-11 18:14:00	0.94	82379.21	79295.12	27056.53	51390.81	179.90
0.76	373.24	81795.40	78714.79	27033.11	51630.86	180.85

HC1/C12/HF/HCN/THC/Methane/Ethane/CO/NOx/SO2 Run 2

5/18/2011 19:18
5/18/2011 21:35

1m

Run 4	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
18-May-11 19:18:00	77.31	42.43	22.30	119	259.41	90.88	1139.43
18-May-11 19:19:00	77.31	42.43	22.12	121	258.57	91.57	1140.00
18-May-11 19:20:00	77.50	42.30	22.32	122	259.99	90.89	1135.47
18-May-11 19:21:00	77.46	42.35	22.41	122	258.50	91.39	1137.58
18-May-11 19:22:00	77.43	42.38	22.25	122	256.89	91.89	1135.51
18-May-11 19:23:00	77.29	42.32	22.19	120	257.28	91.65	1123.97
18-May-11 19:24:00	77.37	42.31	22.17	117	257.99	91.24	1127.93
18-May-11 19:25:00	77.44	42.35	22.18	118	259.00	90.86	1127.35
18-May-11 19:26:00	77.45	42.27	22.35	120	257.95	91.36	1129.00
18-May-11 19:27:00	77.40	42.31	22.36	120	258.62	91.10	1135.75
18-May-11 19:28:00	77.52	42.28	22.23	121	259.32	91.01	1138.10
18-May-11 19:29:00	77.41	42.29	22.13	120	258.29	91.31	1136.78
18-May-11 19:30:00	77.35	42.36	22.26	119	258.53	91.45	1136.30
18-May-11 19:31:00	77.47	42.36	22.17	119	258.72	91.37	1137.61
18-May-11 19:32:00	77.47	42.22	22.28	119	259.35	91.06	1138.45
18-May-11 19:33:00	77.30	42.16	22.11	118	259.06	91.06	1138.59
18-May-11 19:34:00	77.08	42.18	22.06	118	258.89	91.10	1134.11
18-May-11 19:35:00	77.17	42.25	22.32	118	259.45	90.91	1125.01
18-May-11 19:36:00	77.34	42.19	22.32	118	258.87	90.98	1127.72
18-May-11 19:37:00	77.37	42.21	22.29	119	257.83	91.15	1125.18
18-May-11 19:38:00	77.28	42.28	22.32	118	258.95	90.76	1129.47
18-May-11 19:39:00	77.04	42.16	22.30	118	259.47	90.71	1137.53
18-May-11 19:40:00	77.31	42.04	22.22	119	259.23	90.64	1140.82
18-May-11 19:41:00	77.32	42.16	22.09	118	258.14	91.00	1140.22
18-May-11 19:42:00	77.32	42.11	22.21	119	258.11	91.18	1142.07
18-May-11 19:43:00	77.12	42.05	22.15	119	258.62	90.97	1138.91
18-May-11 19:44:00	77.10	42.11	22.14	119	258.67	90.81	1135.88
18-May-11 19:45:00	77.21	42.06	22.21	119	257.25	91.32	1136.93
18-May-11 19:46:00	77.21	42.03	22.28	120	260.19	90.30	1133.88
18-May-11 19:47:00	77.03	42.11	22.34	118	260.33	90.42	1125.64
18-May-11 19:48:00	77.11	42.15	22.29	118	259.41	90.65	1128.43
18-May-11 19:49:00	77.16	42.09	22.43	119	258.55	91.08	1131.31
18-May-11 19:50:00	77.22	42.10	22.49	118	259.23	91.13	1129.98
18-May-11 19:51:00	77.23	42.05	22.40	118	259.81	91.18	1135.61
18-May-11 19:52:00	77.25	41.94	22.25	118	260.66	90.88	1139.39
18-May-11 19:53:00	77.12	42.05	22.17	117	261.13	90.52	1138.52
18-May-11 19:54:00	77.14	42.11	22.17	119	261.01	90.66	1137.83
18-May-11 19:55:00	77.46	42.08	22.51	119	261.43	90.38	1138.05
18-May-11 19:56:00	77.59	42.08	22.51	120	261.35	90.53	1135.57
18-May-11 19:57:00	77.36	42.03	22.41	120	261.46	90.59	1134.05
18-May-11 19:58:00	77.22	41.97	22.45	121	261.21	90.67	1130.22
18-May-11 19:59:00	77.15	41.89	22.52	122	262.23	90.36	1122.68
18-May-11 20:00:00	77.25	41.96	22.34	123	261.89	90.49	1119.07
18-May-11 20:01:00	77.31	42.02	22.26	123	260.83	90.94	1122.34
18-May-11 20:02:00	77.21	42.07	22.43	122	261.64	90.86	1121.86
18-May-11 20:03:00	77.04	42.14	22.63	120	261.37	90.87	1126.69
18-May-11 20:04:00	77.23	42.06	22.61	118	262.63	90.36	1130.96
18-May-11 20:05:00	77.13	41.92	22.39	118	261.66	90.52	1130.76
18-May-11 20:06:00	77.19	41.94	22.42	119	260.90	90.76	1131.87
18-May-11 20:07:00	77.21	41.89	22.63	119	264.64	89.56	1134.68
18-May-11 20:08:00	77.36	41.98	22.45	120	263.17	90.18	1134.58

HC/C12/HF/HCN/THC/

Run 4	#2 Stand Pipe Aeration Air to Regen (lbs/min)		Air to Regen Temp B-1 Outlet (oF)		Tempered Air Temp (oF)		Ambient Air Temp (oF)		Air to Regen Pressure Blower Discharge (psig)		Plant Air to 45lb Air (psig)		CO2 (WGS CEMS) (% by vol. dry)		CO (WGS CEMS) (ppmv. dry)	
	317FI106	317TI1112	317TI1112	317TI1120	DWS AT	317PC039	317PC088	317AI109	317AI111	317AI111	317AI109	317AI111	317AI109	317AI111	317AI109	317AI111
18-May-11 19:18:00	1163.98	238.87	193.66	75.80	15.82	78.83	17.10	55.71								
18-May-11 19:19:00	1164.79	238.96	193.64	75.80	15.86	78.93	17.09	50.11								
18-May-11 19:20:00	1158.61	238.90	193.54	75.73	15.84	78.40	17.09	53.39								
18-May-11 19:21:00	1159.61	238.92	193.03	75.61	15.88	78.36	17.15	61.15								
18-May-11 19:22:00	1161.33	238.92	192.86	75.48	15.84	78.82	17.12	54.10								
18-May-11 19:23:00	1153.77	238.96	192.28	75.40	15.82	78.49	17.10	53.24								
18-May-11 19:24:00	1151.00	239.01	192.30	75.40	15.81	78.08	17.17	60.50								
18-May-11 19:25:00	1154.31	238.85	192.35	75.35	15.84	78.19	17.17	54.76								
18-May-11 19:26:00	1152.79	238.63	192.43	75.40	15.88	77.83	17.21	64.93								
18-May-11 19:27:00	1157.58	238.35	192.31	75.38	15.81	78.14	17.25	96.60								
18-May-11 19:28:00	1161.06	238.40	192.28	75.30	15.85	78.30	17.26	104.24								
18-May-11 19:29:00	1161.75	238.55	192.10	75.23	15.85	78.58	17.21	77.80								
18-May-11 19:30:00	1159.62	238.56	191.83	75.18	15.86	78.45	17.12	52.54								
18-May-11 19:31:00	1161.24	238.56	192.02	75.17	15.86	78.48	17.13	51.61								
18-May-11 19:32:00	1162.49	238.54	192.06	75.27	15.84	78.66	17.12	50.20								
18-May-11 19:33:00	1161.88	238.52	191.86	75.39	15.85	78.75	17.12	50.89								
18-May-11 19:34:00	1161.14	238.61	191.74	75.50	15.85	78.74	17.12	49.26								
18-May-11 19:35:00	1154.89	238.57	191.37	75.43	15.84	78.46	17.12	48.17								
18-May-11 19:36:00	1149.25	238.42	191.37	75.38	15.87	77.90	17.15	49.97								
18-May-11 19:37:00	1150.61	238.46	191.40	75.30	15.88	77.89	17.14	48.71								
18-May-11 19:38:00	1152.63	238.15	191.21	75.28	15.88	77.69	17.17	68.30								
18-May-11 19:39:00	1159.99	238.08	190.83	75.18	15.87	78.20	17.29	114.43								
18-May-11 19:40:00	1162.88	238.10	190.79	75.10	15.82	78.40	17.26	102.74								
18-May-11 19:41:00	1163.18	238.11	190.84	75.10	15.84	78.72	17.16	57.19								
18-May-11 19:42:00	1164.91	237.98	190.88	75.10	15.88	78.87	17.10	49.84								
18-May-11 19:43:00	1162.23	237.95	190.92	75.10	15.84	78.73	17.07	45.52								
18-May-11 19:44:00	1159.24	238.02	190.77	75.10	15.87	78.45	17.08	47.90								
18-May-11 19:45:00	1159.73	237.95	190.93	75.10	15.83	78.38	17.12	50.05								
18-May-11 19:46:00	1159.72	238.12	191.33	75.10	15.80	78.39	17.07	43.61								
18-May-11 19:47:00	1155.25	238.29	191.32	75.08	15.85	78.29	17.08	46.74								
18-May-11 19:48:00	1150.67	238.50	191.38	75.00	15.86	78.07	17.03	42.48								
18-May-11 19:49:00	1155.54	238.56	191.71	74.98	15.89	78.11	16.99	40.19								
18-May-11 19:50:00	1153.82	238.61	191.77	74.90	15.89	77.84	17.06	53.47								
18-May-11 19:51:00	1158.79	238.63	191.80	74.83	15.86	78.34	17.17	84.31								
18-May-11 19:52:00	1161.38	238.57	191.71	74.80	15.84	78.35	17.19	89.02								
18-May-11 19:53:00	1161.86	238.54	191.82	74.73	15.81	78.65	17.14	62.78								
18-May-11 19:54:00	1161.65	238.42	192.47	74.65	15.82	78.79	17.10	52.09								
18-May-11 19:55:00	1161.63	238.48	192.67	74.63	15.79	78.81	17.08	48.39								
18-May-11 19:56:00	1158.82	238.66	192.92	74.53	15.81	78.55	17.07	46.08								
18-May-11 19:57:00	1156.43	238.67	193.37	74.57	15.82	78.15	17.08	44.27								
18-May-11 19:58:00	1154.56	238.76	193.78	74.60	15.81	77.97	17.05	42.97								
18-May-11 19:59:00	1148.42	238.93	194.16	74.58	15.79	77.63	17.02	42.04								
18-May-11 20:00:00	1143.09	238.84	194.12	74.43	15.81	77.40	17.05	43.68								
18-May-11 20:01:00	1147.73	238.79	194.34	74.33	15.83	77.38	17.06	44.68								
18-May-11 20:02:00	1145.20	238.55	194.44	74.23	15.85	76.91	17.07	54.00								
18-May-11 20:03:00	1148.45	238.51	194.67	74.20	15.81	77.20	17.16	74.03								
18-May-11 20:04:00	1150.80	238.49	194.77	74.18	15.79	77.14	17.13	69.61								
18-May-11 20:05:00	1153.54	238.41	194.81	74.10	15.83	77.58	17.09	57.34								
18-May-11 20:06:00	1154.31	238.51	194.76	74.10	15.77	77.60	17.03	47.93								
18-May-11 20:07:00	1157.62	238.42	194.84	74.03	15.75	77.78	16.99	44.47								
18-May-11 20:08:00	1157.69	238.45	194.98	74.00	15.79	78.06	17.05	46.17								

HC/C12/HF/HCN/THC/

5/18/2011 19:18
5/18/2011 21:35

1m

O ₂ (WGS CEMS) (% by vol, dry) 317A107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dflair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 4						
18-May-11 19:18:00	0.88	375.85	82201.78	27139.63	51489.00	180.21
18-May-11 19:19:00	0.96	375.19	82368.68	27052.42	51490.13	180.25
18-May-11 19:20:00	1.01	375.16	82222.81	27040.00	51497.80	180.07
18-May-11 19:21:00	0.86	375.86	82216.63	27206.60	51515.04	179.99
18-May-11 19:22:00	0.88	375.01	82369.01	27217.56	51517.32	180.16
18-May-11 19:23:00	0.95	373.70	82184.15	26970.62	51523.00	180.26
18-May-11 19:24:00	0.77	373.66	81896.67	27094.74	51530.90	180.28
18-May-11 19:25:00	0.76	373.97	81887.33	27126.11	51514.79	181.08
18-May-11 19:26:00	0.87	374.93	81956.47	27214.05	51496.34	181.53
18-May-11 19:27:00	0.80	374.41	82166.16	27247.53	51510.04	181.07
18-May-11 19:28:00	0.63	374.69	82053.02	27325.30	51549.42	180.57
18-May-11 19:29:00	0.71	375.44	82114.14	27288.03	51545.39	181.06
18-May-11 19:30:00	0.85	374.79	82276.92	27041.14	51507.41	180.89
18-May-11 19:31:00	0.85	375.22	82135.17	27136.22	51501.09	180.06
18-May-11 19:32:00	0.77	375.31	82228.82	27113.37	51515.83	180.98
18-May-11 19:33:00	0.82	375.48	82248.57	27153.26	51510.83	181.37
18-May-11 19:34:00	0.91	375.27	82286.97	27187.44	51520.05	181.43
18-May-11 19:35:00	0.93	375.13	82240.34	27093.58	51528.52	180.68
18-May-11 19:36:00	0.85	375.47	82209.73	27275.48	51521.03	180.83
18-May-11 19:37:00	0.87	375.05	82285.27	27211.47	51543.08	180.96
18-May-11 19:38:00	0.84	374.29	82193.13	27281.35	51558.15	180.59
18-May-11 19:39:00	0.67	375.13	82026.73	27387.78	51533.53	181.27
18-May-11 19:40:00	0.58	375.58	82210.09	27403.61	51514.44	182.16
18-May-11 19:41:00	0.78	374.94	82308.92	27169.90	51389.40	181.62
18-May-11 19:42:00	0.93	374.49	82167.95	27031.95	51348.32	181.36
18-May-11 19:43:00	0.93	374.69	82070.67	27007.20	51431.51	181.75
18-May-11 19:44:00	0.93	374.91	82114.44	27028.02	51492.19	181.94
18-May-11 19:45:00	0.99	374.80	82162.15	27051.57	51628.38	181.79
18-May-11 19:46:00	1.05	373.67	82138.21	26899.47	51636.49	181.87
18-May-11 19:47:00	0.99	375.49	81890.94	27052.64	51583.66	181.32
18-May-11 19:48:00	0.98	375.92	82289.93	27029.65	51510.24	182.00
18-May-11 19:49:00	1.07	375.24	82383.82	26906.62	51439.35	181.51
18-May-11 19:50:00	1.05	375.01	82233.79	26984.21	51463.22	180.99
18-May-11 19:51:00	0.89	375.73	82183.47	27216.26	51431.86	181.32
18-May-11 19:52:00	0.70	376.29	82341.19	27335.49	51425.59	182.08
18-May-11 19:53:00	0.79	376.65	82464.43	27276.63	51474.71	181.78
18-May-11 19:54:00	0.84	376.64	82543.28	27206.47	51561.01	181.17
18-May-11 19:55:00	0.91	376.64	82540.36	27159.72	51611.16	180.81
18-May-11 19:56:00	0.97	376.61	82540.53	27132.55	51635.65	180.63
18-May-11 19:57:00	0.97	376.76	82533.27	27148.97	51619.34	180.87
18-May-11 19:58:00	1.04	376.93	82568.13	27105.52	51432.20	181.23
18-May-11 19:59:00	1.03	376.60	82604.62	27057.86	51312.51	181.53
18-May-11 20:00:00	0.96	377.21	82532.91	27155.55	51321.66	181.09
18-May-11 20:01:00	0.94	377.04	82666.17	27154.70	51424.91	181.05
18-May-11 20:02:00	1.01	376.69	82629.52	27127.93	51528.23	180.78
18-May-11 20:03:00	0.82	377.47	82551.56	27353.30	51511.76	180.29
18-May-11 20:04:00	0.81	376.92	82722.50	27277.46	51649.27	181.00
18-May-11 20:05:00	0.91	377.72	82602.84	27256.76	51662.87	181.35
18-May-11 20:06:00	0.96	376.91	82778.11	27105.86	51526.06	181.30
18-May-11 20:07:00	1.03	376.24	82600.16	26993.26	51554.03	181.36
18-May-11 20:08:00	0.92	378.66	82452.30	27265.60	51546.59	180.78

Run 4	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P105B						
18-May-11 20:09:00	77.38		41.92	22.19	120	261.44	91.01	1134.94
18-May-11 20:10:00	77.31		41.87	22.33	121	260.91	91.31	1134.45
18-May-11 20:11:00	77.36		41.83	22.61	120	262.93	90.28	1129.12
18-May-11 20:12:00	77.16		41.88	22.34	118	261.37	91.07	1122.93
18-May-11 20:13:00	77.21		41.89	22.58	121	260.30	91.77	1123.84
18-May-11 20:14:00	77.39		41.96	22.53	121	261.85	90.88	1121.49
18-May-11 20:15:00	77.42		41.97	22.37	122	261.82	91.04	1129.13
18-May-11 20:16:00	77.30		41.96	22.20	121	261.79	91.19	1128.20
18-May-11 20:17:00	77.37		41.92	22.26	120	262.07	90.90	1120.69
18-May-11 20:18:00	77.41		41.77	22.31	119	261.68	90.98	1126.68
18-May-11 20:19:00	77.41		41.73	22.35	118	261.16	91.12	1126.78
18-May-11 20:20:00	77.33		41.89	22.37	118	262.19	90.76	1127.08
18-May-11 20:21:00	77.29		41.94	22.37	118	262.65	90.40	1132.80
18-May-11 20:22:00	77.23		41.97	22.22	117	261.54	90.73	1134.62
18-May-11 20:23:00	77.29		41.87	22.13	119	261.20	90.57	1130.31
18-May-11 20:24:00	77.27		41.88	22.16	120	260.17	90.89	1124.84
18-May-11 20:25:00	77.35		41.92	22.16	120	259.11	91.22	1130.11
18-May-11 20:26:00	77.39		41.97	22.40	121	259.75	90.97	1129.81
18-May-11 20:27:00	77.32		41.90	22.39	120	260.62	90.83	1135.60
18-May-11 20:28:00	77.12		41.85	22.23	118	260.92	90.61	1136.93
18-May-11 20:29:00	77.02		41.94	22.15	118	260.29	90.83	1138.65
18-May-11 20:30:00	77.24		42.00	22.27	118	260.26	90.93	1140.06
18-May-11 20:31:00	77.23		41.92	22.41	121	260.14	90.97	1140.66
18-May-11 20:32:00	77.57		41.88	22.18	122	260.44	90.85	1143.00
18-May-11 20:33:00	77.52		41.96	22.32	122	260.76	90.97	1140.01
18-May-11 20:34:00	77.39		41.90	22.41	122	260.78	90.80	1140.10
18-May-11 20:35:00	77.33		41.92	22.30	122	260.16	91.07	1139.00
18-May-11 20:36:00	77.29		41.98	22.28	121	260.30	90.62	1134.48
18-May-11 20:37:00	77.25		41.85	22.27	119	259.67	90.84	1136.22
18-May-11 20:38:00	77.28		41.86	22.25	121	260.65	90.62	1134.74
18-May-11 20:39:00	77.41		41.78	22.39	120	261.51	90.47	1136.45
18-May-11 20:40:00	77.34		41.84	22.30	119	259.92	91.16	1137.95
18-May-11 20:41:00	77.16		41.89	22.18	119	259.52	91.31	1140.18
18-May-11 20:42:00	77.26		41.84	22.52	119	260.94	90.62	1142.20
18-May-11 20:43:00	77.35		41.79	22.50	121	260.65	90.63	1140.28
18-May-11 20:44:00	77.37		41.83	22.28	122	259.62	91.16	1140.13
18-May-11 20:45:00	77.27		41.86	22.25	121	260.68	90.84	1140.20
18-May-11 20:46:00	77.11		41.87	22.40	120	260.60	91.09	1142.32
18-May-11 20:47:00	77.38		41.91	22.26	119	260.94	91.02	1137.61
18-May-11 20:48:00	77.17		41.93	22.46	119	260.84	91.14	1130.69
18-May-11 20:49:00	77.03		41.81	22.49	119	261.10	90.91	1139.03
18-May-11 20:50:00	77.36		41.93	22.31	119	259.74	91.22	1138.63
18-May-11 20:51:00	77.28		41.87	22.26	120	260.84	91.03	1139.85
18-May-11 20:52:00	77.08		41.85	22.28	120	261.16	90.85	1139.25
18-May-11 20:53:00	77.02		41.91	22.40	122	261.82	90.54	1141.81
18-May-11 20:54:00	77.01		41.89	22.43	122	262.29	90.48	1142.62
18-May-11 20:55:00	77.32		41.80	22.35	122	261.45	90.80	1143.55
18-May-11 20:56:00	77.36		41.86	22.33	122	260.61	91.19	1144.09
18-May-11 20:57:00	77.39		41.98	22.30	121	260.42	91.33	1144.81
18-May-11 20:58:00	77.40		41.95	22.29	119	261.07	91.07	1144.02

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 4							
18-May-11 20:09:00	1158.34	238.51	73.98	15.82	78.21	16.95	39.53
18-May-11 20:10:00	1158.58	238.39	73.90	15.83	78.25	16.90	39.00
18-May-11 20:11:00	1151.11	238.40	73.90	15.75	77.76	16.99	41.13
18-May-11 20:12:00	1144.05	238.55	73.88	15.84	77.28	17.03	41.55
18-May-11 20:13:00	1147.89	238.54	73.87	15.87	77.23	16.97	39.56
18-May-11 20:14:00	1145.03	238.47	73.80	15.80	76.83	17.01	52.67
18-May-11 20:15:00	1150.62	238.43	73.78	15.82	77.30	17.18	91.69
18-May-11 20:16:00	1149.40	238.50	73.70	15.82	77.24	17.19	95.25
18-May-11 20:17:00	1145.94	238.51	73.70	15.80	77.40	17.07	53.26
18-May-11 20:18:00	1148.93	238.42	73.68	15.82	77.22	17.04	46.83
18-May-11 20:19:00	1149.01	238.45	73.60	15.82	77.36	17.03	44.17
18-May-11 20:20:00	1150.73	238.57	73.60	15.80	77.20	17.02	43.95
18-May-11 20:21:00	1157.57	238.63	73.58	15.77	77.71	17.06	45.78
18-May-11 20:22:00	1158.21	238.56	73.52	15.81	78.04	17.08	46.72
18-May-11 20:23:00	1153.45	238.56	73.57	15.80	78.12	17.04	43.94
18-May-11 20:24:00	1147.93	238.59	73.50	15.86	78.02	17.02	42.77
18-May-11 20:25:00	1155.82	238.66	73.50	15.86	78.21	17.06	44.55
18-May-11 20:26:00	1154.13	238.67	73.50	15.85	78.03	17.07	49.79
18-May-11 20:27:00	1158.52	238.65	73.50	15.85	78.46	17.22	101.38
18-May-11 20:28:00	1159.57	238.62	73.50	15.81	78.45	17.29	130.79
18-May-11 20:29:00	1163.02	238.85	73.50	15.82	79.01	17.21	71.34
18-May-11 20:30:00	1164.03	239.14	73.50	15.84	79.25	17.16	55.15
18-May-11 20:31:00	1163.84	238.74	73.50	15.86	79.28	17.13	49.15
18-May-11 20:32:00	1165.98	238.71	73.50	15.84	79.38	17.14	47.96
18-May-11 20:33:00	1164.63	238.74	73.48	15.88	79.37	17.15	46.29
18-May-11 20:34:00	1165.16	238.58	73.40	15.85	79.38	17.12	45.90
18-May-11 20:35:00	1162.55	238.59	73.40	15.86	79.43	17.12	48.47
18-May-11 20:36:00	1155.12	238.59	73.33	15.82	79.11	17.15	51.63
18-May-11 20:37:00	1160.50	238.58	73.30	15.86	79.15	17.11	47.14
18-May-11 20:38:00	1158.92	238.59	73.30	15.83	78.87	17.15	58.61
18-May-11 20:39:00	1160.27	238.66	73.30	15.84	79.03	17.24	96.28
18-May-11 20:40:00	1160.81	238.65	73.30	15.86	78.87	17.26	106.23
18-May-11 20:41:00	1163.30	238.60	73.23	15.87	79.12	17.16	58.60
18-May-11 20:42:00	1164.94	238.63	73.20	15.84	79.30	17.12	50.53
18-May-11 20:43:00	1164.02	238.72	73.20	15.85	79.35	17.12	50.33
18-May-11 20:44:00	1163.68	238.67	73.20	15.85	79.31	17.10	48.10
18-May-11 20:45:00	1164.48	238.71	73.13	15.85	79.41	17.07	44.80
18-May-11 20:46:00	1166.20	238.74	73.10	15.85	79.41	17.12	46.92
18-May-11 20:47:00	1160.99	238.47	73.10	15.81	79.17	17.11	44.59
18-May-11 20:48:00	1154.10	238.22	73.10	15.84	79.00	17.12	45.68
18-May-11 20:49:00	1163.52	238.18	73.10	15.85	79.27	17.11	45.33
18-May-11 20:50:00	1162.15	238.28	73.10	15.83	79.15	17.12	47.18
18-May-11 20:51:00	1163.84	238.35	73.03	15.83	79.52	17.21	82.61
18-May-11 20:52:00	1163.79	238.17	73.02	15.81	79.36	17.26	108.67
18-May-11 20:53:00	1165.40	238.08	73.05	15.79	79.52	17.18	65.50
18-May-11 20:54:00	1165.63	238.18	73.10	15.82	79.53	17.15	53.53
18-May-11 20:55:00	1166.38	238.07	73.10	15.84	79.57	17.12	48.47
18-May-11 20:56:00	1167.58	238.07	73.10	15.83	79.73	17.10	44.03
18-May-11 20:57:00	1168.42	238.22	73.10	15.83	79.85	17.12	45.11
18-May-11 20:58:00	1167.59	238.28	73.03	15.83	79.88	17.12	46.70

	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 4							
18-May-11 20:09:00	0.95	378.05	82984.38	79396.97	27093.58	51525.97	181.94
18-May-11 20:10:00	1.14	377.36	82850.08	79856.87	26933.91	51512.21	181.03
18-May-11 20:11:00	1.12	377.07	82698.08	79871.26	27021.63	51502.42	181.06
18-May-11 20:12:00	1.09	377.65	82634.72	79783.77	27127.64	51497.37	181.12
18-May-11 20:13:00	1.11	377.45	82762.78	79728.79	27027.04	51368.09	181.26
18-May-11 20:14:00	1.11	377.11	82717.63	79814.39	27057.94	51342.85	180.66
18-May-11 20:15:00	0.86	377.39	82644.75	79812.84	27355.31	51525.62	180.52
18-May-11 20:16:00	0.75	377.69	82705.86	79653.16	27419.88	51608.30	180.96
18-May-11 20:17:00	1.00	377.69	82771.25	79631.90	27203.15	51619.38	181.22
18-May-11 20:18:00	1.03	377.62	82770.55	79815.40	27152.60	51639.97	181.38
18-May-11 20:19:00	1.01	377.43	82756.65	79817.54	27127.51	51626.02	181.60
18-May-11 20:20:00	1.01	377.04	82713.05	79774.11	27093.78	51625.06	181.13
18-May-11 20:21:00	0.98	377.52	82627.61	79718.06	27179.57	51615.79	180.99
18-May-11 20:22:00	0.94	377.56	82733.16	79647.57	27227.65	51613.77	181.09
18-May-11 20:23:00	0.93	376.92	82743.47	79724.22	27134.73	51598.62	181.26
18-May-11 20:24:00	1.03	376.42	82601.76	79698.79	27043.59	51658.10	181.34
18-May-11 20:25:00	0.98	375.95	82492.32	79633.88	27072.18	51623.75	181.22
18-May-11 20:26:00	0.98	375.21	82389.63	79517.12	27024.78	51477.62	181.23
18-May-11 20:27:00	0.82	375.64	82227.83	79428.62	27292.70	51502.20	181.71
18-May-11 20:28:00	0.62	376.32	82321.64	79255.67	27483.11	51658.03	182.48
18-May-11 20:29:00	0.75	376.19	82470.55	79231.62	27333.50	51768.75	182.42
18-May-11 20:30:00	0.84	375.80	82442.72	79416.46	27214.22	51756.47	181.52
18-May-11 20:31:00	0.89	376.00	82356.01	79433.94	27186.09	51726.23	181.72
18-May-11 20:32:00	0.89	376.01	82399.82	79372.10	27199.87	51714.39	181.83
18-May-11 20:33:00	0.91	376.25	82403.44	79421.24	27215.15	51717.83	181.41
18-May-11 20:34:00	0.95	376.78	82455.15	79444.15	27214.37	51573.43	181.64
18-May-11 20:35:00	0.94	376.57	82571.03	79510.07	27204.36	51459.28	181.62
18-May-11 20:36:00	0.89	376.13	82524.74	79611.53	27210.78	51522.71	181.03
18-May-11 20:37:00	0.91	375.65	82428.54	79551.74	27129.08	51676.72	181.77
18-May-11 20:38:00	0.84	375.41	82324.00	79431.81	27180.13	51785.86	181.91
18-May-11 20:39:00	0.78	376.12	82271.30	79311.83	27368.41	51758.97	182.52
18-May-11 20:40:00	0.75	376.88	82427.75	79286.63	27451.07	51726.00	182.35
18-May-11 20:41:00	0.96	376.09	82593.54	79432.75	27202.40	51707.92	182.11
18-May-11 20:42:00	1.03	375.81	82420.77	79695.48	27116.47	51713.19	181.50
18-May-11 20:43:00	0.92	376.43	82359.50	79549.93	27192.51	51706.75	181.90
18-May-11 20:44:00	0.90	376.17	82495.52	79379.98	27157.40	51695.95	182.13
18-May-11 20:45:00	1.00	375.69	82438.16	79491.73	27060.99	51687.58	181.92
18-May-11 20:46:00	0.93	376.43	82332.93	79496.07	27188.25	51657.98	181.83
18-May-11 20:47:00	0.92	376.61	82495.08	79368.88	27193.56	51640.30	181.89
18-May-11 20:48:00	0.92	376.73	82534.31	79515.77	27212.58	51643.55	181.54
18-May-11 20:49:00	0.93	377.04	82560.91	79548.29	27227.64	51641.47	182.18
18-May-11 20:50:00	0.99	377.01	82629.47	79589.20	27218.89	51647.86	181.25
18-May-11 20:51:00	0.89	375.93	82622.85	79713.74	27275.80	51659.72	181.34
18-May-11 20:52:00	0.83	376.82	82385.54	79704.08	27422.18	51687.50	181.41
18-May-11 20:53:00	0.84	376.78	82581.12	79453.16	27311.02	51696.99	181.90
18-May-11 20:54:00	0.94	377.14	82572.28	79589.35	27276.72	51697.47	181.77
18-May-11 20:55:00	0.98	377.74	82649.64	79647.76	27267.46	51711.88	181.64
18-May-11 20:56:00	1.05	377.31	82781.67	79736.43	27191.21	51711.55	181.33
18-May-11 20:57:00	0.99	376.79	82688.03	79897.54	27199.85	51716.37	180.27
18-May-11 20:58:00	0.95	376.78	82572.75	79772.77	27203.46	51723.21	180.66

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#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FE106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 4							
18-May-11 20:59:00	1163.75	238.31	195.17	15.82	79.73	17.08	44.65
18-May-11 21:00:00	1158.18	238.13	195.00	15.86	79.58	17.06	42.64
18-May-11 21:01:00	1162.02	238.22	195.05	15.87	79.35	17.05	42.44
18-May-11 21:02:00	1159.67	238.23	195.08	15.85	78.94	17.11	52.43
18-May-11 21:03:00	1162.79	238.24	195.18	15.83	79.33	15.42	77.84
18-May-11 21:04:00	1164.82	238.25	195.28	15.85	79.40	14.07	76.11
18-May-11 21:05:00	1168.10	238.35	195.04	15.83	79.87	17.01	48.88
18-May-11 21:06:00	1167.60	238.58	195.08	15.81	79.87	17.12	50.65
18-May-11 21:07:00	1168.42	238.40	194.95	15.84	79.79	17.10	47.22
18-May-11 21:08:00	1166.87	238.31	194.96	15.88	79.73	17.02	41.03
18-May-11 21:09:00	1167.14	238.21	194.77	15.84	79.75	17.05	41.40
18-May-11 21:10:00	1169.10	238.12	194.76	15.85	79.97	17.09	44.03
18-May-11 21:11:00	1164.48	238.13	194.74	15.89	79.83	17.10	44.03
18-May-11 21:12:00	1159.91	238.38	194.68	15.89	79.67	17.09	42.75
18-May-11 21:13:00	1164.34	238.34	194.65	15.88	79.50	17.12	45.10
18-May-11 21:14:00	1161.15	238.34	194.66	15.88	79.06	17.19	58.47
18-May-11 21:15:00	1162.55	238.29	194.68	15.88	79.31	17.29	88.55
18-May-11 21:16:00	1162.20	238.16	194.65	15.87	79.27	17.27	87.76
18-May-11 21:17:00	1168.67	238.06	194.54	15.88	79.73	17.16	59.64
18-May-11 21:18:00	1171.49	237.86	194.47	15.85	79.66	17.11	49.49
18-May-11 21:19:00	1162.92	238.00	194.51	15.90	79.35	17.12	48.01
18-May-11 21:20:00	1164.18	238.20	194.36	15.88	79.41	17.13	46.54
18-May-11 21:21:00	1170.22	238.11	194.30	15.88	80.04	17.13	45.84
18-May-11 21:22:00	1169.05	238.15	194.23	15.90	80.03	17.14	46.05
18-May-11 21:23:00	1162.55	238.08	194.28	15.91	79.84	17.11	43.82
18-May-11 21:24:00	1157.51	237.86	194.15	15.87	79.70	17.10	43.33
18-May-11 21:25:00	1163.76	237.80	194.18	15.87	79.54	17.16	48.82
18-May-11 21:26:00	1160.40	237.87	194.05	15.87	79.05	17.25	60.37
18-May-11 21:27:00	1163.97	237.86	194.14	15.89	79.45	17.30	80.64
18-May-11 21:28:00	1164.79	237.95	194.16	15.91	79.46	17.27	82.37
18-May-11 21:29:00	1167.09	237.93	193.95	15.92	79.73	17.19	57.06
18-May-11 21:30:00	1168.49	237.74	193.92	15.92	79.93	17.20	53.07
18-May-11 21:31:00	1169.98	237.68	193.91	15.90	80.10	17.20	50.80
18-May-11 21:32:00	1170.85	237.65	193.89	15.91	80.21	17.22	52.98
18-May-11 21:33:00	1169.60	237.60	193.78	15.89	80.23	17.21	50.93
18-May-11 21:34:00	1168.35	237.67	193.67	15.90	80.12	17.17	47.58
1159.83	238.40	194.11	73.82	15.84	78.76	17.09	56.37

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5/19/2011 9:46
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HC1C12/HF/HCN/THC/Methane/Ethane/CO/NOx/SO2 Run 3

1m

Run 5	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FI113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FI105
19-May-11 09:46:00	77.85	42.97	21.90	127	260.31	89.65	1145.81
19-May-11 09:47:00	77.95	42.93	22.03	126	262.09	88.99	1147.81
19-May-11 09:48:00	77.84	43.01	22.19	123	263.41	88.48	1146.38
19-May-11 09:49:00	77.75	43.02	22.04	124	260.03	90.13	1135.03
19-May-11 09:50:00	77.73	43.03	22.26	124	259.54	90.28	1127.46
19-May-11 09:51:00	77.70	42.96	21.98	125	261.19	89.46	1138.28
19-May-11 09:52:00	77.75	43.01	21.98	124	260.76	89.56	1143.49
19-May-11 09:53:00	77.86	43.01	22.01	124	261.92	89.42	1137.15
19-May-11 09:54:00	77.65	43.02	21.89	123	260.06	90.42	1130.58
19-May-11 09:55:00	77.56	42.93	21.91	123	260.46	89.78	1135.33
19-May-11 09:56:00	77.78	42.98	21.90	124	260.36	89.43	1147.71
19-May-11 09:57:00	77.73	42.95	21.64	124	258.28	90.12	1143.58
19-May-11 09:58:00	77.77	43.11	21.83	123	258.52	90.45	1142.87
19-May-11 09:59:00	77.98	43.11	21.84	123	258.41	90.60	1142.98
19-May-11 10:00:00	78.00	43.13	21.78	124	257.48	90.75	1131.93
19-May-11 10:01:00	77.95	43.08	21.79	124	257.79	90.30	1123.98
19-May-11 10:02:00	77.93	43.09	21.57	123	255.72	91.16	1138.64
19-May-11 10:03:00	77.92	42.99	21.75	123	256.14	90.95	1143.20
19-May-11 10:04:00	77.87	42.90	21.80	124	257.21	90.33	1139.22
19-May-11 10:05:00	77.61	42.99	21.79	123	256.55	90.63	1131.07
19-May-11 10:06:00	77.69	43.10	21.78	123	256.36	90.82	1135.68
19-May-11 10:07:00	78.00	43.11	21.85	123	257.64	90.12	1144.53
19-May-11 10:08:00	78.04	43.01	21.84	123	258.06	89.82	1149.54
19-May-11 10:09:00	78.00	42.97	21.68	122	258.26	89.64	1139.62
19-May-11 10:10:00	77.94	43.06	21.79	122	258.66	89.24	1139.53
19-May-11 10:11:00	77.85	43.17	21.80	123	258.48	89.58	1139.75
19-May-11 10:12:00	77.77	43.14	21.80	122	258.89	89.41	1140.87
19-May-11 10:13:00	77.68	43.10	21.45	123	255.91	90.44	1137.27
19-May-11 10:14:00	77.77	43.14	21.52	123	255.61	90.71	1138.98
19-May-11 10:15:00	77.55	43.15	21.67	122	257.23	90.10	1140.65
19-May-11 10:16:00	77.52	43.19	21.67	122	256.13	90.50	1140.06
19-May-11 10:17:00	77.79	43.16	21.63	123	256.49	90.02	1132.94
19-May-11 10:18:00	77.93	43.20	21.65	122	257.69	89.57	1130.99
19-May-11 10:19:00	77.92	43.17	21.50	122	257.85	89.19	1137.49
19-May-11 10:20:00	77.92	43.28	21.55	123	255.79	90.21	1149.76
19-May-11 10:21:00	78.06	43.25	21.55	122	257.29	90.01	1143.33
19-May-11 10:22:00	78.03	43.24	21.72	122	257.22	89.75	1143.56
19-May-11 10:23:00	77.92	43.35	21.73	123	256.45	90.03	1143.95
19-May-11 10:24:00	77.75	43.37	21.67	123	257.55	89.58	1141.50
19-May-11 10:25:00	77.71	43.46	21.71	123	256.16	90.06	1138.40
19-May-11 10:26:00	77.83	43.35	21.65	123	257.14	89.71	1139.74
19-May-11 10:27:00	77.94	43.21	21.67	123	257.99	89.49	1141.15
19-May-11 10:28:00	77.71	43.34	21.71	123	259.46	89.15	1140.36
19-May-11 10:29:00	77.50	43.30	21.49	123	258.99	89.41	1132.33
19-May-11 10:30:00	77.47	43.40	21.61	122	258.34	89.67	1131.02
19-May-11 10:31:00	77.80	43.46	21.71	123	258.83	89.30	1128.72
19-May-11 10:32:00	77.64	43.48	21.58	123	258.63	89.34	1131.03
19-May-11 10:33:00	77.64	43.45	21.62	123	258.30	89.41	1133.30
19-May-11 10:34:00	77.75	43.47	21.54	123	257.95	89.48	1133.71
19-May-11 10:35:00	77.98	43.40	21.40	122	257.82	89.72	1135.35
19-May-11 10:36:00	77.88	43.28	21.66	123	260.40	88.62	1133.52

HC1/C12/HF/HCN/THC/

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TH1112	Tempered Air Temp (oF) 317TH1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 5							
19-May-11 09:46:00	241.85	199.12	79.82	15.70	79.62	17.09	51.50
19-May-11 09:47:00	242.01	199.49	79.90	15.66	79.87	16.99	40.83
19-May-11 09:48:00	241.97	199.55	79.98	15.67	79.68	16.98	38.44
19-May-11 09:49:00	241.96	199.57	80.13	15.76	79.56	16.91	36.62
19-May-11 09:50:00	241.91	199.55	80.32	15.73	79.31	16.85	35.61
19-May-11 09:51:00	241.90	199.34	80.48	15.68	79.01	16.92	36.03
19-May-11 09:52:00	242.13	199.30	80.60	15.67	78.97	16.97	36.55
19-May-11 09:53:00	242.15	199.53	80.53	15.69	78.54	16.95	36.41
19-May-11 09:54:00	242.43	199.81	80.50	15.78	78.46	16.93	36.37
19-May-11 09:55:00	242.44	200.12	80.50	15.76	78.78	16.89	36.06
19-May-11 09:56:00	242.46	200.21	80.52	15.73	79.14	17.04	45.15
19-May-11 09:57:00	242.52	200.23	80.53	15.73	79.50	17.11	53.99
19-May-11 09:58:00	242.59	200.23	80.50	15.79	79.56	17.02	44.75
19-May-11 09:59:00	242.65	200.14	80.50	15.76	79.40	17.03	41.90
19-May-11 10:00:00	242.73	200.25	80.43	15.76	79.19	17.07	41.76
19-May-11 10:01:00	243.15	200.33	80.40	15.73	79.25	17.09	41.46
19-May-11 10:02:00	243.34	200.42	80.40	15.79	78.94	17.12	41.37
19-May-11 10:03:00	243.79	200.71	80.40	15.75	79.06	17.12	42.34
19-May-11 10:04:00	244.03	200.75	80.40	15.74	78.79	17.18	48.11
19-May-11 10:05:00	244.23	201.11	80.42	15.79	78.49	17.22	48.71
19-May-11 10:06:00	244.24	201.39	80.52	15.82	78.45	17.21	47.90
19-May-11 10:07:00	244.25	201.79	80.68	15.82	78.67	17.26	54.42
19-May-11 10:08:00	243.87	201.47	80.80	15.80	78.36	17.38	101.89
19-May-11 10:09:00	243.79	201.07	80.87	15.77	78.79	17.45	151.96
19-May-11 10:10:00	243.67	201.01	80.97	15.73	78.85	17.39	109.21
19-May-11 10:11:00	243.65	201.07	81.02	15.77	78.95	17.34	72.91
19-May-11 10:12:00	243.69	200.81	81.10	15.78	79.26	17.31	60.39
19-May-11 10:13:00	243.53	200.60	81.17	15.81	78.89	17.30	58.96
19-May-11 10:14:00	243.46	200.21	81.28	15.78	78.77	17.29	59.98
19-May-11 10:15:00	243.40	199.77	81.48	15.77	78.96	17.34	72.93
19-May-11 10:16:00	243.53	199.70	81.60	15.79	78.97	17.34	69.19
19-May-11 10:17:00	243.54	199.68	81.68	15.75	78.72	17.34	68.49
19-May-11 10:18:00	243.40	199.57	81.88	15.73	78.42	17.37	77.27
19-May-11 10:19:00	243.64	199.46	82.02	15.74	78.45	17.39	79.74
19-May-11 10:20:00	243.98	199.68	82.10	15.78	78.67	17.44	125.27
19-May-11 10:21:00	243.96	199.90	82.03	15.78	79.19	17.50	188.34
19-May-11 10:22:00	243.96	199.71	82.00	15.72	79.46	17.45	158.41
19-May-11 10:23:00	243.93	199.80	81.98	15.74	79.33	17.37	91.99
19-May-11 10:24:00	244.09	199.75	81.90	15.71	79.26	17.32	78.57
19-May-11 10:25:00	244.01	200.05	81.90	15.76	79.18	17.33	89.40
19-May-11 10:26:00	244.26	200.16	81.90	15.73	79.23	17.29	72.03
19-May-11 10:27:00	244.51	200.34	81.88	15.69	79.03	17.32	75.90
19-May-11 10:28:00	244.61	200.73	81.78	15.70	78.70	17.31	68.14
19-May-11 10:29:00	244.82	201.07	81.63	15.72	78.54	17.29	63.00
19-May-11 10:30:00	244.95	201.70	81.68	15.73	78.09	17.28	59.72
19-May-11 10:31:00	245.20	202.07	81.82	15.73	77.77	17.26	57.60
19-May-11 10:32:00	245.28	202.35	81.98	15.71	77.40	17.34	145.64
19-May-11 10:33:00	245.49	202.75	82.12	15.69	77.83	17.44	244.09
19-May-11 10:34:00	245.95	203.32	82.25	15.71	77.65	17.33	136.01
19-May-11 10:35:00	246.19	203.54	82.18	15.69	77.70	17.27	84.28
19-May-11 10:36:00	246.46	203.80	82.08	15.64	77.74	17.28	78.58

HC/C12/HF/HCN/THC/

5/19/2011 9:46
5/19/2011 12:10

1m

O ₂ (WGS CEMS) (% by vol, dry) 317AI07	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dflair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 5						
19-May-11 09:46:00	1.12	373.68	79221.14	26898.21	51090.81	176.88
19-May-11 09:47:00	1.24	372.99	78988.55	26899.36	51053.24	177.88
19-May-11 09:48:00	1.20	373.86	79120.61	26760.43	51013.43	177.17
19-May-11 09:49:00	1.30	374.78	78926.61	26712.71	51032.88	177.62
19-May-11 09:50:00	1.50	373.39	82132.42	26481.60	51009.23	177.32
19-May-11 09:51:00	1.44	373.01	81827.90	26555.40	51063.70	176.86
19-May-11 09:52:00	1.32	373.43	81744.60	26678.78	51163.03	177.09
19-May-11 09:53:00	1.31	373.15	81838.08	26636.17	51307.62	177.64
19-May-11 09:54:00	1.37	374.32	81775.88	26688.14	51393.47	177.36
19-May-11 09:55:00	1.41	373.72	82032.28	26579.44	51280.74	178.14
19-May-11 09:56:00	1.32	373.39	81900.24	26760.30	51253.49	177.14
19-May-11 09:57:00	1.14	372.63	81828.88	26849.37	51280.52	177.42
19-May-11 09:58:00	1.21	371.43	81662.84	26626.31	51287.98	177.12
19-May-11 09:59:00	1.23	372.31	81396.89	26702.48	51269.66	177.17
19-May-11 10:00:00	1.30	372.13	81590.84	26711.35	51207.22	177.81
19-May-11 10:01:00	1.20	371.19	81549.56	26699.20	51224.34	177.48
19-May-11 10:02:00	1.08	370.85	81345.83	26744.99	51250.95	177.49
19-May-11 10:03:00	1.13	369.90	81271.93	26659.30	51233.88	178.58
19-May-11 10:04:00	1.11	369.78	81063.05	26732.86	51214.02	179.04
19-May-11 10:05:00	0.93	370.13	81038.58	26850.26	51209.25	179.21
19-May-11 10:06:00	0.93	369.99	81114.45	26829.10	51280.11	179.12
19-May-11 10:07:00	0.96	370.17	81083.93	26890.71	51389.83	178.71
19-May-11 10:08:00	0.80	370.72	81122.89	27127.34	51443.05	178.94
19-May-11 10:09:00	0.76	370.81	81242.45	27234.47	51459.78	179.21
19-May-11 10:10:00	0.74	370.64	81262.19	27154.87	51448.37	178.52
19-May-11 10:11:00	0.73	370.50	81226.25	27084.25	51458.66	178.15
19-May-11 10:12:00	0.81	370.97	81194.74	27050.62	51500.21	178.54
19-May-11 10:13:00	0.87	371.15	81298.36	27038.96	51368.88	178.77
19-May-11 10:14:00	0.95	369.39	81337.39	27497.34	51253.07	178.20
19-May-11 10:15:00	0.94	369.36	80951.65	26937.89	51243.01	177.92
19-May-11 10:16:00	0.79	370.29	80944.60	27047.15	51243.70	178.44
19-May-11 10:17:00	0.85	369.59	81150.33	26980.91	51299.09	179.03
19-May-11 10:18:00	0.79	369.25	80996.30	27013.32	51329.21	177.94
19-May-11 10:19:00	0.73	369.96	80921.63	27093.88	51361.38	178.43
19-May-11 10:20:00	0.80	369.64	81076.83	27120.03	51381.94	178.38
19-May-11 10:21:00	0.70	368.98	81006.28	27184.81	51379.56	177.77
19-May-11 10:22:00	0.65	370.15	80863.00	27217.80	51379.83	177.82
19-May-11 10:23:00	0.73	369.47	81118.04	27042.45	51364.75	178.22
19-May-11 10:24:00	0.77	369.18	80969.06	26951.69	51332.46	177.68
19-May-11 10:25:00	0.81	369.57	80906.74	26984.13	51299.55	177.47
19-May-11 10:26:00	0.80	368.96	80990.67	26891.76	51315.46	178.04
19-May-11 10:27:00	0.75	369.29	80857.98	26965.60	51346.81	178.36
19-May-11 10:28:00	0.74	369.77	80930.38	26968.37	51347.01	178.36
19-May-11 10:29:00	0.85	370.86	81035.48	27024.41	51371.06	178.58
19-May-11 10:30:00	0.92	370.64	81274.29	26965.08	51368.88	177.90
19-May-11 10:31:00	0.89	370.20	81226.86	26912.76	51355.73	176.64
19-May-11 10:32:00	0.83	370.27	81129.77	27041.97	51280.82	176.72
19-May-11 10:33:00	0.76	369.89	81145.70	27168.54	51182.15	177.11
19-May-11 10:34:00	0.69	369.48	81061.25	27013.41	51310.09	176.79
19-May-11 10:35:00	0.64	369.15	80972.28	26925.42	51434.85	177.32
19-May-11 10:36:00	0.72	369.14	80899.64	26909.09	51452.54	178.62

Run 5	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B	317P1108	317P1177A	317FC202	317FC115	317F1113	317FI105
19-May-11 10:37:00	77.94		43.33	21.76	122	259.37	89.13	1132.11
19-May-11 10:38:00	78.05		43.34	21.70	122	259.28	89.33	1130.07
19-May-11 10:39:00	78.10		43.35	21.69	122	258.71	89.66	1131.04
19-May-11 10:40:00	77.98		43.35	21.75	122	259.74	89.07	1130.35
19-May-11 10:41:00	77.86		43.40	21.53	121	259.25	89.20	1123.03
19-May-11 10:42:00	77.87		43.30	21.25	121	255.94	90.32	1123.44
19-May-11 10:43:00	77.83		43.37	21.34	122	256.55	90.38	1125.69
19-May-11 10:44:00	77.89		43.50	21.43	122	257.20	89.80	1132.76
19-May-11 10:45:00	77.83		43.34	21.43	122	253.99	90.25	1135.76
19-May-11 10:46:00	77.85		43.28	21.65	122	255.90	90.44	1136.41
19-May-11 10:47:00	78.02		43.38	21.68	122	256.84	89.95	1135.09
19-May-11 10:48:00	77.82		43.36	21.87	122	256.09	90.31	1133.01
19-May-11 10:49:00	77.76		43.36	21.74	122	255.00	90.68	1130.74
19-May-11 10:50:00	77.82		43.47	21.73	122	255.78	89.79	1131.55
19-May-11 10:51:00	77.84		43.51	21.76	121	259.11	89.50	1131.80
19-May-11 10:52:00	77.76		43.60	21.88	121	260.36	89.02	1131.16
19-May-11 10:53:00	77.85		43.54	21.93	121	259.09	89.22	1123.01
19-May-11 10:54:00	77.82		43.51	21.70	122	258.57	89.35	1127.84
19-May-11 10:55:00	77.95		43.51	21.64	122	258.83	89.26	1131.51
19-May-11 10:56:00	77.96		43.34	21.67	121	257.84	89.63	1141.40
19-May-11 10:57:00	77.76		43.39	21.59	122	258.00	89.67	1134.42
19-May-11 10:58:00	77.72		43.58	21.64	122	258.77	89.54	1134.52
19-May-11 10:59:00	77.90		43.61	21.80	121	258.70	89.72	1129.69
19-May-11 11:00:00	77.88		43.58	21.84	121	258.20	89.88	1125.75
19-May-11 11:01:00	77.79		43.68	21.56	121	257.32	90.28	1128.81
19-May-11 11:02:00	77.95		43.55	21.51	121	257.83	89.99	1127.78
19-May-11 11:03:00	77.83		43.53	21.62	121	259.50	89.26	1134.46
19-May-11 11:04:00	77.91		43.53	21.73	121	259.93	89.08	1131.10
19-May-11 11:05:00	77.83		43.58	21.53	121	257.48	89.67	1124.12
19-May-11 11:06:00	77.80		43.72	21.76	121	257.49	89.87	1129.87
19-May-11 11:07:00	77.76		43.68	21.81	121	257.78	89.77	1133.94
19-May-11 11:08:00	77.98		43.69	21.38	121	256.02	90.43	1131.32
19-May-11 11:09:00	77.76		43.66	21.36	122	257.42	90.05	1137.53
19-May-11 11:10:00	77.82		43.64	21.50	122	259.18	89.29	1137.66
19-May-11 11:11:00	77.83		43.62	21.72	122	258.36	89.50	1137.97
19-May-11 11:12:00	77.76		43.69	21.71	121	257.55	89.76	1135.21
19-May-11 11:13:00	77.89		43.61	21.78	121	256.74	90.16	1131.52
19-May-11 11:14:00	77.86		43.56	21.81	121	258.79	89.47	1130.37
19-May-11 11:15:00	78.02		43.62	21.62	121	257.13	90.24	1132.98
19-May-11 11:16:00	77.95		43.62	21.52	121	256.91	90.34	1131.43
19-May-11 11:17:00	77.88		43.69	21.44	121	257.78	89.77	1123.09
19-May-11 11:18:00	77.75		43.72	21.40	121	257.40	89.59	1128.22
19-May-11 11:19:00	77.80		43.59	21.33	121	257.20	89.62	1133.79
19-May-11 11:20:00	77.90		43.58	21.54	120	257.47	89.63	1144.06
19-May-11 11:21:00	77.88		43.63	21.45	120	256.35	90.42	1138.18
19-May-11 11:22:00	78.06		43.46	21.36	120	257.96	89.77	1139.16
19-May-11 11:23:00	77.97		43.53	21.55	120	258.26	89.49	1138.21
19-May-11 11:24:00	77.95		43.51	21.67	120	257.67	89.59	1138.42
19-May-11 11:25:00	77.87		43.51	21.47	120	255.97	90.08	1134.44
19-May-11 11:26:00	77.99		43.57	21.49	120	256.54	89.78	1132.02

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 5							
19-May-11 10:37:00	1155.79	246.53	82.00	15.71	77.82	17.23	72.76
19-May-11 10:38:00	1154.20	246.34	81.92	15.73	77.64	17.10	47.65
19-May-11 10:39:00	1152.87	246.02	81.80	15.75	77.33	17.11	48.85
19-May-11 10:40:00	1149.26	245.78	81.80	15.69	77.02	17.14	49.06
19-May-11 10:41:00	1142.31	245.77	81.78	15.70	76.87	17.15	48.93
19-May-11 10:42:00	1144.51	245.79	81.68	15.72	76.77	17.13	46.92
19-May-11 10:43:00	1147.88	245.86	81.60	15.71	76.90	17.15	50.90
19-May-11 10:44:00	1157.33	245.94	81.53	15.71	77.42	17.29	141.69
19-May-11 10:45:00	1157.61	246.06	81.48	15.75	77.67	17.39	210.02
19-May-11 10:46:00	1156.53	246.28	81.40	15.71	77.70	17.30	87.66
19-May-11 10:47:00	1157.91	246.39	81.40	15.75	77.87	17.30	86.94
19-May-11 10:48:00	1154.87	246.47	81.42	15.72	77.66	17.27	72.08
19-May-11 10:49:00	1153.15	246.60	81.57	15.80	77.60	17.23	59.02
19-May-11 10:50:00	1153.67	246.53	81.60	15.77	77.57	17.22	64.49
19-May-11 10:51:00	1153.98	246.60	81.62	15.72	77.42	17.29	79.77
19-May-11 10:52:00	1152.79	246.67	81.73	15.69	77.23	17.27	64.47
19-May-11 10:53:00	1144.43	246.64	81.98	15.66	76.97	17.22	56.87
19-May-11 10:54:00	1149.55	246.44	82.18	15.68	77.08	17.19	54.66
19-May-11 10:55:00	1154.68	246.43	82.38	15.73	77.43	17.19	58.19
19-May-11 10:56:00	1161.02	246.45	82.57	15.72	77.49	17.25	104.54
19-May-11 10:57:00	1156.65	246.43	82.62	15.70	77.67	17.33	163.48
19-May-11 10:58:00	1156.96	246.30	82.70	15.72	77.76	17.25	97.65
19-May-11 10:59:00	1154.06	246.37	82.72	15.74	77.86	17.20	66.37
19-May-11 11:00:00	1149.82	246.35	82.80	15.71	77.78	17.20	59.09
19-May-11 11:01:00	1151.68	246.33	82.80	15.75	77.49	17.21	57.63
19-May-11 11:02:00	1149.83	246.11	82.80	15.72	76.92	17.19	51.31
19-May-11 11:03:00	1155.94	246.10	82.80	15.67	77.15	17.21	55.09
19-May-11 11:04:00	1153.27	246.14	82.82	15.71	77.22	17.22	57.90
19-May-11 11:05:00	1147.41	246.26	82.90	15.70	77.26	17.15	49.49
19-May-11 11:06:00	1150.50	246.32	82.90	15.71	77.30	17.15	47.94
19-May-11 11:07:00	1155.97	246.28	82.88	15.70	77.51	17.21	54.01
19-May-11 11:08:00	1153.68	246.22	82.80	15.70	77.25	17.29	96.93
19-May-11 11:09:00	1159.38	246.35	82.87	15.68	78.02	17.39	167.42
19-May-11 11:10:00	1160.16	246.52	82.90	15.67	78.21	17.33	145.06
19-May-11 11:11:00	1160.25	246.75	82.90	15.67	78.22	17.24	78.29
19-May-11 11:12:00	1158.75	246.75	82.88	15.72	78.18	17.20	64.43
19-May-11 11:13:00	1155.38	246.78	82.80	15.71	77.91	17.20	66.27
19-May-11 11:14:00	1153.69	246.83	82.80	15.72	77.71	17.22	68.42
19-May-11 11:15:00	1155.27	246.66	82.80	15.77	77.62	17.26	77.06
19-May-11 11:16:00	1153.31	246.68	82.78	15.75	77.49	17.23	58.62
19-May-11 11:17:00	1147.28	246.61	82.78	15.71	77.47	17.25	62.03
19-May-11 11:18:00	1148.85	246.32	82.98	15.74	77.32	17.25	61.83
19-May-11 11:19:00	1155.47	246.43	83.12	15.76	77.62	17.25	63.15
19-May-11 11:20:00	1165.92	246.51	83.20	15.74	78.04	17.31	161.52
19-May-11 11:21:00	1160.63	246.77	83.20	15.78	78.26	17.40	262.73
19-May-11 11:22:00	1161.10	246.81	83.20	15.73	78.32	17.32	121.71
19-May-11 11:23:00	1161.60	246.50	83.20	15.75	78.43	17.31	89.50
19-May-11 11:24:00	1161.72	246.31	83.27	15.74	78.51	17.27	64.70
19-May-11 11:25:00	1158.35	246.41	83.30	15.75	78.51	17.25	57.93
19-May-11 11:26:00	1155.28	246.37	83.23	15.71	78.23	17.27	65.95

Run 5	O ₂ (WGS CEMS) (% by vol, dry)		Total Corrected Air (M lb/hr)		Volume Air to Reg (dscfm) - Q _a		Vol Reg FG (dscfm) - Q _r		EPA Coke Make (lbs/hr)		Cat Feed Rate (BPD)		L/G Ratio (gal/MSCF)	
	317A1107	317C_Tot_Corr_Air	317C_Tot_Corr_Air	317C_dryair	317C_Qa	317C_fuegas	317C_Qr	Rc	317C_B_Cat_Feed	317C_WGS_L_G_RATIO	317C_WGS_L_G_RATIO	317C_WGS_L_G_RATIO	317C_WGS_L_G_RATIO	317C_WGS_L_G_RATIO
19-May-11 10:37:00	0.87	370.29	80898.03	77955.50	26893.35	51535.13	178.20							
19-May-11 10:38:00	1.02	370.15	81148.72	78044.00	26690.79	51512.16	178.09							
19-May-11 10:39:00	1.03	370.42	81119.29	78301.60	26719.49	51383.22	177.26							
19-May-11 10:40:00	0.97	370.27	81177.88	78292.34	26755.27	51354.12	177.41							
19-May-11 10:41:00	0.93	370.43	81145.49	78316.69	26793.40	51352.42	177.17							
19-May-11 10:42:00	0.96	369.95	81179.27	78262.15	26727.29	51317.89	177.71							
19-May-11 10:43:00	0.98	367.96	81074.73	78300.70	26599.60	51290.88	177.62							
19-May-11 10:44:00	0.83	368.82	80637.70	78236.09	26880.32	51258.13	176.87							
19-May-11 10:45:00	0.68	368.45	80826.20	77814.46	27019.44	51224.56	178.59							
19-May-11 10:46:00	0.76	366.18	80745.74	77954.40	26710.63	51266.45	178.94							
19-May-11 10:47:00	0.75	368.13	80248.53	77849.45	26852.00	51328.87	178.07							
19-May-11 10:48:00	0.80	368.58	80675.94	77372.87	26844.67	51336.97	179.87							
19-May-11 10:49:00	0.77	368.18	80774.67	77793.02	26771.42	51334.17	178.96							
19-May-11 10:50:00	0.83	367.57	80687.81	77831.99	26702.17	51318.08	178.20							
19-May-11 10:51:00	0.77	367.56	80553.46	77795.49	26794.86	51359.03	178.23							
19-May-11 10:52:00	0.74	370.35	80552.01	77663.20	26980.80	51379.81	177.89							
19-May-11 10:53:00	0.86	370.75	81161.89	77613.68	26918.07	51337.72	178.56							
19-May-11 10:54:00	0.92	369.46	81250.85	78282.46	26771.75	51513.06	177.24							
19-May-11 10:55:00	0.84	369.36	80966.56	78371.03	26786.64	51657.13	176.53							
19-May-11 10:56:00	0.89	369.74	80944.81	78046.70	26874.32	51532.20	178.12							
19-May-11 10:57:00	0.72	369.08	81028.71	78123.89	26982.56	51427.40	178.04							
19-May-11 10:58:00	0.72	369.22	80883.22	78121.62	26886.90	51367.90	177.05							
19-May-11 10:59:00	0.81	370.08	80915.80	77902.99	26863.85	51294.33	177.29							
19-May-11 11:00:00	0.85	370.18	81102.28	77979.80	26859.86	51278.23	177.42							
19-May-11 11:01:00	0.90	369.64	81125.63	78195.69	26812.32	51320.40	176.49							
19-May-11 11:02:00	0.97	369.43	81007.26	78275.83	26760.25	51337.78	176.67							
19-May-11 11:03:00	0.84	369.42	80959.73	78195.11	26820.53	51392.23	177.02							
19-May-11 11:04:00	0.79	370.33	80959.17	78045.91	26910.16	51437.81	177.35							
19-May-11 11:05:00	0.92	370.52	81157.29	78013.39	26804.71	51436.43	177.34							
19-May-11 11:06:00	0.95	368.67	81200.40	78270.44	26654.37	51440.96	176.29							
19-May-11 11:07:00	0.86	369.02	80794.00	78323.52	26777.40	51390.65	176.06							
19-May-11 11:08:00	0.85	369.03	80871.31	77901.69	26882.25	51361.74	176.90							
19-May-11 11:09:00	0.78	367.94	80872.44	78070.43	26949.59	51404.48	177.05							
19-May-11 11:10:00	0.66	368.96	80634.81	78081.28	26990.85	51390.00	176.71							
19-May-11 11:11:00	0.72	369.70	80858.17	77693.24	26908.52	51355.53	177.80							
19-May-11 11:12:00	0.74	369.18	81018.95	77870.47	26812.89	51358.88	177.35							
19-May-11 11:13:00	0.77	368.75	80905.43	77996.77	26777.51	51353.90	177.00							
19-May-11 11:14:00	0.83	368.45	80812.37	77932.45	26756.03	51328.87	177.64							
19-May-11 11:15:00	0.74	369.82	80746.26	77906.51	26933.47	51328.81	176.99							
19-May-11 11:16:00	0.83	369.21	81045.68	77799.23	26822.95	51369.92	177.58							
19-May-11 11:17:00	0.87	368.89	80911.65	78144.85	26818.01	51401.05	176.46							
19-May-11 11:18:00	0.81	369.00	80843.51	78067.21	26837.52	51404.90	176.45							
19-May-11 11:19:00	0.79	368.66	80866.81	77941.86	26822.52	51404.88	177.35							
19-May-11 11:20:00	0.77	368.64	80791.02	77956.67	26914.22	51393.37	177.34							
19-May-11 11:21:00	0.68	368.84	80788.40	77941.07	27065.86	51396.39	177.12							
19-May-11 11:22:00	0.63	368.72	80831.40	77916.33	26963.67	51388.58	177.82							
19-May-11 11:23:00	0.71	369.43	80805.15	77841.98	26971.17	51366.50	177.70							
19-May-11 11:24:00	0.74	369.59	80960.32	77867.34	26923.92	51329.16	177.86							
19-May-11 11:25:00	0.76	368.98	80994.99	78017.33	26856.06	51345.21	177.61							
19-May-11 11:26:00	0.73	367.80	80861.73	78041.94	26797.36	51381.52	177.17							

Run 5	Scrubbing Liquid		Pump Pressure Lower Circulation (psig) 317P1105B	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FI105	
	Upper Circulation (psig) 317P1105B								
19-May-11 11:27:00	77.96	43.63	21.42	120	257.42	89.62	1135.02		
19-May-11 11:28:00	77.89	43.64	21.31	120	257.58	89.64	1134.26		
19-May-11 11:29:00	77.92	43.45	21.69	120	257.31	89.55	1128.20		
19-May-11 11:30:00	77.87	43.40	21.72	120	258.70	89.00	1132.21		
19-May-11 11:31:00	77.97	43.39	21.71	120	256.67	89.60	1132.27		
19-May-11 11:32:00	78.01	43.46	21.49	120	255.01	90.45	1134.88		
19-May-11 11:33:00	78.04	43.39	21.59	120	257.46	89.50	1138.22		
19-May-11 11:34:00	77.89	43.38	21.59	120	257.23	89.84	1138.22		
19-May-11 11:35:00	77.89	43.25	21.50	120	257.56	89.58	1139.19		
19-May-11 11:36:00	77.94	43.37	21.49	120	257.30	89.86	1137.81		
19-May-11 11:37:00	77.79	43.41	21.66	120	258.54	89.41	1135.46		
19-May-11 11:38:00	77.71	43.37	21.60	120	257.73	89.72	1134.43		
19-May-11 11:39:00	77.54	43.29	21.63	119	256.88	89.99	1135.51		
19-May-11 11:40:00	77.62	43.27	21.65	119	258.28	88.96	1133.70		
19-May-11 11:41:00	77.95	43.21	21.61	120	257.91	89.28	1123.81		
19-May-11 11:42:00	78.00	43.15	21.45	120	258.14	88.99	1129.40		
19-May-11 11:43:00	77.82	43.11	21.28	120	257.28	89.38	1132.54		
19-May-11 11:44:00	77.81	43.16	21.41	120	257.70	88.93	1141.84		
19-May-11 11:45:00	78.00	43.16	21.47	120	257.77	88.86	1135.78		
19-May-11 11:46:00	77.96	43.14	21.55	120	257.15	89.31	1134.94		
19-May-11 11:47:00	77.86	43.10	21.46	120	256.43	89.67	1135.08		
19-May-11 11:48:00	77.80	43.15	21.54	120	257.74	89.42	1133.37		
19-May-11 11:49:00	77.95	43.16	21.61	120	258.58	89.07	1131.34		
19-May-11 11:50:00	77.78	43.31	21.55	119	256.54	89.89	1130.56		
19-May-11 11:51:00	77.75	43.29	21.63	119	259.14	88.86	1131.44		
19-May-11 11:52:00	77.97	43.26	21.58	120	258.20	89.57	1129.94		
19-May-11 11:53:00	77.90	43.14	21.57	120	257.44	89.80	1121.56		
19-May-11 11:54:00	77.89	43.17	21.64	120	257.77	89.35	1129.35		
19-May-11 11:55:00	77.89	43.23	21.58	120	256.96	89.51	1137.87		
19-May-11 11:56:00	77.76	43.25	21.69	120	256.06	89.76	1143.83		
19-May-11 11:57:00	77.92	43.10	21.68	120	256.25	90.00	1135.27		
19-May-11 11:58:00	77.90	43.09	21.70	120	256.92	89.63	1133.27		
19-May-11 11:59:00	77.80	43.11	21.54	120	257.01	89.49	1129.14		
19-May-11 12:00:00	77.67	43.06	21.53	120	256.34	89.50	1123.49		
19-May-11 12:01:00	77.77	43.04	21.55	120	256.22	89.40	1127.60		
19-May-11 12:02:00	77.76	43.12	21.47	119	257.87	88.83	1128.61		
19-May-11 12:03:00	77.96	43.04	21.69	120	258.58	88.86	1127.69		
19-May-11 12:04:00	77.85	43.00	21.50	120	259.11	88.79	1132.01		
19-May-11 12:05:00	77.85	43.07	21.44	119	257.23	89.21	1122.00		
19-May-11 12:06:00	77.72	43.01	21.36	120	256.41	89.58	1128.16		
19-May-11 12:07:00	77.56	42.98	21.40	120	255.53	90.00	1130.47		
19-May-11 12:08:00	77.71	42.99	21.65	120	258.06	89.04	1131.77		
19-May-11 12:09:00	77.92	43.11	21.61	121	257.29	89.25	1136.87		
77.84				43.30	21.64	121.51	257.82	89.70	1134.50

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv. dry) 317AI111
Run 5							
19-May-11 11:27:00	1157.46	246.21	83.18	15.74	78.07	17.29	75.56
19-May-11 11:28:00	1156.72	245.86	83.03	15.75	77.98	17.26	64.85
19-May-11 11:29:00	1153.03	245.67	83.00	15.72	78.09	17.24	59.18
19-May-11 11:30:00	1155.45	245.66	83.02	15.71	78.14	17.24	56.83
19-May-11 11:31:00	1157.81	245.78	83.03	15.76	78.25	17.27	61.73
19-May-11 11:32:00	1158.64	246.09	83.00	15.77	78.09	17.30	105.73
19-May-11 11:33:00	1162.01	246.10	83.00	15.70	78.56	17.43	271.22
19-May-11 11:34:00	1162.87	246.14	82.98	15.75	78.56	17.41	292.63
19-May-11 11:35:00	1163.26	246.20	82.90	15.74	78.64	17.30	84.92
19-May-11 11:36:00	1161.83	246.01	82.90	15.77	78.63	17.27	68.45
19-May-11 11:37:00	1159.73	245.75	82.90	15.75	78.61	17.25	63.17
19-May-11 11:38:00	1157.31	245.57	82.90	15.79	78.28	17.30	70.08
19-May-11 11:39:00	1157.48	245.30	82.91	15.77	77.97	17.27	58.68
19-May-11 11:40:00	1156.92	245.16	82.90	15.71	77.97	17.28	66.02
19-May-11 11:41:00	1149.78	245.08	82.90	15.76	77.86	17.30	71.26
19-May-11 11:42:00	1150.86	245.15	82.90	15.71	77.59	17.27	62.22
19-May-11 11:43:00	1155.76	245.25	82.90	15.74	77.64	17.28	66.33
19-May-11 11:44:00	1163.23	245.08	82.90	15.64	77.77	17.32	116.47
19-May-11 11:45:00	1158.27	245.11	82.83	15.67	78.09	17.41	183.53
19-May-11 11:46:00	1157.25	245.32	82.87	15.71	78.02	17.31	106.46
19-May-11 11:47:00	1157.74	245.74	82.90	15.72	78.04	17.25	68.26
19-May-11 11:48:00	1156.17	245.89	82.90	15.71	77.88	17.26	65.73
19-May-11 11:49:00	1154.62	245.67	82.97	15.72	77.76	17.29	70.23
19-May-11 11:50:00	1154.38	245.62	83.02	15.75	77.76	17.26	63.57
19-May-11 11:51:00	1153.41	245.52	83.12	15.70	77.53	17.22	56.70
19-May-11 11:52:00	1153.15	245.56	83.22	15.78	77.57	17.27	63.84
19-May-11 11:53:00	1147.39	245.66	83.37	15.75	77.49	17.20	48.79
19-May-11 11:54:00	1148.72	245.50	83.47	15.73	77.30	17.19	50.41
19-May-11 11:55:00	1157.79	245.11	83.57	15.77	77.58	17.25	55.58
19-May-11 11:56:00	1160.71	245.13	83.58	15.74	77.45	17.33	116.89
19-May-11 11:57:00	1157.58	244.99	83.48	15.77	77.92	17.44	194.27
19-May-11 11:58:00	1156.09	244.72	83.40	15.76	77.85	17.37	117.81
19-May-11 11:59:00	1152.30	244.60	83.40	15.74	77.65	17.32	75.63
19-May-11 12:00:00	1148.20	244.60	83.40	15.71	77.41	17.31	68.74
19-May-11 12:01:00	1152.28	244.64	83.40	15.68	77.35	17.30	67.61
19-May-11 12:02:00	1151.60	244.91	83.38	15.65	77.51	17.29	62.25
19-May-11 12:03:00	1149.89	245.27	83.23	15.71	76.87	17.25	54.99
19-May-11 12:04:00	1157.56	245.23	83.18	15.74	77.22	17.20	53.54
19-May-11 12:05:00	1149.95	245.42	83.10	15.68	77.67	17.21	56.00
19-May-11 12:06:00	1149.47	245.72	83.08	15.71	77.48	17.20	51.85
19-May-11 12:07:00	1153.81	246.02	83.07	15.70	77.65	17.21	56.12
19-May-11 12:08:00	1153.65	246.38	83.12	15.65	77.41	17.30	149.90
19-May-11 12:09:00	1160.01	246.57	83.27	15.66	78.17	17.41	248.79
	1157.61	245.15	82.18	15.73	78.11	17.25	81.65

	O2 (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dvair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 5							
19-May-11 11:27:00	0.74	367.91	80604.25	77909.79	26836.31	51414.83	177.14
19-May-11 11:28:00	0.70	368.99	80628.79	77691.16	26882.69	51465.42	177.58
19-May-11 11:29:00	0.70	369.13	80863.40	77646.89	26875.48	51438.58	178.62
19-May-11 11:30:00	0.72	368.75	80895.86	77857.51	26843.06	51424.97	178.51
19-May-11 11:31:00	0.70	369.54	80812.76	77904.45	26936.67	51407.95	178.23
19-May-11 11:32:00	0.76	368.30	80983.95	77840.24	26870.20	51393.24	178.19
19-May-11 11:33:00	0.69	367.52	80714.02	78104.59	27011.01	51393.04	177.81
19-May-11 11:34:00	0.56	368.75	80542.79	77905.43	27115.38	51352.74	178.12
19-May-11 11:35:00	0.60	369.04	80810.87	77580.38	26960.74	51340.47	179.73
19-May-11 11:36:00	0.77	369.09	80875.96	77779.26	26879.76	51329.61	178.77
19-May-11 11:37:00	0.85	369.39	80886.65	77960.71	26860.80	51332.86	178.21
19-May-11 11:38:00	0.83	370.11	80952.09	78043.44	26977.88	51412.90	178.25
19-May-11 11:39:00	0.77	369.85	81110.72	78112.34	26939.55	51445.95	178.56
19-May-11 11:40:00	0.84	369.15	81053.88	78193.51	26881.47	51412.59	178.47
19-May-11 11:41:00	0.76	369.38	80898.71	78212.18	26949.25	51349.82	178.32
19-May-11 11:42:00	0.73	369.47	80949.11	77993.02	26918.34	51309.92	178.99
19-May-11 11:43:00	0.80	369.21	80968.52	77993.17	26892.16	51369.89	179.51
19-May-11 11:44:00	0.83	368.81	80911.95	78084.74	26915.36	51458.45	178.99
19-May-11 11:45:00	0.79	368.34	80825.97	78121.37	26999.96	51500.30	178.84
19-May-11 11:46:00	0.71	368.53	80722.74	78062.02	26914.65	51492.62	178.87
19-May-11 11:47:00	0.81	368.48	80763.09	77803.29	26805.20	51124.83	179.84
19-May-11 11:48:00	0.85	368.11	80753.54	77877.00	26779.41	50911.55	179.49
19-May-11 11:49:00	0.81	369.23	80670.66	77916.35	26910.64	51182.82	179.27
19-May-11 11:50:00	0.76	369.64	80917.86	77819.77	26919.50	51346.32	178.85
19-May-11 11:51:00	0.80	368.59	81006.13	77982.82	26779.74	51563.26	178.88
19-May-11 11:52:00	0.72	370.04	80776.95	78067.57	26969.29	51677.01	178.20
19-May-11 11:53:00	0.78	370.19	81095.08	77813.55	26874.09	51487.38	179.64
19-May-11 11:54:00	0.77	369.32	81127.86	78113.35	26808.14	51389.79	178.86
19-May-11 11:55:00	0.69	369.27	80935.62	78132.57	26893.31	51373.86	178.42
19-May-11 11:56:00	0.72	368.83	80924.86	77918.99	26955.24	51349.50	178.90
19-May-11 11:57:00	0.69	368.17	80830.33	78035.71	27051.58	51321.71	179.32
19-May-11 11:58:00	0.58	368.80	80684.18	78000.20	27034.32	51340.97	179.17
19-May-11 11:59:00	0.66	369.07	80823.69	77690.30	26970.00	51402.15	180.04
19-May-11 12:00:00	0.73	368.90	80880.92	77851.89	26928.18	51404.49	180.07
19-May-11 12:01:00	0.75	367.99	80845.49	77975.43	26841.37	51412.60	179.82
19-May-11 12:02:00	0.73	367.72	80644.48	77936.96	26821.16	51430.15	179.46
19-May-11 12:03:00	0.81	368.56	80584.98	77722.57	26811.62	51463.53	180.02
19-May-11 12:04:00	0.88	369.74	80769.82	77701.62	26813.43	51441.48	180.61
19-May-11 12:05:00	0.91	370.01	81029.85	77894.75	26836.26	51358.30	179.75
19-May-11 12:06:00	0.91	368.32	81088.71	78181.66	26700.70	51310.08	179.67
19-May-11 12:07:00	0.89	367.84	80718.57	78235.23	26685.82	51347.07	179.38
19-May-11 12:08:00	0.67	367.43	80611.42	77852.26	26838.79	51465.33	180.36
19-May-11 12:09:00	0.49	368.44	80521.58	77647.42	27101.90	51522.23	179.99
	0.85	369.70	81027.70	78176.70	26877.04	51349.12	178.10

Sulfuric Acid

5/17/2011 13:16
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1m

Run 1	Scrubbing Liquid Upper Circulation (psig) 317PI105B		Pump Pressure Lower Circulation (psig) 317PI108	Aggio-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317PI177A		Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FI113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FI105
17-May-11 13:16:00	77.82		42.63	22.53		122	262.69	91.81	1133.53
17-May-11 13:17:00	77.81		42.68	22.39		121	260.94	92.24	1133.81
17-May-11 13:18:00	77.59		42.72	22.34		121	261.04	92.19	1137.57
17-May-11 13:19:00	77.50		42.64	22.39		122	261.98	91.54	1140.35
17-May-11 13:20:00	77.48		42.66	22.53		118	260.87	91.94	1137.24
17-May-11 13:21:00	77.64		42.65	22.40		120	258.25	93.18	1139.53
17-May-11 13:22:00	77.71		42.61	22.27		120	259.74	92.64	1137.41
17-May-11 13:23:00	77.50		42.62	22.25		118	260.98	92.23	1134.97
17-May-11 13:24:00	77.59		42.65	22.13		120	261.14	91.92	1135.04
17-May-11 13:25:00	77.62		42.49	22.20		119	260.93	92.46	1134.31
17-May-11 13:26:00	77.84		42.58	22.19		122	258.87	93.06	1131.54
17-May-11 13:27:00	77.74		42.46	22.32		121	257.87	93.22	1134.18
17-May-11 13:28:00	77.69		42.37	22.34		120	259.19	92.74	1138.49
17-May-11 13:29:00	77.58		42.53	22.30		124	259.65	93.07	1139.08
17-May-11 13:30:00	77.83		42.54	22.17		124	258.53	93.44	1139.93
17-May-11 13:31:00	77.81		42.32	22.38		122	259.03	93.04	1137.45
17-May-11 13:32:00	77.75		42.38	22.33		121	258.79	92.97	1133.59
17-May-11 13:33:00	77.68		42.51	22.29		122	257.39	93.24	1140.68
17-May-11 13:34:00	77.70		42.44	22.27		121	257.16	93.37	1140.84
17-May-11 13:35:00	77.72		42.51	22.25		119	258.88	92.51	1140.04
17-May-11 13:36:00	77.73		42.45	22.23		119	259.92	92.40	1136.69
17-May-11 13:37:00	77.65		42.44	22.35		121	260.69	92.20	1133.74
17-May-11 13:38:00	77.70		42.36	22.55		119	256.83	93.74	1132.47
17-May-11 13:39:00	77.75		42.47	22.44		120	256.38	93.98	1134.92
17-May-11 13:40:00	77.61		42.53	22.47		118	259.90	92.71	1140.38
17-May-11 13:41:00	77.71		42.41	22.41		117	258.92	93.23	1136.63
17-May-11 13:42:00	77.60		42.49	22.35		117	259.97	92.80	1135.66
17-May-11 13:43:00	77.61		42.49	22.57		118	259.41	92.71	1137.65
17-May-11 13:44:00	77.57		42.48	22.54		121	258.97	92.86	1134.11
17-May-11 13:45:00	77.75		42.52	22.56		123	260.93	92.25	1139.12
17-May-11 13:46:00	77.66		42.45	22.38		122	259.16	93.14	1136.61
17-May-11 13:47:00	77.66		42.30	22.24		120	257.07	94.04	1137.65
17-May-11 13:48:00	77.63		42.38	22.12		120	257.99	93.17	1136.28
17-May-11 13:49:00	77.74		42.29	22.37		123	260.85	92.13	1137.80
17-May-11 13:50:00	77.67		42.35	22.39		120	258.79	92.88	1133.00
17-May-11 13:51:00	78.06		42.35	22.09		119	258.23	93.19	1131.73
17-May-11 13:52:00	77.92		42.35	22.17		120	257.39	93.26	1134.31
17-May-11 13:53:00	77.77		42.26	22.23		118	257.62	93.52	1133.80
17-May-11 13:54:00	77.63		42.10	21.98		120	256.42	93.98	1135.19
17-May-11 13:55:00	77.66		42.28	22.00		122	255.56	93.81	1136.76
17-May-11 13:56:00	77.83		42.27	22.11		120	257.68	92.97	1131.99
17-May-11 13:57:00	77.79		42.13	22.21		120	258.68	92.82	1135.80
17-May-11 13:58:00	77.67		42.10	22.07		121	256.78	93.23	1135.53
17-May-11 13:59:00	77.56		42.04	22.17		122	257.99	92.78	1135.90
17-May-11 14:00:00	77.78		42.10	22.35		120	258.73	92.66	1137.34
17-May-11 14:01:00	77.73		42.06	22.46		120	259.30	92.38	1135.74
17-May-11 14:02:00	77.70		42.02	22.37		120	261.16	91.67	1132.52
17-May-11 14:03:00	77.78		42.16	22.40		123	260.93	91.96	1133.66
17-May-11 14:04:00	77.72		42.15	22.33		121	260.04	92.14	1133.55
17-May-11 14:05:00	77.62		41.89	22.15		120	258.39	92.13	1128.51
17-May-11 14:06:00	77.67		41.85	22.24		122	259.42	91.55	1124.71

Sulfuric Acid

Run 1	#2 Stand Pipe Aeration Air to Regen (lbs/min)		Air to Regen Temp B-1 Outlet (oF)	Tempered Air Temp (oF)	Ambient Air Temp (oF)	Air to Regen Pressure Blower Discharge (psig)	Plant Air to 45lb Air (psig)	CO2 (WGS CEMS)		CO (WGS CEMS)	
	317FE106	317TT1112						(% by vol. dry)	317A1109	(ppmv, dry)	317A1111
17-May-11 13:16:00	1158.51	242.51	208.43	79.19	15.87	79.70	17.15	47.91			
17-May-11 13:17:00	1159.93	242.69	208.83	79.46	15.89	79.82	17.14	46.77			
17-May-11 13:18:00	1161.62	242.84	209.08	79.76	15.92	79.84	17.11	45.99			
17-May-11 13:19:00	1164.37	243.19	209.09	79.97	15.92	79.88	17.13	47.29			
17-May-11 13:20:00	1161.35	243.21	209.66	80.07	15.95	79.87	17.15	51.11			
17-May-11 13:21:00	1163.46	243.25	209.74	80.19	15.97	80.42	17.17	65.30			
17-May-11 13:22:00	1161.66	243.39	209.86	80.30	15.93	80.35	17.20	76.32			
17-May-11 13:23:00	1159.39	243.50	210.20	80.21	15.94	80.18	17.16	62.56			
17-May-11 13:24:00	1158.52	243.60	210.58	80.01	15.88	80.04	17.15	55.01			
17-May-11 13:25:00	1158.01	243.88	210.82	79.81	15.97	79.79	17.12	50.37			
17-May-11 13:26:00	1154.89	243.94	210.88	79.61	15.98	79.53	17.10	48.12			
17-May-11 13:27:00	1156.46	243.94	210.98	79.35	15.97	79.42	17.10	48.51			
17-May-11 13:28:00	1160.79	243.91	210.98	79.13	15.94	79.91	17.19	54.57			
17-May-11 13:29:00	1162.07	243.84	210.96	79.05	16.01	80.19	17.25	59.14			
17-May-11 13:30:00	1163.44	243.72	210.88	79.19	16.03	80.26	17.25	58.57			
17-May-11 13:31:00	1161.24	243.33	210.63	79.46	16.01	79.93	17.25	57.16			
17-May-11 13:32:00	1157.36	243.25	210.22	79.74	15.99	79.41	17.33	78.16			
17-May-11 13:33:00	1163.93	243.35	210.10	79.87	15.99	80.03	17.45	149.98			
17-May-11 13:34:00	1164.50	243.31	209.80	79.90	15.96	80.32	17.45	186.62			
17-May-11 13:35:00	1163.69	243.25	209.84	79.90	15.90	80.24	17.38	114.17			
17-May-11 13:36:00	1159.88	243.31	209.70	79.92	15.94	79.85	17.39	111.67			
17-May-11 13:37:00	1157.19	243.21	209.74	80.00	15.97	79.49	17.35	86.33			
17-May-11 13:38:00	1155.54	243.21	209.55	80.00	16.03	79.11	17.31	69.68			
17-May-11 13:39:00	1156.68	243.12	209.23	80.00	16.02	79.09	17.28	62.80			
17-May-11 13:40:00	1162.23	242.84	208.93	80.00	15.97	79.73	17.34	79.65			
17-May-11 13:41:00	1160.38	242.72	208.50	80.00	15.99	79.76	17.38	95.13			
17-May-11 13:42:00	1160.38	242.75	208.36	80.02	15.95	79.52	17.33	80.40			
17-May-11 13:43:00	1160.66	242.75	207.96	80.12	15.94	79.20	17.36	85.56			
17-May-11 13:44:00	1158.24	242.99	207.96	80.22	15.94	79.18	17.38	91.66			
17-May-11 13:45:00	1163.42	243.31	208.10	80.30	15.89	80.07	17.42	125.84			
17-May-11 13:46:00	1159.94	243.42	208.34	80.23	15.94	79.91	17.43	151.07			
17-May-11 13:47:00	1161.32	243.50	208.44	80.06	15.96	79.98	17.20	82.57			
17-May-11 13:48:00	1162.08	243.82	208.72	79.98	15.86	80.27	17.10	71.31			
17-May-11 13:49:00	1162.28	244.26	209.05	79.88	15.88	80.41	17.30	93.87			
17-May-11 13:50:00	1158.28	244.51	209.28	79.78	15.94	80.09	17.36	107.67			
17-May-11 13:51:00	1155.06	244.55	209.77	79.70	15.95	79.72	17.33	85.09			
17-May-11 13:52:00	1157.40	244.47	209.93	79.77	15.94	79.76	17.30	70.11			
17-May-11 13:53:00	1157.71	244.66	210.06	79.82	15.99	79.75	17.29	65.47			
17-May-11 13:54:00	1160.18	244.88	210.22	79.97	16.02	79.83	17.32	72.31			
17-May-11 13:55:00	1159.67	245.18	210.36	79.98	15.99	79.62	17.34	78.03			
17-May-11 13:56:00	1154.27	245.59	210.91	79.90	15.98	79.34	17.40	102.96			
17-May-11 13:57:00	1159.94	245.86	211.35	79.90	16.01	79.83	17.51	417.44			
17-May-11 13:58:00	1159.99	245.82	211.82	79.90	15.95	79.96	17.57	645.85			
17-May-11 13:59:00	1161.44	245.96	211.91	79.92	15.92	80.27	17.48	208.99			
17-May-11 14:00:00	1162.28	246.14	212.18	80.02	15.96	80.26	17.49	242.07			
17-May-11 14:01:00	1160.24	246.28	212.32	80.14	15.95	80.10	17.49	259.40			
17-May-11 14:02:00	1156.02	246.31	212.90	80.32	15.95	79.80	17.43	127.28			
17-May-11 14:03:00	1156.19	246.02	213.10	80.51	15.97	79.54	17.42	116.75			
17-May-11 14:04:00	1157.76	245.78	213.18	80.74	15.97	79.73	17.36	84.92			
17-May-11 14:05:00	1153.38	245.83	213.37	80.97	15.90	79.45	17.31	73.06			
17-May-11 14:06:00	1151.58	245.92	213.45	81.07	15.90	79.19	17.29	69.45			

Sulfuric Acid

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1m

O ₂ (WGS CEMS) (% by vol, dry)	Total Corrected Air (M lb/hr)	Volume Air to Reg (discfm) - Qa	Vol Reg FG (discfm) - Qr	EPA Coke Make (lbs/hr)	Cat Feed Rate (BPD)	L/G Ratio (gal/MSCF)
317C_Tot_Corr_Air	317C_dryair	317C_fg	Rc	317C_B Cat Feed	317C_WGS_L_G_RATIO	
Run 1						
17-May-11 13:16:00	1.08	378.48	79700.48	27325.41	52593.72	177.76
17-May-11 13:17:00	1.08	377.86	80005.38	27272.69	52621.39	176.89
17-May-11 13:18:00	1.05	376.71	80130.28	27164.07	52575.61	176.54
17-May-11 13:19:00	0.93	376.85	79829.97	27231.21	52490.62	177.14
17-May-11 13:20:00	0.95	377.09	79595.84	27269.83	52490.06	178.00
17-May-11 13:21:00	1.00	376.49	79672.20	27242.08	52509.31	177.82
17-May-11 13:22:00	0.98	375.14	79789.53	27175.56	52506.02	177.60
17-May-11 13:23:00	1.01	376.03	79675.66	27193.51	52476.49	177.91
17-May-11 13:24:00	0.98	376.62	79373.35	27230.08	52446.42	178.31
17-May-11 13:25:00	1.06	376.36	79529.60	27146.41	52642.49	179.00
17-May-11 13:26:00	1.08	376.96	79685.26	27164.26	52837.94	177.77
17-May-11 13:27:00	1.18	375.47	79648.94	27029.98	52765.69	178.70
17-May-11 13:28:00	0.98	374.51	79869.67	27122.12	52680.79	178.38
17-May-11 13:29:00	0.81	375.51	79428.48	27319.93	52603.75	178.68
17-May-11 13:30:00	0.84	376.58	79145.38	27389.20	52548.36	179.18
17-May-11 13:31:00	0.78	375.98	79372.88	27351.86	52580.70	179.84
17-May-11 13:32:00	0.80	376.03	79545.08	27448.98	52581.10	179.13
17-May-11 13:33:00	0.73	375.55	79531.44	27587.05	52550.24	178.67
17-May-11 13:34:00	0.58	374.44	79566.27	27561.73	52570.72	178.81
17-May-11 13:35:00	0.65	374.16	79347.24	27418.71	52605.82	178.96
17-May-11 13:36:00	0.59	374.76	79085.63	27496.55	52632.89	179.78
17-May-11 13:37:00	0.69	376.00	78985.45	27510.91	52645.12	180.22
17-May-11 13:38:00	0.79	376.70	79179.98	27475.18	52645.16	180.15
17-May-11 13:39:00	0.84	374.56	79488.62	27270.50	52659.27	179.03
17-May-11 13:40:00	0.81	374.55	79664.82	27348.19	52473.83	178.20
17-May-11 13:41:00	0.68	376.59	79229.34	27591.54	52333.09	179.48
17-May-11 13:42:00	0.70	376.28	79133.44	27504.29	52571.63	179.90
17-May-11 13:43:00	0.76	376.67	79461.88	27552.19	52738.56	178.77
17-May-11 13:44:00	0.61	375.85	79559.36	27560.44	52740.66	178.80
17-May-11 13:45:00	0.61	375.63	79521.88	27586.80	52591.78	178.60
17-May-11 13:46:00	0.62	376.59	79404.63	27678.15	52461.44	179.09
17-May-11 13:47:00	0.71	376.08	79361.47	27330.29	52461.04	180.03
17-May-11 13:48:00	0.85	374.62	79433.28	27061.08	52488.49	179.40
17-May-11 13:49:00	0.73	374.39	79372.17	27322.76	52501.81	179.98
17-May-11 13:50:00	0.68	376.05	79138.19	27529.46	52489.45	180.03
17-May-11 13:51:00	0.77	375.09	79094.97	27399.75	52517.75	180.34
17-May-11 13:52:00	0.89	374.68	79515.92	27295.19	52511.97	179.13
17-May-11 13:53:00	0.90	374.02	79389.06	27231.32	52520.32	179.98
17-May-11 13:54:00	0.76	374.79	79296.15	27359.35	52512.29	180.83
17-May-11 13:55:00	0.65	373.98	79036.97	27359.55	52503.77	180.80
17-May-11 13:56:00	0.62	372.69	79129.61	27340.22	52716.96	180.50
17-May-11 13:57:00	0.56	374.03	78990.26	27634.52	52849.66	181.31
17-May-11 13:58:00	0.51	374.72	78806.43	27807.99	52734.76	182.04
17-May-11 13:59:00	0.52	372.90	79093.59	27502.62	52467.81	181.89
17-May-11 14:00:00	0.51	373.62	79151.69	27575.34	52347.69	181.11
17-May-11 14:01:00	0.45	374.31	78745.28	27642.82	52397.24	182.24
17-May-11 14:02:00	0.57	374.62	78859.93	27540.68	52500.43	182.42
17-May-11 14:03:00	0.56	375.67	79045.09	27614.83	52619.45	181.21
17-May-11 14:04:00	0.64	375.97	79083.32	27524.33	52526.68	181.25
17-May-11 14:05:00	0.80	374.95	79332.63	27350.55	52478.03	181.86
17-May-11 14:06:00	0.83	372.95	79492.89	27174.63	52507.30	181.73

Run 1	Scrubbing Liquid		Pump Pressure Lower Circulation (psig) 317PH108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317PH177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FI113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FI105
	Upper Circulation (psig) 317PH105B							
17-May-11 14:07:00	77.65	41.97	22.32	122	259.25	91.95	1125.35	
17-May-11 14:08:00	77.64	42.06	22.33	119	259.68	92.32	1127.19	
17-May-11 14:09:00	77.61	41.98	22.42	118	260.33	92.15	1134.14	
17-May-11 14:10:00	77.57	41.94	22.08	119	259.15	92.60	1134.79	
17-May-11 14:11:00	77.43	41.93	21.81	119	257.57	92.62	1132.91	
17-May-11 14:12:00	77.46	41.82	21.99	119	258.58	92.15	1131.86	
17-May-11 14:13:00	77.68	41.94	22.57	120	261.76	92.19	1133.03	
17-May-11 14:14:00	77.57	41.98	22.37	121	258.52	93.16	1131.90	
17-May-11 14:15:00	77.73	41.99	22.51	123	258.24	93.33	1133.36	
17-May-11 14:16:00	77.59	42.00	22.46	119	260.06	92.44	1135.99	
17-May-11 14:17:00	77.43	41.95	22.29	119	259.00	91.83	1136.46	
17-May-11 14:18:00	77.69	41.97	22.40	120	261.60	91.37	1136.52	
17-May-11 14:19:00	77.59	42.02	22.25	120	260.50	91.95	1132.36	
17-May-11 14:20:00	77.61	41.96	22.29	118	261.71	91.28	1128.41	
17-May-11 14:21:00	77.53	41.91	22.34	121	263.61	90.66	1132.67	
17-May-11 14:22:00	77.51	41.93	22.23	122	261.73	91.14	1132.99	
17-May-11 14:23:00	77.61	41.82	22.10	119	260.08	91.53	1133.17	
17-May-11 14:24:00	77.65	41.86	22.17	118	262.26	91.09	1134.11	
17-May-11 14:25:00	77.77	42.00	22.35	122	262.30	91.29	1132.52	
17-May-11 14:26:00	77.75	41.96	22.30	123	260.34	91.98	1127.96	
17-May-11 14:27:00	77.63	41.87	21.94	120	259.21	92.49	1128.87	
17-May-11 14:28:00	77.49	41.89	22.18	121	259.75	91.78	1130.78	
17-May-11 14:29:00	77.44	41.89	22.29	121	259.88	91.44	1132.28	
17-May-11 14:30:00	77.64	41.87	22.31	121	262.04	91.10	1134.26	
17-May-11 14:31:00	77.60	42.00	22.29	124	260.41	91.65	1133.46	
17-May-11 14:32:00	77.57	42.04	22.13	123	260.86	91.21	1128.28	
17-May-11 14:33:00	77.55	41.86	22.21	121	261.36	90.76	1129.37	
17-May-11 14:34:00	77.57	41.90	22.27	120	260.78	91.28	1129.68	
17-May-11 14:35:00	77.66	41.83	22.32	120	261.33	91.52	1129.13	
17-May-11 14:36:00	77.72	41.72	22.37	119	261.71	91.32	1128.36	
17-May-11 14:37:00	77.61	41.78	22.22	121	260.77	91.82	1128.76	
17-May-11 14:38:00	77.55	41.86	22.33	123	261.73	91.38	1127.02	
17-May-11 14:39:00	77.47	41.96	22.41	122	262.78	90.64	1129.59	
17-May-11 14:40:00	77.61	41.89	22.02	120	261.06	91.09	1132.82	
17-May-11 14:41:00	77.73	41.94	22.02	119	260.70	91.14	1133.09	
17-May-11 14:42:00	77.83	42.02	22.23	121	261.79	90.60	1132.47	
17-May-11 14:43:00	77.91	41.92	22.34	122	261.26	91.14	1131.47	
17-May-11 14:44:00	77.73	41.96	22.19	120	260.70	91.69	1129.12	
17-May-11 14:45:00	77.72	41.93	22.41	120	262.22	91.36	1134.09	
17-May-11 14:46:00	77.74	41.78	22.22	123	260.76	91.75	1131.23	
17-May-11 14:47:00	77.50	41.82	22.00	122	258.77	92.15	1128.56	
17-May-11 14:48:00	77.49	41.83	21.98	122	260.82	91.29	1127.10	
17-May-11 14:49:00	77.83	41.76	21.94	121	261.80	91.07	1125.59	
17-May-11 14:50:00	77.81	41.89	22.10	121	260.39	91.73	1124.13	
17-May-11 14:51:00	77.78	41.96	22.19	124	261.31	91.33	1121.88	
17-May-11 14:52:00	77.80	41.99	22.18	123	260.67	91.33	1125.28	
17-May-11 14:53:00	77.75	41.94	21.91	119	259.02	91.87	1124.62	
17-May-11 14:54:00	77.54	41.89	21.86	120	258.03	92.00	1124.65	
17-May-11 14:55:00	77.50	41.93	21.76	120	258.35	91.34	1124.69	
17-May-11 14:56:00	77.53	41.89	21.68	116	257.30	91.56	1119.99	

Run 1	#2 Stand Pipe Aeration Air to Regen (lbs/min)		Air to Regen Temp B-1 Outlet (oF)		Tempered Air Temp (oF)		Ambient Air Temp (oF)		Air to Regen Pressure Blower Discharge (psig)		Plant Air to 45lb Air (psig)		CO2 (WGS CEMS) (% by vol. dry)		CO (WGS CEMS) (ppmv, dry)	
	317F1106	317T1112	317T1112	317T1112	317T1120	DWS AT	317PC039	317PC088	317A1109	317A1111	317A1109	317A1111	317A1109	317A1111	317A1109	317A1111
17-May-11 14:07:00	1148.77	245.71	213.51	81.17	15.92	78.70	17.31	73.52								
17-May-11 14:08:00	1149.09	245.56	213.69	81.18	15.89	78.58	17.30	74.35								
17-May-11 14:09:00	1157.24	245.71	214.20	81.10	15.87	79.76	17.36	105.91								
17-May-11 14:10:00	1158.50	245.88	214.43	81.12	15.93	80.10	17.41	147.77								
17-May-11 14:11:00	1157.22	246.02	214.63	81.20	15.95	80.11	17.31	99.10								
17-May-11 14:12:00	1156.99	246.18	214.73	81.20	15.93	80.05	17.24	69.82								
17-May-11 14:13:00	1159.02	246.36	215.08	81.27	15.93	80.14	17.28	69.41								
17-May-11 14:14:00	1155.81	246.17	215.37	81.37	15.98	79.91	17.24	58.90								
17-May-11 14:15:00	1156.46	245.81	215.32	81.40	15.87	79.82	17.17	53.52								
17-May-11 14:16:00	1160.43	245.82	215.38	81.47	15.84	80.24	17.19	56.40								
17-May-11 14:17:00	1160.50	245.84	215.54	81.52	15.84	80.23	17.20	58.41								
17-May-11 14:18:00	1160.65	245.98	215.66	81.62	15.77	80.15	17.19	56.37								
17-May-11 14:19:00	1157.65	246.10	215.56	81.72	15.80	79.89	17.18	52.35								
17-May-11 14:20:00	1153.58	246.45	215.67	81.80	15.74	79.48	17.15	55.30								
17-May-11 14:21:00	1157.90	246.62	216.00	81.82	15.75	79.91	17.25	115.45								
17-May-11 14:22:00	1157.64	246.61	216.11	81.90	15.79	79.90	17.35	166.58								
17-May-11 14:23:00	1157.96	246.84	216.13	81.90	15.79	79.96	17.18	76.75								
17-May-11 14:24:00	1158.63	247.15	216.35	81.90	15.84	80.06	17.10	57.57								
17-May-11 14:25:00	1157.89	247.16	216.32	81.97	15.88	79.95	17.12	55.63								
17-May-11 14:26:00	1154.08	247.11	216.15	82.00	15.90	79.65	17.08	49.92								
17-May-11 14:27:00	1153.67	247.13	216.04	81.98	15.90	79.45	17.05	47.46								
17-May-11 14:28:00	1156.54	247.38	216.25	81.81	15.85	79.66	17.06	47.50								
17-May-11 14:29:00	1158.13	247.25	216.27	81.54	15.83	79.85	17.14	52.68								
17-May-11 14:30:00	1160.12	247.40	216.04	81.23	15.87	80.06	17.16	54.51								
17-May-11 14:31:00	1157.79	247.38	216.03	80.85	15.92	79.75	17.13	51.41								
17-May-11 14:32:00	1152.83	247.38	216.09	80.54	15.87	79.29	17.09	47.21								
17-May-11 14:33:00	1155.83	247.41	216.21	80.31	15.82	79.67	17.19	74.59								
17-May-11 14:34:00	1154.25	247.56	216.27	80.20	15.88	79.53	17.29	103.29								
17-May-11 14:35:00	1154.15	247.80	216.44	80.11	15.91	79.34	17.17	67.25								
17-May-11 14:36:00	1153.56	247.80	216.43	79.98	15.90	79.16	17.10	53.09								
17-May-11 14:37:00	1153.41	247.40	216.16	79.88	15.93	79.04	17.10	50.97								
17-May-11 14:38:00	1151.14	247.38	216.19	79.82	15.90	78.83	17.10	49.90								
17-May-11 14:39:00	1152.65	247.36	216.12	79.92	15.85	78.96	17.09	48.31								
17-May-11 14:40:00	1157.84	247.29	215.68	80.09	15.85	79.53	17.08	48.14								
17-May-11 14:41:00	1158.10	247.20	215.61	80.22	15.82	79.65	17.05	46.13								
17-May-11 14:42:00	1157.58	247.12	215.68	80.39	15.81	79.51	17.05	46.45								
17-May-11 14:43:00	1155.47	247.22	215.66	80.52	15.83	79.28	17.07	47.87								
17-May-11 14:44:00	1153.34	247.38	215.79	80.60	15.88	79.25	17.05	47.28								
17-May-11 14:45:00	1159.78	247.34	215.70	80.60	15.85	79.90	17.16	74.72								
17-May-11 14:46:00	1156.33	247.28	215.94	80.60	15.84	79.82	17.26	105.69								
17-May-11 14:47:00	1154.00	247.38	215.81	80.67	15.79	79.67	17.15	72.02								
17-May-11 14:48:00	1152.40	247.39	216.03	80.79	15.74	79.35	17.09	55.94								
17-May-11 14:49:00	1150.85	247.41	216.25	81.05	15.78	79.21	17.11	54.52								
17-May-11 14:50:00	1149.66	247.39	216.32	81.34	15.81	78.93	17.11	53.70								
17-May-11 14:51:00	1147.49	247.46	216.24	81.47	15.82	78.69	17.05	48.74								
17-May-11 14:52:00	1150.13	247.51	216.31	81.52	15.80	78.94	17.06	49.36								
17-May-11 14:53:00	1149.95	247.51	216.30	81.62	15.82	78.95	17.05	48.93								
17-May-11 14:54:00	1151.03	247.85	216.17	81.79	15.81	79.03	17.04	47.33								
17-May-11 14:55:00	1150.36	248.02	216.19	81.99	15.77	78.79	17.10	51.65								
17-May-11 14:56:00	1144.72	248.28	216.19	82.10	15.80	78.28	17.17	57.89								

	O2 (WGS CEMS) (% by vol. dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fuegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 1							
17-May-11 14:07:00	0.74	373.43	81731.72	79289.75	27256.36	52484.59	181.38
17-May-11 14:08:00	0.66	373.87	81837.85	78785.98	27305.68	52478.32	182.31
17-May-11 14:09:00	0.70	374.52	81934.03	78816.43	27406.90	52516.00	182.69
17-May-11 14:10:00	0.65	374.86	82076.33	79004.63	27520.37	52531.74	182.55
17-May-11 14:11:00	0.67	374.37	82150.41	79132.89	27345.57	52458.04	182.27
17-May-11 14:12:00	0.84	372.66	82043.39	79141.56	27088.48	52527.95	182.87
17-May-11 14:13:00	0.82	373.54	81668.00	79126.05	27205.13	52706.15	182.11
17-May-11 14:14:00	0.83	376.59	81860.88	78783.47	27373.25	52653.68	182.67
17-May-11 14:15:00	0.87	374.31	82530.43	78924.14	27108.35	52566.13	182.72
17-May-11 14:16:00	0.91	373.99	82030.29	79664.31	27099.62	52554.80	180.92
17-May-11 14:17:00	0.74	374.34	81961.13	79124.56	27192.70	52558.71	181.99
17-May-11 14:18:00	0.72	372.87	82037.19	78906.35	27073.99	52565.46	182.69
17-May-11 14:19:00	0.92	374.65	81715.53	78963.69	27133.83	52455.32	181.98
17-May-11 14:20:00	1.03	374.07	82104.24	78836.68	27031.77	52348.73	182.91
17-May-11 14:21:00	0.86	374.30	81977.73	79283.41	27221.09	52384.72	181.94
17-May-11 14:22:00	0.64	375.70	82029.13	79095.45	27508.84	52408.54	182.16
17-May-11 14:23:00	0.70	374.25	82335.07	79014.20	27175.42	52400.42	182.94
17-May-11 14:24:00	0.91	373.17	82017.76	79221.02	26936.67	52426.79	182.26
17-May-11 14:25:00	0.97	375.21	81781.28	79038.67	27094.70	52501.95	181.68
17-May-11 14:26:00	1.01	375.56	82227.43	78887.35	27061.18	52628.34	182.56
17-May-11 14:27:00	1.00	374.38	82305.23	79314.90	26933.13	52684.31	182.00
17-May-11 14:28:00	1.00	373.77	82045.13	79343.99	26911.00	52590.02	181.81
17-May-11 14:29:00	0.94	373.01	81911.69	79107.84	26970.58	52458.02	182.40
17-May-11 14:30:00	0.90	373.10	81745.30	78998.23	27006.60	52410.81	182.63
17-May-11 14:31:00	0.96	375.08	81766.02	78820.35	27100.72	52430.49	182.44
17-May-11 14:32:00	1.03	374.17	82198.78	78864.86	26962.24	52443.46	182.48
17-May-11 14:33:00	0.93	373.81	81999.13	79316.68	27084.61	52477.17	182.00
17-May-11 14:34:00	0.67	373.63	81921.59	79103.30	27275.06	52497.22	182.23
17-May-11 14:35:00	0.84	374.00	81880.92	78893.49	27103.57	52452.63	182.96
17-May-11 14:36:00	1.05	374.84	81963.27	78916.75	27019.90	52436.00	183.48
17-May-11 14:37:00	1.00	375.00	82145.76	79120.30	27042.60	52464.86	182.88
17-May-11 14:38:00	0.90	374.80	82182.40	79227.59	27055.30	52466.60	182.32
17-May-11 14:39:00	0.96	375.12	82136.77	79178.37	27049.75	52458.67	181.96
17-May-11 14:40:00	1.01	375.13	82208.00	79187.95	27029.32	52414.86	182.17
17-May-11 14:41:00	1.07	373.83	82210.32	79291.53	26881.27	52384.57	181.73
17-May-11 14:42:00	1.15	373.38	81925.64	79334.17	26823.59	52419.32	181.11
17-May-11 14:43:00	1.02	373.97	81827.55	79122.07	26924.18	52382.18	181.89
17-May-11 14:44:00	0.97	374.09	81955.19	78914.40	26928.76	52397.05	182.44
17-May-11 14:45:00	0.96	374.42	81982.96	78989.83	27081.65	52394.73	182.45
17-May-11 14:46:00	0.86	375.42	82054.84	79111.70	27308.98	52431.22	182.74
17-May-11 14:47:00	0.93	374.07	82273.67	79171.30	27061.72	52480.79	182.70
17-May-11 14:48:00	1.13	372.16	81977.34	79360.79	26795.40	52464.59	182.23
17-May-11 14:49:00	1.08	373.29	81558.41	79206.54	26910.10	52478.49	182.01
17-May-11 14:50:00	0.89	374.11	81806.15	78744.77	27020.62	52437.60	182.05
17-May-11 14:51:00	1.00	373.61	81986.27	78804.27	26887.80	52415.61	182.84
17-May-11 14:52:00	1.14	374.06	81877.22	79057.78	26882.83	52401.75	181.99
17-May-11 14:53:00	1.03	373.31	81975.05	79063.67	26856.24	52412.79	182.24
17-May-11 14:54:00	1.06	372.28	81810.73	79052.68	26761.54	52413.91	182.62
17-May-11 14:55:00	1.01	371.24	81584.42	78920.01	26770.76	52552.71	182.79
17-May-11 14:56:00	0.82	370.63	81356.80	78702.16	26866.57	52712.31	183.37

Run 1	Scrubbing Liquid		Pump Pressure		Aggle-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air		Air to Rings Air to Regen (Mlbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317PH106B	Lower Circulation (psig)	317PH108			Air to Regen (Mlbs/hr)	317FC115		
17-May-11 14:57:00	77.79		41.97		21.76	120		256.90	91.79	1124.40
17-May-11 14:58:00	77.83		41.97		21.90	123		256.41	92.16	1125.78
17-May-11 14:59:00	77.83		41.96		21.76	121		255.59	92.47	1127.30
17-May-11 15:00:00	77.79		41.99		21.59	118		256.39	92.18	1127.25
17-May-11 15:01:00	77.76		41.88		21.36	117		256.26	92.19	1124.01
17-May-11 15:02:00	77.65		41.96		21.61	118		257.53	91.47	1120.95
17-May-11 15:03:00	77.64		41.94		21.64	120		257.47	91.30	1121.54
17-May-11 15:04:00	77.65		41.84		21.49	118		255.48	91.66	1125.96
17-May-11 15:05:00	77.78		41.81		21.74	119		256.40	91.19	1127.94
17-May-11 15:06:00	77.86		41.83		21.80	120		256.51	91.53	1129.28
17-May-11 15:07:00	77.90		41.94		21.76	121		254.79	92.10	1126.06
17-May-11 15:08:00	77.94		41.91		21.72	120		254.49	92.13	1123.25
17-May-11 15:09:00	77.91		41.77		21.74	119		255.70	91.66	1128.64
17-May-11 15:10:00	77.83		41.85		21.93	121		257.91	90.66	1129.66
17-May-11 15:11:00	77.70		41.84		21.86	119		257.07	90.96	1130.49
17-May-11 15:12:00	77.72		41.85		21.68	118		256.27	91.75	1132.67
17-May-11 15:13:00	77.86		41.79		21.77	119		256.03	91.78	1131.95
17-May-11 15:14:00	77.59		41.73		21.72	120		256.01	91.46	1127.00
17-May-11 15:15:00	77.45		41.86		21.85	120		257.42	90.94	1125.18
17-May-11 15:16:00	77.48		41.81		21.90	120		259.13	90.21	1126.77
17-May-11 15:17:00	77.36		41.74		21.61	121		258.32	90.32	1128.19
17-May-11 15:18:00	77.47		41.88		21.77	121		256.27	90.87	1131.84
17-May-11 15:19:00	77.59		41.87		21.75	120		256.38	90.43	1130.67
17-May-11 15:20:00	77.67		41.86		21.85	120		256.85	90.22	1127.78
17-May-11 15:21:00	77.66		41.84		21.74	123		258.06	90.34	1130.71
17-May-11 15:22:00	77.70		41.87		21.73	122		257.56	90.68	1128.66
17-May-11 15:23:00	77.78		41.91		21.68	119		257.54	90.58	1129.27
17-May-11 15:24:00	77.75		41.88		21.75	121		258.71	90.17	1129.11
17-May-11 15:25:00	77.73		41.94		21.74	120		259.90	89.71	1131.39
17-May-11 15:26:00	77.91		41.74		21.73	118		257.33	90.91	1129.80
17-May-11 15:27:00	77.82		41.84		21.93	121		259.50	90.68	1129.14
17-May-11 15:28:00	77.70		41.82		21.87	122		259.52	90.67	1132.86
17-May-11 15:29:00	77.68		41.78		21.75	121		259.16	90.75	1133.78
17-May-11 15:30:00	77.76		41.79		21.76	122		260.71	89.88	1137.09
17-May-11 15:31:00	77.76		41.79		21.88	120		259.45	90.31	1125.66
17-May-11 15:32:00	77.59		41.83		21.81	117		258.47	90.80	1121.51
17-May-11 15:33:00	77.63		41.84		21.90	121		259.60	90.48	1128.87
17-May-11 15:34:00	77.70		41.83		21.86	122		260.71	90.06	1125.82
	77.68		42.07		22.12	120.38		259.15	91.89	1131.62

Run 1	#2 Stand Pipe Aeration Air to Regen (lbs/min)		Air to Regen Temp B-1 Outlet (oF)		Tempered Air Temp (oF)		Ambient Air Temp (oF)		Air to Regen Pressure Blower Discharge (psig)		Plant Air to 45lb Air (psig)		CO2 (WGS CEMS) (% by vol. dry)		CO (WGS CEMS) (ppmv, dry)	
	317F1106	317T1112	317T1112	317T1112	DWS AT	317PC039	317PC088	317AI109	317AI111	317AI109	317AI111	317AI109	317AI111	317AI109	317AI111	317AI111
17-May-11 14:57:00	1149.91	248.64	216.32	82.06	15.83	78.76	17.24	80.11								
17-May-11 14:58:00	1152.77	248.73	216.42	81.81	15.85	79.18	17.32	112.08								
17-May-11 14:59:00	1154.70	248.69	216.27	81.63	15.87	79.60	17.25	94.51								
17-May-11 15:00:00	1154.00	248.56	215.79	81.60	15.89	79.64	17.23	75.27								
17-May-11 15:01:00	1150.38	248.55	215.76	81.51	15.89	79.38	17.27	81.68								
17-May-11 15:02:00	1146.64	248.58	215.58	81.24	15.85	78.81	17.30	85.98								
17-May-11 15:03:00	1146.11	248.65	215.42	80.95	15.84	78.46	17.31	86.17								
17-May-11 15:04:00	1151.11	248.77	215.39	80.73	15.81	78.90	17.31	88.29								
17-May-11 15:05:00	1153.20	249.02	215.33	80.70	15.78	79.23	17.27	78.88								
17-May-11 15:06:00	1154.84	249.23	215.30	80.70	15.86	79.36	17.33	99.52								
17-May-11 15:07:00	1152.31	249.32	215.24	80.77	15.89	78.98	17.33	94.89								
17-May-11 15:08:00	1149.26	249.37	215.00	80.82	15.87	78.72	17.31	86.68								
17-May-11 15:09:00	1156.07	249.51	214.67	80.83	15.83	79.55	17.43	384.71								
17-May-11 15:10:00	1156.18	249.86	214.45	80.78	15.80	79.61	17.53	685.89								
17-May-11 15:11:00	1156.06	249.70	214.49	80.61	15.82	79.56	17.48	344.54								
17-May-11 15:12:00	1158.39	249.92	214.36	80.35	15.88	79.71	17.43	201.15								
17-May-11 15:13:00	1158.70	250.00	214.00	80.20	15.84	79.77	17.35	101.54								
17-May-11 15:14:00	1154.57	249.72	213.91	80.22	15.80	79.63	17.35	109.74								
17-May-11 15:15:00	1152.24	249.34	213.98	80.37	15.81	79.44	17.39	142.89								
17-May-11 15:16:00	1153.02	249.29	213.99	80.47	15.82	79.50	17.41	149.96								
17-May-11 15:17:00	1154.45	248.98	213.49	80.50	15.83	79.46	17.41	150.88								
17-May-11 15:18:00	1158.07	248.80	213.24	80.50	15.82	79.56	17.37	121.10								
17-May-11 15:19:00	1156.91	248.74	213.40	80.50	15.80	79.53	17.35	90.48								
17-May-11 15:20:00	1153.73	248.74	213.43	80.50	15.81	79.50	17.45	124.89								
17-May-11 15:21:00	1157.59	248.76	213.31	80.52	15.81	80.09	17.49	236.98								
17-May-11 15:22:00	1155.73	248.81	213.41	80.60	15.83	80.01	17.49	303.21								
17-May-11 15:23:00	1155.85	248.83	213.40	80.58	15.81	79.94	17.37	126.72								
17-May-11 15:24:00	1156.62	249.00	213.59	80.43	15.80	79.90	17.32	107.30								
17-May-11 15:25:00	1158.85	249.37	213.88	80.31	15.78	79.97	17.32	100.76								
17-May-11 15:26:00	1155.79	249.58	214.03	80.27	15.84	79.85	17.31	95.95								
17-May-11 15:27:00	1154.64	249.72	214.18	80.23	15.82	79.60	17.28	79.06								
17-May-11 15:28:00	1158.06	249.63	214.50	80.13	15.79	79.97	17.28	84.15								
17-May-11 15:29:00	1157.64	249.43	214.72	80.03	15.78	79.95	17.24	67.86								
17-May-11 15:30:00	1157.49	249.49	214.72	79.93	15.75	79.53	17.24	67.67								
17-May-11 15:31:00	1151.41	249.59	214.93	79.90	15.76	79.09	17.27	75.09								
17-May-11 15:32:00	1147.11	249.61	215.22	79.83	15.78	78.58	17.23	63.67								
17-May-11 15:33:00	1155.95	249.40	215.16	79.80	15.77	79.40	17.27	113.14								
17-May-11 15:34:00	1152.74	249.50	214.90	79.73	15.75	79.67	17.38	187.59								
	1156.44	246.51	213.41	80.55	15.88	79.61	17.26	101.85								

O ₂ (WGS CEMS) (% by vol. dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fuegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B_Cat_Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 1						
17-May-11 14:57:00	369.89	81223.06	78374.04	26897.88	52692.80	183.61
17-May-11 14:58:00	369.91	81062.27	78330.81	26965.71	52544.52	183.83
17-May-11 14:59:00	369.84	81065.66	78314.62	26896.91	52440.13	183.79
17-May-11 15:00:00	369.57	81049.71	78205.66	26855.27	52450.64	184.05
17-May-11 15:01:00	370.22	80991.69	78126.67	26999.33	52450.53	184.60
17-May-11 15:02:00	369.99	81133.55	77950.58	27020.80	52508.93	184.92
17-May-11 15:03:00	370.37	81084.30	78136.46	27022.00	52529.03	184.60
17-May-11 15:04:00	369.95	81166.22	78229.56	27012.38	52516.90	184.75
17-May-11 15:05:00	368.04	81075.22	78212.49	26847.97	52516.90	184.85
17-May-11 15:06:00	368.58	80657.19	78043.61	26930.66	52470.34	185.02
17-May-11 15:07:00	369.35	80775.10	77780.35	26974.12	52477.28	185.18
17-May-11 15:08:00	368.30	80943.52	77930.42	26901.23	52488.27	185.13
17-May-11 15:09:00	367.89	80714.24	77962.38	27126.05	52526.96	185.36
17-May-11 15:10:00	368.52	80623.81	77675.57	27349.72	52574.04	185.99
17-May-11 15:11:00	369.40	80762.39	77634.00	27292.14	52544.42	186.10
17-May-11 15:12:00	369.15	80955.22	77723.39	27153.46	52471.89	186.05
17-May-11 15:13:00	369.45	80899.29	78016.12	27046.39	52399.16	185.32
17-May-11 15:14:00	368.87	80964.48	77943.43	27008.21	52301.86	185.99
17-May-11 15:15:00	368.42	80839.03	77998.87	27015.59	52305.05	185.46
17-May-11 15:16:00	369.47	80740.46	77964.18	27107.52	52329.20	185.47
17-May-11 15:17:00	370.55	80969.40	77886.46	27186.93	52298.38	186.30
17-May-11 15:18:00	369.86	81206.59	78128.54	27100.84	52090.28	185.01
17-May-11 15:19:00	368.32	81054.69	78250.73	26932.04	51899.83	184.64
17-May-11 15:20:00	367.86	80716.71	78195.88	27013.27	51965.76	184.67
17-May-11 15:21:00	368.35	80615.86	77958.25	27165.52	52123.95	185.20
17-May-11 15:22:00	369.67	80723.41	77751.31	27288.86	52211.11	185.57
17-May-11 15:23:00	369.57	81013.70	77819.06	27078.19	52025.27	185.33
17-May-11 15:24:00	369.31	80992.58	78073.97	26990.04	51898.99	184.82
17-May-11 15:25:00	370.11	80934.21	78040.95	27063.95	51938.96	184.49
17-May-11 15:26:00	370.47	81109.46	77910.14	27058.73	51912.56	185.48
17-May-11 15:27:00	369.58	81189.73	78143.11	26916.28	51902.79	184.92
17-May-11 15:28:00	371.30	80994.03	78347.63	27068.59	51927.32	184.13
17-May-11 15:29:00	371.12	81371.40	78057.92	26995.84	51905.04	185.29
17-May-11 15:30:00	370.82	81331.89	78412.89	26957.11	51903.12	184.43
17-May-11 15:31:00	371.32	81264.91	78441.03	27059.21	51912.91	184.12
17-May-11 15:32:00	370.40	81374.99	78311.19	26903.87	51914.20	184.56
17-May-11 15:33:00	370.08	81172.75	78481.42	26947.12	51904.95	183.94
17-May-11 15:34:00	370.85	81104.20	78294.78	27178.23	51873.58	184.27
0.80	373.32	81825.08	78913.49	27176.91	52446.08	182.01

B Cat WGS ICR Performance Test
May 20, 2011

Run No.	Pump Pressure Lower Circulation (psig) 317PI108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317PI177A	WGS Liquid to Gas Ratio (gal/MSCF) 317C WGS L G RATIO	Vol Reg FG (dscfm) Qr	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C B Cat Feed	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111	O2 (WGS CEMS) (% by vol. dry) 317AI107	Total Corrected Air (M lb/hr) 317C Tot Corr Air
1	43.31	21.46	176.42	77472	26912	51198	17.41	80.04	0.64	366.67
2	43.03	21.31	178.70	76999	26640	50762	17.32	63.46	0.69	364.63
3	43.28	21.31	178.19	76724	26745	50905	17.42	139.65	0.50	363.68
Average	43.21	21.36	177.77	77065	26766	50955	17.38	94.38	0.61	364.99

Speciated VOHAPs/Aldehydes

5/20/2011 11:40
5/20/2011 12:54

1m

Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H ₂ O) 317F177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
20-May-11 11:40:00	77.82	21.35	120	255.52	89.39	1131.12
20-May-11 11:41:00	77.58	21.57	120	256.67	88.85	1130.34
20-May-11 11:42:00	77.61	21.54	121	257.21	88.66	1128.95
20-May-11 11:43:00	77.68	21.45	121	257.12	88.94	1130.33
20-May-11 11:44:00	77.73	21.50	121	257.23	89.11	1130.37
20-May-11 11:45:00	77.82	21.53	120	257.15	89.09	1128.33
20-May-11 11:46:00	77.72	21.45	121	256.41	89.20	1126.61
20-May-11 11:47:00	77.74	21.49	120	256.86	89.15	1130.57
20-May-11 11:48:00	77.73	21.40	121	257.09	89.30	1131.10
20-May-11 11:49:00	77.63	21.37	121	258.99	88.49	1133.24
20-May-11 11:50:00	77.72	21.52	121	258.28	88.74	1129.87
20-May-11 11:51:00	77.71	21.57	121	257.23	89.34	1126.27
20-May-11 11:52:00	77.71	21.64	120	257.46	89.17	1128.01
20-May-11 11:53:00	77.57	21.52	120	256.60	89.32	1128.70
20-May-11 11:54:00	77.70	21.47	120	256.49	89.49	1128.81
20-May-11 11:55:00	77.81	21.60	120	258.06	88.76	1130.26
20-May-11 11:56:00	77.85	21.61	121	257.54	89.00	1132.94
20-May-11 11:57:00	77.74	21.65	120	256.97	88.91	1129.45
20-May-11 11:58:00	77.52	21.49	120	255.14	89.51	1123.67
20-May-11 11:59:00	77.67	21.48	120	256.57	89.36	1130.05
20-May-11 12:00:00	77.93	21.45	120	257.22	89.03	1131.40
20-May-11 12:01:00	77.83	21.38	120	258.03	88.74	1130.08
20-May-11 12:02:00	77.79	21.40	120	257.62	89.02	1127.56
20-May-11 12:03:00	77.93	21.48	120	257.33	89.22	1125.93
20-May-11 12:04:00	77.95	21.30	120	256.13	89.79	1127.25
20-May-11 12:05:00	77.81	21.35	120	256.57	89.12	1128.53
20-May-11 12:06:00	77.58	21.36	120	256.03	89.43	1128.72
20-May-11 12:07:00	77.83	21.41	120	256.54	89.38	1128.60
20-May-11 12:08:00	77.86	21.42	120	256.25	89.43	1129.32
20-May-11 12:09:00	77.79	21.56	120	254.93	89.77	1127.83
20-May-11 12:10:00	77.86	21.46	120	254.84	89.77	1123.12
20-May-11 12:11:00	77.93	21.40	120	256.61	89.37	1125.48
20-May-11 12:12:00	77.80	21.32	120	256.23	89.48	1125.02
20-May-11 12:13:00	77.60	21.34	120	255.87	89.40	1127.81
20-May-11 12:14:00	77.56	21.33	120	256.47	89.10	1125.02
20-May-11 12:15:00	77.60	21.33	120	256.06	89.30	1125.27
20-May-11 12:16:00	77.63	21.21	120	256.79	89.05	1128.12
20-May-11 12:17:00	77.78	21.20	120	256.95	88.71	1126.68
20-May-11 12:18:00	77.86	21.10	120	254.59	89.62	1128.39
20-May-11 12:19:00	77.89	21.24	120	255.51	89.47	1129.31
20-May-11 12:20:00	77.87	21.33	120	256.04	89.32	1130.56
20-May-11 12:21:00	77.81	21.18	120	252.86	90.73	1126.50
20-May-11 12:22:00	77.87	21.31	120	254.28	89.94	1122.20
20-May-11 12:23:00	77.96	21.37	120	255.85	89.27	1128.43
20-May-11 12:24:00	77.85	21.43	121	257.37	88.53	1130.35
20-May-11 12:25:00	77.83	21.51	120	255.46	89.13	1131.58
20-May-11 12:26:00	77.79	21.39	120	255.55	89.27	1129.52
20-May-11 12:27:00	77.83	21.34	120	255.63	89.30	1125.71
20-May-11 12:28:00	77.80	21.47	120	256.38	88.75	1128.21
20-May-11 12:29:00	77.77	21.34	120	254.39	89.56	1128.32

Speciated VOHAPs/A

#2 Stand Pipe Aerator/ Air to Regen (lbs/min)	Air to Regen Temp B-1 Outlet (oF)	Tempered Air Temp (oF)	Ambient Air Temp (oF)	Air to Regen Pressure lower Discharge (psi)	Plant Air to 45lb Air (psig)	CO2 (WGS CEMS) (% by vol. dry)	CO (WGS CEMS) (ppmv. dry)	O2 (WGS CEMS) (% by vol. dry)
317FI106	317TH112	317TH120	DWS AT	317PC038	317PC088	317AI109	317AI111	317AI107
Run 1								
20-May-11 11:40:00	248.07	202.09	86.30	15.61	77.30	17.41	55.90	0.62
20-May-11 11:41:00	247.98	202.01	86.23	15.60	77.55	17.38	51.09	0.63
20-May-11 11:42:00	247.70	202.16	86.27	15.59	77.40	17.41	54.13	0.67
20-May-11 11:43:00	247.64	202.47	86.30	15.60	77.35	17.39	51.89	0.62
20-May-11 11:44:00	247.64	202.40	86.32	15.58	77.34	17.36	48.26	0.76
20-May-11 11:45:00	247.67	202.58	86.38	15.61	77.21	17.36	48.27	0.72
20-May-11 11:46:00	247.67	202.47	86.30	15.59	77.06	17.40	62.94	0.60
20-May-11 11:47:00	247.50	202.23	86.28	15.59	77.41	17.50	105.51	0.62
20-May-11 11:48:00	247.49	201.87	86.22	15.60	77.44	17.49	109.56	0.61
20-May-11 11:49:00	247.46	202.05	86.23	15.56	77.39	17.39	63.97	0.70
20-May-11 11:50:00	247.29	202.03	86.20	15.59	77.22	17.36	56.72	0.70
20-May-11 11:51:00	247.09	202.03	86.27	15.62	76.96	17.30	48.17	0.76
20-May-11 11:52:00	247.16	201.84	86.30	15.59	76.98	17.31	47.07	0.81
20-May-11 11:53:00	247.07	201.65	86.37	15.59	76.99	17.35	48.76	0.74
20-May-11 11:54:00	246.84	201.62	86.33	15.61	77.16	17.33	47.19	0.72
20-May-11 11:55:00	246.83	201.67	86.28	15.57	77.39	17.32	48.37	0.73
20-May-11 11:56:00	246.83	201.53	86.27	15.61	77.40	17.33	49.23	0.78
20-May-11 11:57:00	246.90	201.66	86.30	15.59	76.96	17.31	45.41	0.80
20-May-11 11:58:00	247.01	201.76	86.30	15.61	76.68	17.35	51.76	0.87
20-May-11 11:59:00	246.95	201.67	86.37	15.60	77.11	17.44	93.66	0.72
20-May-11 12:00:00	247.03	201.76	86.40	15.55	77.21	17.51	123.89	0.52
20-May-11 12:01:00	246.96	201.67	86.38	15.57	77.24	17.42	69.87	0.55
20-May-11 12:02:00	246.98	201.82	86.28	15.58	76.91	17.36	57.55	0.64
20-May-11 12:03:00	247.13	201.76	86.13	15.62	76.64	17.32	48.94	0.75
20-May-11 12:04:00	247.02	201.67	86.02	15.62	76.99	17.31	48.88	0.70
20-May-11 12:05:00	246.96	201.80	85.90	15.55	77.30	17.31	49.43	0.73
20-May-11 12:06:00	247.32	201.77	85.82	15.58	77.39	17.36	53.18	0.64
20-May-11 12:07:00	247.56	201.87	85.70	15.59	77.26	17.33	49.53	0.73
20-May-11 12:08:00	247.62	202.09	85.63	15.65	77.09	17.32	48.52	0.83
20-May-11 12:09:00	247.69	202.29	85.60	15.64	76.72	17.37	53.18	0.76
20-May-11 12:10:00	247.55	202.30	85.62	15.63	76.47	17.44	65.78	0.64
20-May-11 12:11:00	247.46	202.19	85.72	15.62	76.97	17.54	151.22	0.47
20-May-11 12:12:00	247.49	201.98	85.80	15.62	76.80	17.55	195.93	0.47
20-May-11 12:13:00	247.71	202.15	85.80	15.60	76.66	17.42	70.89	0.67
20-May-11 12:14:00	247.60	202.20	85.87	15.62	76.64	17.39	61.05	0.73
20-May-11 12:15:00	247.54	202.26	85.97	15.65	76.64	17.41	60.58	0.72
20-May-11 12:16:00	247.63	202.10	86.00	15.64	77.00	17.39	54.37	0.66
20-May-11 12:17:00	247.64	202.00	86.00	15.64	77.06	17.38	53.40	0.61
20-May-11 12:18:00	247.62	202.09	86.00	15.68	77.03	17.36	52.01	0.66
20-May-11 12:19:00	247.59	201.87	86.07	15.64	77.05	17.35	51.86	0.75
20-May-11 12:20:00	247.60	201.89	86.10	15.67	77.08	17.41	60.08	0.65
20-May-11 12:21:00	247.50	201.59	86.10	15.74	76.89	17.39	57.19	0.59
20-May-11 12:22:00	247.51	201.27	86.17	15.65	76.53	17.40	106.98	0.70
20-May-11 12:23:00	247.56	200.99	86.13	15.63	76.97	17.56	228.90	0.57
20-May-11 12:24:00	247.49	200.87	86.10	15.65	77.11	17.56	198.45	0.48
20-May-11 12:25:00	247.30	200.84	86.10	15.64	77.24	17.43	77.84	0.65
20-May-11 12:26:00	247.20	200.85	86.03	15.64	77.21	17.37	57.73	0.83
20-May-11 12:27:00	247.06	200.87	86.00	15.64	76.91	17.37	57.79	0.70
20-May-11 12:28:00	246.96	200.87	85.98	15.60	77.10	17.38	57.66	0.70
20-May-11 12:29:00	246.89	200.87	85.90	15.65	77.12	17.39	56.95	0.61

Speciated VOHAPs/A 5/20/2011 11:40
5/20/2011 12:54

1m

	Total Corrected Air (M lb/hr)	Volume Air to Reg (dscfm)	Volume Air to Reg (dscfm) - Qa	Vol Reg FG (dscfm)	Vol Reg FG (dscfm) - Qr	Vol Reg FG (dscfm) - Qr 317C_Bugas	Total Liquid Flow (gpm)	Cat Feed Rate (BPD)	WGS Liquid to Gas Ratio (gal/MSCF)
	317C_To_Corr_Air	Qa	317C_dryair	Qr	317C_Bugas	317C_Bugas	317C_WGS_Liquid_Flow	317C_B Cat Feed	317C_WGS_L_G_Ratio
Run 1									
20-May-11 11:40:00	366.15	80275.07	80178.05	77375.15	77379.19	77379.19	13565.21	51009.31	175.24
20-May-11 11:41:00	365.69	80172.92	80242.60	77252.72	77272.08	77272.08	13571.35	51000.11	175.66
20-May-11 11:42:00	366.19	80284.14	80140.49	77426.17	77330.21	77330.21	13563.47	50996.46	175.38
20-May-11 11:43:00	366.59	80371.43	80251.67	77449.61	77279.81	77279.81	13527.84	50986.23	175.04
20-May-11 11:44:00	366.80	80417.39	80338.92	77588.61	77339.27	77339.27	13561.14	51082.77	175.39
20-May-11 11:45:00	367.05	80472.78	80384.85	77606.86	77518.12	77518.12	13563.33	51183.06	175.05
20-May-11 11:46:00	366.95	80449.53	80440.22	77515.12	77509.74	77509.74	13578.66	51153.30	175.10
20-May-11 11:47:00	366.27	80300.07	80416.98	77484.47	77516.38	77516.38	13578.03	51134.85	175.29
20-May-11 11:48:00	366.77	80409.62	80267.58	77565.16	77596.97	77596.97	13597.27	51162.41	175.12
20-May-11 11:49:00	367.24	80513.61	80377.09	77655.33	77426.91	77426.91	13577.94	51023.87	175.40
20-May-11 11:50:00	368.10	80702.35	80481.04	77816.83	77523.71	77523.71	13563.36	50885.58	174.95
20-May-11 11:51:00	367.88	80652.91	80669.70	77768.44	77599.91	77599.91	13586.69	50930.31	175.16
20-May-11 11:52:00	367.61	80595.47	80620.28	77763.37	77790.13	77790.13	13595.64	50975.98	174.82
20-May-11 11:53:00	367.44	80557.75	80562.87	77701.88	77785.91	77785.91	13610.67	51059.98	174.94
20-May-11 11:54:00	366.82	80420.78	80525.16	77536.08	77706.18	77706.18	13572.97	51150.23	174.66
20-May-11 11:55:00	366.99	80458.89	80388.25	77571.22	77632.09	77632.09	13593.39	51266.29	175.04
20-May-11 11:56:00	367.64	80600.51	80426.34	77758.60	77510.23	77510.23	13620.34	51348.25	175.70
20-May-11 11:57:00	367.61	80594.24	80567.91	77754.81	77586.29	77586.29	13621.50	51264.61	175.64
20-May-11 11:58:00	366.58	80369.66	80561.64	77639.13	77737.88	77737.88	13644.42	51185.76	175.55
20-May-11 11:59:00	365.65	80164.34	80352.05	77387.95	77823.02	77823.02	13629.00	51183.63	175.17
20-May-11 12:00:00	366.91	80418.13	80132.94	77514.83	77567.08	77567.08	13605.05	51196.34	175.18
20-May-11 12:01:00	366.95	80450.66	80383.62	77490.42	77245.83	77245.83	13618.39	51227.31	176.40
20-May-11 12:02:00	367.54	80578.82	80418.08	77640.70	77421.94	77421.94	13635.47	51109.20	176.07
20-May-11 12:03:00	367.48	80565.05	80546.22	77696.20	77496.33	77496.33	13617.50	50977.10	175.86
20-May-11 12:04:00	367.60	80592.16	80532.46	77663.18	77672.00	77672.00	13633.66	51067.81	175.47
20-May-11 12:05:00	366.87	80432.68	80559.56	77525.65	77608.06	77608.06	13647.19	51161.54	175.90
20-May-11 12:06:00	366.31	80308.71	80400.15	77377.34	77645.43	77645.43	13665.53	51327.49	175.94
20-May-11 12:07:00	366.23	80291.89	80276.22	77421.33	77465.55	77465.55	13643.09	51397.97	176.06
20-May-11 12:08:00	366.76	80407.44	80259.41	77620.31	77415.09	77415.09	13647.22	51295.09	176.30
20-May-11 12:09:00	366.73	80401.87	80374.91	77592.23	77477.24	77477.24	13675.15	51270.04	176.53
20-May-11 12:10:00	365.56	80145.56	80369.35	77296.37	77564.45	77564.45	13670.58	51192.61	176.29
20-May-11 12:11:00	365.60	80153.19	80113.14	77245.61	77507.15	77507.15	13676.37	51106.14	176.37
20-May-11 12:12:00	366.95	80450.53	80120.77	77549.36	77205.71	77205.71	13700.09	51092.92	177.44
20-May-11 12:13:00	366.55	80361.65	80417.99	77510.44	77235.52	77235.52	13700.09	51133.22	177.52
20-May-11 12:14:00	366.03	80248.91	80329.15	77426.77	77565.76	77565.76	13713.29	51190.18	176.86
20-May-11 12:15:00	366.44	80338.97	80216.45	77523.70	77507.26	77507.26	13723.56	51206.70	176.98
20-May-11 12:16:00	366.42	80333.72	80306.47	77447.83	77402.14	77402.14	13733.63	51212.62	177.45
20-May-11 12:17:00	366.80	80417.19	80301.22	77475.82	77416.21	77416.21	13726.36	51217.30	177.28
20-May-11 12:18:00	366.61	80375.42	80384.65	77461.54	77363.70	77363.70	13690.98	51203.81	176.97
20-May-11 12:19:00	365.37	80103.89	80342.90	77268.99	77474.38	77474.38	13693.94	51202.05	176.82
20-May-11 12:20:00	366.06	80255.38	80071.48	77387.14	77504.32	77504.32	13672.19	51211.19	176.35
20-May-11 12:21:00	366.61	80375.88	80222.91	77421.59	77198.67	77198.67	13689.61	51242.51	177.18
20-May-11 12:22:00	365.19	80063.14	80343.37	77237.21	77280.66	77280.66	13705.00	51266.32	177.57
20-May-11 12:23:00	365.24	80076.01	80300.75	77285.75	77514.09	77514.09	13716.88	51260.81	176.85
20-May-11 12:24:00	366.27	80300.99	80431.61	77411.93	77238.48	77238.48	13705.69	51251.34	177.43
20-May-11 12:25:00	366.94	80447.53	80268.51	77588.07	77156.24	77156.24	13697.50	51281.08	177.45
20-May-11 12:26:00	365.74	80185.38	80414.99	77446.14	77433.43	77433.43	13686.76	51297.52	177.06
20-May-11 12:27:00	365.94	80229.12	80152.95	77657.62	77657.62	77657.62	13676.46	51244.14	175.92
20-May-11 12:28:00	366.08	80259.08	80196.66	77403.13	77297.90	77297.90	13676.69	51218.74	176.97
20-May-11 12:29:00	366.04	80250.28	80226.61	77315.54	77338.71	77338.71	13684.80	51247.79	176.88

Run 1	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317F177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F105
20-May-11 12:30:00	77.64	43.23	21.45	120	254.62	89.52	1126.87
20-May-11 12:31:00	77.69	43.19	21.66	119	254.87	89.62	1126.88
20-May-11 12:32:00	77.63	43.20	21.65	119	255.33	89.83	1127.25
20-May-11 12:33:00	77.62	43.14	21.37	120	253.85	90.01	1124.40
20-May-11 12:34:00	77.68	43.19	21.53	120	255.87	89.37	1120.99
20-May-11 12:35:00	77.66	43.23	21.66	121	255.86	89.50	1126.55
20-May-11 12:36:00	77.70	43.25	21.49	120	255.80	89.64	1128.66
20-May-11 12:37:00	77.67	43.33	21.55	120	257.05	89.54	1129.09
20-May-11 12:38:00	77.58	43.33	21.33	120	256.08	89.72	1126.45
20-May-11 12:39:00	77.78	43.26	21.52	121	257.10	89.09	1124.71
20-May-11 12:40:00	77.84	43.32	21.59	120	256.16	89.43	1128.06
20-May-11 12:41:00	77.51	43.30	21.62	120	256.18	89.44	1127.50
20-May-11 12:42:00	77.50	43.15	21.53	121	256.26	89.81	1127.62
20-May-11 12:43:00	77.57	43.17	21.64	120	257.04	89.57	1130.20
20-May-11 12:44:00	77.66	43.27	21.70	120	256.89	89.33	1132.03
20-May-11 12:45:00	77.71	43.27	21.49	119	254.45	90.10	1129.99
20-May-11 12:46:00	77.69	43.07	21.50	120	254.74	90.11	1125.27
20-May-11 12:47:00	77.68	43.07	21.44	120	255.56	90.02	1129.43
20-May-11 12:48:00	77.56	43.05	21.59	120	255.88	89.92	1130.20
20-May-11 12:49:00	77.56	42.99	21.42	120	255.65	89.73	1129.95
20-May-11 12:50:00	77.45	42.98	21.47	120	256.69	89.52	1126.72
20-May-11 12:51:00	77.40	42.98	21.62	119	256.22	89.63	1123.79
20-May-11 12:52:00	77.57	43.04	21.64	119	255.48	90.10	1127.48
20-May-11 12:53:00	77.79	43.04	21.61	119	255.71	89.87	1129.90
20-May-11 12:54:00	77.72	43.31	21.46	120.10	256.22	89.38	1128.11

#2 Stand Pipe Aerator Air to Regen (lbs/min) 317F1106	Air to Regen Temp B-1 Outlet (oF) 317T1112	Tempered Air Temp (oF) 317T1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure lower Discharge (psi) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317A109	CO (WGS CEMS) (ppmv. dry) 317A111	O2 (WGS CEMS) (% by vol. dry) 317A107
Run 1								
20-May-11 12:30:00	246.84	200.84	85.82	15.66	77.07	17.35	49.99	0.64
20-May-11 12:31:00	246.91	200.80	85.62	15.67	77.03	17.36	52.32	0.77
20-May-11 12:32:00	247.10	200.89	85.43	15.71	76.73	17.38	55.90	0.77
20-May-11 12:33:00	247.07	200.87	85.47	15.66	76.25	17.40	59.88	0.64
20-May-11 12:34:00	246.86	200.68	85.50	15.66	76.19	17.45	81.81	0.65
20-May-11 12:35:00	246.90	200.60	85.43	15.64	76.89	17.59	170.93	0.44
20-May-11 12:36:00	246.91	200.59	85.32	15.62	77.04	17.59	197.48	0.39
20-May-11 12:37:00	247.00	200.66	85.20	15.65	76.93	17.50	108.72	0.50
20-May-11 12:38:00	247.13	200.60	85.20	15.62	76.74	17.48	96.27	0.53
20-May-11 12:39:00	246.96	200.59	85.13	15.60	76.55	17.45	71.23	0.61
20-May-11 12:40:00	247.05	200.71	85.05	15.63	76.88	17.44	68.42	0.58
20-May-11 12:41:00	247.03	200.76	85.12	15.63	77.16	17.42	61.54	0.60
20-May-11 12:42:00	246.91	200.72	85.27	15.67	77.04	17.42	62.82	0.60
20-May-11 12:43:00	246.67	200.48	85.38	15.65	76.95	17.41	62.41	0.56
20-May-11 12:44:00	246.49	200.06	85.52	15.64	77.00	17.43	68.02	0.59
20-May-11 12:45:00	246.45	199.78	85.62	15.66	76.90	17.42	63.74	0.62
20-May-11 12:46:00	246.47	199.46	85.77	15.66	76.88	17.44	78.87	0.60
20-May-11 12:47:00	246.30	199.22	85.87	15.67	77.22	17.57	211.62	0.56
20-May-11 12:48:00	246.13	198.84	85.97	15.66	77.12	17.60	296.35	0.40
20-May-11 12:49:00	246.24	198.86	86.07	15.64	76.95	17.51	128.13	0.44
20-May-11 12:50:00	246.25	198.92	86.03	15.65	76.84	17.48	83.41	0.54
20-May-11 12:51:00	246.29	198.83	86.00	15.64	76.78	17.47	76.79	0.54
20-May-11 12:52:00	246.37	198.92	86.07	15.67	76.88	17.46	75.43	0.60
20-May-11 12:53:00	246.28	199.20	86.10	15.66	76.93	17.45	73.40	0.63
1150.45	247.14	201.24	85.93	15.63	77.01	17.41	80.04	0.64

Run 1	Total Corrected Air (M lb/hr)	Volume Air to Reg (dscfm)	Volume Air to Reg (dscfm) - Qa	Vol Reg FG (dscfm)	Vol Reg FG (dscfm) - Qr	Vol Reg FG (dscfm) - Qr 317C_Bugas	Total Liquid Flow (gpm)	Cat Feed Rate (BPD)	WGS Liquid to Gas Ratio (gal/MSCF)
317C_To_Corr_Air	Qa	317C_dryair					317C_WGS_Liquid_Flow	317C_B Cat Feed	317C_WGS_L_G_Ratio
20-May-11 12:30:00	365.29	80084.97	80217.82	77150.82	77287.63	77287.63	13700.15	51285.05	177.33
20-May-11 12:31:00	365.40	80110.62	80052.57	77304.12	77285.01	77285.01	13712.48	51275.57	177.33
20-May-11 12:32:00	366.09	80260.54	80078.22	77466.51	77257.74	77257.74	13706.16	51289.80	177.52
20-May-11 12:33:00	366.61	80376.06	80228.07	77486.13	77279.85	77279.85	13731.97	51296.87	177.55
20-May-11 12:34:00	365.17	80060.00	80343.54	77229.76	77348.39	77348.39	13714.15	51295.26	177.55
20-May-11 12:35:00	366.63	80380.72	80027.61	77480.23	77501.50	77501.50	13698.19	51318.67	176.55
20-May-11 12:36:00	366.48	80347.30	80348.20	77410.93	77134.68	77134.68	13692.62	51306.10	177.55
20-May-11 12:37:00	366.75	80406.99	80314.79	77479.12	77413.89	77413.89	13669.70	51282.11	176.70
20-May-11 12:38:00	367.84	80645.34	80374.46	77716.22	77388.22	77388.22	13669.63	51278.76	176.50
20-May-11 12:39:00	368.88	80433.55	80612.71	77553.41	77460.44	77460.44	13682.02	51292.48	176.88
20-May-11 12:40:00	367.17	80498.48	80401.01	77577.31	77724.32	77724.32	13659.13	51099.57	175.62
20-May-11 12:41:00	366.68	80390.50	80465.92	77469.84	77481.26	77481.26	13683.24	51006.95	176.62
20-May-11 12:42:00	368.87	80433.39	80357.98	77511.65	77544.85	77544.85	13736.56	51234.30	177.13
20-May-11 12:43:00	367.56	80584.08	80400.86	77615.87	77435.04	77435.04	13725.49	51390.69	177.19
20-May-11 12:44:00	368.06	80693.21	80551.49	77767.67	77439.76	77439.76	13691.93	51333.53	176.88
20-May-11 12:45:00	367.54	80580.16	80660.56	77676.92	77637.14	77637.14	13679.43	51205.03	176.25
20-May-11 12:46:00	366.03	80248.17	80547.57	77354.86	77747.83	77747.83	13748.35	51155.44	176.87
20-May-11 12:47:00	366.42	80333.77	80215.71	77535.98	77654.38	77654.38	13750.87	51161.49	176.97
20-May-11 12:48:00	367.36	80540.14	80301.27	77627.46	77418.48	77418.48	13762.18	51205.29	177.72
20-May-11 12:49:00	367.40	80549.59	80507.56	77576.48	77388.15	77388.15	13782.03	51225.22	178.09
20-May-11 12:50:00	366.97	80453.90	80517.00	77533.59	77540.19	77540.19	13790.04	51195.44	177.95
20-May-11 12:51:00	367.81	80638.00	80421.36	77709.26	77594.16	77594.16	13796.08	51321.24	177.71
20-May-11 12:52:00	367.33	80532.35	80605.38	77653.40	77501.55	77501.55	13767.41	51469.91	177.69
20-May-11 12:53:00	367.35	80537.99	80499.77	77669.61	77729.30	77729.30	13753.19	51441.37	177.02
	366.67	80388.14	80351.39	77510.67	77472.09	77472.09	13667.06	51198.08	175.52

Speciated VOHAPs/Aldehydes

5/20/2011 13:50
5/20/2011 14:57

1m

Run 2	Scrubbing Liquid Upper Circulation (psig) 317PI05B	Pump Pressure Lower Circulation (psig) 317PI08	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317PI177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FI113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FI105
20-May-11 13:50:00	77.58	42.99	21.18	121	253.41	90.16	1121.27
20-May-11 13:51:00	77.79	42.99	21.18	120	254.92	89.93	1118.85
20-May-11 13:52:00	77.86	43.00	21.30	121	255.00	89.78	1120.57
20-May-11 13:53:00	77.76	43.02	21.46	121	255.83	89.01	1119.93
20-May-11 13:54:00	77.72	43.11	21.28	121	255.18	89.30	1120.03
20-May-11 13:55:00	77.75	43.02	21.03	121	253.46	89.91	1122.81
20-May-11 13:56:00	77.68	42.98	21.15	121	255.96	89.09	1125.90
20-May-11 13:57:00	77.71	43.08	21.26	121	254.80	89.35	1121.15
20-May-11 13:58:00	77.74	43.08	21.27	121	253.33	89.61	1117.93
20-May-11 13:59:00	77.72	43.01	21.38	121	254.06	89.80	1123.51
20-May-11 14:00:00	77.95	43.04	21.35	121	254.05	89.83	1122.88
20-May-11 14:01:00	77.83	43.13	21.16	121	253.33	90.06	1122.89
20-May-11 14:02:00	77.74	43.15	21.22	121	254.43	89.91	1120.82
20-May-11 14:03:00	77.67	43.04	21.50	122	256.23	89.34	1116.06
20-May-11 14:04:00	77.45	43.02	21.14	121	254.73	89.68	1115.67
20-May-11 14:05:00	77.56	42.97	20.96	121	251.90	90.46	1119.51
20-May-11 14:06:00	77.69	42.98	21.16	121	254.71	89.26	1121.29
20-May-11 14:07:00	77.51	43.02	21.54	120	255.75	88.84	1121.06
20-May-11 14:08:00	77.44	43.00	21.38	120	254.64	89.15	1122.16
20-May-11 14:09:00	77.70	42.95	21.11	120	254.65	89.03	1123.60
20-May-11 14:10:00	77.72	42.94	21.13	121	255.32	88.79	1132.88
20-May-11 14:11:00	77.87	43.03	21.29	121	254.32	89.29	1124.64
20-May-11 14:12:00	77.81	42.96	21.38	121	255.87	88.72	1122.45
20-May-11 14:13:00	77.57	42.95	21.28	121	254.91	89.09	1131.70
20-May-11 14:14:00	77.60	43.04	21.42	121	253.90	89.43	1124.50
20-May-11 14:15:00	77.73	43.07	21.46	121	254.02	89.30	1128.06
20-May-11 14:16:00	77.98	43.06	21.16	121	253.77	89.41	1135.84
20-May-11 14:17:00	77.92	42.98	21.33	121	255.13	89.12	1135.74
20-May-11 14:18:00	77.86	43.04	21.42	121	254.17	89.36	1133.24
20-May-11 14:19:00	77.79	43.06	21.38	122	253.23	89.61	1128.84
20-May-11 14:20:00	77.90	43.06	21.36	122	254.08	89.36	1133.44
20-May-11 14:21:00	77.75	43.08	21.33	122	254.93	89.06	1133.53
20-May-11 14:22:00	77.71	43.06	21.46	121	254.76	89.02	1131.22
20-May-11 14:23:00	77.68	42.99	21.39	121	254.54	88.74	1131.37
20-May-11 14:24:00	77.72	43.05	21.37	121	255.95	88.28	1130.86
20-May-11 14:25:00	77.78	43.03	21.29	121	255.91	88.70	1131.35
20-May-11 14:26:00	77.74	43.00	21.26	121	254.96	89.06	1130.87
20-May-11 14:27:00	77.79	42.99	21.59	121	256.97	88.39	1129.92
20-May-11 14:28:00	77.76	43.04	21.55	122	256.14	88.83	1133.99
20-May-11 14:29:00	77.84	43.05	21.32	122	255.49	89.29	1134.17
20-May-11 14:30:00	77.76	43.03	21.49	122	255.89	89.05	1131.31
20-May-11 14:31:00	77.67	43.01	21.52	121	255.95	88.94	1129.51
20-May-11 14:32:00	77.73	43.00	21.33	121	255.30	89.40	1134.43
20-May-11 14:33:00	77.70	43.04	21.15	122	254.39	89.76	1135.39
20-May-11 14:34:00	77.74	43.07	21.20	122	255.25	89.78	1137.45
20-May-11 14:35:00	77.96	43.06	21.39	121	255.13	89.74	1136.57
20-May-11 14:36:00	77.82	43.04	21.20	121	253.88	90.42	1136.06
20-May-11 14:37:00	77.79	43.11	21.34	121	254.60	89.97	1134.17
20-May-11 14:38:00	77.88	43.15	21.31	121	253.70	90.33	1133.90
20-May-11 14:39:00	77.89	43.03	21.32	121	255.66	89.52	1134.31

Speciated VOHAPs/AIdeI

Run 2	#2 Stand Pipe Aeration Air to Regen Temp 317FH106	Air to Regen Temp B-1 Outlet (oF) 317TH112	Tempered Air Temp (oF) 317TH120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv. dry) 317AI111
20-May-11 13:50:00	1143.33	248.98	203.27	87.27	15.65	76.58	17.47	99.09
20-May-11 13:51:00	1139.85	249.01	203.29	87.30	15.66	76.13	17.44	75.17
20-May-11 13:52:00	1141.38	248.96	203.35	87.37	15.66	76.01	17.44	74.86
20-May-11 13:53:00	1140.53	248.92	203.18	87.42	15.58	75.96	17.41	65.60
20-May-11 13:54:00	1140.40	248.84	203.36	87.50	15.63	75.99	17.42	66.64
20-May-11 13:55:00	1143.96	248.90	203.32	87.52	15.60	76.16	17.39	59.69
20-May-11 13:56:00	1147.77	249.03	203.49	87.67	15.59	76.22	17.41	69.03
20-May-11 13:57:00	1141.84	249.28	203.74	87.70	15.63	75.87	17.42	75.42
20-May-11 13:58:00	1138.25	249.50	203.89	87.70	15.61	75.79	17.34	58.00
20-May-11 13:59:00	1144.03	249.59	204.11	87.70	15.65	76.30	17.44	136.64
20-May-11 14:00:00	1143.09	249.50	204.10	87.70	15.64	76.46	17.53	198.07
20-May-11 14:01:00	1143.11	249.42	204.05	87.68	15.64	76.38	17.42	87.72
20-May-11 14:02:00	1142.19	249.45	203.89	87.60	15.67	76.07	17.37	66.33
20-May-11 14:03:00	1136.80	249.27	203.76	87.60	15.66	75.56	17.39	64.15
20-May-11 14:04:00	1135.96	248.97	203.82	87.60	15.68	75.53	17.38	58.63
20-May-11 14:05:00	1140.06	248.86	203.76	87.62	15.64	75.84	17.33	53.54
20-May-11 14:06:00	1142.03	248.73	203.45	87.70	15.60	76.06	17.33	57.24
20-May-11 14:07:00	1142.68	248.97	203.40	87.63	15.61	76.21	17.38	64.33
20-May-11 14:08:00	1143.57	248.95	203.47	87.60	15.62	76.24	17.35	57.26
20-May-11 14:09:00	1142.83	248.79	203.47	87.60	15.61	75.68	17.32	51.78
20-May-11 14:10:00	1151.82	248.83	203.44	87.60	15.62	76.27	17.34	53.06
20-May-11 14:11:00	1148.56	248.76	203.17	87.67	15.63	77.15	17.35	53.45
20-May-11 14:12:00	1146.57	248.74	202.75	87.70	15.61	77.17	17.34	56.24
20-May-11 14:13:00	1154.29	248.42	202.84	87.72	15.63	77.16	17.38	62.86
20-May-11 14:14:00	1150.41	248.40	202.72	87.80	15.61	77.05	17.37	54.38
20-May-11 14:15:00	1150.56	248.42	202.64	87.85	15.62	77.08	17.36	55.61
20-May-11 14:16:00	1158.73	248.57	202.58	87.73	15.63	77.99	17.35	56.55
20-May-11 14:17:00	1158.24	248.61	202.54	87.70	15.65	78.04	17.33	53.42
20-May-11 14:18:00	1156.49	248.54	202.38	87.70	15.67	77.70	17.33	52.61
20-May-11 14:19:00	1152.20	248.45	202.37	87.70	15.64	77.34	17.33	60.64
20-May-11 14:20:00	1156.17	248.33	201.92	87.72	15.62	77.92	17.44	108.83
20-May-11 14:21:00	1155.87	248.27	201.77	87.82	15.63	77.98	17.46	127.46
20-May-11 14:22:00	1155.18	248.23	201.52	87.90	15.65	77.72	17.37	75.02
20-May-11 14:23:00	1155.72	247.96	201.29	87.97	15.61	77.63	17.33	55.71
20-May-11 14:24:00	1153.58	248.11	201.34	88.05	15.58	77.66	17.30	52.38
20-May-11 14:25:00	1154.06	248.33	201.58	87.98	15.63	77.70	17.28	50.57
20-May-11 14:26:00	1154.03	248.60	202.04	87.90	15.59	77.74	17.22	46.50
20-May-11 14:27:00	1153.40	248.69	202.62	87.83	15.58	77.57	17.20	44.24
20-May-11 14:28:00	1157.60	249.05	202.75	87.87	15.55	77.70	17.22	44.68
20-May-11 14:29:00	1157.09	249.18	202.98	87.90	15.60	77.86	17.18	42.33
20-May-11 14:30:00	1155.81	249.15	203.16	87.90	15.60	77.72	17.17	42.86
20-May-11 14:31:00	1153.54	248.89	203.47	87.90	15.56	77.73	17.22	49.43
20-May-11 14:32:00	1158.51	249.02	203.68	87.88	15.59	78.25	17.29	64.19
20-May-11 14:33:00	1158.26	249.06	203.63	87.82	15.59	78.22	17.25	64.25
20-May-11 14:34:00	1160.10	249.14	203.54	87.82	15.62	78.37	17.21	53.35
20-May-11 14:35:00	1160.21	249.02	203.46	87.70	15.60	78.46	17.20	49.23
20-May-11 14:36:00	1160.22	248.67	202.91	87.70	15.67	78.49	17.19	46.15
20-May-11 14:37:00	1157.68	248.56	202.82	87.62	15.61	78.32	17.19	45.38
20-May-11 14:38:00	1156.82	248.55	202.56	87.35	15.62	78.14	17.22	46.83
20-May-11 14:39:00	1156.39	248.50	202.29	87.12	15.61	77.94	17.21	44.82

Speciated VOHAPs/AI del

5/20/2011 13:50
5/20/2011 14:57

1m

Run 2	O ₂ (WGS CEMS) (% by vol, dry) 317A/H07	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (discm) - Qa 317C_dryair	Vol Reg FG (discm) - Qr 317C_flluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	WGS Liquid to Gas Ratio (gal/MSCF) 317C_WGS_L_G_Ratio
20-May-11 13:50:00	0.52	364.17	79805.94	76906.32	26833.96	50996.62	179.14
20-May-11 13:51:00	0.56	364.31	79807.96	76884.48	26788.39	51075.55	179.11
20-May-11 13:52:00	0.59	365.68	79838.53	76898.62	26881.71	51028.55	178.90
20-May-11 13:53:00	0.53	365.33	80139.58	76940.48	26839.33	50886.74	178.94
20-May-11 13:54:00	0.56	365.16	80061.26	77162.20	26824.94	50793.40	178.07
20-May-11 13:55:00	0.67	364.88	80024.65	77119.98	26744.26	50779.19	178.30
20-May-11 13:56:00	0.71	363.75	79963.56	77169.51	26674.03	50790.08	178.73
20-May-11 13:57:00	0.54	365.39	79716.13	77149.39	26854.52	50812.14	177.91
20-May-11 13:58:00	0.61	364.40	80076.06	76762.43	26666.01	50776.72	179.06
20-May-11 13:59:00	0.64	363.23	79858.02	77114.77	26694.97	50760.96	178.71
20-May-11 14:00:00	0.47	364.38	79801.03	77021.02	26940.38	50759.75	178.23
20-May-11 14:01:00	0.53	364.26	79854.91	76700.83	26769.20	50748.77	178.94
20-May-11 14:02:00	0.58	363.90	79828.62	76886.24	26671.81	50762.29	178.45
20-May-11 14:03:00	0.67	365.02	79749.23	76871.81	26747.65	50766.50	178.99
20-May-11 14:04:00	0.71	366.27	79995.10	76893.79	26821.83	50722.67	179.29
20-May-11 14:05:00	0.81	365.00	80269.21	77156.83	26647.89	50692.65	178.84
20-May-11 14:06:00	0.80	362.90	79989.47	77478.07	26489.37	50700.16	177.98
20-May-11 14:07:00	0.59	364.35	79528.70	77183.97	26717.36	50702.27	178.15
20-May-11 14:08:00	0.63	364.99	79846.70	76596.23	26716.04	50713.38	180.02
20-May-11 14:09:00	0.75	364.14	79987.52	76919.54	26584.56	50713.64	179.41
20-May-11 14:10:00	0.66	364.13	79801.55	77131.10	26631.90	50714.03	178.83
20-May-11 14:11:00	0.62	364.57	79798.22	76883.69	26682.28	50720.74	178.73
20-May-11 14:12:00	0.69	364.22	79896.22	76859.57	26625.51	50713.03	179.41
20-May-11 14:13:00	0.56	365.14	79819.91	77002.10	26783.59	50735.35	179.10
20-May-11 14:14:00	0.62	364.62	80020.22	76852.65	26710.60	50750.85	179.22
20-May-11 14:15:00	0.69	363.89	79906.83	77086.73	26633.58	50742.99	178.47
20-May-11 14:16:00	0.67	363.85	79747.57	77035.42	26625.44	50747.09	178.18
20-May-11 14:17:00	0.68	363.94	79738.65	76854.21	26605.52	50776.85	179.22
20-May-11 14:18:00	0.71	365.10	79757.42	76838.53	26672.52	50805.25	178.94
20-May-11 14:19:00	0.78	364.36	80012.91	76883.48	26608.26	50801.01	179.01
20-May-11 14:20:00	0.71	363.58	79850.81	77208.67	26697.36	50748.80	178.10
20-May-11 14:21:00	0.55	364.22	79678.76	77069.51	26813.77	50734.68	178.17
20-May-11 14:22:00	0.61	364.85	79818.42	76775.13	26738.15	50754.13	179.06
20-May-11 14:23:00	0.63	364.64	79956.05	76885.35	26669.06	50738.55	179.29
20-May-11 14:24:00	0.66	363.92	79910.47	76999.58	26574.36	50743.82	178.69
20-May-11 14:25:00	0.72	364.93	79753.33	76968.94	26607.93	50863.74	178.67
20-May-11 14:26:00	0.78	365.31	79974.46	76842.39	26548.61	50843.28	179.09
20-May-11 14:27:00	0.83	364.58	80058.48	77058.81	26450.86	50742.11	178.96
20-May-11 14:28:00	0.75	365.70	79897.44	77148.18	26578.70	50737.71	178.12
20-May-11 14:29:00	0.87	365.16	80144.15	76956.61	26462.64	50727.94	178.84
20-May-11 14:30:00	0.83	365.25	80024.40	77260.73	26472.16	50747.94	178.07
20-May-11 14:31:00	0.84	365.23	80043.98	77101.76	26521.69	50725.33	178.57
20-May-11 14:32:00	0.81	365.14	80040.68	77189.50	26613.55	50622.02	178.51
20-May-11 14:33:00	0.74	365.00	80021.15	77206.29	26575.51	50578.06	178.12
20-May-11 14:34:00	0.79	364.56	79989.38	77097.91	26471.30	50836.09	178.41
20-May-11 14:35:00	0.75	365.53	79893.86	77062.11	26553.91	50704.78	178.08
20-May-11 14:36:00	0.79	365.40	80107.17	76929.67	26514.20	50773.33	178.74
20-May-11 14:37:00	0.85	365.31	80076.57	77158.20	26490.09	50906.17	177.96
20-May-11 14:38:00	0.85	365.15	80058.61	77200.04	26510.20	50958.53	177.54
20-May-11 14:39:00	0.75	364.79	80021.87	77187.61	26500.43	50823.51	178.14

Run 2	Scrubbing Liquid Upper Circulation (psig) 317PI05B	Pump Pressure Lower Circulation (psig) 317PI108	Aggio-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317PI177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FI113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FI105
20-May-11 14:40:00	77.88	43.06	21.28	121	254.56	89.98	1134.97
20-May-11 14:41:00	77.90	43.14	21.43	121	254.17	89.98	1133.96
20-May-11 14:42:00	77.82	43.06	21.27	120	253.69	89.83	1130.89
20-May-11 14:43:00	77.75	43.00	21.25	120	255.17	88.65	1127.32
20-May-11 14:44:00	77.89	43.06	21.51	121	254.79	88.80	1134.09
20-May-11 14:45:00	77.89	43.09	21.55	121	254.61	89.17	1136.08
20-May-11 14:46:00	77.97	43.02	21.47	121	254.84	89.10	1137.02
20-May-11 14:47:00	77.96	43.02	21.34	121	253.81	89.57	1134.36
20-May-11 14:48:00	77.70	42.97	21.28	121	253.23	89.63	1129.89
20-May-11 14:49:00	77.58	42.96	21.45	121	253.77	89.49	1128.60
20-May-11 14:50:00	77.85	42.98	21.19	121	254.65	89.14	1127.24
20-May-11 14:51:00	77.75	43.04	21.16	121	256.24	88.53	1126.28
20-May-11 14:52:00	77.60	43.02	21.32	121	255.58	88.60	1129.14
20-May-11 14:53:00	77.62	42.93	21.31	120	252.88	89.76	1129.12
20-May-11 14:54:00	77.93	43.01	21.18	120	254.66	89.08	1128.93
20-May-11 14:55:00	77.90	42.97	21.26	120	255.15	88.56	1126.63
20-May-11 14:56:00	77.71	42.91	21.22	121	254.69	89.02	1132.41
	77.76	43.03	21.31	120.96	254.70	89.35	1128.45

Run 2								
#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111	
20-May-11 14:40:00	248.47	202.33	86.92	15.64	78.02	17.22	46.33	
20-May-11 14:41:00	248.63	202.18	86.80	15.63	78.09	17.20	45.12	
20-May-11 14:42:00	248.44	202.00	86.88	15.62	77.50	17.24	45.96	
20-May-11 14:43:00	248.28	201.70	87.08	15.59	77.17	17.31	61.15	
20-May-11 14:44:00	248.28	202.21	87.12	15.63	77.84	17.42	92.88	
20-May-11 14:45:00	248.44	202.16	86.98	15.63	78.13	17.37	86.53	
20-May-11 14:46:00	248.51	202.30	86.90	15.62	78.24	17.27	60.43	
20-May-11 14:47:00	248.34	202.23	86.97	15.66	78.05	17.26	54.76	
20-May-11 14:48:00	248.18	202.04	87.10	15.63	77.51	17.26	51.31	
20-May-11 14:49:00	248.27	201.57	87.38	15.62	77.19	17.28	52.79	
20-May-11 14:50:00	248.40	201.44	87.48	15.62	77.16	17.28	51.55	
20-May-11 14:51:00	248.40	201.37	87.42	15.58	77.13	17.27	48.45	
20-May-11 14:52:00	248.35	201.57	87.52	15.60	77.15	17.28	49.48	
20-May-11 14:53:00	248.33	201.62	87.67	15.68	77.16	17.24	46.98	
20-May-11 14:54:00	248.35	201.70	87.72	15.62	77.01	17.24	48.05	
20-May-11 14:55:00	248.28	201.91	87.80	15.58	76.99	17.33	63.44	
20-May-11 14:56:00	248.35	202.28	87.87	15.62	77.58	17.39	94.53	
1150.82	248.71	202.74	87.58	15.62	77.18	17.32	63.46	

Run 2							
O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fuegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	WGS Liquid to Gas Ratio (gal/MSCF) 317C_WGS_L_G_Ratio	
20-May-11 14:40:00	365.87	79944.08	77065.06	26594.50	50662.76	178.15	
20-May-11 14:41:00	365.41	80179.91	77016.98	26527.28	50584.13	178.17	
20-May-11 14:42:00	364.86	80079.54	77258.48	26535.31	50616.90	177.87	
20-May-11 14:43:00	364.15	79959.78	77180.44	26580.37	50649.26	178.46	
20-May-11 14:44:00	364.35	79803.55	77073.23	26764.02	50713.52	178.20	
20-May-11 14:45:00	364.40	79846.62	76872.98	26733.22	50854.71	178.49	
20-May-11 14:46:00	364.50	79858.23	76809.42	26586.46	50932.52	178.95	
20-May-11 14:47:00	364.66	79879.80	76873.45	26559.69	50934.13	178.88	
20-May-11 14:48:00	364.25	79915.92	76965.10	26509.95	50858.15	179.04	
20-May-11 14:49:00	363.64	79826.11	77049.89	26504.37	50721.92	179.09	
20-May-11 14:50:00	363.98	79691.66	76925.31	26580.23	50654.40	178.81	
20-May-11 14:51:00	364.47	79766.05	76652.47	26563.27	50676.06	179.45	
20-May-11 14:52:00	365.27	79872.77	76807.93	26649.36	50708.03	179.28	
20-May-11 14:53:00	364.73	80048.58	76878.05	26556.47	50690.83	179.57	
20-May-11 14:54:00	363.72	79931.03	77028.71	26441.58	50679.31	178.70	
20-May-11 14:55:00	364.32	79708.97	77056.86	26605.46	50706.98	178.58	
20-May-11 14:56:00	364.17	79840.81	76883.47	26733.61	50840.70	179.58	
	364.63	79909.18	76999.24	26639.96	50762.45	178.70	

Speciated VOHAPs/Aldehydes

5/20/2011 15:40
5/20/2011 16:48

1m

Run 3	Scrubbing Liquid Upper Circulation (psig) 317P1105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317FC1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
20-May-11 15:40:00	77.85	42.97	21.21	120	252.00	90.38	1131.45
20-May-11 15:41:00	77.81	43.03	21.19	120	253.55	89.93	1134.55
20-May-11 15:42:00	77.83	43.03	21.28	120	254.88	89.21	1131.76
20-May-11 15:43:00	77.84	43.02	21.25	120	251.64	90.20	1127.43
20-May-11 15:44:00	77.78	43.09	21.22	120	251.95	90.15	1135.12
20-May-11 15:45:00	77.61	43.06	21.29	120	254.41	89.35	1135.69
20-May-11 15:46:00	77.80	43.03	21.22	120	253.58	89.35	1135.55
20-May-11 15:47:00	77.80	42.99	21.27	120	254.28	89.41	1135.79
20-May-11 15:48:00	77.72	42.98	21.27	120	254.16	89.68	1134.29
20-May-11 15:49:00	77.74	43.06	21.29	120	253.19	90.11	1131.12
20-May-11 15:50:00	77.83	43.11	21.34	120	249.55	91.07	1129.16
20-May-11 15:51:00	77.86	43.14	21.28	120	250.59	90.92	1128.48
20-May-11 15:52:00	77.70	43.05	21.38	120	252.80	90.15	1132.10
20-May-11 15:53:00	77.85	43.04	21.29	120	253.55	89.81	1133.48
20-May-11 15:54:00	77.93	43.06	21.23	120	251.85	90.39	1132.51
20-May-11 15:55:00	77.83	43.03	21.22	121	250.30	90.74	1127.94
20-May-11 15:56:00	77.92	43.04	21.23	121	251.15	90.27	1132.90
20-May-11 15:57:00	77.94	43.11	21.22	121	252.79	89.61	1132.72
20-May-11 15:58:00	77.89	43.18	21.29	120	253.16	89.83	1133.61
20-May-11 15:59:00	77.82	43.17	21.18	120	252.22	90.42	1134.44
20-May-11 16:00:00	77.76	43.16	21.10	120	252.39	90.33	1131.29
20-May-11 16:01:00	77.65	43.17	21.21	121	252.69	89.96	1128.73
20-May-11 16:02:00	77.86	43.20	21.25	120	253.65	89.52	1127.94
20-May-11 16:03:00	77.94	43.22	21.19	120	253.25	89.67	1128.65
20-May-11 16:04:00	77.98	43.31	21.08	121	252.36	90.08	1135.13
20-May-11 16:05:00	77.98	43.24	21.33	121	252.91	89.69	1135.75
20-May-11 16:06:00	77.91	43.27	21.27	120	251.36	89.91	1134.15
20-May-11 16:07:00	77.84	43.34	21.25	120	252.46	89.27	1130.23
20-May-11 16:08:00	77.80	43.29	21.19	120	252.83	89.37	1134.93
20-May-11 16:09:00	77.53	43.32	21.13	120	251.46	89.95	1134.51
20-May-11 16:10:00	77.60	43.44	21.12	120	252.07	90.36	1133.00
20-May-11 16:11:00	77.61	43.37	21.51	120	252.94	90.28	1133.05
20-May-11 16:12:00	77.56	43.34	21.39	120	254.34	89.70	1130.97
20-May-11 16:13:00	77.52	43.31	21.05	120	251.11	90.88	1126.56
20-May-11 16:14:00	77.86	43.28	21.34	120	251.89	90.46	1128.57
20-May-11 16:15:00	77.99	43.37	21.19	120	250.16	90.60	1138.68
20-May-11 16:16:00	77.88	43.41	21.29	120	250.81	90.26	1133.62
20-May-11 16:17:00	77.70	43.37	21.29	120	252.66	89.09	1132.70
20-May-11 16:18:00	77.75	43.38	21.32	120	251.90	88.88	1131.24
20-May-11 16:19:00	77.72	43.40	21.50	120	252.85	89.27	1128.12
20-May-11 16:20:00	77.58	43.40	21.57	120	251.20	89.51	1132.91
20-May-11 16:21:00	77.67	43.43	21.68	120	250.96	90.70	1133.29
20-May-11 16:22:00	77.58	43.52	21.63	120	253.73	90.48	1132.97
20-May-11 16:23:00	77.59	43.51	21.69	120	252.20	90.62	1132.56
20-May-11 16:24:00	77.58	43.41	21.71	120	255.40	89.69	1132.38
20-May-11 16:25:00	77.67	43.40	21.79	120	254.91	89.59	1130.19
20-May-11 16:26:00	77.64	43.43	21.66	120	255.23	89.47	1129.38
20-May-11 16:27:00	77.86	43.42	21.47	120	255.09	89.81	1129.24
20-May-11 16:28:00	78.03	43.45	21.44	120	255.34	89.63	1134.00
20-May-11 16:29:00	77.93	43.48	21.45	120	254.46	89.81	1134.23

Speciated VOHAPs/AI

Run 3	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv. dry) 317AI111
	317FI106	317TI1112	317TI1120	DWS AT	317PC039	317PC088	317AI109	317AI111
20-May-11 15:40:00	1156.49	248.89	202.20	87.90	15.64	77.36	17.27	56.19
20-May-11 15:41:00	1158.72	248.91	201.97	87.88	15.66	77.80	17.33	70.96
20-May-11 15:42:00	1154.06	248.52	201.99	87.80	15.65	77.36	17.34	70.74
20-May-11 15:43:00	1149.21	248.45	201.96	87.80	15.67	77.11	17.35	63.33
20-May-11 15:44:00	1158.04	248.71	201.80	87.78	15.61	77.93	17.40	120.59
20-May-11 15:45:00	1159.61	248.95	201.45	87.70	15.64	78.28	17.48	188.27
20-May-11 15:46:00	1160.05	248.98	201.81	87.70	15.61	78.47	17.40	126.10
20-May-11 15:47:00	1159.24	249.04	201.80	87.70	15.66	78.41	17.36	77.76
20-May-11 15:48:00	1157.11	249.09	201.83	87.77	15.67	78.22	17.35	71.47
20-May-11 15:49:00	1153.50	249.11	201.98	87.82	15.69	77.91	17.31	62.71
20-May-11 15:50:00	1151.43	249.03	201.91	87.82	15.67	77.88	17.32	63.20
20-May-11 15:51:00	1150.88	249.03	201.86	87.68	15.68	77.50	17.34	69.07
20-May-11 15:52:00	1154.62	249.06	201.95	87.52	15.64	77.45	17.43	98.95
20-May-11 15:53:00	1155.36	249.14	202.05	87.38	15.64	77.39	17.45	100.24
20-May-11 15:54:00	1153.47	249.16	202.26	87.30	15.70	77.21	17.40	71.65
20-May-11 15:55:00	1150.69	249.19	202.37	87.23	15.67	77.29	17.40	87.57
20-May-11 15:56:00	1157.34	249.14	201.97	87.18	15.58	77.98	17.51	407.23
20-May-11 15:57:00	1155.87	249.28	202.19	87.10	15.58	77.94	17.58	690.04
20-May-11 15:58:00	1155.70	249.60	202.64	87.03	15.63	77.93	17.52	278.93
20-May-11 15:59:00	1156.15	249.62	202.61	86.93	15.68	77.98	17.47	133.00
20-May-11 16:00:00	1154.84	249.48	202.56	86.90	15.68	78.03	17.45	103.11
20-May-11 16:01:00	1152.26	249.16	202.56	86.97	15.62	77.93	17.45	108.98
20-May-11 16:02:00	1150.04	249.11	202.48	87.00	15.63	77.47	17.47	128.54
20-May-11 16:03:00	1150.71	249.01	202.17	87.00	15.62	77.19	17.48	128.65
20-May-11 16:04:00	1157.61	248.98	201.78	87.00	15.65	77.58	17.45	97.29
20-May-11 16:05:00	1160.08	248.89	201.60	86.95	15.66	77.87	17.47	112.77
20-May-11 16:06:00	1157.82	248.53	201.41	86.98	15.69	77.67	17.47	116.01
20-May-11 16:07:00	1152.08	248.40	200.90	86.90	15.65	77.46	17.47	161.78
20-May-11 16:08:00	1157.95	248.38	200.56	86.90	15.71	77.95	17.58	407.99
20-May-11 16:09:00	1158.13	248.36	200.45	86.90	15.64	78.03	17.56	409.46
20-May-11 16:10:00	1158.28	248.27	200.19	86.92	15.65	78.03	17.46	122.72
20-May-11 16:11:00	1156.86	248.42	200.04	87.00	15.61	78.01	17.44	107.05
20-May-11 16:12:00	1153.92	248.50	199.86	87.07	15.65	77.68	17.42	95.44
20-May-11 16:13:00	1147.94	248.38	199.76	87.12	15.69	77.01	17.37	82.26
20-May-11 16:14:00	1146.98	248.38	199.64	87.13	15.68	76.48	17.35	68.51
20-May-11 16:15:00	1154.75	248.40	199.47	87.03	15.72	76.77	17.41	82.44
20-May-11 16:16:00	1157.07	248.38	199.38	87.00	15.65	77.43	17.41	79.02
20-May-11 16:17:00	1157.86	248.47	199.28	86.98	15.69	77.54	17.42	83.02
20-May-11 16:18:00	1153.45	248.55	199.23	86.88	15.68	77.22	17.41	81.14
20-May-11 16:19:00	1150.05	248.39	199.22	86.80	15.66	77.02	17.41	92.62
20-May-11 16:20:00	1156.35	248.40	199.27	86.82	15.72	77.76	17.49	182.03
20-May-11 16:21:00	1156.93	248.37	199.27	86.92	15.68	77.99	17.51	220.49
20-May-11 16:22:00	1155.35	248.29	198.97	87.02	15.67	77.77	17.48	159.25
20-May-11 16:23:00	1154.74	248.04	198.66	87.08	15.63	77.62	17.46	157.52
20-May-11 16:24:00	1155.77	247.95	198.52	87.00	15.57	77.75	17.42	107.38
20-May-11 16:25:00	1153.73	247.98	198.72	87.00	15.57	77.77	17.43	114.83
20-May-11 16:26:00	1153.35	247.73	198.63	87.00	15.57	77.64	17.35	75.98
20-May-11 16:27:00	1153.32	247.53	198.50	86.98	15.61	77.37	17.37	84.17
20-May-11 16:28:00	1156.75	247.29	198.40	86.90	15.61	77.36	17.37	78.56
20-May-11 16:29:00	1157.06	247.36	198.08	86.85	15.64	77.50	17.37	73.71

Speciated VOHAPs/AI

5/20/2011 15:40
5/20/2011 16:48

1m

Run 3	O ₂ (WGS CEMS) (% by vol, dry) 317AH107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Q _a 317C_dhvolr	Vol Reg FG (dscfm) - Q _r 317C_flluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
20-May-11 15:40:00	0.66	363.99	79805.84	76387.88	26540.42	51121.09	180.42
20-May-11 15:41:00	0.65	363.13	79767.79	76840.41	26549.85	51122.15	179.18
20-May-11 15:42:00	0.64	364.41	79580.60	76834.29	26662.84	51125.42	178.86
20-May-11 15:43:00	0.72	364.94	79860.85	76665.70	26686.23	51111.67	179.53
20-May-11 15:44:00	0.59	362.60	79976.80	77003.53	26622.48	51107.33	178.49
20-May-11 15:45:00	0.45	362.92	79464.03	77059.29	26775.86	51112.61	178.37
20-May-11 15:46:00	0.47	364.36	79533.50	76496.20	26785.64	51103.33	179.53
20-May-11 15:47:00	0.59	363.59	79850.60	76521.71	26633.49	51080.21	180.26
20-May-11 15:48:00	0.60	364.53	79680.16	76882.41	26686.42	51073.54	179.04
20-May-11 15:49:00	0.67	364.90	79887.37	76732.53	26655.42	51047.29	179.37
20-May-11 15:50:00	0.63	364.11	79968.77	76944.35	26614.07	51017.85	178.37
20-May-11 15:51:00	0.68	361.49	79794.27	77010.42	26435.03	51013.42	178.27
20-May-11 15:52:00	0.48	362.47	79221.46	76896.51	26664.52	51047.27	178.57
20-May-11 15:53:00	0.43	363.63	79435.88	76242.79	26792.65	51093.15	180.31
20-May-11 15:54:00	0.50	364.08	79690.42	76429.08	26745.01	51099.53	179.85
20-May-11 15:55:00	0.63	363.13	79787.97	76695.32	26637.78	51078.71	179.47
20-May-11 15:56:00	0.52	361.73	79581.02	76906.69	26742.48	51063.49	178.82
20-May-11 15:57:00	0.26	361.67	79274.07	76735.54	26925.43	51095.53	178.66
20-May-11 15:58:00	0.26	362.72	79259.58	76281.17	26876.00	51118.66	179.51
20-May-11 15:59:00	0.37	363.50	79489.98	76178.06	26831.48	51058.53	179.99
20-May-11 16:00:00	0.46	363.52	79662.14	76458.99	26770.99	50963.05	179.54
20-May-11 16:01:00	0.48	363.47	79665.53	76672.56	26766.84	50902.88	178.95
20-May-11 16:02:00	0.49	363.16	79653.67	76703.18	26770.51	50896.57	178.60
20-May-11 16:03:00	0.41	363.71	79587.58	76718.08	26847.81	50901.76	178.32
20-May-11 16:04:00	0.40	363.48	79707.63	76580.63	26793.36	50905.11	178.26
20-May-11 16:05:00	0.41	363.25	79657.07	76667.18	26789.74	50917.76	178.42
20-May-11 16:06:00	0.40	363.45	79607.09	76634.54	26814.53	50929.55	178.35
20-May-11 16:07:00	0.52	362.19	79850.12	76591.06	26696.42	50948.23	178.34
20-May-11 16:08:00	0.40	362.83	79374.79	76758.21	26932.97	50925.87	178.03
20-May-11 16:09:00	0.25	363.33	79513.41	76469.32	26990.15	51097.10	178.66
20-May-11 16:10:00	0.44	362.48	79623.08	76467.95	26715.09	51111.03	178.52
20-May-11 16:11:00	0.43	363.42	79438.22	76617.82	26763.29	50922.66	178.00
20-May-11 16:12:00	0.50	364.20	79642.67	76420.81	26774.17	50945.94	178.99
20-May-11 16:13:00	0.62	365.00	79815.23	76669.84	26746.39	50941.05	178.44
20-May-11 16:14:00	0.62	363.24	79990.34	76891.14	26589.09	50783.87	178.11
20-May-11 16:15:00	0.59	363.51	79604.85	77043.39	26685.94	50681.87	176.74
20-May-11 16:16:00	0.57	362.03	79662.39	76698.39	26591.36	50805.12	177.72
20-May-11 16:17:00	0.48	362.21	79339.14	76730.43	26635.65	50932.31	177.87
20-May-11 16:18:00	0.51	362.79	79378.40	76349.88	26657.84	50992.29	178.59
20-May-11 16:19:00	0.56	361.95	79506.27	76408.74	26590.42	51051.56	178.74
20-May-11 16:20:00	0.50	363.18	79322.60	76592.92	26801.63	50994.52	178.09
20-May-11 16:21:00	0.34	361.99	79591.87	76414.28	26783.59	50919.48	178.51
20-May-11 16:22:00	0.35	363.30	79330.52	76557.83	26833.36	50914.74	177.83
20-May-11 16:23:00	0.49	365.31	79616.74	76282.13	26953.46	50796.55	178.17
20-May-11 16:24:00	0.49	364.02	80058.05	76547.50	26772.66	50729.32	178.75
20-May-11 16:25:00	0.49	365.84	79774.96	77065.13	26920.30	50741.50	176.81
20-May-11 16:26:00	0.51	365.27	80173.66	76795.73	26777.16	50793.14	177.71
20-May-11 16:27:00	0.48	365.55	80048.75	77113.75	26827.43	50954.34	176.68
20-May-11 16:28:00	0.54	366.05	80111.47	76991.90	26850.55	51075.52	176.71
20-May-11 16:29:00	0.56	366.12	80219.13	77105.14	26848.49	51091.92	176.32

Run 3	Scrubbing Liquid Upper Circulation (psig) 317P1105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
20-May-11 16:30:00	77.77	43.48	21.43	120	254.76	89.14	1131.44
20-May-11 16:31:00	77.73	43.38	21.29	120	253.02	89.70	1127.76
20-May-11 16:32:00	77.77	43.38	21.52	120	254.70	89.09	1132.53
20-May-11 16:33:00	77.67	43.38	21.40	120	254.20	89.21	1132.88
20-May-11 16:34:00	77.94	43.39	21.30	119	254.03	89.54	1135.89
20-May-11 16:35:00	77.87	43.42	21.05	120	252.82	90.29	1137.10
20-May-11 16:36:00	77.81	43.45	21.15	120	252.03	90.50	1135.30
20-May-11 16:37:00	77.91	43.52	21.35	119	252.07	90.36	1133.15
20-May-11 16:38:00	77.72	43.44	21.33	119	252.54	90.08	1132.39
20-May-11 16:39:00	77.79	43.42	21.18	120	252.28	90.18	1132.06
20-May-11 16:40:00	77.82	43.40	21.08	120	251.69	90.21	1134.35
20-May-11 16:41:00	77.83	43.39	21.18	120	252.52	89.96	1134.00
20-May-11 16:42:00	77.80	43.43	21.21	119	251.85	89.88	1129.57
20-May-11 16:43:00	77.86	43.43	21.20	119	251.84	89.67	1125.18
20-May-11 16:44:00	77.96	43.41	21.23	120	251.15	90.08	1133.06
20-May-11 16:45:00	77.81	43.36	21.17	119	252.09	89.79	1133.87
20-May-11 16:46:00	77.78	43.45	21.35	120	252.98	89.30	1133.60
20-May-11 16:47:00	77.85	43.43	21.24	120	252.23	89.76	1131.25
77.79		43.28	21.31	119.98	252.72	89.92	1132.27

Run 3	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv. dry) 317AI111
20-May-11 16:30:00	1154.24	247.25	197.90	86.83	15.62	77.32	17.35	67.54
20-May-11 16:31:00	1151.44	247.14	197.94	86.82	15.66	77.33	17.38	80.41
20-May-11 16:32:00	1155.88	247.25	197.86	86.88	15.59	77.69	17.45	245.40
20-May-11 16:33:00	1155.28	247.31	197.99	86.80	15.58	77.68	17.51	372.96
20-May-11 16:34:00	1157.86	247.27	197.86	86.80	15.61	77.93	17.38	104.81
20-May-11 16:35:00	1160.15	247.21	197.97	86.80	15.67	78.20	17.32	69.79
20-May-11 16:36:00	1159.07	247.31	197.72	86.80	15.67	78.30	17.28	62.33
20-May-11 16:37:00	1156.10	247.29	197.82	86.78	15.66	78.12	17.31	65.79
20-May-11 16:38:00	1155.32	247.31	197.93	86.77	15.64	77.95	17.34	70.26
20-May-11 16:39:00	1155.23	247.51	197.80	86.73	15.67	77.76	17.38	76.85
20-May-11 16:40:00	1158.13	247.45	197.75	86.70	15.69	77.84	17.38	76.76
20-May-11 16:41:00	1158.50	247.15	197.86	86.70	15.68	77.77	17.37	78.57
20-May-11 16:42:00	1152.57	247.11	197.62	86.70	15.67	77.08	17.38	79.86
20-May-11 16:43:00	1147.80	247.14	197.24	86.63	15.67	76.75	17.39	93.18
20-May-11 16:44:00	1156.70	247.09	197.11	86.53	15.66	77.48	17.53	324.53
20-May-11 16:45:00	1157.00	247.11	196.91	86.50	15.65	77.84	17.58	488.01
20-May-11 16:46:00	1156.86	247.13	196.87	86.48	15.63	77.97	17.49	192.87
20-May-11 16:47:00	1154.59	247.09	197.05	86.33	15.68	77.75	17.43	115.63
Run 3								
	1155.18	248.27	199.96	87.07	15.65	77.66	17.42	139.65

	O ₂ (WGS CEMS) (% by vol, dry) 317A107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_flluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3							
20-May-11 16:30:00	0.63	365.59	80234.75	77231.02	26755.63	50917.88	176.20
20-May-11 16:31:00	0.58	365.01	80118.24	77288.62	26767.38	50793.23	176.43
20-May-11 16:32:00	0.45	364.19	79993.04	77145.92	26845.94	50830.74	176.77
20-May-11 16:33:00	0.40	364.76	79812.36	76992.63	26989.90	50858.90	177.05
20-May-11 16:34:00	0.52	364.37	79938.12	76836.16	26739.50	50851.63	177.36
20-May-11 16:35:00	0.56	364.86	79852.45	76928.51	26693.26	50795.29	176.91
20-May-11 16:36:00	0.58	364.67	79958.44	76922.73	26629.77	50739.57	177.16
20-May-11 16:37:00	0.60	364.06	79918.59	76917.88	26611.94	50731.17	176.61
20-May-11 16:38:00	0.56	363.82	79783.59	76918.19	26640.88	50551.00	177.02
20-May-11 16:39:00	0.52	364.00	79730.36	76778.53	26707.59	50354.63	177.42
20-May-11 16:40:00	0.51	363.84	79771.75	76725.75	26696.14	50524.26	177.59
20-May-11 16:41:00	0.56	363.56	79736.36	76755.36	26654.51	50706.54	177.64
20-May-11 16:42:00	0.63	364.00	79675.06	76770.60	26679.27	50674.92	177.36
20-May-11 16:43:00	0.61	363.20	79771.91	76774.09	26635.59	50664.51	177.46
20-May-11 16:44:00	0.48	362.97	79595.18	76866.96	26851.72	50668.01	177.02
20-May-11 16:45:00	0.31	362.73	79544.11	76717.43	26964.54	50602.98	177.80
20-May-11 16:46:00	0.32	363.34	79492.54	76571.63	26855.77	50563.09	177.70
20-May-11 16:47:00	0.40	363.63	79625.30	76417.68	26783.85	50460.29	178.21
	0.50	363.68	79702.80	76723.85	26744.96	50905.09	178.19

B Cat WGS ICR Performance Test
May 23-24, 2011

Run No.	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H ₂ O) 317P1177A	WGS Liquid to Gas Ratio (gal/MSCF) 317C_WGS_L_G_RATIO	Vol Reg FG (discfm) Or	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	CO ₂ (WGS CEMS) (% by vol. dry) 317A1109	CO (WGS CEMS) (ppmv. dry) 317A1111	O ₂ (WGS CEMS) (% by vol. dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air
1	41.90	21.52	182.75	77244	26650	51686	17.20	79.91	0.64	366.52
2	41.99	21.58	182.57	77286	26466	51649	17.04	59.50	0.76	366.98
3	42.78	21.82	181.30	77771	26876	52596	17.28	80.42	0.68	368.46
Average	42.22	21.64	182.21	77434	26664	51977	17.17	73.28	0.69	367.32

Dioxins/Furans/Speciated Semi-VOHAPs

5/23/2011 16:28
5/23/2011 20:25

1m

Run 2	Scrubbing Liquid Upper Circulation (psig) 317P1105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Shipped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FE1105
23-May-11 16:28:00	78.00	42.08	21.46	120	253.88	88.76	1130.93
23-May-11 16:29:00	77.97	41.55	21.29	120	252.81	88.86	1130.84
23-May-11 16:30:00	77.91	41.89	21.07	120	251.69	89.48	1134.26
23-May-11 16:31:00	77.99	42.12	21.38	120	253.35	88.85	1140.16
23-May-11 16:32:00	77.93	42.07	21.58	120	254.90	88.80	1140.46
23-May-11 16:33:00	78.00	41.83	21.42	120	256.69	88.42	1140.89
23-May-11 16:34:00	77.78	41.99	21.53	120	255.34	88.67	1139.96
23-May-11 16:35:00	77.59	41.94	21.60	119	255.55	88.45	1137.78
23-May-11 16:36:00	77.86	41.95	21.52	119	254.19	88.62	1136.62
23-May-11 16:37:00	77.93	41.85	21.36	119	254.74	88.73	1133.61
23-May-11 16:38:00	77.94	41.81	21.59	118	255.89	88.68	1132.34
23-May-11 16:39:00	77.87	42.08	21.61	119	255.86	88.66	1125.32
23-May-11 16:40:00	77.96	41.97	21.41	119	256.66	88.34	1131.14
23-May-11 16:41:00	78.07	42.13	21.29	119	255.76	88.60	1134.29
23-May-11 16:42:00	77.99	41.89	21.41	118	255.25	88.83	1135.47
23-May-11 16:43:00	77.84	41.68	21.47	118	255.69	88.52	1142.69
23-May-11 16:44:00	77.75	41.33	21.69	119	256.20	88.37	1142.74
23-May-11 16:45:00	77.55	41.42	21.41	119	255.39	88.99	1141.10
23-May-11 16:46:00	77.52	41.66	21.39	119	253.41	89.82	1141.61
23-May-11 16:47:00	77.87	41.76	21.43	119	255.76	88.68	1141.30
23-May-11 16:48:00	77.86	42.10	21.25	119	256.04	88.48	1141.16
23-May-11 16:49:00	77.98	42.08	21.29	119	256.34	88.31	1137.01
23-May-11 16:50:00	77.72	42.07	21.34	119	255.49	88.46	1132.22
23-May-11 16:51:00	77.89	41.98	21.43	118	255.18	88.81	1128.65
23-May-11 16:52:00	78.05	41.82	21.43	118	256.32	88.26	1131.97
23-May-11 16:53:00	78.03	42.18	21.36	119	255.31	88.46	1133.82
23-May-11 16:54:00	77.90	41.96	21.61	120	253.35	89.25	1137.81
23-May-11 16:55:00	77.80	41.85	21.45	119	253.08	89.94	1141.62
23-May-11 16:56:00	77.92	42.10	21.34	119	255.23	89.06	1142.10
23-May-11 16:57:00	77.99	41.98	21.45	119	255.68	88.88	1142.95
23-May-11 16:58:00	77.98	41.85	21.43	119	255.04	89.21	1143.60
23-May-11 16:59:00	78.02	41.74	21.37	119	255.78	88.69	1135.38
23-May-11 17:00:00	77.93	41.62	21.33	118	256.56	88.14	1115.81
23-May-11 17:01:00	78.00	41.64	21.30	119	254.44	89.25	1115.82
23-May-11 17:02:00	78.06	41.47	21.39	119	254.61	89.15	1136.59
23-May-11 17:03:00	78.11	41.57	21.50	119	256.00	88.76	1143.63
23-May-11 17:04:00	77.92	41.69	21.58	119	255.30	88.99	1143.58
23-May-11 17:05:00	77.78	41.83	21.52	119	254.27	89.37	1141.76
23-May-11 17:06:00	77.88	41.68	21.32	119	254.09	89.50	1138.85
23-May-11 17:07:00	77.86	41.79	21.31	119	255.71	88.74	1144.48
23-May-11 17:08:00	77.81	41.79	21.25	119	255.51	88.85	1145.25
23-May-11 17:09:00	77.81	41.99	21.11	119	253.83	89.32	1144.43
23-May-11 17:10:00	77.83	41.69	21.27	119	252.93	89.41	1142.50
23-May-11 17:11:00	78.04	41.52	21.44	119	254.28	88.84	1142.18
23-May-11 17:12:00	78.09	41.55	21.39	119	255.80	88.26	1141.52
23-May-11 17:13:00	77.83	41.67	21.67	119	254.92	88.31	1139.69
23-May-11 17:14:00	77.61	41.74	21.52	119	255.93	88.00	1142.76
23-May-11 17:15:00	77.93	41.68	21.17	119	253.98	88.82	1136.46
23-May-11 17:16:00	77.82	41.58	21.26	119	253.05	88.98	1125.28
23-May-11 17:17:00	77.88	41.19	21.42	119	254.37	88.31	1133.97
23-May-11 17:18:00	77.69	41.46	21.34	119	255.13	88.27	1139.15

Dioxins/Furans/Speci:

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DW SAT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO ₂ (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 2							
23-May-11 16:28:00	247.41	197.59	86.22	15.65	78.66	17.25	79.71
23-May-11 16:29:00	247.50	197.58	86.32	15.65	78.58	17.24	78.67
23-May-11 16:30:00	247.77	197.54	86.35	15.69	78.53	17.32	158.55
23-May-11 16:31:00	247.96	197.69	86.42	15.60	79.12	17.41	312.35
23-May-11 16:32:00	247.93	197.95	86.50	15.62	79.09	17.34	253.85
23-May-11 16:33:00	247.80	198.12	86.42	15.63	79.22	17.25	101.09
23-May-11 16:34:00	247.62	198.23	86.22	15.60	79.19	17.19	77.05
23-May-11 16:35:00	247.35	198.22	85.95	15.62	79.14	17.16	65.45
23-May-11 16:36:00	247.22	198.26	85.65	15.58	78.88	17.14	64.26
23-May-11 16:37:00	247.17	198.44	85.40	15.60	78.45	17.10	54.25
23-May-11 16:38:00	247.18	198.43	85.18	15.61	78.58	17.12	54.61
23-May-11 16:39:00	247.33	198.61	85.08	15.61	78.78	17.10	51.61
23-May-11 16:40:00	247.42	198.62	84.92	15.63	78.57	17.07	49.51
23-May-11 16:41:00	247.17	198.65	84.80	15.64	78.60	17.09	50.85
23-May-11 16:42:00	247.32	198.43	84.78	15.64	78.37	17.17	90.59
23-May-11 16:43:00	247.20	198.26	84.62	15.62	79.33	17.30	158.02
23-May-11 16:44:00	246.75	197.90	84.37	15.59	79.48	17.23	121.25
23-May-11 16:45:00	246.68	197.94	84.28	15.65	79.41	17.14	66.48
23-May-11 16:46:00	246.60	197.77	84.22	15.67	79.42	17.07	53.26
23-May-11 16:47:00	246.61	197.65	84.32	15.61	79.44	17.03	49.07
23-May-11 16:48:00	246.57	197.39	84.48	15.60	79.47	17.04	50.14
23-May-11 16:49:00	246.64	197.39	84.68	15.61	79.06	17.00	45.10
23-May-11 16:50:00	246.50	197.31	84.87	15.58	78.85	16.99	43.96
23-May-11 16:51:00	246.49	197.40	84.97	15.58	78.68	16.99	43.54
23-May-11 16:52:00	246.14	197.48	85.07	15.59	78.33	16.99	43.65
23-May-11 16:53:00	246.21	197.45	85.10	15.61	78.82	16.99	43.17
23-May-11 16:54:00	246.32	197.52	85.03	15.58	78.85	17.06	59.63
23-May-11 16:55:00	246.46	197.55	84.85	15.61	79.53	17.17	85.11
23-May-11 16:56:00	246.79	197.44	84.63	15.61	79.51	17.10	71.01
23-May-11 16:57:00	246.71	197.44	84.53	15.63	79.57	17.07	58.64
23-May-11 16:58:00	246.65	197.75	84.43	15.64	79.70	17.05	50.17
23-May-11 16:59:00	246.70	197.77	84.38	15.60	79.44	17.05	49.32
23-May-11 17:00:00	246.76	198.19	84.30	15.59	78.65	17.06	50.70
23-May-11 17:01:00	246.61	198.28	84.28	15.65	77.79	17.02	45.83
23-May-11 17:02:00	246.59	198.22	84.13	15.64	77.80	17.00	44.37
23-May-11 17:03:00	246.48	198.21	84.08	15.62	79.24	15.32	46.84
23-May-11 17:04:00	246.62	198.28	84.00	15.64	79.64	13.96	45.11
23-May-11 17:05:00	246.68	198.27	83.93	15.69	79.43	16.95	44.62
23-May-11 17:06:00	246.42	198.14	83.83	15.68	79.03	17.07	70.84
23-May-11 17:07:00	246.15	197.66	83.80	15.63	79.74	17.23	130.19
23-May-11 17:08:00	246.07	197.68	83.80	15.64	79.90	17.22	120.02
23-May-11 17:09:00	246.14	197.46	83.87	15.64	79.79	17.12	63.76
23-May-11 17:10:00	246.29	197.01	83.88	15.68	79.65	17.08	54.24
23-May-11 17:11:00	246.75	197.25	83.73	15.68	79.45	17.09	53.04
23-May-11 17:12:00	246.27	197.44	83.62	15.65	79.38	17.08	51.21
23-May-11 17:13:00	246.25	197.77	83.48	15.61	79.45	17.06	47.26
23-May-11 17:14:00	246.27	197.69	83.42	15.63	79.48	17.06	46.85
23-May-11 17:15:00	246.73	197.69	83.52	15.66	79.67	17.05	47.66
23-May-11 17:16:00	246.70	197.77	83.67	15.66	79.29	17.03	44.60
23-May-11 17:17:00	246.70	197.98	83.78	15.65	79.32	17.04	46.12
23-May-11 17:18:00	246.78	198.08	83.88	15.65	79.20	17.14	77.16

Dioxins/Furans/Speci:

5/23/2011 16:28
5/23/2011 20:25

1m

Oz (WGS CEMS) (% by vol, dry) 317A107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2						
23-May-11 16:28:00	0.45	363.47	79817.85	26545.07	51577.99	183.36
23-May-11 16:29:00	0.43	363.87	79853.78	26568.22	51589.24	185.61
23-May-11 16:30:00	0.41	362.95	79742.49	26603.19	51582.63	184.76
23-May-11 16:31:00	0.29	362.61	79540.19	26742.62	51587.76	183.18
23-May-11 16:32:00	0.26	363.18	79465.15	26699.97	51652.55	183.75
23-May-11 16:33:00	0.45	365.08	79591.33	26657.29	51680.19	185.48
23-May-11 16:34:00	0.51	366.19	80007.30	26658.88	51691.29	184.37
23-May-11 16:35:00	0.58	365.12	80250.61	26514.92	51658.02	184.04
23-May-11 16:36:00	0.61	365.06	80017.37	26482.18	51606.38	182.73
23-May-11 16:37:00	0.60	363.72	80003.18	26348.47	51631.26	183.77
23-May-11 16:38:00	0.55	364.69	79710.40	26451.36	51637.38	183.99
23-May-11 16:39:00	0.66	365.71	79921.78	26470.72	51697.52	183.57
23-May-11 16:40:00	0.70	365.69	80145.99	26419.29	51747.90	183.66
23-May-11 16:41:00	0.63	366.24	80140.99	26507.67	51736.10	181.98
23-May-11 16:42:00	0.60	365.66	80262.52	26590.82	51706.90	183.41
23-May-11 16:43:00	0.46	365.41	80133.87	26752.70	51579.72	183.98
23-May-11 16:44:00	0.38	365.43	80078.97	26692.00	51502.16	185.93
23-May-11 16:45:00	0.49	365.89	80084.21	26577.60	51533.46	186.36
23-May-11 16:46:00	0.63	365.92	80184.12	26453.77	51545.49	185.10
23-May-11 16:47:00	0.77	364.93	80191.97	26301.23	51550.35	184.30
23-May-11 16:48:00	0.71	365.75	79975.57	26394.34	51590.77	182.11
23-May-11 16:49:00	0.73	365.90	80153.99	26349.00	51666.41	182.92
23-May-11 16:50:00	0.85	365.91	80186.38	26300.11	51694.08	182.74
23-May-11 16:51:00	0.78	365.11	80189.79	26263.62	51738.46	182.64
23-May-11 16:52:00	0.75	365.22	80014.61	26283.07	51784.28	183.42
23-May-11 16:53:00	0.80	365.88	80038.51	26314.72	51712.30	182.21
23-May-11 16:54:00	0.73	365.01	80182.75	26353.71	51653.95	183.17
23-May-11 16:55:00	0.66	363.85	79992.60	26420.54	51530.96	183.59
23-May-11 16:56:00	0.53	364.52	79739.05	26426.63	51462.52	182.40
23-May-11 16:57:00	0.65	365.69	79883.79	26433.54	51512.64	184.04
23-May-11 16:58:00	0.78	366.09	80141.73	26403.44	51571.81	184.31
23-May-11 16:59:00	0.71	365.78	80229.86	26403.26	51667.21	183.82
23-May-11 17:00:00	0.63	365.68	80160.11	26429.01	51753.65	184.41
23-May-11 17:01:00	0.73	365.83	80137.92	26367.52	51807.05	184.52
23-May-11 17:02:00	0.81	365.07	80172.83	26270.20	51638.03	185.31
23-May-11 17:03:00	1.98	365.27	80005.86	24032.03	51519.03	184.52
23-May-11 17:04:00	2.83	366.17	80049.79	22324.78	51553.07	185.29
23-May-11 17:05:00	1.00	365.82	80246.59	26205.87	51534.79	186.49
23-May-11 17:06:00	0.85	365.42	80168.87	26362.15	51535.63	183.87
23-May-11 17:07:00	0.54	365.37	80081.08	26637.91	51581.21	183.43
23-May-11 17:08:00	0.40	366.10	80071.28	26714.57	51622.57	184.03
23-May-11 17:09:00	0.55	365.95	80230.76	26545.35	51572.15	183.49
23-May-11 17:10:00	0.63	364.76	80198.63	26393.35	51564.43	184.45
23-May-11 17:11:00	0.60	364.14	79937.38	26361.66	51615.46	184.91
23-May-11 17:12:00	0.60	365.08	79802.33	26718.95	51659.84	185.41
23-May-11 17:13:00	0.77	365.58	80007.36	26594.96	51675.54	185.44
23-May-11 17:14:00	0.80	364.66	80116.71	26301.84	51635.29	184.75
23-May-11 17:15:00	0.66	365.43	79915.44	26391.87	51594.43	184.05
23-May-11 17:16:00	0.72	364.31	80083.23	26272.02	51522.68	185.51
23-May-11 17:17:00	0.80	363.49	79839.24	26202.79	51511.06	186.85
23-May-11 17:18:00	0.70	364.21	79659.02	26403.77	51549.88	186.05

Run 2	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air		Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B				317P1108	317P1177A		
23-May-11 17:19:00	77.69		41.74	21.14	119	254.18		88.53	1146.12
23-May-11 17:20:00	77.95		41.54	21.38	119	255.08		88.38	1144.88
23-May-11 17:21:00	77.89		41.18	21.71	118	257.07		88.04	1144.94
23-May-11 17:22:00	77.72		41.56	21.36	119	254.16		89.32	1145.95
23-May-11 17:23:00	77.84		41.53	21.33	119	255.24		89.16	1145.42
23-May-11 17:24:00	77.85		41.33	21.48	119	258.54		87.87	1143.74
23-May-11 17:25:00	77.70		41.49	21.35	119	256.02		88.91	1142.45
23-May-11 17:26:00	77.77		41.48	21.09	119	253.28		89.89	1143.27
23-May-11 17:27:00	77.84		41.45	21.38	119	254.63		89.32	1140.53
23-May-11 17:28:00	77.82		41.64	21.70	119	253.94		89.15	1134.05
23-May-11 17:29:00	77.69		41.50	21.62	119	255.59		88.37	1144.49
23-May-11 17:30:00	77.85		41.65	21.47	120	256.58		88.21	1140.16
23-May-11 17:31:00	77.79		41.62	21.50	120	256.68		88.24	1144.51
23-May-11 17:32:00	77.93		41.38	21.67	119	257.89		87.70	1144.56
23-May-11 17:33:00	77.83		41.63	21.48	119	256.76		88.02	1147.07
23-May-11 17:34:00	77.91		41.63	21.34	119	254.49		89.22	1148.26
23-May-11 17:35:00	77.85		41.52	21.54	120	254.72		88.96	1147.08
23-May-11 17:36:00	77.84		41.56	21.46	119	254.97		88.92	1145.73
23-May-11 17:37:00	78.02		41.04	21.42	119	255.75		88.86	1143.23
23-May-11 17:38:00	78.02		41.17	21.54	119	257.07		88.23	1144.62
23-May-11 17:39:00	77.94		41.41	21.73	119	257.44		87.98	1138.77
23-May-11 17:40:00	77.82		41.40	21.61	119	256.09		88.45	1126.15
23-May-11 17:41:00	77.80		41.58	21.55	119	254.82		88.83	1140.71
23-May-11 17:42:00	78.03		41.88	21.55	119	253.96		88.95	1140.10
23-May-11 17:43:00	78.14		41.34	21.49	119	255.91		88.73	1147.26
23-May-11 17:44:00	77.92		41.30	21.48	119	257.31		88.32	1149.29
23-May-11 17:45:00	77.98		41.27	21.40	119	255.53		89.03	1148.50
23-May-11 17:46:00	77.85		41.21	21.43	119	255.05		89.31	1147.90
23-May-11 17:47:00	77.69		41.33	21.45	119	256.09		88.78	1147.55
23-May-11 17:48:00	77.64		41.60	21.50	120	256.23		88.65	1146.00
23-May-11 17:49:00	77.70		41.57	21.46	119	256.78		88.37	1141.94
23-May-11 17:50:00	77.75		41.50	21.57	119	256.99		88.33	1142.08
23-May-11 17:51:00	77.82		41.25	21.90	119	256.77		88.50	1135.23
23-May-11 17:52:00	77.88		40.75	21.62	119	256.82		88.60	1122.12
23-May-11 17:53:00	78.03		41.39	21.49	119	256.75		88.33	1137.16
23-May-11 17:54:00	77.88		41.34	21.49	119	256.07		88.43	1143.58
23-May-11 17:55:00	77.85		41.68	21.58	119	256.19		88.30	1147.06
23-May-11 17:56:00	77.99		41.57	21.83	119	256.83		87.89	1146.60
23-May-11 17:57:00	77.97		41.47	21.59	119	257.76		87.84	1146.17
23-May-11 17:58:00	77.87		41.11	21.50	119	256.74		88.36	1148.09
23-May-11 17:59:00	77.77		41.05	21.50	120	255.90		88.75	1142.13
23-May-11 18:00:00	77.75		41.47	21.48	119	255.98		88.70	1124.01
23-May-11 18:01:00	77.88		41.55	21.43	119	255.94		88.66	1120.64
23-May-11 18:02:00	77.88		41.67	21.48	119	256.60		88.53	1136.10
23-May-11 18:03:00	77.85		41.60	21.67	119	256.38		88.43	1146.14
23-May-11 18:04:00	78.17		41.45	21.78	120	256.83		88.32	1143.94
23-May-11 18:05:00	78.05		41.28	21.78	119	255.78		88.69	1142.74
23-May-11 18:06:00	78.00		41.37	21.77	120	256.00		88.76	1142.69
23-May-11 18:07:00	78.04		41.59	21.99	119	257.47		88.15	1148.02
23-May-11 18:08:00	78.00		41.21	21.78	119	257.44		88.06	1148.73

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317F1106	Air to Regen Temp B-1 Outlet (oF) 317T11112	Tempered Air Temp (oF) 317T11120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317A109	CO (WGS CEMS) (ppmv, dry) 317A111
Run 2					Run 2			
23-May-11 17:19:00	1169.31	246.71	198.19	83.78	15.64	79.98	17.25	118.08
23-May-11 17:20:00	1168.77	246.78	198.07	83.62	15.64	80.07	17.16	86.82
23-May-11 17:21:00	1168.51	246.64	198.06	83.43	15.64	79.96	17.08	60.20
23-May-11 17:22:00	1169.50	246.63	198.14	83.40	15.67	79.99	17.01	50.01
23-May-11 17:23:00	1171.84	246.72	198.13	83.38	15.63	80.28	16.97	44.86
23-May-11 17:24:00	1168.97	246.65	198.32	83.30	15.58	80.23	17.03	49.35
23-May-11 17:25:00	1165.56	246.63	198.53	83.23	15.66	79.85	17.04	49.65
23-May-11 17:26:00	1166.29	246.60	198.52	83.13	15.66	79.72	16.96	43.06
23-May-11 17:27:00	1164.13	246.42	198.40	83.03	15.65	79.94	16.96	44.30
23-May-11 17:28:00	1158.03	245.89	198.00	83.07	15.64	79.79	17.04	49.77
23-May-11 17:29:00	1166.23	245.94	197.98	83.10	15.62	79.73	17.08	51.83
23-May-11 17:30:00	1164.00	245.99	197.98	83.08	15.66	79.29	17.20	88.43
23-May-11 17:31:00	1168.77	245.90	197.98	83.00	15.63	79.77	17.30	132.45
23-May-11 17:32:00	1167.44	245.76	198.01	83.00	15.61	79.82	17.19	90.73
23-May-11 17:33:00	1170.20	245.84	198.06	83.00	15.61	80.13	17.10	62.07
23-May-11 17:34:00	1171.97	245.47	197.90	83.00	15.67	80.25	17.02	49.12
23-May-11 17:35:00	1171.69	245.39	197.58	83.00	15.63	80.29	17.03	50.58
23-May-11 17:36:00	1170.25	245.35	197.21	83.00	15.66	80.17	17.10	58.25
23-May-11 17:37:00	1167.33	245.27	196.96	82.98	15.65	79.90	17.13	56.88
23-May-11 17:38:00	1168.30	244.97	196.95	82.90	15.64	79.86	17.11	53.15
23-May-11 17:39:00	1166.45	244.98	196.83	82.90	15.63	80.10	17.12	53.06
23-May-11 17:40:00	1158.25	244.88	196.65	82.88	15.64	79.95	17.11	51.37
23-May-11 17:41:00	1165.64	244.80	196.91	82.73	15.68	79.66	17.08	47.92
23-May-11 17:42:00	1163.73	244.92	196.90	82.70	15.62	79.27	17.14	104.14
23-May-11 17:43:00	1172.42	244.91	196.88	82.70	15.64	80.26	17.28	187.72
23-May-11 17:44:00	1173.56	244.88	196.58	82.70	15.62	80.50	17.23	130.28
23-May-11 17:45:00	1172.43	244.93	196.76	82.77	15.66	80.53	17.13	68.57
23-May-11 17:46:00	1171.88	244.91	196.93	82.78	15.66	80.43	17.09	56.66
23-May-11 17:47:00	1171.33	244.83	196.87	82.68	15.62	80.37	17.11	57.66
23-May-11 17:48:00	1169.49	244.80	196.88	82.53	15.60	80.23	17.15	59.13
23-May-11 17:49:00	1165.53	244.90	196.99	82.48	15.60	79.89	17.12	54.16
23-May-11 17:50:00	1164.60	245.04	197.10	82.40	15.61	79.71	17.09	50.38
23-May-11 17:51:00	1162.47	245.44	197.15	82.33	15.60	79.75	17.07	48.32
23-May-11 17:52:00	1155.05	245.34	197.28	82.30	15.66	79.55	17.05	47.99
23-May-11 17:53:00	1162.99	245.33	197.28	82.30	15.65	79.64	17.06	48.77
23-May-11 17:54:00	1166.88	245.20	197.35	82.30	15.63	79.58	17.16	93.55
23-May-11 17:55:00	1170.94	244.84	197.36	82.30	15.63	80.20	17.28	147.45
23-May-11 17:56:00	1169.94	244.78	196.99	82.32	15.60	80.10	17.20	93.03
23-May-11 17:57:00	1169.86	244.84	196.79	82.40	15.61	80.11	17.13	65.30
23-May-11 17:58:00	1171.26	244.82	196.69	82.40	15.63	80.24	17.07	53.80
23-May-11 17:59:00	1167.61	244.85	196.84	82.47	15.64	80.21	17.03	49.07
23-May-11 18:00:00	1158.76	244.80	196.90	82.58	15.64	79.92	17.03	47.88
23-May-11 18:01:00	1155.72	244.61	196.98	82.72	15.64	79.19	17.06	49.24
23-May-11 18:02:00	1159.43	244.86	196.83	82.82	15.64	78.77	17.07	49.55
23-May-11 18:03:00	1172.74	244.91	196.80	82.90	15.60	79.97	17.08	49.99
23-May-11 18:04:00	1171.12	244.85	196.95	82.90	15.61	80.29	17.10	52.46
23-May-11 18:05:00	1167.96	244.83	196.76	82.85	15.65	79.98	17.08	50.27
23-May-11 18:06:00	1165.35	244.82	196.79	82.83	15.65	79.54	17.13	69.17
23-May-11 18:07:00	1171.54	244.75	196.97	82.73	15.60	80.22	17.23	109.39
23-May-11 18:08:00	1172.49	244.73	196.85	82.63	15.61	80.46	17.18	95.65

	O ₂ (WGS CEMS) (% by vol, dry) 317AH107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2							
23-May-11 17:19:00	0.47	364.88	79816.05	76606.02	26648.71	51584.89	185.23
23-May-11 17:20:00	0.51	364.09	79963.51	76641.11	26469.27	51603.09	185.76
23-May-11 17:21:00	0.66	365.12	79790.50	76739.10	26408.00	51558.76	187.44
23-May-11 17:22:00	0.76	366.62	80015.37	76630.76	26407.44	51592.72	185.82
23-May-11 17:23:00	0.85	365.16	80344.52	76886.23	26221.64	51684.77	185.61
23-May-11 17:24:00	0.69	365.93	80025.48	77230.58	26399.82	51854.18	185.33
23-May-11 17:25:00	0.65	367.70	80194.53	76835.67	26552.09	51906.24	185.70
23-May-11 17:26:00	0.76	366.41	80582.09	76983.52	26326.14	51739.37	185.53
23-May-11 17:27:00	0.80	364.88	80299.21	77374.24	26211.44	51680.75	184.70
23-May-11 17:28:00	0.74	365.50	79964.05	77143.55	26363.35	51589.41	183.96
23-May-11 17:29:00	0.61	364.63	80099.02	76829.52	26384.83	51511.73	185.81
23-May-11 17:30:00	0.59	365.58	79908.81	76889.18	26601.10	51591.56	184.75
23-May-11 17:31:00	0.50	366.51	80117.94	76806.20	26813.28	51626.52	185.14
23-May-11 17:32:00	0.48	366.58	80320.26	76997.85	26692.93	51586.50	185.79
23-May-11 17:33:00	0.62	367.02	80336.65	77087.50	26578.10	51562.01	184.36
23-May-11 17:34:00	0.68	366.33	80433.75	77141.57	26416.88	51573.58	184.16
23-May-11 17:35:00	0.70	365.64	80281.22	77210.78	26370.21	51549.39	184.62
23-May-11 17:36:00	0.62	365.45	80129.72	77102.79	26467.05	51571.01	184.51
23-May-11 17:37:00	0.53	365.90	80088.73	76932.98	26551.55	51608.67	187.22
23-May-11 17:38:00	0.63	366.59	80186.12	76946.70	26554.51	51612.36	187.04
23-May-11 17:39:00	0.64	367.31	80338.39	77015.28	26612.38	51636.46	185.53
23-May-11 17:40:00	0.70	367.24	80495.46	77173.67	26575.15	51631.88	185.31
23-May-11 17:41:00	0.74	366.55	80479.87	77382.01	26482.48	51603.87	184.08
23-May-11 17:42:00	0.65	365.63	80329.43	77351.73	26525.46	51607.74	183.15
23-May-11 17:43:00	0.57	364.76	80127.57	77227.43	26653.31	51643.65	185.24
23-May-11 17:44:00	0.42	366.72	79936.91	77053.87	26770.62	51703.05	185.62
23-May-11 17:45:00	0.63	367.56	80365.92	76706.99	26653.40	51678.44	186.97
23-May-11 17:46:00	0.64	366.66	80551.28	77204.79	26537.56	51569.42	186.18
23-May-11 17:47:00	0.61	366.43	80354.18	77354.53	26547.99	51579.76	185.26
23-May-11 17:48:00	0.56	366.72	80304.35	77149.67	26625.76	51626.01	184.44
23-May-11 17:49:00	0.61	366.64	80367.48	77094.94	26578.87	51740.70	184.72
23-May-11 17:50:00	0.67	366.89	80348.49	77184.23	26544.01	51840.72	184.87
23-May-11 17:51:00	0.69	367.01	80403.80	77190.14	26524.69	51738.93	185.72
23-May-11 17:52:00	0.73	366.93	80430.66	77238.79	26482.63	51564.00	188.32
23-May-11 17:53:00	0.73	367.34	80412.18	77290.86	26522.16	51509.28	184.84
23-May-11 17:54:00	0.59	366.87	80503.56	77266.47	26651.29	51567.41	185.35
23-May-11 17:55:00	0.48	366.31	80399.34	77337.02	26786.10	51597.60	183.64
23-May-11 17:56:00	0.44	366.31	80276.07	77234.14	26697.35	51602.31	184.04
23-May-11 17:57:00	0.53	366.50	80276.55	77009.23	26597.98	51555.20	185.20
23-May-11 17:58:00	0.56	367.46	80319.34	77022.55	26590.11	51521.68	186.84
23-May-11 17:59:00	0.68	367.03	80529.05	77040.75	26485.82	51544.96	187.50
23-May-11 18:00:00	0.81	366.64	80435.09	77325.80	26414.93	51582.88	184.78
23-May-11 18:01:00	0.76	366.53	80348.40	77352.09	26454.66	51599.64	184.06
23-May-11 18:02:00	0.64	366.60	80326.13	77235.21	26504.21	51603.80	183.80
23-May-11 18:03:00	0.66	366.96	80339.53	77118.63	26535.26	51712.87	184.30
23-May-11 18:04:00	0.75	366.60	80419.20	77176.23	26508.39	51766.81	184.86
23-May-11 18:05:00	0.73	366.97	80340.50	77334.69	26514.13	51743.36	185.08
23-May-11 18:06:00	0.77	366.54	80422.32	77229.43	26532.07	51725.05	185.35
23-May-11 18:07:00	0.67	366.78	80327.73	77395.89	26699.66	51635.98	183.62
23-May-11 18:08:00	0.57	367.44	80379.40	77295.07	26721.91	51605.48	185.67

Run 2	Scrubbing Liquid Upper Circulation (psig)		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)		Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	317P1105B	317P1108	317P1108	317P1177A	317FC202	317FC202	317FC115	317FI113	317FI105
23-May-11 18:09:00	78.01	41.50	21.67	119	257.74	87.98	1148.80		
23-May-11 18:10:00	77.97	41.28	21.73	119	257.75	88.31	1147.07		
23-May-11 18:11:00	60.84	40.64	20.09	119	257.52	88.34	1145.81		
23-May-11 18:12:00	42.13	41.40	18.40	120	257.83	88.40	1143.85		
23-May-11 18:13:00	75.99	42.40	21.63	119	257.12	87.80	1142.32		
23-May-11 18:14:00	77.30	42.39	21.73	120	258.93	87.50	1144.56		
23-May-11 18:15:00	77.60	42.36	21.57	120	257.68	88.03	1139.32		
23-May-11 18:16:00	77.56	42.37	21.42	120	256.66	88.42	1127.73		
23-May-11 18:17:00	77.35	42.39	21.52	120	256.99	88.43	1140.90		
23-May-11 18:18:00	77.51	42.46	21.66	119	256.64	88.79	1141.97		
23-May-11 18:19:00	77.58	42.47	21.67	119	257.45	88.40	1147.80		
23-May-11 18:20:00	77.48	42.44	21.50	120	257.55	88.47	1146.14		
23-May-11 18:21:00	77.42	42.40	21.39	119	256.03	88.88	1144.90		
23-May-11 18:22:00	77.45	42.36	21.44	120	256.36	88.76	1145.39		
23-May-11 18:23:00	77.47	42.40	21.58	120	257.13	88.39	1147.76		
23-May-11 18:24:00	77.64	42.39	21.41	120	257.15	88.44	1147.43		
23-May-11 18:25:00	77.38	42.40	21.60	119	257.77	88.31	1142.90		
23-May-11 18:26:00	77.53	42.43	21.68	120	259.10	87.81	1142.83		
23-May-11 18:27:00	77.41	42.41	21.57	120	257.68	88.17	1145.72		
23-May-11 18:28:00	77.57	42.38	21.53	120	256.52	88.51	1144.06		
23-May-11 18:29:00	77.74	42.40	21.69	120	258.36	87.60	1142.91		
23-May-11 18:30:00	77.40	42.38	21.59	120	257.32	88.06	1140.08		
23-May-11 18:31:00	77.23	42.36	21.49	120	256.94	88.55	1143.12		
23-May-11 18:32:00	77.09	42.42	21.46	120	257.64	88.28	1143.30		
23-May-11 18:33:00	77.08	42.45	21.54	119	256.95	88.78	1146.67		
23-May-11 18:34:00	77.20	42.33	21.69	119	255.71	89.32	1147.87		
23-May-11 18:35:00	77.31	42.31	21.41	120	255.40	89.10	1147.86		
23-May-11 18:36:00	77.54	42.36	21.25	119	253.74	88.84	1145.05		
23-May-11 18:37:00	77.60	42.37	21.79	119	255.09	88.47	1141.35		
23-May-11 18:38:00	77.25	42.43	21.79	119	256.39	88.54	1143.96		
23-May-11 18:39:00	77.29	42.48	21.79	119	256.19	88.55	1147.29		
23-May-11 18:40:00	77.50	42.36	21.66	120	257.49	88.13	1144.66		
23-May-11 18:41:00	77.49	42.34	21.42	119	256.20	88.52	1139.66		
23-May-11 18:42:00	77.64	42.25	21.64	120	256.14	88.46	1139.41		
23-May-11 18:43:00	77.39	42.34	21.80	120	256.65	88.52	1147.78		
23-May-11 18:44:00	77.37	42.37	21.54	119	256.60	88.45	1149.70		
23-May-11 18:45:00	77.47	42.45	21.54	120	255.15	89.11	1148.76		
23-May-11 18:46:00	77.53	42.51	21.75	120	255.96	88.38	1147.94		
23-May-11 18:47:00	77.39	42.43	21.53	119	256.89	87.95	1147.82		
23-May-11 18:48:00	77.36	42.36	21.55	120	258.58	87.70	1145.74		
23-May-11 18:49:00	77.48	42.35	21.35	120	255.29	88.98	1140.91		
23-May-11 18:50:00	77.41	42.29	21.46	119	255.73	88.80	1140.39		
23-May-11 18:51:00	77.59	42.29	21.32	119	257.13	88.21	1141.05		
23-May-11 18:52:00	77.60	42.40	21.36	120	256.43	88.52	1139.38		
23-May-11 18:53:00	77.52	42.44	21.56	120	256.36	88.19	1142.77		
23-May-11 18:54:00	77.32	42.44	21.66	120	255.73	88.69	1140.44		
23-May-11 18:55:00	77.48	42.42	21.75	119	256.39	88.82	1145.03		
23-May-11 18:56:00	77.36	42.40	21.78	120	255.56	89.29	1144.01		
23-May-11 18:57:00	77.17	42.33	21.68	121	256.72	88.85	1143.10		
23-May-11 18:58:00	77.53	42.29	21.55	120	256.55	88.80	1143.85		

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317F1106	Air to Regen Temp B-1 Outlet (oF) 317T11112	Tempered Air Temp (oF) 317T11120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	Run 2	
							CO2 (WGS CEMS) (% by vol. dry) 317A1109	CO (WGS CEMS) (ppmv, dry) 317A111
Run 2								
23-May-11 18:09:00	1172.41	244.68	196.87	82.53	15.61	80.45	17.11	60.66
23-May-11 18:10:00	1170.02	244.71	196.92	82.50	15.65	80.28	17.07	53.36
23-May-11 18:11:00	1168.49	244.85	197.06	82.50	15.61	80.07	17.03	48.42
23-May-11 18:12:00	1167.39	244.93	197.59	82.43	15.64	79.94	16.99	45.86
23-May-11 18:13:00	1166.68	244.90	197.61	82.40	15.59	79.91	16.99	44.80
23-May-11 18:14:00	1168.51	244.85	197.63	82.42	15.60	79.98	16.99	44.92
23-May-11 18:15:00	1167.99	244.93	197.86	82.52	15.61	80.27	17.01	45.61
23-May-11 18:16:00	1163.49	244.90	198.25	82.62	15.63	80.08	16.99	43.53
23-May-11 18:17:00	1166.15	244.85	198.22	82.63	15.63	79.81	16.99	43.55
23-May-11 18:18:00	1165.05	244.90	198.27	82.58	15.65	79.48	17.06	54.89
23-May-11 18:19:00	1171.34	244.85	198.19	82.48	15.60	80.24	17.16	78.07
23-May-11 18:20:00	1169.54	244.93	198.41	82.38	15.62	80.26	17.12	74.56
23-May-11 18:21:00	1168.83	244.95	198.40	82.30	15.61	80.08	17.04	54.55
23-May-11 18:22:00	1170.25	244.96	198.37	82.32	15.61	80.18	17.02	48.71
23-May-11 18:23:00	1172.23	244.90	198.42	82.40	15.57	80.48	17.01	46.76
23-May-11 18:24:00	1171.51	245.05	198.40	82.40	15.60	80.54	16.99	44.92
23-May-11 18:25:00	1167.40	245.18	198.50	82.40	15.59	80.16	16.97	43.40
23-May-11 18:26:00	1166.75	245.28	198.93	82.40	15.59	79.87	16.96	43.33
23-May-11 18:27:00	1169.27	245.50	199.23	82.40	15.59	80.21	16.97	43.16
23-May-11 18:28:00	1169.00	245.56	199.63	82.40	15.59	80.29	16.94	41.13
23-May-11 18:29:00	1167.22	245.64	199.70	82.40	15.58	79.99	16.94	41.68
23-May-11 18:30:00	1162.72	245.64	199.70	82.40	15.60	79.49	17.05	55.53
23-May-11 18:31:00	1166.28	245.85	199.79	82.40	15.61	79.92	17.15	76.07
23-May-11 18:32:00	1166.36	246.06	200.11	82.38	15.59	79.95	17.11	70.33
23-May-11 18:33:00	1169.83	245.93	200.37	82.30	15.64	80.23	17.04	52.60
23-May-11 18:34:00	1171.76	245.60	200.39	82.30	15.57	80.37	17.00	45.80
23-May-11 18:35:00	1170.66	245.61	200.22	82.30	15.65	80.39	16.98	43.42
23-May-11 18:36:00	1169.08	245.66	199.93	82.30	15.73	80.24	16.98	43.43
23-May-11 18:37:00	1165.83	245.61	199.62	82.23	15.63	79.90	17.01	43.51
23-May-11 18:38:00	1167.45	245.44	199.52	82.20	15.63	79.90	17.04	42.69
23-May-11 18:39:00	1169.73	245.27	199.20	82.13	15.60	80.26	17.00	41.08
23-May-11 18:40:00	1166.35	245.11	198.74	82.10	15.63	80.15	16.98	41.33
23-May-11 18:41:00	1162.92	245.26	199.02	82.08	15.66	79.64	16.97	41.96
23-May-11 18:42:00	1162.16	245.41	199.37	82.00	15.63	79.29	17.06	68.51
23-May-11 18:43:00	1171.01	245.36	199.40	82.02	15.65	80.32	17.23	107.17
23-May-11 18:44:00	1172.70	245.58	199.37	82.05	15.61	80.58	17.17	80.57
23-May-11 18:45:00	1172.10	245.57	199.31	82.10	15.66	80.62	17.09	55.35
23-May-11 18:46:00	1171.90	245.52	199.22	82.08	15.60	80.57	17.07	49.90
23-May-11 18:47:00	1171.74	245.51	199.36	82.00	15.60	80.52	17.10	50.58
23-May-11 18:48:00	1170.14	245.48	199.53	82.00	15.63	80.44	17.07	47.31
23-May-11 18:49:00	1165.16	245.49	199.94	82.00	15.67	80.01	17.06	45.40
23-May-11 18:50:00	1163.84	245.46	199.84	82.00	15.63	79.69	17.03	43.67
23-May-11 18:51:00	1164.89	245.38	199.55	81.98	15.60	79.74	17.08	47.72
23-May-11 18:52:00	1163.55	245.41	199.62	81.90	15.63	79.61	17.09	46.48
23-May-11 18:53:00	1165.92	245.36	199.98	81.90	15.60	79.57	17.08	44.79
23-May-11 18:54:00	1162.91	245.71	200.17	81.90	15.63	79.36	17.16	70.40
23-May-11 18:55:00	1167.64	246.14	200.29	81.90	15.67	80.04	17.27	138.96
23-May-11 18:56:00	1166.55	246.34	200.19	81.90	15.66	80.01	17.24	143.95
23-May-11 18:57:00	1166.29	246.25	200.44	81.90	15.65	79.99	17.12	60.07
23-May-11 18:58:00	1166.54	246.20	200.82	81.90	15.63	80.02	17.12	55.16

	O2 (WGS CEMS) (% by vol, dry) 317AH107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2							
23-May-11 18:09:00	0.65	367.26	80523.73	77206.59	26594.43	51615.71	184.67
23-May-11 18:10:00	0.68	367.76	80486.02	77358.61	26580.55	51606.22	185.12
23-May-11 18:11:00	0.75	368.04	80593.77	77309.20	26531.69	51616.65	188.99
23-May-11 18:12:00	0.85	367.84	80657.28	77454.21	26447.00	51607.72	186.72
23-May-11 18:13:00	0.73	368.00	80611.94	77542.34	26490.52	51588.13	180.62
23-May-11 18:14:00	0.81	367.33	80648.33	77417.14	26419.47	51580.95	181.08
23-May-11 18:15:00	0.71	368.39	80501.32	77500.80	26545.46	51566.88	180.36
23-May-11 18:16:00	0.82	367.35	80733.45	77302.08	26418.88	51618.06	181.17
23-May-11 18:17:00	0.85	366.85	80505.17	77613.41	26373.17	51645.53	180.38
23-May-11 18:18:00	0.79	367.35	80396.06	77409.03	26502.49	51610.41	180.33
23-May-11 18:19:00	0.67	367.31	80504.28	77313.77	26657.98	51638.26	180.60
23-May-11 18:20:00	0.67	367.65	80497.11	77396.16	26637.60	51661.89	180.60
23-May-11 18:21:00	0.85	367.72	80571.10	77367.85	26494.10	51672.19	180.85
23-May-11 18:22:00	0.85	366.58	80585.26	77526.76	26384.29	51670.03	180.81
23-May-11 18:23:00	0.76	366.76	80336.34	77510.29	26415.59	51629.38	180.33
23-May-11 18:24:00	0.82	367.06	80376.73	77180.38	26394.58	51602.97	181.11
23-May-11 18:25:00	0.91	367.22	80441.34	77285.56	26355.36	51583.75	181.14
23-May-11 18:26:00	0.90	367.65	80477.42	77387.74	26381.34	51581.70	180.56
23-May-11 18:27:00	0.86	368.36	80570.30	77405.76	26450.77	51572.48	180.59
23-May-11 18:28:00	0.90	367.13	80727.20	77461.76	26317.79	51526.23	180.69
23-May-11 18:29:00	0.96	366.44	80456.95	77626.13	26254.23	51525.35	180.01
23-May-11 18:30:00	0.89	367.19	80305.08	77423.25	26460.30	51544.08	180.61
23-May-11 18:31:00	0.73	366.80	80469.40	77321.16	26596.36	51584.75	181.32
23-May-11 18:32:00	0.58	366.82	80384.84	77406.96	26593.89	51661.16	180.81
23-May-11 18:33:00	0.69	367.29	80389.68	77157.39	26503.52	51646.71	181.36
23-May-11 18:34:00	0.83	367.22	80490.88	77206.01	26417.16	51597.27	181.74
23-May-11 18:35:00	0.83	366.30	80475.75	77388.90	26328.68	51598.26	181.41
23-May-11 18:36:00	0.84	366.12	80275.88	77362.66	26309.01	51620.28	180.87
23-May-11 18:37:00	0.80	364.50	80235.04	77175.38	26240.80	51682.75	181.42
23-May-11 18:38:00	0.72	365.25	79881.44	77117.09	26343.72	51638.80	181.39
23-May-11 18:39:00	0.78	366.45	80045.16	76734.57	26370.69	51568.85	181.98
23-May-11 18:40:00	0.85	366.32	80307.93	76915.19	26316.66	51575.64	182.27
23-May-11 18:41:00	0.86	367.35	80279.57	77207.69	26378.55	51548.54	181.30
23-May-11 18:42:00	0.83	366.44	80504.97	77186.05	26431.09	51502.41	181.90
23-May-11 18:43:00	0.63	366.29	80304.98	77470.15	26675.20	51548.02	180.90
23-May-11 18:44:00	0.54	366.95	80273.02	77222.06	26675.78	51558.95	181.14
23-May-11 18:45:00	0.66	366.59	80416.63	77065.66	26524.10	51580.98	181.34
23-May-11 18:46:00	0.75	366.06	80338.50	77248.69	26434.40	51619.45	180.58
23-May-11 18:47:00	0.79	365.65	80222.82	77244.95	26424.89	51590.65	180.92
23-May-11 18:48:00	0.79	366.48	80131.81	77185.74	26455.12	51613.85	181.42
23-May-11 18:49:00	0.76	367.90	80314.09	77075.23	26553.60	51735.00	181.53
23-May-11 18:50:00	0.73	366.02	80624.75	77201.53	26396.92	51838.12	181.92
23-May-11 18:51:00	0.70	366.11	80213.48	77461.59	26465.65	51772.09	180.83
23-May-11 18:52:00	0.65	366.79	80232.23	77075.14	26544.04	51678.73	181.22
23-May-11 18:53:00	0.74	366.52	80382.97	77058.11	26476.91	51474.97	181.35
23-May-11 18:54:00	0.70	365.87	80322.09	77280.07	26548.12	51419.32	180.94
23-May-11 18:55:00	0.47	366.05	80180.09	77258.23	26753.87	51509.21	180.84
23-May-11 18:56:00	0.43	366.87	80219.46	77007.86	26788.46	51492.76	181.50
23-May-11 18:57:00	0.64	366.51	80398.91	76994.80	26563.93	51570.13	182.36
23-May-11 18:58:00	0.64	367.11	80321.82	77237.56	26606.40	51693.21	181.16

Run 2	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air		#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B				Air to Regen (M lbs/hr)	317FC115	
23-May-11 18:59:00	77.57		42.30	21.72	120	257.05	88.47	1142.98
23-May-11 19:00:00	77.38		42.31	21.72	120	256.91	88.60	1140.48
23-May-11 19:01:00	77.51		42.29	21.71	120	256.45	88.78	1132.02
23-May-11 19:02:00	77.47		42.28	21.64	121	256.80	88.60	1133.33
23-May-11 19:03:00	77.58		42.22	21.49	120	256.19	88.91	1145.03
23-May-11 19:04:00	77.61		42.31	21.47	120	256.38	88.86	1144.56
23-May-11 19:05:00	77.42		42.37	21.54	120	256.31	88.83	1141.84
23-May-11 19:06:00	77.65		42.32	21.51	120	255.44	89.03	1136.79
23-May-11 19:07:00	77.53		42.39	21.67	120	256.50	88.55	1142.92
23-May-11 19:08:00	77.42		42.37	21.70	119	256.58	88.39	1142.39
23-May-11 19:09:00	77.27		42.41	21.93	120	255.64	88.89	1141.47
23-May-11 19:10:00	77.26		42.38	21.74	120	257.22	88.58	1139.93
23-May-11 19:11:00	77.46		42.32	21.59	119	257.19	88.74	1139.42
23-May-11 19:12:00	77.48		42.27	21.46	119	256.00	89.22	1138.28
23-May-11 19:13:00	77.64		42.32	21.48	119	256.57	88.98	1137.45
23-May-11 19:14:00	77.83		42.36	21.55	120	256.83	88.83	1140.78
23-May-11 19:15:00	77.87		42.28	21.47	121	255.39	89.50	1141.38
23-May-11 19:16:00	77.96		42.29	21.50	120	255.17	89.38	1138.74
23-May-11 19:17:00	77.65		42.31	21.78	120	255.70	88.56	1137.49
23-May-11 19:18:00	77.41		42.38	21.78	119	255.24	88.87	1136.10
23-May-11 19:19:00	77.46		42.39	21.55	120	256.44	88.93	1141.25
23-May-11 19:20:00	77.51		42.31	21.62	120	257.91	88.18	1139.24
23-May-11 19:21:00	77.37		42.22	21.65	120	256.63	88.53	1137.86
23-May-11 19:22:00	77.51		42.27	21.74	121	256.48	88.53	1138.35
23-May-11 19:23:00	77.45		42.34	21.75	120	258.24	87.97	1140.66
23-May-11 19:24:00	77.51		42.36	21.72	120	257.79	88.39	1141.43
23-May-11 19:25:00	77.47		42.35	21.66	120	256.22	89.28	1137.87
23-May-11 19:26:00	77.45		42.33	21.76	119	256.60	88.91	1136.07
23-May-11 19:27:00	77.54		42.22	21.72	120	256.71	88.79	1136.98
23-May-11 19:28:00	77.68		42.26	21.60	120	256.59	88.89	1134.56
23-May-11 19:29:00	77.38		42.36	21.53	120	255.61	88.98	1134.94
23-May-11 19:30:00	77.40		42.36	21.62	120	255.27	88.88	1132.58
23-May-11 19:31:00	77.52		42.32	21.52	119	256.46	88.90	1138.64
23-May-11 19:32:00	77.59		42.27	21.39	119	257.38	88.75	1139.02
23-May-11 19:33:00	77.64		42.25	21.47	120	257.15	88.82	1143.58
23-May-11 19:34:00	77.51		42.32	21.46	119	255.79	89.13	1144.65
23-May-11 19:35:00	77.43		42.33	21.76	120	257.01	88.51	1144.18
23-May-11 19:36:00	77.25		42.36	21.58	120	256.77	88.82	1144.63
23-May-11 19:37:00	77.42		42.31	21.59	120	256.69	88.96	1142.21
23-May-11 19:38:00	77.64		42.33	21.62	120	257.35	88.38	1139.51
23-May-11 19:39:00	77.54		42.30	21.51	119	257.15	88.36	1141.28
23-May-11 19:40:00	77.30		42.30	21.59	119	257.28	88.41	1139.03
23-May-11 19:41:00	77.41		42.31	21.61	119	256.66	88.62	1134.42
23-May-11 19:42:00	77.75		42.22	21.66	119	258.03	88.10	1132.37
23-May-11 19:43:00	77.94		42.25	21.81	119	259.28	87.82	1140.03
23-May-11 19:44:00	77.57		42.27	21.78	119	257.90	88.80	1140.06
23-May-11 19:45:00	77.30		42.29	21.86	120	257.99	88.88	1139.27
23-May-11 19:46:00	77.52		42.29	21.87	120	258.85	88.79	1138.00
23-May-11 19:47:00	77.92		42.24	21.81	120	258.08	88.82	1137.74
23-May-11 19:48:00	77.64		42.19	21.75	119	257.32	88.79	1138.42

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWSAT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 2							
23-May-11 18:59:00	1165.90	246.07	81.90	15.63	79.98	17.12	50.92
23-May-11 19:00:00	1163.90	246.06	81.92	15.64	79.84	17.11	48.62
23-May-11 19:01:00	1155.70	246.07	82.00	15.65	78.93	17.08	46.20
23-May-11 19:02:00	1156.04	246.14	82.00	15.64	78.35	17.08	45.81
23-May-11 19:03:00	1169.53	246.24	82.00	15.67	79.61	17.08	46.50
23-May-11 19:04:00	1167.99	246.25	82.00	15.63	79.79	17.09	48.16
23-May-11 19:05:00	1164.94	246.20	82.00	15.66	79.38	17.09	46.91
23-May-11 19:06:00	1158.97	246.14	81.93	15.68	79.04	17.09	52.01
23-May-11 19:07:00	1165.06	246.24	81.90	15.64	79.61	17.19	85.60
23-May-11 19:08:00	1164.97	246.07	81.90	15.60	79.77	17.23	99.12
23-May-11 19:09:00	1163.57	245.93	81.90	15.60	79.71	17.13	57.72
23-May-11 19:10:00	1162.96	245.72	81.83	15.61	79.60	17.06	48.18
23-May-11 19:11:00	1163.33	245.87	81.85	15.65	79.42	17.05	46.17
23-May-11 19:12:00	1162.03	245.58	81.80	15.66	79.26	17.04	43.43
23-May-11 19:13:00	1161.97	245.52	81.80	15.64	79.28	17.02	43.39
23-May-11 19:14:00	1162.57	245.58	81.78	15.66	79.32	17.05	44.21
23-May-11 19:15:00	1164.47	245.73	81.75	15.66	79.66	17.02	41.31
23-May-11 19:16:00	1164.01	245.66	81.75	15.63	79.58	17.00	40.61
23-May-11 19:17:00	1162.63	245.47	81.75	15.60	79.22	17.05	42.61
23-May-11 19:18:00	1158.36	245.44	81.72	15.67	78.84	17.13	52.17
23-May-11 19:19:00	1163.52	245.48	81.80	15.65	79.46	17.18	66.66
23-May-11 19:20:00	1162.23	245.41	81.78	15.62	79.44	17.12	62.76
23-May-11 19:21:00	1161.01	245.27	81.70	15.64	79.16	17.04	49.86
23-May-11 19:22:00	1160.74	244.99	81.70	15.62	79.03	16.99	43.07
23-May-11 19:23:00	1163.57	245.09	81.77	15.60	79.33	16.99	41.80
23-May-11 19:24:00	1164.71	245.24	81.78	15.65	79.40	16.98	41.13
23-May-11 19:25:00	1160.93	245.31	81.70	15.69	79.10	16.95	39.62
23-May-11 19:26:00	1158.16	244.97	81.65	15.63	78.79	16.96	40.20
23-May-11 19:27:00	1160.22	244.96	81.70	15.63	78.98	17.01	42.35
23-May-11 19:28:00	1159.51	244.94	81.70	15.66	79.00	17.03	41.89
23-May-11 19:29:00	1157.85	245.10	81.68	15.65	78.67	17.02	40.49
23-May-11 19:30:00	1154.48	245.06	81.62	15.65	78.27	17.10	58.16
23-May-11 19:31:00	1161.04	245.15	81.70	15.66	78.82	17.23	96.77
23-May-11 19:32:00	1162.02	245.02	81.63	15.67	79.09	17.22	91.55
23-May-11 19:33:00	1166.47	244.90	81.58	15.69	79.67	17.11	55.21
23-May-11 19:34:00	1168.26	244.98	81.50	15.66	79.95	17.06	46.56
23-May-11 19:35:00	1168.10	244.95	81.43	15.64	79.96	17.05	44.60
23-May-11 19:36:00	1167.38	244.98	81.40	15.68	79.95	17.04	43.62
23-May-11 19:37:00	1165.20	244.97	81.40	15.65	79.75	17.00	40.89
23-May-11 19:38:00	1163.74	245.01	81.38	15.63	79.58	17.00	41.06
23-May-11 19:39:00	1164.05	244.88	81.30	15.64	79.62	17.02	40.93
23-May-11 19:40:00	1161.65	244.93	81.30	15.66	79.43	17.00	39.31
23-May-11 19:41:00	1158.03	244.97	81.28	15.68	78.80	16.98	39.26
23-May-11 19:42:00	1154.53	244.98	81.20	15.63	78.27	17.04	57.09
23-May-11 19:43:00	1162.33	244.68	81.20	15.61	79.07	17.19	85.83
23-May-11 19:44:00	1162.06	244.50	81.20	15.64	79.14	17.12	68.82
23-May-11 19:45:00	1161.17	244.49	81.20	15.62	79.06	17.01	46.39
23-May-11 19:46:00	1160.09	244.50	81.20	15.64	78.83	16.97	42.96
23-May-11 19:47:00	1160.13	244.53	81.20	15.63	78.76	16.96	41.11
23-May-11 19:48:00	1160.97	244.49	81.20	15.63	78.78	16.93	39.39

O ₂ (WGS CEMS) (% by vol, dry) 317AH107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Q _a 317C_dryair	Vol Reg FG (dscfm) - Q _r 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2						
23-May-11 18:59:00	366.75	80452.67	77168.77	26560.59	51738.06	181.07
23-May-11 19:00:00	366.95	80374.21	77324.97	26557.41	51740.48	181.29
23-May-11 19:01:00	367.01	80417.10	77240.94	26534.46	51731.32	181.46
23-May-11 19:02:00	366.70	80430.09	77282.93	26497.71	51641.05	181.54
23-May-11 19:03:00	366.82	80363.44	77308.93	26514.20	51551.83	181.57
23-May-11 19:04:00	366.60	80389.83	77216.22	26513.33	51543.91	181.46
23-May-11 19:05:00	366.61	80340.53	77250.89	26526.42	51521.08	181.24
23-May-11 19:06:00	366.63	80343.32	77163.81	26508.14	51525.41	181.47
23-May-11 19:07:00	366.03	80347.94	77264.15	26595.10	51516.32	181.15
23-May-11 19:08:00	366.43	80215.39	77304.45	26705.04	51581.35	181.04
23-May-11 19:09:00	366.11	80303.14	77094.84	26525.59	51762.45	181.56
23-May-11 19:10:00	365.83	80233.57	77191.82	26398.73	51853.48	181.55
23-May-11 19:11:00	367.22	80171.92	77147.58	26489.54	51798.49	181.54
23-May-11 19:12:00	367.48	80475.84	77085.27	26470.70	51670.02	182.14
23-May-11 19:13:00	366.87	80532.61	77421.66	26408.03	51605.35	181.01
23-May-11 19:14:00	367.16	80399.42	77486.22	26475.33	51590.03	180.37
23-May-11 19:15:00	367.32	80463.14	77300.68	26458.21	51555.51	181.10
23-May-11 19:16:00	366.53	80498.52	77339.52	26333.49	51536.38	181.10
23-May-11 19:17:00	365.93	80324.20	77477.75	26367.32	51570.59	180.77
23-May-11 19:18:00	365.59	80192.96	77335.69	26461.11	51568.24	180.99
23-May-11 19:19:00	365.95	80119.77	77193.52	26588.92	51518.61	181.20
23-May-11 19:20:00	367.10	80198.49	77043.77	26576.17	51530.30	181.95
23-May-11 19:21:00	367.61	80450.47	77126.40	26514.84	51607.05	182.33
23-May-11 19:22:00	366.77	80562.15	77294.25	26383.95	51659.54	181.61
23-May-11 19:23:00	366.60	80378.35	77402.71	26350.16	51639.05	181.01
23-May-11 19:24:00	367.72	80341.09	77307.25	26419.52	51628.17	181.03
23-May-11 19:25:00	368.02	80586.74	77251.62	26391.57	51627.41	181.32
23-May-11 19:26:00	367.50	80652.76	77508.27	26329.88	51608.57	180.91
23-May-11 19:27:00	367.19	80537.26	77678.19	26408.46	51765.45	180.75
23-May-11 19:28:00	367.27	80470.98	77500.60	26448.40	51836.85	180.86
23-May-11 19:29:00	367.34	80487.79	77431.28	26431.28	51693.97	180.90
23-May-11 19:30:00	366.21	80502.16	77459.58	26448.68	51634.16	180.83
23-May-11 19:31:00	365.97	80255.93	77531.32	26625.12	51582.31	180.74
23-May-11 19:32:00	367.27	80202.26	77288.64	26763.37	51535.13	181.15
23-May-11 19:33:00	368.22	80488.42	77046.83	26651.99	51513.47	182.15
23-May-11 19:34:00	368.05	80696.58	77359.67	26557.73	51537.81	181.21
23-May-11 19:35:00	366.85	80658.09	77586.89	26443.92	51581.67	180.77
23-May-11 19:36:00	367.45	80394.53	77602.05	26461.02	51554.82	180.50
23-May-11 19:37:00	367.66	80525.96	77413.09	26408.83	51535.18	181.21
23-May-11 19:38:00	367.52	80572.95	77537.30	26441.37	51572.46	180.57
23-May-11 19:39:00	367.44	80541.45	77452.23	26472.24	51605.52	180.90
23-May-11 19:40:00	367.37	80525.25	77402.23	26436.13	51655.67	181.30
23-May-11 19:41:00	367.60	80509.56	77412.56	26422.88	51717.05	181.12
23-May-11 19:42:00	367.28	80559.29	77371.20	26481.31	51671.97	181.47
23-May-11 19:43:00	367.84	80490.73	77492.13	26694.22	51605.50	180.91
23-May-11 19:44:00	368.85	80611.82	77530.35	26727.77	51621.33	180.76
23-May-11 19:45:00	368.60	80834.46	77438.45	26542.21	51630.33	181.26
23-May-11 19:46:00	368.82	80779.99	77663.80	26473.69	51630.20	180.68
23-May-11 19:47:00	369.57	80827.13	77739.84	26489.57	51657.69	180.24
23-May-11 19:48:00	368.66	80992.22	77805.84	26391.17	51643.53	180.60

Run 2									
Scrubbing Liquid Upper Circulation (psig) 317P1105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105			
23-May-11 19:49:00	77.49	42.14	119	257.20	89.04	1135.32			
23-May-11 19:50:00	77.51	42.18	120	259.07	88.72	1131.98			
23-May-11 19:51:00	77.59	42.21	119	259.65	88.41	1133.83			
23-May-11 19:52:00	77.62	42.23	119	258.91	88.70	1134.46			
23-May-11 19:53:00	77.94	42.22	120	259.37	88.03	1135.46			
23-May-11 19:54:00	77.65	42.17	120	259.41	87.88	1133.06			
23-May-11 19:55:00	77.62	42.25	120	258.73	88.81	1138.17			
23-May-11 19:56:00	77.50	42.23	120	259.47	88.72	1137.62			
23-May-11 19:57:00	77.68	42.22	119	258.87	88.83	1137.70			
23-May-11 19:58:00	77.90	42.25	119	258.48	88.90	1138.72			
23-May-11 19:59:00	77.54	42.25	119	260.20	88.37	1137.40			
23-May-11 20:00:00	77.43	42.19	119	260.07	88.36	1132.69			
23-May-11 20:01:00	77.40	42.22	119	261.33	87.90	1125.21			
23-May-11 20:02:00	77.24	42.18	120	260.53	87.98	1124.73			
23-May-11 20:03:00	77.31	42.15	120	260.87	88.00	1136.88			
23-May-11 20:04:00	77.35	42.12	119	260.12	88.41	1137.51			
23-May-11 20:05:00	77.30	42.10	120	259.03	88.78	1134.85			
23-May-11 20:06:00	77.26	42.22	120	260.07	88.68	1129.66			
23-May-11 20:07:00	77.54	42.18	120	261.29	88.11	1136.04			
23-May-11 20:08:00	77.66	42.12	120	260.44	88.34	1133.51			
23-May-11 20:09:00	77.80	42.09	119	260.57	88.64	1130.43			
23-May-11 20:10:00	77.69	42.19	119	261.15	88.39	1131.10			
23-May-11 20:11:00	77.63	42.24	119	258.79	89.21	1129.69			
23-May-11 20:12:00	77.45	42.23	120	261.11	88.42	1128.05			
23-May-11 20:13:00	77.30	42.21	120	262.87	87.51	1127.76			
23-May-11 20:14:00	77.35	42.22	120	262.58	87.53	1129.08			
23-May-11 20:15:00	77.44	42.16	119	262.08	87.95	1130.41			
23-May-11 20:16:00	77.31	42.21	119	261.25	88.45	1128.66			
23-May-11 20:17:00	77.28	42.21	120	258.54	89.35	1128.05			
23-May-11 20:18:00	77.42	42.23	120	261.08	88.34	1124.80			
23-May-11 20:19:00	77.56	42.21	119	259.80	89.10	1129.40			
23-May-11 20:20:00	77.66	42.24	120	260.38	88.86	1128.78			
23-May-11 20:21:00	77.66	42.21	119	261.37	88.73	1128.54			
23-May-11 20:22:00	77.28	42.17	120	260.49	89.16	1129.31			
23-May-11 20:23:00	77.48	42.08	119	259.33	89.27	1132.81			
23-May-11 20:24:00	77.62	42.13	119	259.11	89.48	1132.15			
77.44	41.99	21.58	119.41	256.74	88.62	1139.36			

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWSAT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 2							
23-May-11 19:49:00	1158.40	199.26	81.18	15.64	78.64	16.92	38.80
23-May-11 19:50:00	1155.84	198.96	81.10	15.65	78.49	16.92	38.60
23-May-11 19:51:00	1156.59	198.92	81.03	15.62	78.43	16.93	38.76
23-May-11 19:52:00	1156.15	198.97	81.00	15.65	78.29	16.90	38.21
23-May-11 19:53:00	1157.85	199.23	80.93	15.61	78.21	16.90	38.45
23-May-11 19:54:00	1154.25	199.78	80.97	15.63	78.04	16.98	44.32
23-May-11 19:55:00	1159.81	199.66	81.00	15.66	78.82	17.09	56.12
23-May-11 19:56:00	1160.21	199.68	81.00	15.66	78.97	17.05	56.05
23-May-11 19:57:00	1160.77	199.63	80.93	15.66	79.03	17.01	46.77
23-May-11 19:58:00	1162.23	199.68	80.95	15.66	79.22	16.96	42.24
23-May-11 19:59:00	1160.77	199.85	80.97	15.64	79.11	16.96	41.03
23-May-11 20:00:00	1156.88	200.00	80.93	15.64	78.68	16.97	40.63
23-May-11 20:01:00	1149.12	200.10	80.90	15.62	77.72	16.92	39.32
23-May-11 20:02:00	1146.91	200.11	80.90	15.60	77.04	16.91	38.53
23-May-11 20:03:00	1161.51	200.26	80.83	15.61	78.12	16.91	38.50
23-May-11 20:04:00	1161.30	200.62	80.80	15.64	78.58	16.92	39.36
23-May-11 20:05:00	1157.43	200.74	80.73	15.65	78.34	16.88	38.63
23-May-11 20:06:00	1152.27	200.57	80.70	15.66	77.92	16.92	42.85
23-May-11 20:07:00	1158.60	200.56	80.70	15.61	78.54	17.06	57.10
23-May-11 20:08:00	1156.56	200.49	80.65	15.62	78.56	17.04	60.04
23-May-11 20:09:00	1153.84	200.63	80.70	15.62	78.29	16.92	44.41
23-May-11 20:10:00	1152.73	200.57	80.70	15.62	78.10	16.87	40.86
23-May-11 20:11:00	1151.46	200.20	80.63	15.65	77.81	16.88	39.81
23-May-11 20:12:00	1150.89	199.99	80.62	15.63	77.62	16.85	38.39
23-May-11 20:13:00	1151.54	199.96	80.70	15.58	77.61	16.88	38.48
23-May-11 20:14:00	1152.93	199.84	80.72	15.59	77.66	16.87	37.75
23-May-11 20:15:00	1153.98	199.86	80.80	15.62	78.07	16.81	36.94
23-May-11 20:16:00	1152.75	199.76	80.73	15.68	78.00	16.82	36.92
23-May-11 20:17:00	1150.61	199.56	80.70	15.66	77.56	16.82	36.92
23-May-11 20:18:00	1146.32	199.43	80.68	15.62	77.19	16.89	45.97
23-May-11 20:19:00	1150.74	199.55	80.60	15.66	77.76	17.06	59.88
23-May-11 20:20:00	1150.24	199.58	80.60	15.62	77.73	17.00	52.28
23-May-11 20:21:00	1149.78	199.58	80.60	15.65	77.60	16.94	43.99
23-May-11 20:22:00	1150.57	199.49	80.60	15.67	77.65	16.92	41.27
23-May-11 20:23:00	1155.23	199.54	80.60	15.64	78.12	16.89	39.40
23-May-11 20:24:00	1154.49	199.63	80.60	15.69	78.08	16.91	39.49
Run 2							
23-May-11 20:25:00	1163.03	198.77	82.54	15.63	79.38	17.04	59.50

	O2 (WGS CEMS) (% by vol, dry) 317AH107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2							
23-May-11 19:49:00	1.02	367.84	80793.07	77938.19	26316.03	51559.30	180.55
23-May-11 19:50:00	1.01	368.28	80613.15	77781.08	26348.07	51527.54	180.70
23-May-11 19:51:00	1.02	369.78	80708.46	77603.93	26457.38	51567.45	180.91
23-May-11 19:52:00	1.00	369.94	81036.48	77707.08	26441.04	51622.40	180.77
23-May-11 19:53:00	1.00	369.56	81072.06	77968.85	26411.61	51651.50	179.83
23-May-11 19:54:00	1.00	369.03	80988.71	78017.11	26470.58	51586.40	180.23
23-May-11 19:55:00	0.91	369.05	80874.17	78019.61	26628.14	51563.88	179.77
23-May-11 19:56:00	0.88	369.54	80876.55	77908.58	26628.59	51629.93	180.18
23-May-11 19:57:00	0.90	370.17	80984.74	77859.82	26618.89	51645.36	180.28
23-May-11 19:58:00	0.87	369.53	81123.15	77939.33	26528.29	51639.16	179.82
23-May-11 19:59:00	0.85	369.43	80981.84	77994.28	26518.94	51591.31	179.90
23-May-11 20:00:00	0.91	370.35	80960.02	77846.37	26578.19	51565.72	180.47
23-May-11 20:01:00	1.03	370.31	81162.16	77886.85	26490.81	51599.23	180.56
23-May-11 20:02:00	1.06	370.76	81154.46	78155.65	26492.22	51620.73	180.02
23-May-11 20:03:00	0.99	369.99	81252.92	78152.62	26464.53	51610.41	180.26
23-May-11 20:04:00	0.97	370.50	81082.97	78188.74	26517.08	51638.40	180.09
23-May-11 20:05:00	1.02	370.20	81196.30	78016.22	26436.20	51687.21	180.72
23-May-11 20:06:00	1.06	369.69	81129.82	78135.03	26428.24	51721.01	180.07
23-May-11 20:07:00	0.90	370.65	81017.77	78148.99	26710.98	51757.53	179.80
23-May-11 20:08:00	0.74	370.96	81227.71	78008.09	26763.95	51739.70	180.33
23-May-11 20:09:00	0.85	370.40	81296.34	78050.52	26540.31	51790.13	180.35
23-May-11 20:10:00	0.99	371.03	81173.13	78115.49	26489.16	51836.60	179.86
23-May-11 20:11:00	0.97	371.03	81310.69	78077.88	26509.80	51816.87	179.73
23-May-11 20:12:00	0.98	369.93	81310.71	78192.50	26387.90	51832.60	179.78
23-May-11 20:13:00	1.03	371.31	81069.44	78173.25	26508.83	51855.26	179.70
23-May-11 20:14:00	1.02	371.87	81372.50	78025.51	26539.79	51861.11	180.29
23-May-11 20:15:00	0.97	371.58	81495.02	78273.70	26463.89	51908.72	179.74
23-May-11 20:16:00	1.11	371.91	81431.52	78318.35	26456.21	51914.46	179.61
23-May-11 20:17:00	1.15	371.67	81504.70	78387.38	26435.91	51900.43	179.32
23-May-11 20:18:00	1.12	369.99	81451.06	78507.38	26408.50	52004.06	179.12
23-May-11 20:19:00	0.85	371.28	81083.26	78485.26	26773.63	52204.45	178.64
23-May-11 20:20:00	0.83	370.98	81365.35	78028.03	26680.23	52365.96	179.86
23-May-11 20:21:00	0.98	371.11	81301.02	78234.40	26576.92	52410.81	179.49
23-May-11 20:22:00	1.00	372.19	81328.88	78252.59	26632.68	52372.25	179.83
23-May-11 20:23:00	1.02	371.58	81565.83	78279.22	26543.51	52362.42	180.13
23-May-11 20:24:00	0.98	370.55	81431.22	78497.46	26507.40	52379.94	179.32
	0.76	366.98	80418.73	77285.67	26465.66	51649.28	182.57

Dioxins/Furans/Speciated Semi-VOHAPs

5/24/2011 8:25
5/24/2011 12:39

1m

Run 3	Scrubbing Liquid		Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)		Stripped Sour Water		Carrying Air		Air to Rings		#1 Stand Pipe Aeration	
	Upper Circulation (psig)	317P1105B	Pump Pressure Lower Circulation (psig)	317P1108	317P1177A	317FC202	Air to Regen (M lbs/hr)	317FC115	Air to Regen (M lbs/hr)	317E1113	Air to Regen (lbs/min)	317E1105
24-May-11 08:25:00	77.81		42.20		22.06	123	258.99		89.94		1134.78	
24-May-11 08:26:00	77.74		42.21		21.97	122	259.15		89.82		1127.76	
24-May-11 08:27:00	77.75		42.34		21.97	122	258.21		89.93		1120.04	
24-May-11 08:28:00	77.84		42.28		22.07	123	260.03		89.39		1125.42	
24-May-11 08:29:00	77.86		42.16		22.20	122	258.95		89.03		1126.72	
24-May-11 08:30:00	77.84		42.26		22.12	123	258.38		89.50		1131.53	
24-May-11 08:31:00	77.79		42.22		22.18	123	260.93		88.98		1137.52	
24-May-11 08:32:00	77.86		42.17		21.98	122	258.97		89.79		1138.10	
24-May-11 08:33:00	77.82		42.27		21.97	122	258.31		89.93		1136.35	
24-May-11 08:34:00	77.75		42.26		21.89	121	258.38		89.80		1138.30	
24-May-11 08:35:00	78.05		42.29		22.20	121	258.58		89.65		1138.79	
24-May-11 08:36:00	78.04		42.40		22.35	123	259.44		89.42		1137.33	
24-May-11 08:37:00	77.77		42.42		22.07	124	258.55		89.59		1135.75	
24-May-11 08:38:00	77.72		42.43		21.96	123	259.72		89.18		1128.17	
24-May-11 08:39:00	77.90		42.41		22.12	123	259.33		89.41		1118.93	
24-May-11 08:40:00	77.84		42.43		22.19	122	257.31		90.12		1119.72	
24-May-11 08:41:00	77.93		42.42		22.05	122	254.28		91.16		1125.52	
24-May-11 08:42:00	77.94		42.45		21.99	122	256.52		90.34		1132.81	
24-May-11 08:43:00	77.75		42.50		21.98	123	258.30		89.46		1139.46	
24-May-11 08:44:00	77.85		42.52		22.13	123	258.13		89.72		1141.21	
24-May-11 08:45:00	77.83		42.50		21.92	123	258.09		89.71		1141.90	
24-May-11 08:46:00	77.98		42.51		21.85	123	257.37		90.32		1142.19	
24-May-11 08:47:00	77.92		42.65		21.91	123	257.98		90.09		1144.20	
24-May-11 08:48:00	77.90		42.64		21.92	123	256.62		90.50		1143.33	
24-May-11 08:49:00	77.97		42.59		22.02	123	258.06		90.01		1141.53	
24-May-11 08:50:00	78.10		42.63		22.00	122	258.30		89.40		1132.33	
24-May-11 08:51:00	78.04		42.60		22.08	121	259.32		89.03		1125.14	
24-May-11 08:52:00	77.95		42.40		21.86	121	256.86		90.32		1129.03	
24-May-11 08:53:00	77.71		42.49		21.86	121	257.39		89.87		1132.74	
24-May-11 08:54:00	77.69		42.60		22.00	122	257.61		89.85		1139.92	
24-May-11 08:55:00	77.71		42.61		21.96	122	257.02		90.20		1146.25	
24-May-11 08:56:00	77.85		42.71		21.77	122	256.37		90.69		1146.11	
24-May-11 08:57:00	78.04		42.74		21.88	122	257.05		90.38		1145.58	
24-May-11 08:58:00	78.07		42.73		21.96	122	257.95		89.92		1145.57	
24-May-11 08:59:00	78.02		42.60		21.86	123	256.37		90.66		1143.13	
24-May-11 09:00:00	77.85		42.70		21.95	122	255.92		90.46		1132.92	
24-May-11 09:01:00	77.73		42.73		21.88	122	256.99		89.76		1132.42	
24-May-11 09:02:00	77.69		42.66		21.81	121	258.55		89.09		1139.03	
24-May-11 09:03:00	77.60		42.65		21.78	121	259.02		89.27		1146.65	
24-May-11 09:04:00	77.88		42.67		21.99	122	258.45		89.46		1145.56	
24-May-11 09:05:00	77.97		42.59		22.03	122	254.91		90.69		1146.91	
24-May-11 09:06:00	77.84		42.55		21.89	121	256.13		90.35		1143.55	
24-May-11 09:07:00	77.63		42.53		21.90	120	255.03		91.08		1149.42	
24-May-11 09:08:00	77.67		42.53		22.09	121	259.71		89.09		1149.49	
24-May-11 09:09:00	77.87		42.47		22.07	121	258.29		89.75		1150.94	
24-May-11 09:10:00	77.86		42.42		21.72	121	255.01		91.25		1149.11	
24-May-11 09:11:00	77.74		42.39		21.76	121	256.95		90.17		1149.75	
24-May-11 09:12:00	77.96		42.55		21.79	120	255.57		90.81		1151.01	
24-May-11 09:13:00	78.01		42.54		22.09	121	256.33		90.44		1148.56	
24-May-11 09:14:00	77.97		42.39		21.90	121	257.89		89.85		1148.73	
24-May-11 09:15:00	77.97		42.32		21.78	121	257.75		89.77		1141.23	

Dioxins/Furans/Speci:

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 3	Run 3							
24-May-11 08:25:00	1158.71	243.92	197.82	80.50	15.70	78.99	17.13	42.69
24-May-11 08:26:00	1153.98	243.81	197.88	80.50	15.69	78.63	17.15	43.86
24-May-11 08:27:00	1147.27	243.47	197.91	80.50	15.67	78.54	17.13	44.31
24-May-11 08:28:00	1145.80	243.32	197.60	80.48	15.72	78.26	17.14	43.12
24-May-11 08:29:00	1152.20	243.25	197.15	80.38	15.69	78.23	17.18	43.90
24-May-11 08:30:00	1152.80	243.23	196.91	80.23	15.74	77.97	17.22	54.37
24-May-11 08:31:00	1159.01	242.89	196.56	80.20	15.69	78.69	17.34	75.10
24-May-11 08:32:00	1161.20	242.89	196.38	80.22	15.70	78.88	17.27	68.23
24-May-11 08:33:00	1159.76	243.29	196.33	80.30	15.68	78.91	17.16	50.75
24-May-11 08:34:00	1160.82	243.25	196.25	80.32	15.68	79.04	17.15	48.00
24-May-11 08:35:00	1161.07	243.35	196.29	80.42	15.65	79.07	17.15	46.37
24-May-11 08:36:00	1159.85	243.49	196.37	80.50	15.66	78.96	17.16	45.53
24-May-11 08:37:00	1158.51	243.72	196.61	80.57	15.68	78.65	17.15	44.72
24-May-11 08:38:00	1154.12	243.61	196.84	80.65	15.69	78.46	17.14	43.99
24-May-11 08:39:00	1147.82	243.73	197.00	80.67	15.70	78.52	17.14	43.74
24-May-11 08:40:00	1142.16	243.54	196.83	80.72	15.73	78.18	17.11	41.91
24-May-11 08:41:00	1148.65	243.46	196.48	80.82	15.78	77.98	17.11	42.13
24-May-11 08:42:00	1154.69	243.14	196.28	80.98	15.73	78.00	17.23	84.25
24-May-11 08:43:00	1162.29	243.20	196.05	81.12	15.68	79.07	17.41	140.55
24-May-11 08:44:00	1164.02	243.42	196.13	81.13	15.70	79.32	17.32	90.20
24-May-11 08:45:00	1164.55	243.89	196.38	81.10	15.71	79.42	17.22	52.54
24-May-11 08:46:00	1164.35	243.87	196.42	81.10	15.79	79.44	17.18	46.86
24-May-11 08:47:00	1166.63	243.91	196.39	81.10	15.75	79.61	17.16	45.61
24-May-11 08:48:00	1166.60	243.75	196.25	81.12	15.75	79.60	17.17	46.08
24-May-11 08:49:00	1164.63	243.59	195.81	81.20	15.77	79.39	17.17	46.95
24-May-11 08:50:00	1161.15	243.54	195.81	81.22	15.71	79.19	17.21	48.40
24-May-11 08:51:00	1157.05	243.22	195.68	81.32	15.70	79.26	17.19	45.53
24-May-11 08:52:00	1151.41	243.21	195.35	81.40	15.80	79.15	17.19	45.88
24-May-11 08:53:00	1157.08	243.23	195.11	81.33	15.77	79.17	17.14	43.92
24-May-11 08:54:00	1162.81	243.28	195.01	81.30	15.76	79.11	17.29	68.79
24-May-11 08:55:00	1169.95	243.19	195.08	81.25	15.75	80.03	17.40	95.24
24-May-11 08:56:00	1169.67	242.98	194.97	81.32	15.77	80.09	17.30	68.70
24-May-11 08:57:00	1169.82	243.08	194.68	81.42	15.75	80.15	17.23	53.99
24-May-11 08:58:00	1169.21	243.20	194.65	81.50	15.73	80.10	17.22	51.30
24-May-11 08:59:00	1165.41	243.25	194.49	81.50	15.78	79.88	17.24	49.53
24-May-11 09:00:00	1153.28	243.31	194.23	81.50	15.73	79.29	17.22	48.80
24-May-11 09:01:00	1151.79	243.25	194.49	81.43	15.71	78.75	17.24	52.05
24-May-11 09:02:00	1161.92	243.40	194.58	81.33	15.69	78.93	17.26	50.74
24-May-11 09:03:00	1171.26	243.48	194.87	81.28	15.74	80.13	15.93	77.27
24-May-11 09:04:00	1170.82	243.36	195.19	81.20	15.72	80.41	14.86	98.09
24-May-11 09:05:00	1169.90	243.30	195.40	81.20	15.75	80.16	17.14	48.42
24-May-11 09:06:00	1167.98	243.19	195.46	81.18	15.76	79.83	17.25	87.67
24-May-11 09:07:00	1175.64	243.21	194.98	81.10	15.80	80.54	17.44	146.40
24-May-11 09:08:00	1172.44	243.27	194.85	81.02	15.68	80.58	17.41	108.56
24-May-11 09:09:00	1173.27	243.35	195.00	80.88	15.76	80.60	17.31	80.10
24-May-11 09:10:00	1172.32	243.16	194.91	80.78	15.83	80.60	17.16	49.04
24-May-11 09:11:00	1173.42	243.17	194.90	80.68	15.73	80.61	17.16	52.80
24-May-11 09:12:00	1175.35	243.35	194.90	80.58	15.78	80.64	17.26	60.18
24-May-11 09:13:00	1172.95	243.21	194.71	80.57	15.73	80.58	17.23	50.83
24-May-11 09:14:00	1173.06	242.93	194.26	80.60	15.74	80.57	17.25	51.64
24-May-11 09:15:00	1167.77	243.11	194.39	80.62	15.73	80.68	17.25	48.53

Dioxins/Furans/Speci:
5/24/2011 8:25
5/24/2011 12:39
1m

O ₂ (WGS CEMS) (% by vol, dry) 317AH107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3						
24-May-11 08:25:00	1.07	371.39	78797.59	26796.58	52572.18	181.39
24-May-11 08:26:00	1.01	371.69	78775.19	26854.53	52678.24	181.46
24-May-11 08:27:00	0.99	371.30	78555.81	26816.85	52634.96	181.34
24-May-11 08:28:00	1.06	370.77	78607.51	26772.75	52568.44	181.61
24-May-11 08:29:00	0.90	372.13	78580.95	26953.49	52657.79	181.78
24-May-11 08:30:00	0.92	370.52	78364.11	26887.09	52656.92	182.32
24-May-11 08:31:00	0.78	371.03	78200.15	27101.47	52627.49	181.55
24-May-11 08:32:00	0.77	372.79	78339.66	27150.57	52619.37	182.47
24-May-11 08:33:00	0.93	371.59	78375.97	26887.10	52606.63	182.33
24-May-11 08:34:00	1.00	370.98	78802.79	26812.84	52640.71	181.25
24-May-11 08:35:00	0.93	370.83	78605.96	26824.52	52609.31	181.28
24-May-11 08:36:00	0.81	370.88	78399.35	26869.38	52546.23	181.35
24-May-11 08:37:00	0.88	371.34	78278.62	26870.78	52534.35	181.70
24-May-11 08:38:00	0.89	370.76	78378.85	26815.12	52606.46	181.82
24-May-11 08:39:00	0.90	371.51	78441.53	26868.46	52584.92	181.28
24-May-11 08:40:00	0.95	371.41	78312.20	26805.94	52564.82	181.66
24-May-11 08:41:00	1.09	370.14	78506.59	26673.54	52554.80	181.23
24-May-11 08:42:00	0.99	368.67	78604.62	26743.06	52570.08	180.82
24-May-11 08:43:00	0.77	369.82	80794.65	78368.77	52618.28	181.10
24-May-11 08:44:00	0.72	370.49	78019.34	27060.96	52579.81	181.89
24-May-11 08:45:00	0.90	370.63	78126.89	26899.34	52563.99	181.86
24-May-11 08:46:00	1.00	370.60	78355.71	26922.22	52591.68	181.19
24-May-11 08:47:00	0.90	371.07	78411.95	26855.50	52567.65	180.39
24-May-11 08:48:00	0.97	370.98	78318.63	26847.47	52601.56	180.69
24-May-11 08:49:00	0.92	370.39	78480.52	26821.61	52650.57	180.66
24-May-11 08:50:00	0.90	371.20	78417.09	26924.09	52662.74	180.17
24-May-11 08:51:00	0.88	370.56	78318.40	26861.29	52694.22	180.91
24-May-11 08:52:00	0.75	371.23	78425.86	26943.03	52637.85	181.22
24-May-11 08:53:00	0.94	370.62	78354.66	26787.34	52494.21	181.92
24-May-11 08:54:00	0.91	370.59	78468.10	26975.77	52426.32	180.68
24-May-11 08:55:00	0.73	370.70	78452.79	27168.18	52494.90	180.62
24-May-11 08:56:00	0.71	370.52	78366.90	27035.95	52523.73	180.22
24-May-11 08:57:00	0.80	370.52	78274.43	26928.71	52616.49	180.15
24-May-11 08:58:00	0.79	370.77	78259.60	26944.56	52675.45	180.23
24-May-11 08:59:00	0.71	371.12	78243.86	27009.66	52583.15	180.87
24-May-11 09:00:00	0.86	370.41	78330.84	26895.03	52497.88	180.60
24-May-11 09:01:00	0.88	369.42	78456.58	26845.09	52537.16	180.05
24-May-11 09:02:00	0.71	369.70	80958.87	78304.51	52632.95	180.44
24-May-11 09:03:00	1.81	370.51	81020.97	77985.11	52626.04	181.56
24-May-11 09:04:00	2.59	371.60	81198.38	77747.82	52569.29	181.45
24-May-11 09:05:00	1.07	370.73	81437.11	77788.97	52540.28	182.33
24-May-11 09:06:00	0.85	368.88	81245.81	78658.00	52498.94	180.32
24-May-11 09:07:00	0.68	369.75	80840.74	78390.04	52495.42	180.80
24-May-11 09:08:00	0.57	369.75	81030.85	78002.07	52523.87	182.00
24-May-11 09:09:00	0.62	371.78	81031.37	78056.24	52542.30	181.86
24-May-11 09:10:00	0.83	371.36	81476.05	78008.00	52554.29	182.33
24-May-11 09:11:00	0.99	369.97	81383.21	78506.69	52565.99	181.58
24-May-11 09:12:00	0.78	370.31	81079.78	78552.79	52616.75	180.23
24-May-11 09:13:00	0.74	369.77	81153.34	78137.10	52551.73	181.26
24-May-11 09:14:00	0.89	370.05	81035.23	78178.18	52526.94	181.95
24-May-11 09:15:00	0.91	371.08	81097.74	78217.63	52726.78	182.13

Scrubbing Liquid		Pump Pressure	Agglo-Filtering Module (AFM)	Stripped Sour Water	Carrying Air	Air to Rings	#1 Stand Pipe Aeration
Upper Circulation (psig)	Lower Circulation (psig)		and Cyclolabs Pressure (in. H2O)	Makeup (gpm)	Air to Regen (M lbs/hr)	Air to Regen (M lbs/hr)	Air to Regen (lbs/min)
317P1105B	317P1108		317P1177A	317FC202	317FC115	317E1113	317F1105
Run 3							
24-May-11 09:16:00	77.76	42.36	21.84	121	257.60	89.71	1127.84
24-May-11 09:17:00	77.98	42.27	21.98	120	257.08	89.68	1139.47
24-May-11 09:18:00	77.92	42.28	21.77	121	256.17	90.08	1145.82
24-May-11 09:19:00	77.95	42.35	21.81	122	255.56	90.67	1152.11
24-May-11 09:20:00	77.77	42.32	22.02	122	256.37	90.51	1149.11
24-May-11 09:21:00	77.72	42.37	22.04	121	257.48	89.77	1148.52
24-May-11 09:22:00	77.84	42.47	21.83	121	257.17	89.84	1148.89
24-May-11 09:23:00	77.73	42.39	21.82	120	256.75	89.93	1150.61
24-May-11 09:24:00	77.83	42.34	21.96	121	256.67	90.06	1153.90
24-May-11 09:25:00	77.88	42.38	21.97	120	257.07	89.95	1149.11
24-May-11 09:26:00	77.79	42.34	21.97	121	256.77	89.60	1147.24
24-May-11 09:27:00	77.83	42.32	21.96	120	257.12	89.79	1139.41
24-May-11 09:28:00	77.81	42.37	22.03	120	257.74	89.54	1127.28
24-May-11 09:29:00	77.53	42.31	22.00	121	258.06	89.35	1143.32
24-May-11 09:30:00	77.57	42.38	21.90	121	256.22	89.68	1142.93
24-May-11 09:31:00	78.02	42.41	21.89	121	258.03	89.44	1148.77
24-May-11 09:32:00	77.99	42.45	21.94	121	257.79	89.70	1150.90
24-May-11 09:33:00	77.82	42.44	21.85	121	256.66	90.20	1150.88
24-May-11 09:34:00	77.94	42.34	21.80	121	257.41	89.74	1151.19
24-May-11 09:35:00	77.85	42.40	21.76	121	256.97	89.79	1149.79
24-May-11 09:36:00	77.90	42.48	21.66	122	257.57	89.56	1149.53
24-May-11 09:37:00	78.01	42.41	21.83	121	256.49	90.06	1147.78
24-May-11 09:38:00	77.94	42.45	22.01	121	257.44	89.70	1146.94
24-May-11 09:39:00	77.86	42.67	21.99	121	257.20	89.67	1149.71
24-May-11 09:40:00	77.97	42.61	21.81	122	257.02	89.65	1145.38
24-May-11 09:41:00	77.93	42.59	21.85	122	256.65	89.58	1140.65
24-May-11 09:42:00	77.98	42.61	22.07	121	257.52	89.32	1141.22
24-May-11 09:43:00	77.98	42.63	21.92	121	256.04	89.92	1145.45
24-May-11 09:44:00	77.79	42.63	21.90	122	256.19	90.00	1147.05
24-May-11 09:45:00	77.80	42.71	21.87	121	256.60	89.79	1145.95
24-May-11 09:46:00	77.65	42.58	22.00	122	258.21	89.20	1146.59
24-May-11 09:47:00	77.74	42.67	22.17	122	257.12	89.56	1147.51
24-May-11 09:48:00	77.72	42.67	21.89	122	257.63	89.52	1147.20
24-May-11 09:49:00	77.85	42.74	21.90	121	259.28	88.85	1144.02
24-May-11 09:50:00	77.95	42.75	21.95	121	258.91	88.67	1139.53
24-May-11 09:51:00	77.75	42.81	22.03	121	257.79	89.28	1130.36
24-May-11 09:52:00	77.77	42.79	22.04	121	257.50	89.50	1113.44
24-May-11 09:53:00	77.96	42.70	21.85	121	256.86	89.47	1130.33
24-May-11 09:54:00	78.03	42.69	21.81	122	258.77	88.88	1137.43
24-May-11 09:55:00	77.96	42.70	21.77	121	258.78	88.99	1144.78
24-May-11 09:56:00	77.93	42.74	21.61	120	258.75	89.00	1145.07
24-May-11 09:57:00	77.86	42.67	21.72	121	259.08	88.44	1146.67
24-May-11 09:58:00	77.84	42.63	21.83	121	258.29	88.89	1146.20
24-May-11 09:59:00	77.75	42.63	21.69	120	256.82	89.56	1141.22
24-May-11 10:00:00	77.78	42.60	21.84	121	257.07	89.87	1121.79
24-May-11 10:01:00	77.88	42.62	21.95	121	256.03	90.26	1116.60
24-May-11 10:02:00	77.96	42.50	21.76	120	255.46	90.22	1134.60
24-May-11 10:03:00	77.91	42.62	21.90	120	257.75	89.30	1145.86
24-May-11 10:04:00	77.80	42.58	21.93	121	258.60	89.14	1146.12
24-May-11 10:05:00	77.78	42.55	21.80	120	257.46	89.72	1143.41

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317F1106	Air to Regen Temp B-1 Outlet (oF) 317T11112	Tempered Air Temp (oF) 317T11120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317A109	CO (WGS CEMS) (ppmw, dry) 317A111
Run 3								
24-May-11 09:16:00	1156.90	243.27	194.79	80.70	15.71	80.34	17.25	48.76
24-May-11 09:17:00	1164.76	243.47	194.88	80.70	15.74	80.24	17.26	49.11
24-May-11 09:18:00	1168.99	243.39	195.02	80.77	15.73	80.15	17.35	94.26
24-May-11 09:19:00	1176.17	243.35	195.49	80.88	15.75	80.94	17.47	150.04
24-May-11 09:20:00	1174.10	243.62	195.56	81.08	15.74	80.89	17.38	98.28
24-May-11 09:21:00	1172.95	243.93	195.61	81.35	15.71	80.70	17.34	72.75
24-May-11 09:22:00	1172.43	243.91	195.62	81.57	15.72	80.55	17.35	66.66
24-May-11 09:23:00	1173.06	243.74	195.41	81.67	15.71	80.64	17.33	63.20
24-May-11 09:24:00	1175.83	243.68	195.48	81.72	15.72	80.80	17.33	62.79
24-May-11 09:25:00	1172.31	244.03	195.73	81.82	15.73	80.65	17.33	61.62
24-May-11 09:26:00	1170.70	243.94	195.90	81.97	15.70	80.43	17.34	60.87
24-May-11 09:27:00	1168.20	243.96	196.10	82.02	15.73	80.62	17.30	56.21
24-May-11 09:28:00	1160.64	243.97	196.26	82.10	15.70	80.49	17.29	52.72
24-May-11 09:29:00	1168.69	243.91	196.61	82.15	15.73	80.33	17.30	55.32
24-May-11 09:30:00	1166.17	243.96	196.59	82.03	15.72	79.95	17.37	99.62
24-May-11 09:31:00	1172.82	243.93	196.53	81.93	15.71	80.64	17.47	159.18
24-May-11 09:32:00	1174.80	244.26	196.55	81.90	15.72	80.88	17.41	113.41
24-May-11 09:33:00	1175.26	244.58	196.67	81.88	15.73	81.05	17.35	75.92
24-May-11 09:34:00	1175.89	244.64	196.91	81.85	15.70	81.14	17.33	66.12
24-May-11 09:35:00	1174.76	244.48	196.86	81.82	15.70	81.03	17.33	65.96
24-May-11 09:36:00	1173.85	244.59	196.87	81.92	15.70	80.80	17.32	61.88
24-May-11 09:37:00	1171.64	244.48	196.88	82.02	15.73	80.47	17.32	59.84
24-May-11 09:38:00	1169.98	244.33	197.02	82.18	15.72	80.24	17.30	54.50
24-May-11 09:39:00	1172.45	244.59	197.10	82.32	15.71	80.50	17.30	58.37
24-May-11 09:40:00	1169.11	244.60	196.94	82.42	15.74	80.36	17.28	55.21
24-May-11 09:41:00	1166.36	244.55	196.88	82.50	15.74	79.89	17.28	52.26
24-May-11 09:42:00	1165.30	244.38	196.94	82.50	15.75	79.58	17.38	103.68
24-May-11 09:43:00	1170.49	244.35	197.12	82.50	15.73	80.33	17.48	166.71
24-May-11 09:44:00	1171.16	244.52	197.30	82.43	15.70	80.38	17.38	107.71
24-May-11 09:45:00	1170.36	244.59	197.62	82.35	15.70	80.36	17.34	74.82
24-May-11 09:46:00	1170.99	244.70	197.65	82.47	15.68	80.44	17.32	64.58
24-May-11 09:47:00	1172.35	244.60	197.58	82.50	15.71	80.50	17.30	59.91
24-May-11 09:48:00	1171.29	244.64	197.61	82.57	15.70	80.36	17.26	52.99
24-May-11 09:49:00	1168.64	244.68	197.61	82.67	15.69	80.00	17.27	53.88
24-May-11 09:50:00	1166.15	244.52	197.55	82.72	15.68	79.63	17.27	52.98
24-May-11 09:51:00	1161.76	244.52	197.82	82.88	15.70	79.69	17.21	47.08
24-May-11 09:52:00	1153.87	244.58	197.72	83.08	15.72	79.48	17.16	44.77
24-May-11 09:53:00	1157.80	244.53	197.56	83.28	15.70	78.98	17.16	44.93
24-May-11 09:54:00	1160.03	244.71	197.80	83.48	15.67	78.83	17.26	75.49
24-May-11 09:55:00	1168.84	245.11	197.74	83.60	15.68	79.80	17.38	113.18
24-May-11 09:56:00	1168.94	245.01	197.71	83.52	15.68	79.93	17.27	76.00
24-May-11 09:57:00	1171.32	244.90	197.74	83.25	15.63	80.25	17.20	55.19
24-May-11 09:58:00	1170.34	245.05	197.73	82.93	15.66	80.35	17.18	50.61
24-May-11 09:59:00	1165.45	245.15	197.83	82.60	15.65	80.21	17.10	45.32
24-May-11 10:00:00	1150.22	245.11	197.98	82.25	15.71	79.54	17.11	44.70
24-May-11 10:01:00	1143.51	245.25	198.35	82.08	15.72	78.56	17.14	45.99
24-May-11 10:02:00	1156.98	245.47	198.42	82.00	15.70	78.49	17.16	46.82
24-May-11 10:03:00	1170.39	245.65	198.52	81.93	15.68	79.79	17.22	50.28
24-May-11 10:04:00	1171.30	245.66	198.82	81.83	15.68	80.03	17.24	53.12
24-May-11 10:05:00	1167.73	245.64	199.04	81.72	15.74	79.55	17.19	48.77

	O2 (WGS CEMS) (% by vol, dry) 317AH107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3							
24-May-11 09:16:00	0.82	370.68	81322.77	78277.34	26961.24	52824.22	182.04
24-May-11 09:17:00	0.80	370.25	81234.56	78415.72	26943.17	52737.15	181.84
24-May-11 09:18:00	0.74	369.83	81139.60	78329.63	27044.13	52673.80	182.13
24-May-11 09:19:00	0.53	369.34	81047.67	78259.34	27214.44	52601.66	181.88
24-May-11 09:20:00	0.59	369.49	80940.03	78084.91	27089.81	52525.92	182.52
24-May-11 09:21:00	0.69	370.00	80974.06	77969.94	27052.83	52520.46	182.79
24-May-11 09:22:00	0.63	370.08	81086.55	78038.28	27083.84	52559.02	182.05
24-May-11 09:23:00	0.74	369.89	81102.87	78113.94	27019.10	52583.93	182.33
24-May-11 09:24:00	0.69	369.50	81061.07	78211.68	27008.01	52632.11	182.17
24-May-11 09:25:00	0.67	369.71	80986.05	78172.36	27030.83	52545.92	182.08
24-May-11 09:26:00	0.75	369.94	81016.81	78109.42	27026.63	52467.48	182.40
24-May-11 09:27:00	0.75	369.19	81036.50	78168.22	26934.49	52529.12	182.51
24-May-11 09:28:00	0.69	369.70	80907.72	78120.41	26965.95	52659.16	182.10
24-May-11 09:29:00	0.67	370.11	81020.64	77930.87	27018.98	52689.50	183.30
24-May-11 09:30:00	0.70	370.09	81110.41	78033.90	27101.82	52666.45	182.61
24-May-11 09:31:00	0.69	368.70	81105.33	78238.86	27120.06	52665.24	181.99
24-May-11 09:32:00	0.56	370.30	80800.68	78280.63	27207.66	52580.78	181.15
24-May-11 09:33:00	0.65	370.21	81151.94	77834.42	27088.45	52576.68	182.70
24-May-11 09:34:00	0.59	369.67	81131.62	78185.88	27048.19	52608.51	182.25
24-May-11 09:35:00	0.54	369.67	81012.92	78088.48	27064.06	52602.95	182.09
24-May-11 09:36:00	0.63	369.40	81014.12	77936.46	26999.16	52574.89	182.26
24-May-11 09:37:00	0.75	369.64	80954.68	78015.28	26986.55	52588.35	182.15
24-May-11 09:38:00	0.81	369.38	81006.05	78075.60	26923.73	52514.10	182.14
24-May-11 09:39:00	0.71	369.76	80950.53	78144.24	26982.71	52483.31	180.83
24-May-11 09:40:00	0.68	369.53	81032.92	77996.65	26956.02	52546.04	181.47
24-May-11 09:41:00	0.75	369.38	80970.38	78057.66	26920.34	52510.26	181.39
24-May-11 09:42:00	0.65	368.93	80953.54	78041.60	27038.59	52519.19	181.45
24-May-11 09:43:00	0.50	369.56	80875.95	78002.80	27258.19	52550.07	181.22
24-May-11 09:44:00	0.53	368.71	80889.08	77912.40	27062.36	52505.91	181.84
24-May-11 09:45:00	0.61	368.67	80802.57	77953.90	26978.02	52508.83	181.07
24-May-11 09:46:00	0.71	368.91	80794.73	77806.46	26942.53	52556.13	182.34
24-May-11 09:47:00	0.74	369.75	80847.50	77865.93	26968.88	52570.24	181.59
24-May-11 09:48:00	0.82	369.20	81030.01	77932.90	26863.02	52539.91	181.65
24-May-11 09:49:00	0.76	369.71	80911.05	78150.56	26930.39	52533.41	180.58
24-May-11 09:50:00	0.64	370.51	81021.66	77977.37	27024.20	52588.68	180.80
24-May-11 09:51:00	0.79	369.86	81197.09	77977.48	26861.28	52643.57	180.79
24-May-11 09:52:00	1.00	369.57	81054.19	78251.00	26723.14	52695.98	180.25
24-May-11 09:53:00	0.90	369.36	80991.36	78238.72	26736.01	52717.31	180.33
24-May-11 09:54:00	0.78	368.79	80945.00	78083.07	26844.97	52734.02	180.82
24-May-11 09:55:00	0.60	369.85	80819.77	78024.27	27125.28	52687.09	180.76
24-May-11 09:56:00	0.60	370.09	81052.35	77843.01	27010.31	52606.93	181.21
24-May-11 09:57:00	0.76	369.91	81105.11	77976.04	26865.09	52652.86	181.26
24-May-11 09:58:00	0.82	369.53	81065.22	78115.86	26789.91	52693.33	181.18
24-May-11 09:59:00	1.00	369.19	80982.32	78098.54	26628.79	52669.46	181.10
24-May-11 10:00:00	1.10	368.45	80909.20	78143.39	26554.98	52623.41	181.45
24-May-11 10:01:00	0.90	369.29	80746.08	78137.48	26704.66	52563.86	180.81
24-May-11 10:02:00	0.89	368.48	80929.23	77835.72	26671.37	52554.66	182.35
24-May-11 10:03:00	0.70	367.86	80753.29	78011.60	26749.34	52601.25	181.32
24-May-11 10:04:00	0.66	369.17	80617.77	77718.92	26887.37	52556.42	182.13
24-May-11 10:05:00	0.80	369.84	80902.92	77584.65	26838.30	52573.46	182.91

Run 3	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H ₂ O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B	317P1108	317P1177A	317FC202	317FC115	317E113	317F1105
24-May-11 10:06:00	77.73		42.55	21.73	120	256.91	89.96	1137.88
24-May-11 10:07:00	77.70		42.53	22.03	120	258.57	89.31	1141.92
24-May-11 10:08:00	77.86		42.62	21.92	120	259.56	88.90	1139.80
24-May-11 10:09:00	77.87		42.59	21.71	120	257.96	89.30	1143.90
24-May-11 10:10:00	77.86		42.63	21.74	120	259.83	88.44	1140.13
24-May-11 10:11:00	77.86		42.55	21.82	120	257.56	89.49	1140.26
24-May-11 10:12:00	77.89		42.51	21.98	121	257.65	89.60	1142.00
24-May-11 10:13:00	77.78		42.60	22.10	121	259.98	88.48	1140.12
24-May-11 10:14:00	77.72		42.59	21.84	121	257.51	89.67	1140.42
24-May-11 10:15:00	77.75		42.56	21.80	121	256.82	89.94	1134.42
24-May-11 10:16:00	77.90		42.69	21.91	121	258.26	89.48	1117.66
24-May-11 10:17:00	77.64		42.74	21.87	120	257.21	89.67	1132.23
24-May-11 10:18:00	77.93		42.74	21.91	120	258.10	89.34	1138.50
24-May-11 10:19:00	78.06		42.69	21.76	121	256.51	90.05	1144.74
24-May-11 10:20:00	77.91		42.78	21.73	121	257.40	89.63	1142.67
24-May-11 10:21:00	77.76		42.74	21.87	120	258.74	89.19	1141.95
24-May-11 10:22:00	77.88		42.63	21.89	120	257.45	89.77	1141.94
24-May-11 10:23:00	77.98		42.71	21.86	120	257.82	89.26	1144.20
24-May-11 10:24:00	77.97		42.78	21.78	121	258.75	88.87	1145.42
24-May-11 10:25:00	77.78		42.79	21.92	121	256.60	89.83	1139.40
24-May-11 10:26:00	77.63		42.73	21.81	121	255.27	90.60	1137.05
24-May-11 10:27:00	77.54		42.73	21.83	121	256.83	89.80	1142.23
24-May-11 10:28:00	77.66		42.79	21.74	121	257.52	89.53	1139.92
24-May-11 10:29:00	77.73		42.74	21.78	121	255.65	89.97	1133.99
24-May-11 10:30:00	77.85		42.84	21.66	121	255.13	90.44	1136.40
24-May-11 10:31:00	77.83		42.92	21.91	121	257.92	89.49	1143.51
24-May-11 10:32:00	77.79		42.90	21.90	121	256.51	89.96	1144.24
24-May-11 10:33:00	77.85		42.93	22.03	121	257.73	89.47	1141.85
24-May-11 10:34:00	77.89		42.98	21.71	121	256.22	90.29	1145.84
24-May-11 10:35:00	78.02		42.98	21.72	121	253.63	90.91	1146.50
24-May-11 10:36:00	77.86		42.96	21.73	121	254.12	90.38	1147.21
24-May-11 10:37:00	77.75		42.88	21.78	121	255.08	90.10	1144.88
24-May-11 10:38:00	77.67		42.95	21.73	121	253.80	90.62	1142.07
24-May-11 10:39:00	77.74		42.94	21.49	121	252.39	91.04	1143.48
24-May-11 10:40:00	77.80		42.92	21.58	122	254.84	89.78	1139.85
24-May-11 10:41:00	77.88		43.05	21.67	122	255.48	89.46	1138.74
24-May-11 10:42:00	77.79		43.04	21.78	121	254.36	89.93	1139.43
24-May-11 10:43:00	77.68		43.04	21.70	121	254.95	89.75	1145.38
24-May-11 10:44:00	77.81		43.08	21.83	121	254.18	90.02	1148.08
24-May-11 10:45:00	77.67		43.18	21.78	121	254.73	90.26	1147.01
24-May-11 10:46:00	77.81		43.12	21.74	121	254.28	90.25	1147.07
24-May-11 10:47:00	78.04		43.11	21.78	121	255.63	89.53	1147.07
24-May-11 10:48:00	77.85		43.05	21.99	120	257.43	88.85	1145.87
24-May-11 10:49:00	78.00		43.01	21.74	121	254.62	90.04	1141.65
24-May-11 10:50:00	77.90		43.03	21.75	121	255.19	89.53	1138.62
24-May-11 10:51:00	77.91		43.05	22.02	120	257.44	88.52	1143.12
24-May-11 10:52:00	77.92		43.11	21.85	120	256.63	88.89	1142.38
24-May-11 10:53:00	77.87		42.96	21.93	121	257.11	88.30	1139.22
24-May-11 10:54:00	78.02		43.02	22.08	120	256.26	88.86	1143.71
24-May-11 10:55:00	77.94		43.08	22.03	120	257.53	88.75	1150.20

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmw, dry) 317AI111
Run 3	Run 3							
24-May-11 10:06:00	1162.46	245.61	199.17	81.60	15.76	79.13	17.21	57.58
24-May-11 10:07:00	1167.28	245.62	199.46	81.68	15.71	79.69	17.36	104.98
24-May-11 10:08:00	1162.07	245.51	199.58	81.88	15.68	79.48	17.40	128.25
24-May-11 10:09:00	1164.09	245.66	199.65	82.07	15.66	79.35	17.27	73.42
24-May-11 10:10:00	1162.69	246.08	200.16	82.17	15.63	79.59	17.18	53.01
24-May-11 10:11:00	1164.60	246.09	200.59	82.28	15.69	79.58	17.21	53.80
24-May-11 10:12:00	1166.58	246.14	200.68	82.48	15.68	79.46	17.15	47.23
24-May-11 10:13:00	1164.47	246.29	200.52	82.70	15.64	79.37	17.18	49.54
24-May-11 10:14:00	1162.75	246.20	200.61	82.97	15.71	79.26	17.20	50.15
24-May-11 10:15:00	1162.66	246.18	200.78	83.08	15.69	79.58	17.15	45.33
24-May-11 10:16:00	1153.62	246.39	200.70	83.28	15.70	79.29	17.19	48.18
24-May-11 10:17:00	1157.53	246.23	200.39	83.40	15.72	78.91	17.22	49.31
24-May-11 10:18:00	1160.19	245.88	200.51	83.40	15.70	78.91	17.29	95.90
24-May-11 10:19:00	1167.02	245.57	200.49	83.35	15.73	79.82	17.43	154.89
24-May-11 10:20:00	1165.12	245.51	200.05	83.40	15.67	79.82	17.34	96.71
24-May-11 10:21:00	1164.59	245.59	200.05	83.38	15.68	79.69	17.32	76.86
24-May-11 10:22:00	1165.12	245.73	200.06	83.23	15.73	79.66	17.29	65.17
24-May-11 10:23:00	1166.90	246.10	199.92	83.22	15.66	79.85	17.27	56.70
24-May-11 10:24:00	1168.76	246.24	199.93	83.30	15.65	79.94	17.30	61.88
24-May-11 10:25:00	1162.73	246.25	200.27	83.30	15.71	79.47	17.31	59.40
24-May-11 10:26:00	1160.23	246.21	200.48	83.32	15.74	79.07	17.29	55.52
24-May-11 10:27:00	1164.73	246.07	200.47	83.48	15.69	79.45	17.30	64.19
24-May-11 10:28:00	1163.17	245.90	200.06	83.68	15.74	79.51	17.35	76.56
24-May-11 10:29:00	1158.96	245.69	199.77	83.80	15.74	79.13	17.34	65.19
24-May-11 10:30:00	1158.66	245.71	199.54	83.73	15.75	78.79	17.40	114.55
24-May-11 10:31:00	1166.32	245.61	199.33	83.57	15.70	79.55	17.53	262.99
24-May-11 10:32:00	1167.36	245.49	199.27	83.42	15.72	79.76	17.47	256.04
24-May-11 10:33:00	1166.38	245.46	198.99	83.22	15.70	79.87	17.35	79.70
24-May-11 10:34:00	1169.75	245.26	198.83	83.10	15.77	80.10	17.32	70.55
24-May-11 10:35:00	1170.85	245.06	198.63	83.10	15.74	80.22	17.26	55.42
24-May-11 10:36:00	1171.57	245.00	198.26	83.10	15.70	80.20	17.27	58.33
24-May-11 10:37:00	1168.80	245.19	198.36	83.08	15.72	80.01	17.31	63.59
24-May-11 10:38:00	1164.59	245.64	198.36	83.00	15.74	79.70	17.29	55.41
24-May-11 10:39:00	1165.67	245.66	198.53	83.00	15.75	79.69	17.29	54.93
24-May-11 10:40:00	1163.25	245.61	198.37	83.00	15.72	79.54	17.34	70.48
24-May-11 10:41:00	1162.69	245.54	198.65	83.00	15.77	79.22	17.38	84.12
24-May-11 10:42:00	1162.51	245.61	198.98	83.02	15.76	79.03	17.41	112.67
24-May-11 10:43:00	1169.03	245.52	198.94	83.12	15.73	80.01	17.50	208.91
24-May-11 10:44:00	1171.55	245.69	199.11	83.27	15.73	80.45	17.44	200.28
24-May-11 10:45:00	1170.76	246.08	199.17	83.40	15.76	80.51	17.38	94.33
24-May-11 10:46:00	1170.66	246.19	198.96	83.62	15.75	80.38	17.35	76.76
24-May-11 10:47:00	1170.64	246.23	199.06	83.70	15.70	80.34	17.33	64.93
24-May-11 10:48:00	1168.21	245.90	199.12	83.70	15.69	79.99	17.35	65.37
24-May-11 10:49:00	1164.08	245.89	199.29	83.70	15.76	79.53	17.32	59.43
24-May-11 10:50:00	1161.75	245.67	199.23	83.70	15.70	79.10	17.26	53.05
24-May-11 10:51:00	1166.41	245.76	199.07	83.77	15.70	79.35	17.32	64.88
24-May-11 10:52:00	1166.91	245.92	199.12	83.87	15.76	79.60	17.30	62.92
24-May-11 10:53:00	1165.66	245.78	199.23	83.98	15.71	79.48	17.22	48.02
24-May-11 10:54:00	1166.35	245.70	199.08	84.13	15.67	79.48	17.30	70.29
24-May-11 10:55:00	1174.13	245.60	199.07	84.32	15.68	80.59	17.38	123.26

	O2 (WGS CEMS) (% by vol, dry) 317AH107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3							
24-May-11 10:06:00	0.88	369.60	81051.73	77948.85	26819.37	52615.91	182.13
24-May-11 10:07:00	0.69	369.30	80998.28	78178.83	27032.85	52561.84	181.61
24-May-11 10:08:00	0.53	370.18	80933.28	78084.26	27195.29	52537.37	181.18
24-May-11 10:09:00	0.67	370.36	81125.01	77916.98	27003.29	52550.68	181.67
24-May-11 10:10:00	0.80	369.14	81163.67	78102.77	26776.28	52571.01	181.33
24-May-11 10:11:00	0.81	369.78	80897.97	78187.80	26844.55	52554.20	181.10
24-May-11 10:12:00	0.87	368.91	81038.11	77963.00	26698.52	52590.47	182.08
24-May-11 10:13:00	0.84	369.06	80847.27	78088.38	26749.52	52567.40	181.40
24-May-11 10:14:00	0.84	370.07	80879.87	77913.24	26853.02	52541.68	181.82
24-May-11 10:15:00	0.90	369.02	81101.12	77966.99	26700.69	52602.18	182.06
24-May-11 10:16:00	0.82	368.75	80871.81	78192.61	26748.60	52595.51	180.77
24-May-11 10:17:00	0.64	369.51	80811.89	77905.66	26888.66	52582.26	181.06
24-May-11 10:18:00	0.76	368.90	80978.86	77729.00	26896.20	52612.40	181.67
24-May-11 10:19:00	0.63	369.40	80843.76	78089.85	27141.72	52588.85	180.83
24-May-11 10:20:00	0.55	368.76	80955.08	77936.39	27011.33	52542.48	180.81
24-May-11 10:21:00	0.74	368.99	80812.97	77921.00	26942.74	52526.29	181.19
24-May-11 10:22:00	0.68	369.98	80864.59	77910.33	27002.50	52738.85	181.59
24-May-11 10:23:00	0.71	369.31	81081.61	77879.48	26911.17	52837.63	181.43
24-May-11 10:24:00	0.71	368.87	80933.77	78100.61	26919.11	52726.79	180.56
24-May-11 10:25:00	0.66	369.29	80837.08	77982.04	26975.71	52684.12	180.72
24-May-11 10:26:00	0.78	368.42	80929.86	77865.49	26852.86	52582.05	181.57
24-May-11 10:27:00	0.75	367.95	80740.51	78042.05	26834.07	52547.49	181.20
24-May-11 10:28:00	0.55	368.62	80635.94	77827.27	27010.93	52583.97	181.19
24-May-11 10:29:00	0.59	369.23	80783.66	77593.25	27025.62	52581.71	181.99
24-May-11 10:30:00	0.67	367.77	80917.53	77775.96	26973.75	52591.77	181.28
24-May-11 10:31:00	0.53	368.05	80597.12	78043.76	27208.44	52627.66	180.08
24-May-11 10:32:00	0.43	369.54	80658.63	77715.19	27267.99	52657.67	180.71
24-May-11 10:33:00	0.56	368.71	80984.52	77631.23	27009.09	52664.72	181.21
24-May-11 10:34:00	0.59	369.51	80802.46	77950.34	27020.49	52650.47	179.95
24-May-11 10:35:00	0.63	369.06	80978.02	77754.74	26904.07	52543.36	180.28
24-May-11 10:36:00	0.68	366.92	80880.52	77922.88	26750.81	52505.43	180.30
24-May-11 10:37:00	0.54	366.83	80410.79	77872.12	26827.75	52604.51	180.49
24-May-11 10:38:00	0.63	367.57	80390.30	77338.72	26837.73	52624.56	181.62
24-May-11 10:39:00	0.68	366.75	80553.73	77382.52	26757.39	52627.70	181.68
24-May-11 10:40:00	0.66	365.78	80373.69	77582.49	26757.23	52684.83	181.27
24-May-11 10:41:00	0.59	366.96	80160.77	77447.21	26906.15	52737.14	180.77
24-May-11 10:42:00	0.56	367.33	80418.44	77200.66	26987.11	52724.22	181.47
24-May-11 10:43:00	0.54	366.74	80501.17	77485.82	27060.51	52700.96	181.23
24-May-11 10:44:00	0.39	366.88	80370.27	77592.48	27048.93	52553.73	180.25
24-May-11 10:45:00	0.52	366.52	80402.54	77290.55	26894.74	52464.20	180.89
24-May-11 10:46:00	0.56	367.38	80323.26	77374.57	26916.39	52495.90	180.64
24-May-11 10:47:00	0.59	366.74	80511.79	77318.43	26836.84	52484.23	180.84
24-May-11 10:48:00	0.47	367.24	80371.13	77493.30	26925.67	52552.89	180.56
24-May-11 10:49:00	0.55	368.30	80480.23	77263.46	26940.73	52643.61	180.93
24-May-11 10:50:00	0.81	366.91	80714.26	77429.02	26703.06	52709.15	181.18
24-May-11 10:51:00	0.69	366.77	80407.62	77847.36	26799.49	52741.68	179.94
24-May-11 10:52:00	0.54	367.99	80377.55	77468.48	26906.07	52694.15	180.23
24-May-11 10:53:00	0.74	367.87	80646.00	77298.43	26747.73	52650.22	181.74
24-May-11 10:54:00	0.81	367.34	80618.18	77676.17	26782.15	52578.74	180.39
24-May-11 10:55:00	0.63	367.10	80503.52	77787.70	26916.87	52547.13	179.85

Run 3	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H ₂ O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B	317P1108	317P1177A	317FC202	317FC115	317E113	317F1105
24-May-11 10:56:00	77.90		42.97	22.04	121	258.19	88.77	1150.41
24-May-11 10:57:00	78.05		42.99	21.88	121	257.49	89.54	1150.18
24-May-11 10:58:00	77.99		42.89	22.01	120	257.42	89.54	1149.43
24-May-11 10:59:00	78.18		42.99	22.00	120	257.22	89.57	1142.94
24-May-11 11:00:00	78.06		43.03	21.69	120	257.18	89.42	1134.04
24-May-11 11:01:00	77.91		43.04	21.83	120	258.92	88.72	1140.39
24-May-11 11:02:00	77.87		43.08	22.00	120	258.22	88.70	1140.98
24-May-11 11:03:00	77.99		43.13	21.86	120	258.52	88.62	1152.45
24-May-11 11:04:00	77.91		43.13	21.80	120	256.41	89.77	1152.02
24-May-11 11:05:00	77.89		42.98	21.73	120	253.70	90.96	1146.66
24-May-11 11:06:00	77.87		43.02	21.90	119	252.61	91.01	1141.29
24-May-11 11:07:00	77.82		43.04	22.05	119	256.56	89.64	1149.63
24-May-11 11:08:00	77.87		43.02	21.91	119	255.28	90.31	1142.54
24-May-11 11:09:00	77.80		42.94	21.68	120	255.65	90.26	1144.02
24-May-11 11:10:00	77.84		42.90	21.85	119	258.03	89.34	1144.42
24-May-11 11:11:00	77.75		42.96	21.99	119	257.58	89.59	1144.58
24-May-11 11:12:00	77.92		42.99	21.73	120	256.09	90.15	1147.06
24-May-11 11:13:00	77.94		42.98	21.49	120	255.85	90.26	1144.75
24-May-11 11:14:00	77.79		42.90	21.53	119	255.65	89.88	1146.12
24-May-11 11:15:00	77.83		42.87	21.68	119	254.76	89.85	1143.67
24-May-11 11:16:00	77.99		42.87	21.64	120	254.50	90.08	1141.71
24-May-11 11:17:00	77.97		42.82	21.59	120	254.21	90.03	1142.16
24-May-11 11:18:00	77.95		42.99	21.63	120	255.26	89.51	1139.09
24-May-11 11:19:00	77.91		42.89	21.66	120	253.81	90.10	1144.68
24-May-11 11:20:00	78.02		42.94	21.68	119	253.44	90.61	1143.33
24-May-11 11:21:00	78.06		43.05	21.64	120	252.92	90.87	1145.78
24-May-11 11:22:00	77.90		43.12	21.88	120	255.64	89.77	1147.67
24-May-11 11:23:00	77.95		43.13	21.86	120	255.00	89.97	1149.09
24-May-11 11:24:00	78.06		43.14	21.64	120	254.67	89.94	1151.17
24-May-11 11:25:00	77.91		43.00	21.58	119	253.00	90.68	1147.35
24-May-11 11:26:00	77.97		43.05	21.76	119	254.45	90.22	1146.25
24-May-11 11:27:00	77.97		43.06	21.60	119	253.17	90.54	1149.30
24-May-11 11:28:00	78.05		43.07	21.65	120	253.62	89.98	1144.53
24-May-11 11:29:00	78.04		43.02	21.80	120	254.01	89.78	1142.22
24-May-11 11:30:00	77.97		43.04	21.98	120	256.33	89.07	1140.42
24-May-11 11:31:00	77.94		43.09	21.84	120	257.46	88.97	1147.34
24-May-11 11:32:00	78.03		43.05	21.81	120	255.46	89.62	1149.62
24-May-11 11:33:00	77.86		43.12	21.74	119	255.86	89.57	1149.98
24-May-11 11:34:00	77.79		43.17	21.82	119	256.09	89.43	1151.07
24-May-11 11:35:00	77.83		43.10	21.63	120	252.44	90.91	1149.14
24-May-11 11:36:00	77.99		43.03	21.75	120	252.14	91.16	1148.55
24-May-11 11:37:00	78.01		42.98	21.72	120	253.97	90.76	1146.47
24-May-11 11:38:00	77.95		42.99	21.58	120	253.87	90.50	1144.85
24-May-11 11:39:00	77.99		43.19	21.58	120	253.84	90.21	1147.66
24-May-11 11:40:00	77.94		43.27	21.53	120	253.00	90.19	1145.50
24-May-11 11:41:00	77.89		43.19	21.61	120	252.38	90.47	1142.99
24-May-11 11:42:00	77.80		43.16	21.70	120	254.54	89.99	1142.41
24-May-11 11:43:00	77.90		43.13	21.73	120	253.70	90.22	1148.90
24-May-11 11:44:00	77.90		43.12	21.95	120	254.36	89.89	1149.85
24-May-11 11:45:00	77.67		43.19	21.90	120	254.96	89.64	1149.42

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 3								
24-May-11 10:56:00	1173.86	245.69	198.94	84.40	15.67	80.73	17.35	123.44
24-May-11 10:57:00	1175.47	245.52	198.59	84.40	15.75	80.82	17.25	63.48
24-May-11 10:58:00	1175.01	245.52	198.40	84.38	15.70	80.77	17.20	53.12
24-May-11 10:59:00	1171.55	245.42	198.47	84.30	15.71	80.69	17.22	53.60
24-May-11 11:00:00	1167.80	245.14	198.25	84.38	15.68	80.39	17.22	50.11
24-May-11 11:01:00	1164.72	245.06	197.85	84.50	15.67	79.68	17.21	49.27
24-May-11 11:02:00	1165.20	245.27	197.97	84.48	15.69	78.98	17.23	49.49
24-May-11 11:03:00	1178.12	245.56	198.27	84.38	15.70	79.80	17.19	46.74
24-May-11 11:04:00	1175.30	245.73	198.29	84.28	15.71	80.12	17.21	47.76
24-May-11 11:05:00	1168.24	245.66	198.39	84.20	15.77	79.58	17.19	45.29
24-May-11 11:06:00	1164.81	245.66	198.16	84.20	15.70	79.27	17.21	53.75
24-May-11 11:07:00	1174.89	245.66	197.75	84.13	15.66	79.79	17.35	215.74
24-May-11 11:08:00	1166.04	245.69	197.90	84.10	15.70	79.84	17.44	326.45
24-May-11 11:09:00	1166.35	245.74	198.15	84.12	15.70	79.81	17.28	70.10
24-May-11 11:10:00	1167.19	245.66	198.31	84.28	15.67	80.04	17.27	61.87
24-May-11 11:11:00	1168.38	245.66	198.39	84.47	15.69	80.00	17.26	59.16
24-May-11 11:12:00	1170.80	245.66	198.54	84.50	15.72	79.97	17.19	47.45
24-May-11 11:13:00	1166.64	245.66	198.57	84.52	15.75	79.81	17.18	46.41
24-May-11 11:14:00	1165.92	245.51	198.28	84.62	15.74	79.65	17.22	47.88
24-May-11 11:15:00	1166.47	245.14	198.08	84.70	15.75	79.84	17.24	49.06
24-May-11 11:16:00	1166.34	245.08	197.92	84.70	15.76	79.76	17.26	50.14
24-May-11 11:17:00	1166.79	245.10	197.62	84.70	15.74	79.49	17.25	50.78
24-May-11 11:18:00	1162.46	245.25	197.48	84.63	15.70	79.13	17.34	93.57
24-May-11 11:19:00	1168.87	245.55	197.60	84.60	15.72	79.99	17.45	155.13
24-May-11 11:20:00	1167.92	245.71	197.70	84.67	15.75	80.08	17.39	116.05
24-May-11 11:21:00	1169.62	245.73	197.66	84.70	15.75	80.04	17.32	75.77
24-May-11 11:22:00	1171.44	245.54	197.51	84.77	15.72	80.15	17.32	68.59
24-May-11 11:23:00	1173.07	245.60	197.70	84.88	15.75	80.39	17.35	72.41
24-May-11 11:24:00	1175.28	245.49	197.62	85.00	15.72	80.53	17.31	61.25
24-May-11 11:25:00	1171.89	245.56	197.22	85.00	15.76	80.31	17.30	60.41
24-May-11 11:26:00	1170.24	245.64	197.08	84.98	15.74	80.12	17.30	64.20
24-May-11 11:27:00	1172.63	245.57	197.07	84.90	15.75	80.41	17.34	73.82
24-May-11 11:28:00	1170.12	245.39	196.71	84.88	15.72	80.36	17.32	55.79
24-May-11 11:29:00	1168.01	245.05	196.43	84.72	15.75	79.93	17.32	57.75
24-May-11 11:30:00	1163.21	245.07	196.45	84.52	15.70	79.48	17.36	110.34
24-May-11 11:31:00	1170.72	245.47	196.33	84.33	15.71	80.14	17.46	182.43
24-May-11 11:32:00	1172.93	245.65	196.68	84.30	15.69	80.35	17.37	113.69
24-May-11 11:33:00	1173.09	245.66	197.06	84.30	15.72	80.57	17.26	63.16
24-May-11 11:34:00	1174.57	245.66	197.20	84.30	15.70	80.72	17.25	57.59
24-May-11 11:35:00	1173.83	245.68	197.30	84.30	15.75	80.71	17.23	52.35
24-May-11 11:36:00	1172.59	245.88	197.30	84.38	15.74	80.50	17.22	52.32
24-May-11 11:37:00	1170.66	246.25	197.23	84.65	15.77	80.20	17.27	61.34
24-May-11 11:38:00	1167.98	246.32	197.35	84.88	15.75	79.95	17.30	61.55
24-May-11 11:39:00	1169.89	246.34	197.42	85.03	15.73	80.20	17.30	56.20
24-May-11 11:40:00	1167.91	246.40	197.49	85.18	15.75	80.13	17.31	57.21
24-May-11 11:41:00	1166.57	246.43	197.45	85.10	15.77	79.67	17.31	57.72
24-May-11 11:42:00	1165.99	246.43	197.87	85.12	15.75	79.45	17.38	190.08
24-May-11 11:43:00	1172.66	246.49	197.96	85.18	15.74	80.38	17.51	361.01
24-May-11 11:44:00	1173.77	246.57	197.98	85.03	15.73	80.61	17.48	216.03
24-May-11 11:45:00	1173.06	246.45	198.33	84.98	15.74	80.65	17.41	126.46

	O2 (WGS CEMS) (% by vol, dry) 317AH107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3							
24-May-11 10:56:00	0.48	368.28	80449.93	77557.04	27000.85	52595.40	180.68
24-May-11 10:57:00	0.72	369.05	80709.39	77370.07	26871.95	52599.90	181.26
24-May-11 10:58:00	0.74	369.50	80877.30	77736.80	26840.71	52587.51	180.80
24-May-11 10:59:00	0.75	369.26	80980.60	77864.65	26845.39	52553.84	180.00
24-May-11 11:00:00	0.78	369.00	80923.64	78000.64	26812.89	52556.47	179.42
24-May-11 11:01:00	0.81	368.88	80855.93	77967.27	26786.12	52547.30	179.69
24-May-11 11:02:00	0.80	369.66	80840.14	77924.55	26864.70	52582.27	179.52
24-May-11 11:03:00	0.79	369.19	81010.94	77906.62	26789.08	52638.82	179.54
24-May-11 11:04:00	0.77	369.27	80908.19	78024.05	26821.62	52586.66	178.95
24-May-11 11:05:00	0.80	368.52	80925.99	77935.20	26738.57	52577.19	180.13
24-May-11 11:06:00	0.78	367.01	80761.67	77959.25	26656.40	52589.80	179.72
24-May-11 11:07:00	0.64	365.89	80429.53	77808.21	26798.22	52581.36	180.24
24-May-11 11:08:00	0.41	368.21	80178.32	77491.62	27159.94	52544.72	180.54
24-May-11 11:09:00	0.66	367.79	80693.08	77138.29	26836.91	52581.50	182.38
24-May-11 11:10:00	0.68	368.16	80599.03	77696.05	26842.18	52655.92	181.04
24-May-11 11:11:00	0.62	369.48	80683.26	77604.28	26942.94	52697.79	180.90
24-May-11 11:12:00	0.67	369.29	80972.14	77623.72	26831.74	52698.59	180.86
24-May-11 11:13:00	0.67	368.54	80930.54	77874.81	26766.05	52666.14	180.23
24-May-11 11:14:00	0.75	368.57	80766.57	77847.60	26790.61	52677.94	180.63
24-May-11 11:15:00	0.66	367.82	80773.00	77786.33	26780.65	52571.09	180.97
24-May-11 11:16:00	0.59	367.20	80606.90	77720.00	26778.84	52436.53	180.85
24-May-11 11:17:00	0.65	367.10	80472.18	77518.42	26751.32	52459.90	181.59
24-May-11 11:18:00	0.57	366.76	80449.71	77436.48	26851.60	52511.72	181.17
24-May-11 11:19:00	0.44	366.88	80375.37	77438.95	27039.25	52651.85	181.54
24-May-11 11:20:00	0.39	366.33	80401.14	77332.13	26931.69	52769.81	181.64
24-May-11 11:21:00	0.52	366.42	80280.66	77262.93	26822.31	52682.40	181.13
24-May-11 11:22:00	0.53	366.37	80301.76	77192.23	26813.01	52662.61	181.25
24-May-11 11:23:00	0.56	367.76	80289.79	77236.81	26934.86	52705.19	180.88
24-May-11 11:24:00	0.51	367.51	80595.74	77260.34	26891.43	52583.62	180.84
24-May-11 11:25:00	0.55	366.89	80541.03	77486.83	26820.01	52449.66	180.96
24-May-11 11:26:00	0.57	366.37	80403.15	77457.50	26769.94	52424.04	180.84
24-May-11 11:27:00	0.64	367.17	80273.88	77369.89	26858.73	52476.41	180.87
24-May-11 11:28:00	0.65	366.24	80462.51	77336.41	26765.33	52517.92	180.99
24-May-11 11:29:00	0.56	366.03	80253.83	77488.53	26780.26	52626.72	180.74
24-May-11 11:30:00	0.56	366.40	80216.02	77204.20	26852.65	52790.99	181.35
24-May-11 11:31:00	0.54	367.93	80297.33	77229.91	27102.60	52730.11	181.32
24-May-11 11:32:00	0.42	368.73	80632.81	77356.84	27074.27	52648.56	180.89
24-May-11 11:33:00	0.58	367.30	80807.99	77490.12	26791.75	52554.30	180.71
24-May-11 11:34:00	0.67	367.84	80494.02	77712.61	26790.45	52427.88	179.67
24-May-11 11:35:00	0.67	367.69	80611.44	77476.13	26755.66	52476.49	180.58
24-May-11 11:36:00	0.67	365.75	80579.66	77572.67	26614.18	52623.57	180.65
24-May-11 11:37:00	0.66	365.86	80155.16	77538.22	26683.26	52684.29	180.75
24-May-11 11:38:00	0.63	367.24	80170.16	77178.47	26820.89	52681.63	181.66
24-May-11 11:39:00	0.54	366.68	80480.30	77171.86	26802.55	52704.35	180.99
24-May-11 11:40:00	0.53	366.30	80355.62	77387.98	26788.15	52586.86	180.01
24-May-11 11:41:00	0.51	365.37	80274.40	77269.24	26731.34	52506.15	180.56
24-May-11 11:42:00	0.46	365.37	80071.62	77173.18	26841.87	52553.77	181.13
24-May-11 11:43:00	0.31	366.79	80071.93	77012.62	27164.61	52572.51	181.39
24-May-11 11:44:00	0.31	366.12	80382.65	77001.29	27059.67	52576.49	181.86
24-May-11 11:45:00	0.40	366.41	80235.69	77268.54	26962.09	52508.48	180.82

Scrubbing Liquid		Pump Pressure	Aggio-Filtering Module (AFM)		Stripped Sour Water	Carrying Air	Air to Rings		#1 Stand Pipe Aeration
Upper Circulation (psig)	317P1105B	Lower Circulation (psig)	317P1108	and Cyclolabs Pressure (in. H2O)	317FC202	317FC115	317E113	317E113	317E1105
Run 3									
24-May-11 11:46:00	77.72	43.17	21.81	120	254.50	89.94	1148.98		
24-May-11 11:47:00	77.68	43.13	21.59	120	254.73	89.85	1147.96		
24-May-11 11:48:00	77.65	43.03	21.64	120	254.79	89.94	1146.35		
24-May-11 11:49:00	77.60	43.08	21.69	121	254.67	89.53	1142.97		
24-May-11 11:50:00	77.70	43.04	21.56	120	254.89	89.63	1139.98		
24-May-11 11:51:00	77.85	43.07	21.47	120	254.40	90.01	1141.74		
24-May-11 11:52:00	77.91	43.16	21.72	120	254.16	89.96	1139.12		
24-May-11 11:53:00	77.95	43.23	21.92	121	254.59	89.41	1138.35		
24-May-11 11:54:00	78.02	43.20	21.59	120	252.96	90.04	1141.73		
24-May-11 11:55:00	77.95	43.17	21.57	120	253.40	90.21	1146.35		
24-May-11 11:56:00	78.13	43.15	21.52	120	254.94	89.68	1146.39		
24-May-11 11:57:00	78.22	43.17	21.42	120	253.99	89.96	1146.16		
24-May-11 11:58:00	78.19	43.20	21.62	120	253.67	90.14	1144.56		
24-May-11 11:59:00	78.10	43.08	21.63	121	254.12	89.96	1144.88		
24-May-11 12:00:00	77.99	43.04	21.70	121	255.74	89.05	1142.60		
24-May-11 12:01:00	77.87	43.01	21.73	121	254.59	89.55	1135.87		
24-May-11 12:02:00	78.03	42.98	21.83	121	255.26	89.35	1138.38		
24-May-11 12:03:00	77.99	42.98	21.83	120	253.92	89.86	1150.10		
24-May-11 12:04:00	77.98	42.99	21.83	120	254.63	89.46	1149.17		
24-May-11 12:05:00	77.93	43.11	21.80	119	255.31	89.05	1145.17		
24-May-11 12:06:00	77.87	43.06	21.52	120	254.77	89.31	1140.21		
24-May-11 12:07:00	77.90	42.93	21.77	120	255.47	89.41	1149.34		
24-May-11 12:08:00	77.75	42.85	21.61	120	255.18	89.55	1146.78		
24-May-11 12:09:00	78.01	42.83	21.67	121	255.12	89.71	1147.14		
24-May-11 12:10:00	78.11	42.92	21.66	121	254.07	90.25	1145.55		
24-May-11 12:11:00	78.12	42.95	21.66	120	253.55	90.47	1146.24		
24-May-11 12:12:00	78.05	42.89	21.70	121	254.65	89.95	1148.19		
24-May-11 12:13:00	78.19	42.94	21.77	120	254.92	89.82	1145.81		
24-May-11 12:14:00	78.21	42.99	21.78	120	256.54	89.05	1145.65		
24-May-11 12:15:00	77.99	43.07	21.76	121	255.68	89.59	1147.52		
24-May-11 12:16:00	77.88	43.00	21.75	120	253.80	90.37	1144.68		
24-May-11 12:17:00	77.91	42.86	21.68	120	253.42	90.26	1141.15		
24-May-11 12:18:00	78.03	42.82	21.50	120	254.26	89.82	1137.81		
24-May-11 12:19:00	77.99	42.90	21.38	120	252.93	90.24	1142.71		
24-May-11 12:20:00	77.93	42.97	21.45	120	253.18	90.01	1141.01		
24-May-11 12:21:00	77.92	43.13	21.62	120	252.99	90.21	1141.78		
24-May-11 12:22:00	78.01	43.06	21.84	121	255.69	89.39	1143.83		
24-May-11 12:23:00	77.96	42.97	21.55	120	254.09	90.02	1144.93		
24-May-11 12:24:00	77.91	42.99	21.66	120	255.44	89.83	1147.20		
24-May-11 12:25:00	77.94	42.95	21.58	121	254.81	89.96	1142.97		
24-May-11 12:26:00	77.80	42.93	21.40	121	255.04	89.96	1141.46		
24-May-11 12:27:00	77.78	42.89	21.68	120	254.39	90.15	1145.51		
24-May-11 12:28:00	77.87	42.98	21.85	120	254.15	90.14	1144.49		
24-May-11 12:29:00	78.09	42.99	21.53	120	253.65	90.21	1140.82		
24-May-11 12:30:00	78.06	42.93	21.58	120	253.51	90.10	1135.04		
24-May-11 12:31:00	78.01	42.90	21.66	120	252.65	90.49	1141.06		
24-May-11 12:32:00	77.85	42.82	21.60	121	254.60	89.83	1141.86		
24-May-11 12:33:00	78.05	42.76	21.59	121	254.64	89.95	1141.59		
24-May-11 12:34:00	77.99	42.83	21.64	120	255.25	89.63	1143.45		
24-May-11 12:35:00	77.81	42.87	21.77	120	256.10	89.33	1141.23		
24-May-11 12:36:00	77.88	42.85	21.58	120	253.65	90.31	1140.06		
24-May-11 12:37:00	77.95	42.89	21.50	120	251.29	91.40	1138.07		
24-May-11 12:38:00	78.07	42.87	21.66	120	254.07	90.39	1134.91		
77.88	42.78	21.82	120.74	256.22	89.80	1142.41			

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317E1106	Air to Regen Temp B-1 Outlet (oF) 317T11112	Tempered Air Temp (oF) 317T11120	Ambient Air Temp (oF) DWSAT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317A1109	CO (WGS CEMS) (ppmv, dry) 317A111
Run 3							
24-May-11 11:46:00	1172.53	198.25	84.88	15.75	80.56	17.36	86.95
24-May-11 11:47:00	1171.38	197.92	84.80	15.73	80.37	17.33	86.58
24-May-11 11:48:00	1169.33	198.01	84.78	15.75	80.08	17.32	85.91
24-May-11 11:49:00	1166.17	197.77	84.68	15.68	79.70	17.32	86.23
24-May-11 11:50:00	1162.85	197.59	84.60	15.72	79.32	17.36	85.06
24-May-11 11:51:00	1165.54	197.66	84.68	15.77	79.51	17.34	88.39
24-May-11 11:52:00	1165.75	197.70	84.88	15.75	79.66	17.32	85.25
24-May-11 11:53:00	1163.55	197.56	85.08	15.70	79.50	17.35	71.72
24-May-11 11:54:00	1164.31	197.53	85.28	15.72	79.37	17.41	104.68
24-May-11 11:55:00	1170.26	197.59	85.48	15.71	80.16	17.47	166.69
24-May-11 11:56:00	1169.71	197.61	85.60	15.69	80.27	17.46	182.83
24-May-11 11:57:00	1169.89	197.72	85.60	15.70	80.38	17.41	130.05
24-May-11 11:58:00	1168.87	197.98	85.53	15.70	80.31	17.35	80.84
24-May-11 11:59:00	1168.66	198.18	85.43	15.71	80.16	17.35	78.40
24-May-11 12:00:00	1166.59	198.57	85.40	15.66	79.90	17.37	88.23
24-May-11 12:01:00	1159.92	198.85	85.38	15.70	79.10	17.35	83.53
24-May-11 12:02:00	1161.73	199.33	85.23	15.70	78.49	17.31	64.52
24-May-11 12:03:00	1175.99	199.32	85.18	15.73	79.47	17.32	68.73
24-May-11 12:04:00	1172.32	199.42	85.10	15.70	79.95	17.31	64.70
24-May-11 12:05:00	1167.35	199.55	85.10	15.72	79.51	17.33	71.00
24-May-11 12:06:00	1164.08	199.55	85.17	15.70	79.35	17.34	82.88
24-May-11 12:07:00	1174.49	199.50	85.27	15.73	80.08	17.41	171.43
24-May-11 12:08:00	1170.46	199.38	85.30	15.71	80.33	17.46	226.01
24-May-11 12:09:00	1170.35	199.40	85.35	15.72	80.40	17.36	107.62
24-May-11 12:10:00	1168.94	199.36	85.32	15.78	80.31	17.32	87.34
24-May-11 12:11:00	1169.90	199.01	85.48	15.77	80.09	17.32	75.93
24-May-11 12:12:00	1171.19	198.79	85.68	15.74	80.02	17.33	73.68
24-May-11 12:13:00	1168.64	198.72	85.73	15.73	79.91	17.34	71.66
24-May-11 12:14:00	1168.24	198.84	85.70	15.71	79.87	17.31	68.44
24-May-11 12:15:00	1170.19	198.73	85.72	15.76	80.18	17.29	64.31
24-May-11 12:16:00	1168.14	198.35	85.87	15.80	80.08	17.26	53.54
24-May-11 12:17:00	1165.19	198.27	85.97	15.74	79.50	17.27	58.58
24-May-11 12:18:00	1160.54	198.03	86.07	15.74	79.04	17.37	126.68
24-May-11 12:19:00	1166.66	197.63	86.08	15.73	79.72	17.49	210.70
24-May-11 12:20:00	1164.75	197.53	85.92	15.72	79.64	17.44	156.53
24-May-11 12:21:00	1165.11	197.73	85.80	15.75	79.52	17.37	109.98
24-May-11 12:22:00	1166.40	197.67	85.80	15.71	79.62	17.32	74.96
24-May-11 12:23:00	1167.45	197.75	85.80	15.73	79.81	17.31	75.92
24-May-11 12:24:00	1169.94	198.14	85.80	15.76	79.94	17.28	65.14
24-May-11 12:25:00	1166.50	198.34	85.80	15.71	79.72	17.30	72.00
24-May-11 12:26:00	1164.95	198.53	85.82	15.73	79.55	17.28	63.74
24-May-11 12:27:00	1168.85	198.77	85.90	15.74	79.81	17.27	61.05
24-May-11 12:28:00	1168.16	198.79	85.82	15.72	79.68	17.27	60.27
24-May-11 12:29:00	1164.29	198.95	85.60	15.76	79.16	17.29	66.86
24-May-11 12:30:00	1157.30	198.70	85.40	15.74	78.64	17.31	113.83
24-May-11 12:31:00	1164.30	198.57	85.55	15.72	79.24	17.45	268.42
24-May-11 12:32:00	1164.78	198.60	85.80	15.71	79.37	17.49	308.50
24-May-11 12:33:00	1165.77	198.69	86.07	15.74	79.50	17.39	152.14
24-May-11 12:34:00	1168.00	198.77	86.18	15.70	79.68	17.32	77.16
24-May-11 12:35:00	1164.51	198.99	86.43	15.73	79.52	17.31	71.47
24-May-11 12:36:00	1163.36	199.34	86.42	15.74	79.20	17.28	61.64
24-May-11 12:37:00	1160.51	199.18	86.22	15.77	78.93	17.25	55.04
24-May-11 12:38:00	1157.47	198.94	86.03	15.72	78.66	17.27	70.30
Run 3							
1166.43	245.23	197.70	83.30	15.72	79.79	17.28	80.42

Dioxins/Furans/Speciated Semi-VOHAPs

5/23/2011 10:25
5/23/2011 14:31

1m

Run 1	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FH113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FH105
23-May-11 10:25:00	77.94	42.09	21.64	121	255.16	89.75	1134.04
23-May-11 10:26:00	77.87	41.85	21.49	120	255.05	89.66	1138.90
23-May-11 10:27:00	77.83	42.01	21.42	120	254.43	89.92	1140.05
23-May-11 10:28:00	77.64	42.21	21.64	121	256.47	88.88	1137.66
23-May-11 10:29:00	77.60	42.26	21.47	121	254.54	89.72	1133.52
23-May-11 10:30:00	77.83	42.14	21.62	121	254.74	89.66	1138.06
23-May-11 10:31:00	77.83	42.00	21.64	120	253.65	90.07	1137.19
23-May-11 10:32:00	77.81	42.18	21.72	120	256.71	88.83	1138.16
23-May-11 10:33:00	77.82	41.86	21.61	120	256.49	89.05	1138.87
23-May-11 10:34:00	77.81	41.92	21.73	120	255.05	89.82	1141.52
23-May-11 10:35:00	77.74	42.03	21.57	120	253.94	89.96	1141.38
23-May-11 10:36:00	77.72	41.90	21.51	121	255.24	89.37	1132.98
23-May-11 10:37:00	77.74	41.83	21.58	120	255.44	89.42	1132.07
23-May-11 10:38:00	77.78	42.04	21.60	121	254.79	89.71	1137.58
23-May-11 10:39:00	77.83	42.27	21.65	120	257.19	88.85	1140.85
23-May-11 10:40:00	77.69	42.02	21.28	120	254.05	89.89	1132.79
23-May-11 10:41:00	77.63	42.02	21.41	120	253.92	89.86	1129.63
23-May-11 10:42:00	77.76	42.16	21.61	120	254.74	89.79	1140.98
23-May-11 10:43:00	77.79	42.38	21.68	121	257.80	88.46	1136.52
23-May-11 10:44:00	77.97	42.11	21.67	120	257.67	88.61	1137.78
23-May-11 10:45:00	77.92	42.19	21.33	120	254.29	90.26	1137.27
23-May-11 10:46:00	77.65	42.23	21.47	121	256.05	89.32	1136.12
23-May-11 10:47:00	77.65	42.17	21.64	121	256.23	88.71	1134.20
23-May-11 10:48:00	77.84	42.03	21.73	120	257.27	88.47	1135.38
23-May-11 10:49:00	77.85	42.06	21.68	120	257.30	88.72	1134.00
23-May-11 10:50:00	77.82	42.09	21.71	121	257.28	88.92	1137.35
23-May-11 10:51:00	77.99	42.09	21.55	120	256.10	89.59	1138.98
23-May-11 10:52:00	77.98	42.31	21.77	120	257.06	89.19	1136.19
23-May-11 10:53:00	77.91	42.08	22.06	120	258.06	88.45	1134.65
23-May-11 10:54:00	77.86	42.12	21.96	119	257.61	88.72	1143.53
23-May-11 10:55:00	77.90	42.30	21.75	120	257.30	89.15	1139.20
23-May-11 10:56:00	77.73	42.33	21.58	120	257.65	89.14	1138.03
23-May-11 10:57:00	77.70	42.06	21.63	120	258.42	88.68	1138.88
23-May-11 10:58:00	77.79	42.14	21.73	119	256.67	89.39	1139.73
23-May-11 10:59:00	77.97	42.15	21.88	120	258.30	88.59	1142.09
23-May-11 11:00:00	77.92	42.05	21.91	120	258.33	88.64	1136.79
23-May-11 11:01:00	77.94	41.97	21.76	119	256.58	89.21	1124.71
23-May-11 11:02:00	77.80	41.79	21.84	120	258.93	88.29	1128.05
23-May-11 11:03:00	77.56	41.88	21.85	120	257.24	88.96	1132.88
23-May-11 11:04:00	77.64	41.94	21.95	120	257.52	88.83	1137.15
23-May-11 11:05:00	77.80	41.77	21.75	121	257.35	88.58	1133.82
23-May-11 11:06:00	77.81	41.64	21.63	120	258.80	88.07	1137.62
23-May-11 11:07:00	77.78	41.57	21.71	120	258.71	88.27	1141.24
23-May-11 11:08:00	77.95	42.13	21.61	121	257.77	88.90	1142.75
23-May-11 11:09:00	77.82	42.10	21.68	120	258.54	88.52	1142.62
23-May-11 11:10:00	77.63	41.80	21.64	119	257.68	88.73	1138.73
23-May-11 11:11:00	77.85	42.12	21.84	120	257.52	88.77	1135.70
23-May-11 11:12:00	77.85	41.97	21.59	120	257.99	88.78	1135.91
23-May-11 11:13:00	77.94	41.85	21.36	119	257.07	88.96	1138.56
23-May-11 11:14:00	77.93	42.05	21.38	120	256.77	88.90	1144.63
23-May-11 11:15:00	77.96	42.10	21.58	120	254.50	89.55	1144.62

Dioxins/Furans/Speci:

	Run 1							
	#2 Stand Pipe Aeration Air to Regen (lbs/min)	Air to Regen Temp B-1 Outlet (oF)	Tempered Air Temp (oF)	Ambient Air Temp (oF)	Air to Regen Pressure Blower Discharge (psig)	Plant Air to 45lb Air (psig)	CO2 (WGS CEMS) (% by vol. dry)	CO (WGS CEMS) (ppmv, dry)
	317FI106	317TH112	317TH120	DWS AT	317PC039	317PC088	317AI109	317AI111
23-May-11 10:25:00	1157.12	243.68	196.04	83.68	15.69	78.27	17.26	56.89
23-May-11 10:26:00	1160.73	243.30	196.07	83.80	15.68	78.29	17.28	61.10
23-May-11 10:27:00	1162.39	243.30	195.74	83.78	15.69	78.23	17.27	60.30
23-May-11 10:28:00	1158.74	243.35	195.33	83.53	15.67	77.95	17.26	62.16
23-May-11 10:29:00	1157.32	243.31	195.24	83.20	15.73	78.02	17.30	69.83
23-May-11 10:30:00	1163.01	243.25	194.93	82.92	15.70	78.39	17.36	155.06
23-May-11 10:31:00	1158.83	243.35	194.62	82.73	15.69	78.43	17.45	239.26
23-May-11 10:32:00	1159.93	243.31	194.63	82.63	15.63	78.51	17.36	105.12
23-May-11 10:33:00	1161.66	243.25	194.49	82.60	15.67	78.72	17.33	88.63
23-May-11 10:34:00	1162.09	243.35	194.47	82.60	15.70	78.70	17.26	63.86
23-May-11 10:35:00	1160.67	243.31	194.37	82.60	15.67	78.49	17.25	60.47
23-May-11 10:36:00	1154.67	243.29	193.85	82.60	15.64	78.07	17.29	71.27
23-May-11 10:37:00	1154.52	243.47	193.79	82.70	15.67	77.87	17.32	77.90
23-May-11 10:38:00	1161.04	243.41	193.89	82.92	15.65	78.23	17.27	63.92
23-May-11 10:39:00	1163.31	243.36	193.97	83.00	15.66	78.13	17.27	64.64
23-May-11 10:40:00	1154.71	243.30	193.92	83.00	15.69	77.60	17.27	66.11
23-May-11 10:41:00	1151.08	243.19	194.07	82.93	15.68	77.25	17.24	64.67
23-May-11 10:42:00	1163.13	243.25	194.03	82.90	15.67	77.70	17.39	156.14
23-May-11 10:43:00	1160.05	243.40	194.12	82.90	15.59	78.36	17.47	218.87
23-May-11 10:44:00	1159.94	243.59	194.43	82.90	15.68	78.60	17.36	115.86
23-May-11 10:45:00	1159.93	243.80	194.64	82.90	15.73	78.72	17.24	74.83
23-May-11 10:46:00	1158.89	243.93	194.61	82.97	15.67	78.62	17.20	61.11
23-May-11 10:47:00	1157.27	243.91	194.81	83.07	15.64	78.39	17.28	70.96
23-May-11 10:48:00	1159.37	243.86	195.11	83.10	15.63	78.37	17.24	57.43
23-May-11 10:49:00	1157.55	243.91	195.06	83.17	15.64	78.27	17.22	54.40
23-May-11 10:50:00	1159.62	243.83	195.20	83.28	15.61	78.16	17.19	52.33
23-May-11 10:51:00	1161.57	243.86	195.56	83.45	15.63	78.00	17.19	52.94
23-May-11 10:52:00	1157.98	243.94	195.77	83.40	15.61	77.89	17.19	53.46
23-May-11 10:53:00	1158.00	243.92	195.72	83.42	15.59	78.07	17.22	60.91
23-May-11 10:54:00	1167.99	243.89	195.64	83.43	15.61	78.67	17.33	104.33
23-May-11 10:55:00	1162.71	243.87	195.76	83.40	15.63	78.95	17.41	141.44
23-May-11 10:56:00	1161.86	243.67	195.69	83.40	15.64	78.89	17.30	86.87
23-May-11 10:57:00	1161.83	243.56	195.80	83.40	15.61	78.84	17.26	68.19
23-May-11 10:58:00	1162.35	243.37	195.63	83.40	15.67	78.80	17.23	61.90
23-May-11 10:59:00	1162.94	243.22	195.25	83.32	15.60	78.46	17.20	56.31
23-May-11 11:00:00	1159.54	243.21	195.21	83.17	15.63	77.75	17.23	58.57
23-May-11 11:01:00	1148.30	243.21	195.05	82.92	15.64	76.97	17.19	52.76
23-May-11 11:02:00	1149.28	243.07	194.70	82.78	15.59	77.06	17.17	51.60
23-May-11 11:03:00	1153.06	242.67	194.40	82.63	15.62	77.94	17.19	54.75
23-May-11 11:04:00	1156.55	242.55	194.09	82.53	15.61	78.29	17.12	48.09
23-May-11 11:05:00	1155.07	242.61	193.98	82.43	15.61	78.36	17.13	48.83
23-May-11 11:06:00	1159.30	242.70	193.81	82.38	15.57	78.41	17.22	82.17
23-May-11 11:07:00	1164.38	242.60	193.68	82.30	15.59	79.15	17.31	116.63
23-May-11 11:08:00	1164.90	242.69	193.76	82.32	15.61	79.31	17.15	65.63
23-May-11 11:09:00	1164.64	242.75	194.08	82.42	15.56	79.26	17.09	52.15
23-May-11 11:10:00	1160.74	242.87	194.16	82.63	15.57	78.95	17.07	49.31
23-May-11 11:11:00	1157.44	242.96	194.47	82.70	15.56	78.62	17.06	46.93
23-May-11 11:12:00	1158.97	243.17	194.86	82.77	15.60	78.62	17.10	48.01
23-May-11 11:13:00	1161.99	243.21	194.85	82.82	15.63	78.76	17.09	46.50
23-May-11 11:14:00	1167.55	243.21	194.90	82.98	15.64	79.02	17.08	45.83
23-May-11 11:15:00	1168.32	243.25	194.90	83.18	15.63	79.03	17.11	46.79

Dioxins/Furans/Speci:

5/23/2011 10:25
5/23/2011 14:31

1m

O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsdcm) - Oa 317C_dryair	Vol Reg FG (dsdcm) - Qr 317C_flegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 1						
23-May-11 10:25:00	367.49	80616.18	77352.61	26783.98	51804.29	181.52
23-May-11 10:26:00	367.48	80536.46	77604.36	26785.02	51769.12	182.25
23-May-11 10:27:00	367.19	80532.54	77604.74	26755.98	51759.90	181.47
23-May-11 10:28:00	367.02	80469.28	77585.32	26735.25	51723.49	180.84
23-May-11 10:29:00	367.83	80433.55	77497.32	26877.65	51657.66	180.57
23-May-11 10:30:00	367.21	80609.27	77393.53	26913.90	51637.99	181.45
23-May-11 10:31:00	367.08	80473.84	77628.69	27054.15	51645.62	181.38
23-May-11 10:32:00	366.42	80445.34	77490.37	26882.84	51680.59	180.94
23-May-11 10:33:00	367.91	80300.66	77347.78	26951.15	51641.21	182.53
23-May-11 10:34:00	368.23	80626.99	77183.23	26865.56	51515.97	182.99
23-May-11 10:35:00	367.64	80697.14	77549.69	26784.78	51483.83	181.64
23-May-11 10:36:00	366.44	80567.55	77683.73	26743.46	51504.79	181.85
23-May-11 10:37:00	367.21	80305.53	77569.46	26859.41	51590.96	182.27
23-May-11 10:38:00	367.35	80473.92	77277.84	26794.83	51675.33	182.09
23-May-11 10:39:00	367.20	80504.38	77472.73	26755.20	51677.34	180.79
23-May-11 10:40:00	368.56	80473.03	77547.27	26871.82	51678.06	181.40
23-May-11 10:41:00	366.55	80769.69	77501.69	26653.97	51647.00	182.11
23-May-11 10:42:00	366.50	80329.48	77879.49	26899.77	51607.25	180.14
23-May-11 10:43:00	367.11	80317.85	77357.05	27122.92	51530.16	180.15
23-May-11 10:44:00	368.56	80452.56	77158.49	27059.86	51483.43	181.91
23-May-11 10:45:00	368.85	80769.17	77294.11	26846.49	51516.11	181.28
23-May-11 10:46:00	367.47	80832.78	77797.18	26654.82	51488.95	180.34
23-May-11 10:47:00	367.69	80531.46	77936.11	26835.11	51529.21	179.70
23-May-11 10:48:00	367.19	80579.94	77485.44	26756.13	51607.38	181.60
23-May-11 10:49:00	367.97	80469.29	77483.99	26783.87	51540.87	181.36
23-May-11 10:50:00	368.33	80640.58	77389.88	26756.14	51527.76	181.59
23-May-11 10:51:00	368.32	80720.70	77609.21	26720.14	51514.24	181.00
23-May-11 10:52:00	367.91	80717.01	7774.08	26700.06	51503.15	179.50
23-May-11 10:53:00	368.28	80628.03	77743.27	26786.09	51539.14	180.56
23-May-11 10:54:00	368.44	80708.63	77623.64	26946.15	51525.63	180.86
23-May-11 10:55:00	368.50	80743.48	77767.33	27049.71	51604.46	179.76
23-May-11 10:56:00	368.74	80757.54	77854.04	26918.18	51670.97	179.25
23-May-11 10:57:00	369.09	80809.38	77787.49	26886.42	51651.44	180.82
23-May-11 10:58:00	369.32	80886.95	77825.30	26861.19	51718.77	180.34
23-May-11 10:59:00	368.51	80935.68	77882.28	26772.07	51678.32	180.02
23-May-11 11:00:00	369.22	80758.66	77929.26	26847.46	51644.35	180.26
23-May-11 11:01:00	369.16	80915.34	77798.90	26782.42	51628.30	180.85
23-May-11 11:02:00	368.22	80901.17	77959.86	26690.35	51560.25	181.74
23-May-11 11:03:00	369.32	80695.06	77943.11	26832.67	51583.85	181.11
23-May-11 11:04:00	368.68	80937.66	77632.18	26684.85	51514.65	181.79
23-May-11 11:05:00	368.74	80796.08	77870.68	26695.85	51470.76	181.84
23-May-11 11:06:00	368.32	80808.99	77741.40	26805.97	51545.77	182.70
23-May-11 11:07:00	369.13	80717.28	77770.50	26980.68	51576.72	183.10
23-May-11 11:08:00	369.39	80896.05	77682.65	26804.51	51584.51	180.56
23-May-11 11:09:00	369.17	80951.71	77750.59	26640.26	51578.46	180.65
23-May-11 11:10:00	369.24	80903.16	77972.79	26606.71	51554.27	181.65
23-May-11 11:11:00	368.44	80919.38	77968.00	26551.08	51539.49	180.00
23-May-11 11:12:00	368.47	80743.16	77927.74	26614.61	51707.18	180.69
23-May-11 11:13:00	368.96	80749.40	77739.62	26622.05	51801.21	181.61
23-May-11 11:14:00	368.48	80858.82	77814.29	26563.38	51688.13	180.82
23-May-11 11:15:00	367.98	80753.03	77935.85	26606.30	51614.18	179.94

Run 1	Scrubbing Liquid		Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
	Upper Circulation (psig) 317P1105B	Lower Circulation (psig) 317P1108						
23-May-11 11:16:00	77.89	42.16	21.60	120	255.30	89.17	1139.98	
23-May-11 11:17:00	77.75	41.97	21.64	120	256.05	88.54	1137.01	
23-May-11 11:18:00	77.67	41.96	21.48	120	255.70	88.81	1147.40	
23-May-11 11:19:00	77.76	42.06	21.41	121	254.11	89.62	1142.22	
23-May-11 11:20:00	77.66	42.10	21.42	121	254.95	89.15	1137.52	
23-May-11 11:21:00	77.87	42.08	21.22	120	255.18	89.34	1136.75	
23-May-11 11:22:00	77.91	41.75	21.42	120	255.66	89.31	1140.31	
23-May-11 11:23:00	77.79	41.79	21.50	121	256.26	89.01	1143.10	
23-May-11 11:24:00	77.85	42.08	21.59	121	256.39	89.00	1140.78	
23-May-11 11:25:00	77.70	42.29	21.61	120	255.99	89.14	1138.83	
23-May-11 11:26:00	77.80	42.09	21.57	120	254.37	89.77	1143.99	
23-May-11 11:27:00	77.84	41.70	21.70	120	255.98	89.13	1147.61	
23-May-11 11:28:00	77.67	41.86	21.68	119	256.10	88.83	1144.46	
23-May-11 11:29:00	77.84	41.91	21.50	120	255.71	88.78	1141.95	
23-May-11 11:30:00	77.98	42.18	21.45	119	256.83	88.57	1148.47	
23-May-11 11:31:00	77.92	42.06	21.58	120	256.56	88.76	1142.52	
23-May-11 11:32:00	77.92	42.33	21.36	120	255.82	88.84	1144.07	
23-May-11 11:33:00	77.82	42.16	21.32	119	255.52	88.77	1145.53	
23-May-11 11:34:00	77.90	42.27	21.68	120	256.18	88.73	1145.32	
23-May-11 11:35:00	77.94	42.02	21.71	120	257.04	88.50	1143.73	
23-May-11 11:36:00	77.78	42.11	21.48	120	256.56	88.52	1141.36	
23-May-11 11:37:00	77.67	42.15	21.48	120	257.36	88.33	1140.10	
23-May-11 11:38:00	77.86	42.14	21.62	120	255.75	88.99	1147.36	
23-May-11 11:39:00	77.95	42.16	21.66	120	255.39	89.08	1149.37	
23-May-11 11:40:00	77.90	41.99	21.64	120	256.20	88.80	1138.38	
23-May-11 11:41:00	77.87	41.76	21.66	121	256.74	88.58	1136.64	
23-May-11 11:42:00	77.66	41.93	21.58	119	255.71	89.01	1148.85	
23-May-11 11:43:00	77.65	42.11	21.63	120	255.05	89.19	1142.42	
23-May-11 11:44:00	77.66	41.92	21.60	120	256.66	88.46	1142.59	
23-May-11 11:45:00	77.93	41.84	21.68	119	256.20	88.76	1141.68	
23-May-11 11:46:00	77.80	41.95	21.72	119	256.48	89.17	1141.54	
23-May-11 11:47:00	77.82	42.20	21.86	120	259.28	88.06	1141.03	
23-May-11 11:48:00	77.91	42.13	21.67	121	258.11	88.49	1140.90	
23-May-11 11:49:00	77.85	41.56	21.87	120	258.65	88.12	1139.23	
23-May-11 11:50:00	77.82	41.48	21.65	120	257.85	88.79	1143.90	
23-May-11 11:51:00	77.91	41.89	21.63	120	257.67	88.66	1147.58	
23-May-11 11:52:00	77.87	41.83	21.52	120	254.79	89.61	1137.41	
23-May-11 11:53:00	77.84	42.18	21.74	120	256.71	88.82	1132.79	
23-May-11 11:54:00	77.95	41.80	21.67	120	257.37	88.67	1136.73	
23-May-11 11:55:00	77.96	41.77	21.63	121	257.44	88.70	1141.02	
23-May-11 11:56:00	77.87	42.10	21.62	120	258.49	88.37	1140.59	
23-May-11 11:57:00	77.92	42.10	21.55	120	257.39	89.05	1140.43	
23-May-11 11:58:00	77.82	42.07	21.57	120	257.03	89.12	1141.17	
23-May-11 11:59:00	77.85	42.04	21.47	119	256.59	89.23	1140.96	
23-May-11 12:00:00	77.91	42.03	21.56	120	256.20	89.53	1139.20	
23-May-11 12:01:00	77.99	42.06	21.71	120	257.07	89.01	1132.37	
23-May-11 12:02:00	77.95	41.91	21.75	121	255.84	89.34	1128.80	
23-May-11 12:03:00	77.86	42.04	21.60	121	255.95	89.28	1128.36	
23-May-11 12:04:00	77.77	42.46	21.49	121	256.96	88.70	1133.15	
23-May-11 12:05:00	77.87	42.29	21.46	120	256.28	88.62	1133.47	

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TH112	Tempered Air Temp (oF) 317TH1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
23-May-11 11:16:00	1162.11	243.35	194.86	83.30	15.64	78.59	17.14	48.31
23-May-11 11:17:00	1160.58	243.31	194.84	83.37	15.62	78.52	17.19	53.07
23-May-11 11:18:00	1172.26	243.21	195.00	83.47	15.61	79.14	17.27	95.44
23-May-11 11:19:00	1165.99	243.38	194.91	83.48	15.61	79.36	17.36	136.34
23-May-11 11:20:00	1161.29	243.84	195.09	83.32	15.61	79.06	17.27	79.46
23-May-11 11:21:00	1160.16	244.07	195.61	83.13	15.64	78.80	17.22	67.13
23-May-11 11:22:00	1162.47	244.45	196.00	83.03	15.65	78.86	17.16	51.64
23-May-11 11:23:00	1163.89	244.54	196.52	82.92	15.65	79.12	17.19	54.58
23-May-11 11:24:00	1163.60	244.42	196.60	82.78	15.66	79.15	17.23	57.83
23-May-11 11:25:00	1161.49	244.45	196.55	82.63	15.66	78.97	17.23	55.13
23-May-11 11:26:00	1166.42	244.58	196.55	82.53	15.69	79.03	17.21	52.74
23-May-11 11:27:00	1170.14	244.70	196.54	82.50	15.68	79.08	17.20	52.86
23-May-11 11:28:00	1166.14	244.55	196.57	82.50	15.68	78.97	17.25	57.63
23-May-11 11:29:00	1164.48	244.45	196.54	82.52	15.67	78.87	17.26	60.13
23-May-11 11:30:00	1172.23	244.49	196.25	82.67	15.65	79.26	17.35	131.80
23-May-11 11:31:00	1165.54	244.51	196.25	82.78	15.66	79.43	17.40	186.09
23-May-11 11:32:00	1167.26	244.64	195.80	82.97	15.64	79.56	17.26	81.06
23-May-11 11:33:00	1169.42	244.46	195.81	83.07	15.62	79.84	17.22	65.82
23-May-11 11:34:00	1168.99	244.51	195.89	83.18	15.63	79.90	17.22	61.31
23-May-11 11:35:00	1165.92	244.49	195.93	83.38	15.64	79.68	17.19	55.44
23-May-11 11:36:00	1164.23	244.49	196.17	83.58	15.62	79.44	17.18	53.18
23-May-11 11:37:00	1163.87	244.49	196.50	83.77	15.65	79.24	17.16	51.81
23-May-11 11:38:00	1169.93	244.43	196.47	83.78	15.67	79.34	17.17	51.49
23-May-11 11:39:00	1168.67	244.32	196.41	83.70	15.63	78.97	17.13	48.19
23-May-11 11:40:00	1158.45	244.46	196.51	83.70	15.64	78.43	17.16	51.23
23-May-11 11:41:00	1157.55	244.73	196.64	83.70	15.66	78.25	17.18	53.16
23-May-11 11:42:00	1169.07	245.02	197.02	83.72	15.67	78.59	17.25	82.21
23-May-11 11:43:00	1166.82	244.91	197.13	83.82	15.64	79.33	17.30	111.89
23-May-11 11:44:00	1167.53	244.88	196.89	83.97	15.60	79.52	17.20	73.28
23-May-11 11:45:00	1166.00	244.88	196.95	84.08	15.63	79.54	17.19	62.99
23-May-11 11:46:00	1164.70	244.60	196.92	84.28	15.62	79.37	17.12	52.31
23-May-11 11:47:00	1163.60	244.31	196.85	84.42	15.56	79.17	17.09	49.89
23-May-11 11:48:00	1164.42	244.44	196.84	84.58	15.62	79.08	17.10	50.38
23-May-11 11:49:00	1164.54	244.34	196.84	84.77	15.58	78.90	17.03	46.01
23-May-11 11:50:00	1163.11	244.39	196.87	84.87	15.62	78.77	17.06	47.22
23-May-11 11:51:00	1160.20	244.24	196.92	84.90	15.60	78.34	17.04	44.62
23-May-11 11:52:00	1158.73	244.46	196.90	84.82	15.65	78.31	17.04	44.48
23-May-11 11:53:00	1154.83	244.54	197.00	84.62	15.57	78.29	17.05	48.37
23-May-11 11:54:00	1159.41	244.56	197.00	84.50	15.59	78.53	17.23	87.19
23-May-11 11:55:00	1163.86	244.89	197.10	84.42	15.60	79.25	17.32	114.41
23-May-11 11:56:00	1162.72	244.88	197.08	84.28	15.60	79.12	17.20	69.19
23-May-11 11:57:00	1162.87	244.84	197.05	84.20	15.65	79.09	17.14	57.52
23-May-11 11:58:00	1163.54	244.58	197.14	84.18	15.61	79.12	17.12	51.08
23-May-11 11:59:00	1159.55	244.45	197.18	84.10	15.63	78.63	17.15	52.60
23-May-11 12:00:00	1153.25	244.37	197.01	84.10	15.63	77.84	17.14	51.51
23-May-11 12:01:00	1153.05	244.41	196.96	84.17	15.58	77.49	17.11	49.58
23-May-11 12:02:00	1152.46	244.56	196.97	84.27	15.61	77.71	17.13	50.58
23-May-11 12:03:00	1151.28	244.91	197.19	84.28	15.60	78.62	17.13	50.22
23-May-11 12:04:00	1152.45	245.00	197.68	84.20	15.64	78.70	17.13	50.21
23-May-11 12:05:00	1155.11	245.27	197.95	84.22	15.66	78.72	17.14	49.32

Run 1	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsfm) - Oa 317C_dryair	Vol Reg FG (dsfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
23-May-11 11:16:00	0.83	366.44	80642.89	77735.67	26519.05	51569.85	180.39
23-May-11 11:17:00	0.72	366.75	80306.58	77684.67	26630.37	51599.83	181.26
23-May-11 11:18:00	0.64	366.88	80373.74	77285.28	26757.68	51601.46	182.57
23-May-11 11:19:00	0.60	366.75	80402.40	77360.15	26875.67	51549.70	181.84
23-May-11 11:20:00	0.66	365.90	80372.54	77427.65	26682.91	51542.90	181.64
23-May-11 11:21:00	0.69	366.21	80187.15	77370.78	26639.90	51560.92	181.47
23-May-11 11:22:00	0.73	366.73	80256.12	77169.93	26591.51	51516.84	183.48
23-May-11 11:23:00	0.75	367.14	80368.74	77230.31	26654.95	51506.03	183.49
23-May-11 11:24:00	0.67	367.38	80458.86	77370.25	26739.36	51549.47	181.64
23-May-11 11:25:00	0.69	367.62	80511.29	77425.04	26753.71	51546.25	180.66
23-May-11 11:26:00	0.81	367.26	80563.62	77507.54	26663.45	51539.95	181.24
23-May-11 11:27:00	0.83	366.51	80485.42	77646.89	26601.07	51557.31	182.89
23-May-11 11:28:00	0.60	367.43	80321.64	77563.34	26792.98	51496.55	182.14
23-May-11 11:29:00	0.56	367.13	80523.23	77236.84	26789.80	51442.47	182.85
23-May-11 11:30:00	0.59	366.75	80456.69	77429.07	26867.54	51559.58	181.00
23-May-11 11:31:00	0.48	367.61	80373.79	77473.72	27027.73	51686.47	181.45
23-May-11 11:32:00	0.58	367.46	80562.05	77331.25	26807.46	51648.83	180.54
23-May-11 11:33:00	0.66	366.68	80530.13	77474.61	26686.17	51615.54	181.19
23-May-11 11:34:00	0.67	366.24	80358.06	77482.88	26646.77	51654.78	180.42
23-May-11 11:35:00	0.73	367.12	80260.90	77326.30	26662.38	51647.88	181.96
23-May-11 11:36:00	0.75	367.58	80454.88	77258.25	26666.98	51586.66	181.82
23-May-11 11:37:00	0.77	367.08	80555.15	77447.26	26606.88	51507.36	181.44
23-May-11 11:38:00	0.76	367.80	80445.45	77541.14	26669.95	51477.59	180.84
23-May-11 11:39:00	0.81	366.93	80604.68	77436.36	26550.02	51490.68	181.10
23-May-11 11:40:00	0.71	366.51	80413.73	77605.03	26584.40	51553.87	181.36
23-May-11 11:41:00	0.64	367.05	80321.01	77348.68	26669.50	51549.53	183.02
23-May-11 11:42:00	0.67	367.42	80438.20	77226.77	26763.55	51526.04	182.96
23-May-11 11:43:00	0.56	366.76	80519.57	77427.39	26809.68	51538.01	181.59
23-May-11 11:44:00	0.56	366.16	80375.27	77443.32	26654.22	51555.81	182.26
23-May-11 11:45:00	0.57	366.85	80244.76	77216.22	26686.10	51693.62	182.95
23-May-11 11:46:00	0.76	366.87	80396.11	77094.64	26543.98	51801.63	183.04
23-May-11 11:47:00	0.92	367.65	80398.83	77363.44	26525.20	51636.96	181.35
23-May-11 11:48:00	0.81	368.98	80570.39	77465.40	26661.75	51492.91	180.95
23-May-11 11:49:00	0.90	368.54	80861.14	77540.92	26518.99	51488.16	183.72
23-May-11 11:50:00	0.81	368.53	80766.11	77835.88	26589.72	51515.07	183.34
23-May-11 11:51:00	0.82	368.64	80763.17	77687.51	26570.42	51559.75	181.72
23-May-11 11:52:00	0.87	368.12	80788.43	77684.45	26507.69	51592.06	182.19
23-May-11 11:53:00	0.87	366.38	80672.84	77749.03	26395.45	51603.77	180.33
23-May-11 11:54:00	0.72	367.18	80293.22	77655.28	26714.53	51520.55	181.89
23-May-11 11:55:00	0.56	367.76	80468.59	77305.27	26908.57	51569.56	183.12
23-May-11 11:56:00	0.72	367.88	80595.30	77427.65	26726.32	51609.40	181.53
23-May-11 11:57:00	0.71	368.68	80621.83	77577.30	26718.98	51561.45	180.88
23-May-11 11:58:00	0.68	368.46	80795.59	77529.48	26684.84	51531.70	181.27
23-May-11 11:59:00	0.75	368.02	80747.60	77655.74	26670.89	51642.23	181.12
23-May-11 12:00:00	0.80	367.84	80651.33	77708.06	26635.88	51737.28	180.93
23-May-11 12:01:00	0.81	367.71	80611.93	77649.09	26585.19	51549.50	180.87
23-May-11 12:02:00	0.80	367.71	80584.09	77601.61	26615.97	51441.39	181.68
23-May-11 12:03:00	0.74	366.94	80582.98	77568.56	26569.99	51492.69	181.42
23-May-11 12:04:00	0.77	366.96	80416.00	77520.42	26567.90	51562.90	179.55
23-May-11 12:05:00	0.77	367.50	80419.61	77387.57	26620.41	51615.11	180.52

Run 1	Scrubbing Liquid Upper Circulation (psig) 317P1105B		Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
23-May-11 12:06:00	77.83		42.21	21.45	121	253.95	89.75	1136.67
23-May-11 12:07:00	77.89		41.94	21.59	121	255.25	89.16	1141.66
23-May-11 12:08:00	77.86		41.99	21.56	121	256.91	88.65	1143.85
23-May-11 12:09:00	77.79		42.00	21.45	120	256.23	89.11	1143.88
23-May-11 12:10:00	77.80		41.85	21.44	121	254.99	89.48	1140.73
23-May-11 12:11:00	77.75		41.85	21.58	121	256.17	88.90	1138.31
23-May-11 12:12:00	77.77		42.31	21.48	120	255.21	89.14	1138.67
23-May-11 12:13:00	77.54		42.40	21.56	121	254.28	89.66	1139.38
23-May-11 12:14:00	77.57		42.35	21.49	120	254.08	89.76	1144.14
23-May-11 12:15:00	77.97		42.45	21.43	120	255.44	88.98	1142.49
23-May-11 12:16:00	77.97		42.20	21.57	121	254.80	88.99	1138.84
23-May-11 12:17:00	77.94		42.11	21.43	120	254.55	89.28	1133.24
23-May-11 12:18:00	77.89		41.73	21.43	120	254.92	89.25	1139.72
23-May-11 12:19:00	77.72		41.94	21.51	121	255.81	88.98	1142.79
23-May-11 12:20:00	77.64		42.02	21.40	120	254.43	89.60	1138.44
23-May-11 12:21:00	77.83		41.96	21.54	120	254.61	89.65	1138.68
23-May-11 12:22:00	77.85		42.06	21.59	120	255.14	89.49	1140.45
23-May-11 12:23:00	77.86		42.21	21.62	121	254.05	89.64	1139.94
23-May-11 12:24:00	77.84		41.68	21.61	121	255.90	89.06	1140.08
23-May-11 12:25:00	77.90		41.98	21.62	120	256.13	88.99	1139.89
23-May-11 12:26:00	77.94		41.72	21.51	120	255.26	89.01	1146.57
23-May-11 12:27:00	77.96		41.87	21.62	120	256.81	88.47	1149.30
23-May-11 12:28:00	77.86		41.94	21.79	120	256.97	88.34	1141.11
23-May-11 12:29:00	77.95		41.73	21.63	120	255.90	88.66	1141.68
23-May-11 12:30:00	77.95		41.70	21.53	120	254.40	89.50	1149.53
23-May-11 12:31:00	77.80		41.81	21.61	120	255.14	89.30	1139.13
23-May-11 12:32:00	77.72		41.84	21.60	119	256.87	88.24	1139.51
23-May-11 12:33:00	77.75		41.66	21.35	120	256.18	88.49	1141.88
23-May-11 12:34:00	77.98		41.83	21.45	121	256.88	88.40	1141.21
23-May-11 12:35:00	77.90		41.92	21.46	121	255.95	88.88	1139.00
23-May-11 12:36:00	77.80		41.91	21.48	120	256.88	88.51	1138.33
23-May-11 12:37:00	77.80		41.79	21.60	119	257.81	88.34	1137.73
23-May-11 12:38:00	77.80		41.68	21.27	120	253.19	89.97	1139.34
23-May-11 12:39:00	77.65		41.73	21.31	121	253.09	89.95	1136.27
23-May-11 12:40:00	78.01		41.84	21.48	120	255.63	88.77	1134.75
23-May-11 12:41:00	77.91		41.67	21.35	120	254.19	89.29	1127.56
23-May-11 12:42:00	77.79		41.44	21.28	120	254.42	89.42	1133.05
23-May-11 12:43:00	77.84		41.40	21.46	120	254.53	89.41	1140.87
23-May-11 12:44:00	77.94		41.82	21.46	120	253.73	89.63	1141.03
23-May-11 12:45:00	77.77		41.75	21.56	121	253.87	89.59	1141.82
23-May-11 12:46:00	77.81		41.82	21.83	120	253.33	89.90	1141.49
23-May-11 12:47:00	77.90		41.98	21.34	120	253.75	89.68	1138.69
23-May-11 12:48:00	77.98		41.85	21.16	121	252.92	89.93	1139.95
23-May-11 12:49:00	77.99		42.17	21.29	120	254.22	89.68	1137.89
23-May-11 12:50:00	77.90		42.11	21.38	120	253.90	89.86	1138.82
23-May-11 12:51:00	77.77		42.10	21.24	120	254.05	89.70	1141.53
23-May-11 12:52:00	77.81		41.96	21.31	121	255.01	89.32	1138.98
23-May-11 12:53:00	77.61		41.96	21.35	121	254.22	89.41	1138.14
23-May-11 12:54:00	77.73		42.07	21.69	120	254.53	89.21	1147.42
23-May-11 12:55:00	77.86		42.06	21.64	120	255.48	88.99	1141.56

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 1								
23-May-11 12:06:00	1158.69	245.54	198.12	84.23	15.68	78.69	17.22	72.33
23-May-11 12:07:00	1165.28	245.62	198.21	84.20	15.62	79.44	17.33	111.82
23-May-11 12:08:00	1167.40	245.61	198.14	84.20	15.63	79.63	17.29	100.40
23-May-11 12:09:00	1167.52	245.74	198.15	84.20	15.66	79.68	17.23	72.29
23-May-11 12:10:00	1163.88	245.55	198.21	84.27	15.67	79.47	17.17	57.37
23-May-11 12:11:00	1160.33	245.56	198.08	84.30	15.63	79.09	17.15	57.01
23-May-11 12:12:00	1161.56	245.46	198.22	84.30	15.64	78.95	17.18	61.05
23-May-11 12:13:00	1162.70	245.44	198.05	84.30	15.64	78.99	17.15	52.28
23-May-11 12:14:00	1164.69	245.50	198.07	84.37	15.66	79.06	17.15	53.09
23-May-11 12:15:00	1159.04	245.49	198.04	84.38	15.63	78.74	17.18	57.13
23-May-11 12:16:00	1158.48	245.53	198.06	84.30	15.63	78.63	17.19	60.70
23-May-11 12:17:00	1155.29	245.56	198.01	84.27	15.69	78.50	17.19	57.40
23-May-11 12:18:00	1161.62	245.49	198.09	84.08	15.67	78.72	17.29	110.08
23-May-11 12:19:00	1165.64	245.51	198.09	83.93	15.64	79.38	17.39	167.87
23-May-11 12:20:00	1162.18	245.72	198.09	83.90	15.67	79.17	17.29	100.60
23-May-11 12:21:00	1161.35	246.17	198.11	83.90	15.68	78.98	17.21	68.21
23-May-11 12:22:00	1162.10	245.92	198.16	83.97	15.69	78.99	17.21	65.63
23-May-11 12:23:00	1162.31	245.52	198.05	84.00	15.66	79.15	17.19	58.94
23-May-11 12:24:00	1162.75	245.48	197.70	83.98	15.65	79.23	17.16	55.72
23-May-11 12:25:00	1162.66	245.46	197.51	83.88	15.68	79.14	17.18	57.84
23-May-11 12:26:00	1166.96	245.46	197.46	83.87	15.64	79.05	17.15	50.97
23-May-11 12:27:00	1165.41	245.55	197.36	83.97	15.63	78.78	17.14	51.00
23-May-11 12:28:00	1161.11	245.35	197.31	84.07	15.65	78.77	17.14	50.91
23-May-11 12:29:00	1162.87	245.04	197.12	84.10	15.69	78.77	17.13	50.48
23-May-11 12:30:00	1169.23	245.01	197.04	84.10	15.69	78.82	17.22	80.17
23-May-11 12:31:00	1162.04	244.94	197.13	84.10	15.64	79.01	17.31	113.73
23-May-11 12:32:00	1162.63	245.06	196.87	84.03	15.59	79.03	17.22	82.57
23-May-11 12:33:00	1164.62	244.91	196.78	83.98	15.61	79.21	17.16	63.74
23-May-11 12:34:00	1164.37	245.00	196.67	83.97	15.60	79.25	17.08	49.71
23-May-11 12:35:00	1161.43	244.96	196.99	84.02	15.66	79.11	17.06	48.50
23-May-11 12:36:00	1160.12	244.86	196.98	84.18	15.64	78.87	17.04	46.14
23-May-11 12:37:00	1160.54	244.92	196.97	84.38	15.67	78.72	17.04	46.29
23-May-11 12:38:00	1162.36	244.83	196.76	84.57	15.69	78.66	16.99	43.93
23-May-11 12:39:00	1156.37	244.29	196.37	84.73	15.64	78.30	16.99	44.77
23-May-11 12:40:00	1154.97	244.43	195.96	84.88	15.62	78.10	17.09	50.32
23-May-11 12:41:00	1150.00	244.43	195.91	84.98	15.67	77.82	17.10	50.22
23-May-11 12:42:00	1155.94	244.41	196.00	84.82	15.66	77.99	17.15	87.89
23-May-11 12:43:00	1163.70	244.82	196.07	84.57	15.66	79.02	17.31	138.33
23-May-11 12:44:00	1165.03	245.02	195.97	84.45	15.66	79.22	17.22	88.50
23-May-11 12:45:00	1166.07	244.93	196.01	84.50	15.64	79.35	17.17	65.17
23-May-11 12:46:00	1164.06	244.99	196.16	84.50	15.65	79.34	17.16	56.68
23-May-11 12:47:00	1161.46	245.12	196.27	84.58	15.65	79.18	17.13	52.37
23-May-11 12:48:00	1162.23	245.11	196.19	84.78	15.65	79.08	17.13	52.25
23-May-11 12:49:00	1160.90	245.18	196.26	84.90	15.64	78.81	17.13	52.19
23-May-11 12:50:00	1158.82	245.35	196.67	84.97	15.64	78.53	17.16	54.70
23-May-11 12:51:00	1155.76	245.68	196.85	85.07	15.64	78.19	17.17	55.62
23-May-11 12:52:00	1159.64	245.56	196.96	85.10	15.66	78.36	17.20	60.59
23-May-11 12:53:00	1158.11	245.66	197.16	85.12	15.67	78.36	17.21	64.54
23-May-11 12:54:00	1164.33	245.66	197.22	85.18	15.65	78.58	17.32	211.29
23-May-11 12:55:00	1164.65	245.69	197.28	85.08	15.66	79.31	17.44	348.27

Run 1	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsfm) - Oa 317C_dryair	Vol Reg FG (dsfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
23-May-11 12:06:00	0.74	366.71	80537.60	77399.72	26661.50	51588.90	180.92
23-May-11 12:07:00	0.60	365.57	80364.78	77566.90	26750.64	51563.96	181.72
23-May-11 12:08:00	0.47	366.06	80114.39	77349.93	26770.24	51569.74	181.81
23-May-11 12:09:00	0.58	367.33	80222.37	76955.46	26765.87	51539.82	182.86
23-May-11 12:10:00	0.78	367.15	80500.98	77136.73	26622.79	51606.09	183.33
23-May-11 12:11:00	0.79	366.40	80460.65	77514.41	26540.65	51695.22	182.61
23-May-11 12:12:00	0.72	366.66	80296.15	77472.29	26620.55	51682.75	180.38
23-May-11 12:13:00	0.63	366.08	80354.21	77259.33	26563.09	51663.83	180.61
23-May-11 12:14:00	0.70	365.70	80225.78	77224.29	26522.37	51656.06	181.00
23-May-11 12:15:00	0.66	365.74	80142.95	77151.27	26563.04	51662.67	180.27
23-May-11 12:16:00	0.66	365.97	80152.34	77066.44	26597.35	51622.36	181.64
23-May-11 12:17:00	0.60	365.48	80202.33	77077.96	26571.93	51580.62	182.10
23-May-11 12:18:00	0.59	365.80	80096.20	77081.66	26728.11	51566.78	183.83
23-May-11 12:19:00	0.49	366.10	80164.76	77073.85	26901.59	51589.25	183.12
23-May-11 12:20:00	0.50	366.52	80230.59	77120.18	26798.90	51644.35	182.54
23-May-11 12:21:00	0.65	365.86	80323.45	77108.03	26618.09	51657.72	182.86
23-May-11 12:22:00	0.61	366.24	80179.38	77261.69	26652.93	51619.08	182.05
23-May-11 12:23:00	0.63	366.47	80260.73	77084.45	26645.19	51571.81	181.47
23-May-11 12:24:00	0.75	365.53	80311.44	77167.49	26505.65	51568.40	184.17
23-May-11 12:25:00	0.66	366.95	80106.44	77298.89	26659.50	51628.22	182.05
23-May-11 12:26:00	0.65	367.02	80418.10	77017.91	26620.53	51669.08	184.03
23-May-11 12:27:00	0.84	366.10	80431.78	77303.35	26494.74	51696.97	182.99
23-May-11 12:28:00	0.74	367.05	80230.34	77469.81	26587.87	51760.01	181.85
23-May-11 12:29:00	0.67	367.17	80438.40	77176.89	26601.32	51777.84	183.60
23-May-11 12:30:00	0.64	366.72	80465.77	77314.49	26686.37	51732.01	183.46
23-May-11 12:31:00	0.51	366.09	80366.59	77401.51	26788.67	51664.61	182.86
23-May-11 12:32:00	0.51	366.34	80227.81	77257.00	26704.45	51631.17	182.93
23-May-11 12:33:00	0.65	366.66	80283.10	77057.97	26618.54	51644.94	184.36
23-May-11 12:34:00	0.80	366.43	80354.62	77177.49	26454.54	51645.21	183.26
23-May-11 12:35:00	0.80	367.08	80303.74	77305.02	26487.95	51641.97	182.42
23-May-11 12:36:00	0.79	366.79	80446.37	77238.32	26440.35	51656.44	182.73
23-May-11 12:37:00	0.82	367.51	80382.00	77356.53	26483.24	51674.66	183.05
23-May-11 12:38:00	0.84	368.21	80539.40	77305.34	26467.20	51659.49	183.49
23-May-11 12:39:00	0.91	365.30	80692.51	77436.12	26239.13	51758.40	183.51
23-May-11 12:40:00	0.73	365.15	80056.62	77642.74	26393.05	51907.93	181.73
23-May-11 12:41:00	0.65	366.27	80022.14	76947.19	26509.91	51863.84	184.16
23-May-11 12:42:00	0.71	365.67	80267.55	76868.20	26518.26	51776.71	185.96
23-May-11 12:43:00	0.57	366.05	80137.88	77216.22	26772.00	51739.38	185.27
23-May-11 12:44:00	0.58	365.99	80220.09	77098.32	26656.43	51671.82	183.34
23-May-11 12:45:00	0.65	365.48	80206.18	77105.23	26539.83	51630.96	183.88
23-May-11 12:46:00	0.67	365.42	80095.63	77109.77	26515.60	51664.47	183.46
23-May-11 12:47:00	0.71	365.30	80081.83	77014.30	26457.52	51703.25	182.89
23-May-11 12:48:00	0.65	365.34	80056.77	76994.88	26478.54	51725.83	183.46
23-May-11 12:49:00	0.66	364.87	80063.59	76928.97	26443.92	51732.39	182.26
23-May-11 12:50:00	0.64	365.82	79960.61	76940.82	26549.92	51762.70	182.36
23-May-11 12:51:00	0.64	365.52	80169.21	76845.25	26540.50	51737.25	182.85
23-May-11 12:52:00	0.63	365.57	80103.45	77056.27	26583.37	51675.32	182.99
23-May-11 12:53:00	0.66	366.20	80115.39	77018.70	26632.91	51782.73	183.16
23-May-11 12:54:00	0.57	365.49	80253.17	77071.41	26752.44	51976.65	182.67
23-May-11 12:55:00	0.36	365.62	80097.06	77237.03	26982.39	51996.83	181.93

Run 1	Scrubbing Liquid Upper Circulation (psig) 317P1105B		Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
23-May-11 12:56:00	77.91	41.72	21.51	121	254.59	89.17	1139.79	
23-May-11 12:57:00	77.84	41.85	21.46	120	253.64	89.40	1140.53	
23-May-11 12:58:00	77.86	41.62	21.42	121	254.30	89.48	1140.24	
23-May-11 12:59:00	77.95	42.12	21.28	120	255.27	89.16	1135.74	
23-May-11 13:00:00	77.85	42.05	21.37	120	255.11	89.37	1130.47	
23-May-11 13:01:00	77.75	41.88	21.52	120	255.53	88.86	1133.31	
23-May-11 13:02:00	77.80	41.93	21.50	120	255.11	88.74	1128.59	
23-May-11 13:03:00	77.89	41.91	21.29	120	255.36	88.98	1123.68	
23-May-11 13:04:00	78.08	41.90	21.19	121	255.18	89.05	1129.06	
23-May-11 13:05:00	77.79	42.13	21.51	120	253.87	89.56	1131.69	
23-May-11 13:06:00	77.82	42.07	21.49	121	254.12	89.23	1135.12	
23-May-11 13:07:00	77.82	41.84	21.49	121	256.55	88.59	1134.51	
23-May-11 13:08:00	77.77	41.66	21.31	121	254.61	89.29	1131.42	
23-May-11 13:09:00	77.82	41.73	21.50	121	254.74	89.18	1129.29	
23-May-11 13:10:00	77.70	41.49	21.61	120	256.13	88.59	1126.30	
23-May-11 13:11:00	77.64	41.70	21.50	120	256.34	88.64	1126.43	
23-May-11 13:12:00	77.83	41.91	21.61	121	256.71	88.59	1127.30	
23-May-11 13:13:00	77.90	41.91	21.77	120	256.41	88.56	1130.44	
23-May-11 13:14:00	78.07	41.79	21.49	120	253.93	89.88	1133.37	
23-May-11 13:15:00	77.88	41.48	21.53	121	255.58	89.25	1127.22	
23-May-11 13:16:00	77.74	41.73	21.78	120	257.45	88.43	1132.13	
23-May-11 13:17:00	77.78	41.94	21.79	121	256.93	88.38	1132.03	
23-May-11 13:18:00	77.86	42.06	21.55	120	256.54	88.81	1133.51	
23-May-11 13:19:00	77.78	41.88	21.58	120	256.13	89.16	1140.09	
23-May-11 13:20:00	77.65	41.88	21.46	120	255.48	89.80	1137.71	
23-May-11 13:21:00	77.70	41.86	21.50	120	255.26	89.80	1136.29	
23-May-11 13:22:00	77.52	41.72	21.49	120	255.18	89.75	1135.16	
23-May-11 13:23:00	77.47	41.72	21.47	120	253.82	89.99	1133.54	
23-May-11 13:24:00	77.63	41.71	21.55	120	253.83	89.55	1136.14	
23-May-11 13:25:00	77.61	41.50	21.37	120	254.59	89.29	1132.88	
23-May-11 13:26:00	77.84	41.67	21.21	121	255.23	89.30	1132.89	
23-May-11 13:27:00	78.00	41.70	21.43	120	254.03	89.56	1128.51	
23-May-11 13:28:00	77.97	41.63	21.36	120	253.82	89.58	1128.37	
23-May-11 13:29:00	77.97	41.64	21.48	120	255.55	88.80	1127.45	
23-May-11 13:30:00	77.88	41.81	21.56	121	255.26	88.80	1132.06	
23-May-11 13:31:00	77.76	41.66	21.17	121	252.12	90.47	1138.00	
23-May-11 13:32:00	77.80	41.83	21.35	121	253.48	89.89	1139.27	
23-May-11 13:33:00	77.75	41.66	21.42	121	253.57	89.47	1141.16	
23-May-11 13:34:00	77.75	41.93	21.49	120	253.84	89.40	1141.53	
23-May-11 13:35:00	77.77	41.89	21.35	121	254.00	89.61	1136.80	
23-May-11 13:36:00	77.80	41.76	21.43	120	254.12	89.37	1134.19	
23-May-11 13:37:00	77.79	41.68	21.70	120	254.84	89.13	1133.85	
23-May-11 13:38:00	77.74	41.82	21.62	120	255.71	88.85	1135.21	
23-May-11 13:39:00	77.99	41.91	21.21	121	254.28	89.45	1128.18	
23-May-11 13:40:00	78.00	41.82	21.41	121	252.27	90.08	1124.31	
23-May-11 13:41:00	77.78	41.82	21.49	121	253.42	89.45	1121.21	
23-May-11 13:42:00	77.88	41.50	21.40	121	254.86	88.99	1129.76	
23-May-11 13:43:00	77.82	41.67	21.30	121	255.04	89.07	1132.38	
23-May-11 13:44:00	77.87	41.70	21.57	120	254.64	89.41	1137.55	
23-May-11 13:45:00	78.13	41.65	21.32	121	251.80	90.51	1135.90	

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 1								
23-May-11 12:56:00	1163.11	245.74	197.11	84.98	15.64	79.21	17.31	123.67
23-May-11 12:57:00	1162.95	245.78	197.12	84.82	15.62	79.16	17.25	80.85
23-May-11 12:58:00	1163.12	245.97	197.17	84.62	15.67	79.17	17.24	77.12
23-May-11 12:59:00	1157.39	245.78	197.15	84.50	15.68	78.62	17.26	79.90
23-May-11 13:00:00	1149.42	245.74	197.10	84.52	15.69	77.75	17.25	75.34
23-May-11 13:01:00	1151.94	245.67	197.08	84.67	15.66	77.38	17.24	68.68
23-May-11 13:02:00	1155.25	245.53	197.07	84.77	15.64	77.76	17.27	74.26
23-May-11 13:03:00	1155.34	245.38	197.17	84.82	15.65	78.72	15.56	67.87
23-May-11 13:04:00	1151.02	245.77	197.17	84.97	15.66	78.51	14.19	57.50
23-May-11 13:05:00	1155.75	245.63	197.13	84.98	15.71	78.74	17.12	58.00
23-May-11 13:06:00	1157.09	245.52	197.03	84.97	15.63	78.36	17.25	115.19
23-May-11 13:07:00	1156.70	245.39	196.98	85.00	15.65	78.52	17.39	217.19
23-May-11 13:08:00	1153.61	245.07	196.94	85.02	15.66	78.04	17.32	157.93
23-May-11 13:09:00	1150.59	245.06	197.10	85.12	15.63	77.46	17.21	70.52
23-May-11 13:10:00	1147.43	245.15	196.96	85.18	15.62	77.01	17.21	70.41
23-May-11 13:11:00	1146.44	245.02	196.90	85.02	15.65	76.66	17.21	67.92
23-May-11 13:12:00	1147.84	244.92	196.80	84.90	15.64	76.86	17.18	57.85
23-May-11 13:13:00	1152.55	245.05	196.82	84.97	15.62	77.26	17.15	53.09
23-May-11 13:14:00	1154.61	244.96	196.66	85.07	15.63	77.54	17.13	51.59
23-May-11 13:15:00	1148.70	244.88	196.34	85.08	15.59	77.53	17.10	50.71
23-May-11 13:16:00	1154.09	244.97	196.21	85.07	15.60	78.01	17.14	56.08
23-May-11 13:17:00	1155.35	245.01	196.15	85.18	15.59	78.48	17.16	56.37
23-May-11 13:18:00	1157.13	244.90	196.21	85.40	15.61	78.30	17.21	73.09
23-May-11 13:19:00	1163.74	245.00	196.49	85.70	15.62	79.00	17.27	97.09
23-May-11 13:20:00	1160.38	245.02	196.79	85.92	15.67	78.89	17.18	73.53
23-May-11 13:21:00	1159.36	245.10	196.77	86.02	15.63	78.62	17.14	62.32
23-May-11 13:22:00	1158.40	245.27	196.90	86.03	15.63	78.42	17.16	62.66
23-May-11 13:23:00	1155.92	245.47	196.80	86.07	15.63	78.33	17.18	63.34
23-May-11 13:24:00	1157.77	245.41	196.82	86.12	15.64	78.35	17.18	61.02
23-May-11 13:25:00	1155.10	245.41	196.77	86.27	15.66	78.09	17.20	61.46
23-May-11 13:26:00	1154.14	245.43	196.75	86.28	15.67	77.94	17.18	55.38
23-May-11 13:27:00	1147.80	245.40	196.77	86.18	15.64	77.73	17.20	56.51
23-May-11 13:28:00	1150.91	245.29	196.87	86.03	15.66	77.93	17.22	59.83
23-May-11 13:29:00	1151.88	245.58	196.80	85.85	15.64	78.10	17.22	64.20
23-May-11 13:30:00	1153.83	245.87	197.09	85.53	15.62	77.93	17.32	159.56
23-May-11 13:31:00	1159.94	246.16	197.34	85.22	15.70	78.67	17.42	246.01
23-May-11 13:32:00	1162.22	246.17	197.46	85.03	15.66	78.90	17.31	127.86
23-May-11 13:33:00	1164.06	246.19	197.42	84.93	15.62	79.24	17.29	115.58
23-May-11 13:34:00	1164.06	246.25	197.55	84.97	15.63	79.36	17.26	73.37
23-May-11 13:35:00	1159.33	246.32	197.54	85.08	15.68	79.14	17.23	69.40
23-May-11 13:36:00	1156.28	246.50	197.65	85.28	15.67	78.73	17.21	65.69
23-May-11 13:37:00	1156.45	246.38	197.89	85.40	15.66	78.37	17.22	62.60
23-May-11 13:38:00	1157.91	246.17	198.25	85.32	15.67	78.28	17.23	63.19
23-May-11 13:39:00	1150.63	246.29	198.38	85.20	15.69	77.88	17.20	59.87
23-May-11 13:40:00	1145.88	246.15	198.30	85.27	15.69	77.39	17.16	54.11
23-May-11 13:41:00	1141.15	246.24	197.83	85.37	15.68	76.63	17.21	62.92
23-May-11 13:42:00	1146.88	246.12	197.72	85.48	15.66	76.46	17.33	131.92
23-May-11 13:43:00	1156.76	246.20	197.64	85.67	15.67	77.68	17.39	185.22
23-May-11 13:44:00	1160.65	246.17	197.68	85.78	15.67	78.31	17.24	89.33
23-May-11 13:45:00	1158.61	246.25	197.71	85.98	15.70	78.50	17.19	68.74

Run 1	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsd/m) - Oa 317C_dryair	Vol Reg FG (dsd/m) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
23-May-11 12:56:00	0.38	366.31	80125.40	76991.94	26840.40	51861.36	184.08
23-May-11 12:57:00	0.51	365.38	80276.29	76919.80	26659.22	51782.39	183.80
23-May-11 12:58:00	0.50	364.72	80072.96	77116.71	26611.48	51721.72	184.43
23-May-11 12:59:00	0.48	365.71	79927.80	76903.66	26705.28	51656.61	182.34
23-May-11 13:00:00	0.51	366.42	80144.60	76766.71	26746.20	51693.71	183.17
23-May-11 13:01:00	0.52	366.51	80300.32	76998.73	26730.84	51734.88	183.64
23-May-11 13:02:00	0.43	366.07	80320.06	77132.21	26759.65	51697.04	182.92
23-May-11 13:03:00	1.39	365.68	80225.06	77112.19	24516.38	51692.39	182.98
23-May-11 13:04:00	2.34	366.11	80138.25	76208.07	22730.81	51733.55	184.30
23-May-11 13:05:00	0.90	366.14	80233.98	76015.42	26454.91	51755.36	185.44
23-May-11 13:06:00	0.62	365.35	80240.74	77315.48	26630.38	51835.67	181.78
23-May-11 13:07:00	0.47	365.20	80066.28	77210.63	26837.85	51887.67	183.14
23-May-11 13:08:00	0.26	366.97	80033.74	76992.49	26938.60	51896.17	184.07
23-May-11 13:09:00	0.59	365.82	80421.41	76733.18	26632.31	51907.18	184.95
23-May-11 13:10:00	0.67	365.68	80170.06	77314.04	26597.11	51791.98	184.61
23-May-11 13:11:00	0.56	366.42	80137.92	77129.01	26683.14	51718.49	184.06
23-May-11 13:12:00	0.55	366.88	80300.13	76992.02	26677.02	51765.88	183.25
23-May-11 13:13:00	0.67	367.13	80402.47	77114.93	26626.88	51771.28	183.08
23-May-11 13:14:00	0.74	366.67	80457.68	77305.41	26547.81	51746.12	182.87
23-May-11 13:15:00	0.77	365.58	80356.95	77394.07	26431.66	51759.46	184.35
23-May-11 13:16:00	0.69	366.55	80116.38	77299.70	26574.12	51810.81	183.38
23-May-11 13:17:00	0.59	367.48	80330.22	77023.23	26692.33	51837.07	183.07
23-May-11 13:18:00	0.61	366.98	80533.31	77170.02	26705.07	51763.90	182.29
23-May-11 13:19:00	0.55	367.11	80424.62	77430.00	26806.85	51682.91	182.36
23-May-11 13:20:00	0.57	367.28	80453.27	77320.56	26702.13	51726.72	182.78
23-May-11 13:21:00	0.65	367.36	80488.69	77268.82	26642.24	51794.12	182.78
23-May-11 13:22:00	0.76	366.95	80506.17	77368.91	26600.19	51799.51	183.60
23-May-11 13:23:00	0.55	366.67	80417.45	77482.50	26669.20	51804.14	183.17
23-May-11 13:24:00	0.49	365.52	80356.30	77216.80	26599.50	51791.42	183.73
23-May-11 13:25:00	0.51	365.14	80103.25	77118.44	26591.55	51756.10	184.98
23-May-11 13:26:00	0.53	365.91	80020.29	76912.17	26620.05	51740.59	184.57
23-May-11 13:27:00	0.55	366.40	80190.44	76826.35	26662.96	51757.63	184.55
23-May-11 13:28:00	0.50	365.33	80297.17	77024.74	26623.36	51745.16	184.53
23-May-11 13:29:00	0.41	365.30	80062.26	77083.03	26654.98	51747.19	184.14
23-May-11 13:30:00	0.38	366.05	80054.70	76800.67	26844.89	51793.49	184.09
23-May-11 13:31:00	0.26	365.55	80220.04	76857.94	26962.83	51786.37	184.91
23-May-11 13:32:00	0.42	364.62	80109.57	77006.99	26713.54	51801.78	183.72
23-May-11 13:33:00	0.47	365.04	79907.71	76939.91	26705.93	51854.73	184.56
23-May-11 13:34:00	0.57	364.51	79998.99	76772.92	26600.33	51810.42	183.91
23-May-11 13:35:00	0.61	364.91	79882.87	76929.38	26583.17	51771.70	183.55
23-May-11 13:36:00	0.56	365.44	79969.95	76809.11	26605.35	51812.21	184.29
23-May-11 13:37:00	0.61	365.15	80085.70	76846.05	26588.25	51826.06	184.91
23-May-11 13:38:00	0.63	365.64	80022.86	77001.27	26628.66	51805.98	183.87
23-May-11 13:39:00	0.65	366.31	80130.27	76987.19	26632.37	51785.58	183.26
23-May-11 13:40:00	0.50	365.44	80277.08	77037.37	26569.21	51804.35	183.46
23-May-11 13:41:00	0.64	364.06	80085.49	77038.26	26480.44	51825.39	183.65
23-May-11 13:42:00	0.55	364.65	79783.20	77023.25	26696.35	51821.88	184.98
23-May-11 13:43:00	0.38	365.47	79913.50	76757.18	26883.69	51824.57	184.98
23-May-11 13:44:00	0.47	365.92	80091.99	76781.77	26709.28	51782.36	184.77
23-May-11 13:45:00	0.65	365.77	80191.07	76902.27	26579.40	51831.26	184.58

Run 1	Scrubbing Liquid Upper Circulation (psig) 317P1105B		Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
23-May-11 13:46:00	77.99	41.98	21.34	122	252.60	90.11	1133.98	
23-May-11 13:47:00	78.10	41.92	21.45	121	253.42	89.86	1131.79	
23-May-11 13:48:00	78.03	41.78	21.45	120	254.31	89.32	1131.61	
23-May-11 13:49:00	77.92	41.90	21.55	120	253.43	89.41	1133.85	
23-May-11 13:50:00	77.99	41.90	21.58	120	252.26	90.15	1132.71	
23-May-11 13:51:00	77.99	41.88	21.47	121	254.54	89.19	1126.22	
23-May-11 13:52:00	77.86	41.80	21.28	121	253.74	89.25	1127.81	
23-May-11 13:53:00	77.88	41.63	21.00	121	252.88	89.59	1129.79	
23-May-11 13:54:00	77.98	41.75	21.39	121	252.96	89.72	1137.68	
23-May-11 13:55:00	77.84	41.95	21.43	120	252.52	90.15	1138.97	
23-May-11 13:56:00	77.70	41.82	21.42	120	252.86	90.05	1137.85	
23-May-11 13:57:00	77.70	41.78	21.36	121	254.39	89.33	1136.42	
23-May-11 13:58:00	77.60	41.92	21.42	120	254.46	89.37	1137.00	
23-May-11 13:59:00	77.70	41.77	21.41	120	254.26	89.34	1132.16	
23-May-11 14:00:00	77.93	41.68	21.49	121	253.07	89.89	1123.73	
23-May-11 14:01:00	77.86	41.75	21.42	121	253.87	89.63	1124.14	
23-May-11 14:02:00	78.01	41.95	21.55	121	253.67	89.58	1128.60	
23-May-11 14:03:00	77.96	41.82	21.65	120	254.41	89.26	1128.22	
23-May-11 14:04:00	78.02	41.88	21.36	121	254.46	89.10	1119.49	
23-May-11 14:05:00	77.94	41.72	21.26	121	252.70	89.91	1129.82	
23-May-11 14:06:00	77.74	41.66	21.46	121	252.54	89.77	1129.46	
23-May-11 14:07:00	77.91	41.82	21.56	121	254.14	89.22	1134.72	
23-May-11 14:08:00	77.90	41.61	21.64	120	254.22	89.38	1135.93	
23-May-11 14:09:00	77.81	41.45	21.44	120	253.26	89.78	1136.25	
23-May-11 14:10:00	77.67	41.58	21.16	120	253.01	89.74	1130.48	
23-May-11 14:11:00	77.84	41.49	21.18	120	253.39	90.08	1123.76	
23-May-11 14:12:00	77.95	41.53	21.26	120	253.70	89.73	1124.15	
23-May-11 14:13:00	77.88	41.87	21.20	121	254.21	89.56	1128.47	
23-May-11 14:14:00	77.84	41.71	21.33	121	254.44	89.08	1131.66	
23-May-11 14:15:00	77.82	41.51	21.39	121	253.14	89.81	1124.14	
23-May-11 14:16:00	77.99	41.52	21.33	121	253.07	89.77	1125.61	
23-May-11 14:17:00	78.00	41.61	21.49	121	254.23	89.26	1124.26	
23-May-11 14:18:00	77.86	41.49	21.32	120	254.42	89.13	1129.38	
23-May-11 14:19:00	77.86	41.46	21.30	121	253.79	89.34	1135.33	
23-May-11 14:20:00	77.58	41.46	21.43	120	253.96	89.44	1132.89	
23-May-11 14:21:00	77.73	41.51	21.44	119	253.91	89.56	1133.63	
23-May-11 14:22:00	77.96	41.59	21.44	120	254.00	89.57	1133.78	
23-May-11 14:23:00	77.87	41.62	21.60	120	254.66	89.09	1130.91	
23-May-11 14:24:00	77.89	41.45	21.50	120	252.91	89.73	1131.97	
23-May-11 14:25:00	77.79	41.81	21.35	121	253.76	89.47	1131.78	
23-May-11 14:26:00	77.79	41.72	21.18	121	253.94	89.21	1129.54	
23-May-11 14:27:00	77.86	41.77	21.25	120	254.93	88.49	1121.37	
23-May-11 14:28:00	78.00	41.75	21.13	121	251.79	89.55	1124.29	
23-May-11 14:29:00	78.06	41.47	21.41	121	253.99	88.82	1122.10	
23-May-11 14:30:00	77.81	41.53	21.65	120	254.83	88.71	1122.86	
	77.84	41.90	21.52	120.27	255.33	89.20	1136.35	

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	Run 1	
							CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
23-May-11 13:46:00	1157.11	246.15	197.74	86.17	15.68	78.43	17.18	63.05
23-May-11 13:47:00	1154.72	246.26	197.53	86.12	15.67	78.28	17.23	73.06
23-May-11 13:48:00	1154.16	246.32	197.25	85.92	15.63	78.24	17.23	68.74
23-May-11 13:49:00	1155.32	246.25	197.52	85.65	15.63	78.05	17.23	66.22
23-May-11 13:50:00	1153.25	246.12	197.36	85.35	15.68	77.77	17.20	58.61
23-May-11 13:51:00	1145.72	246.20	197.12	85.13	15.65	77.47	17.21	65.78
23-May-11 13:52:00	1148.53	246.10	197.02	85.12	15.66	77.57	17.26	76.05
23-May-11 13:53:00	1150.78	246.12	197.13	85.22	15.68	77.78	17.24	66.09
23-May-11 13:54:00	1157.16	246.24	197.05	85.32	15.67	77.92	17.33	241.03
23-May-11 13:55:00	1161.52	246.25	197.24	85.47	15.72	78.91	17.45	429.25
23-May-11 13:56:00	1160.58	246.25	197.59	85.57	15.69	78.88	17.34	177.09
23-May-11 13:57:00	1159.52	246.25	197.59	85.62	15.67	78.81	17.29	96.30
23-May-11 13:58:00	1159.76	246.29	197.58	85.70	15.68	78.70	17.26	86.54
23-May-11 13:59:00	1153.97	246.30	197.53	85.77	15.66	78.27	17.24	72.87
23-May-11 14:00:00	1143.86	246.08	197.53	85.72	15.71	77.39	17.24	68.47
23-May-11 14:01:00	1143.37	246.06	197.38	85.58	15.67	76.73	17.23	67.27
23-May-11 14:02:00	1149.64	246.10	197.19	85.48	15.67	76.86	17.22	65.31
23-May-11 14:03:00	1151.31	246.17	197.11	85.32	15.65	77.80	17.17	57.95
23-May-11 14:04:00	1144.16	246.10	197.27	85.13	15.65	77.79	17.17	56.81
23-May-11 14:05:00	1153.10	246.02	197.14	85.03	15.72	77.88	17.17	56.91
23-May-11 14:06:00	1152.32	246.17	196.82	85.00	15.68	77.59	17.23	120.39
23-May-11 14:07:00	1156.71	246.05	196.70	85.05	15.65	78.26	17.35	237.05
23-May-11 14:08:00	1157.53	246.17	196.68	85.00	15.67	78.37	17.33	188.09
23-May-11 14:09:00	1157.96	246.08	196.67	85.00	15.71	78.29	17.24	84.20
23-May-11 14:10:00	1153.17	245.95	196.80	85.00	15.68	78.14	17.19	72.84
23-May-11 14:11:00	1148.04	246.13	196.81	85.00	15.73	77.77	17.22	79.95
23-May-11 14:12:00	1147.45	246.10	196.65	84.98	15.67	77.37	17.24	69.75
23-May-11 14:13:00	1149.62	246.06	196.81	84.90	15.67	77.36	17.24	70.52
23-May-11 14:14:00	1152.96	245.92	196.96	84.82	15.62	77.70	17.25	68.34
23-May-11 14:15:00	1144.32	246.14	196.68	84.68	15.69	77.51	17.21	63.72
23-May-11 14:16:00	1145.51	246.00	196.79	84.67	15.69	77.50	17.18	60.35
23-May-11 14:17:00	1146.99	246.10	196.91	84.78	15.71	77.58	17.22	67.46
23-May-11 14:18:00	1150.58	246.00	197.00	85.00	15.68	77.41	17.32	146.89
23-May-11 14:19:00	1156.50	246.17	196.80	85.23	15.65	78.19	17.39	226.48
23-May-11 14:20:00	1154.59	246.19	196.95	85.42	15.71	78.21	17.30	131.24
23-May-11 14:21:00	1155.33	246.11	197.12	85.57	15.68	78.09	17.25	101.54
23-May-11 14:22:00	1156.30	245.69	196.73	85.60	15.67	78.08	17.23	74.93
23-May-11 14:23:00	1153.47	245.42	196.38	85.53	15.68	78.07	17.23	75.71
23-May-11 14:24:00	1153.51	245.46	196.33	85.42	15.71	77.99	17.20	71.32
23-May-11 14:25:00	1153.33	245.55	196.29	85.23	15.69	77.78	17.14	54.07
23-May-11 14:26:00	1151.26	245.53	196.28	85.15	15.67	77.61	17.18	60.36
23-May-11 14:27:00	1140.95	245.61	196.02	85.20	15.63	77.18	17.19	63.64
23-May-11 14:28:00	1144.11	245.52	196.17	85.27	15.66	77.13	17.18	61.96
23-May-11 14:29:00	1145.06	245.55	195.89	85.23	15.64	77.11	17.16	61.02
23-May-11 14:30:00	1144.96	245.51	195.93	85.13	15.66	76.79	17.30	155.50
	1158.41	244.91	196.50	84.31	15.65	78.45	17.20	79.91

Run 1	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsd/m) - Oa 317C_dryair	Vol Reg FG (dsd/m) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
23-May-11 13:46:00	0.71	364.21	80159.66	77118.27	26443.14	51890.17	182.77
23-May-11 13:47:00	0.58	364.53	79816.94	77130.27	26562.20	51878.04	182.52
23-May-11 13:48:00	0.54	365.01	79887.67	76723.88	26611.23	51873.88	184.39
23-May-11 13:49:00	0.55	365.11	79992.06	76760.41	26611.62	51836.87	183.90
23-May-11 13:50:00	0.57	364.32	80013.41	76870.59	26507.75	51801.96	183.54
23-May-11 13:51:00	0.60	364.31	79840.64	76876.02	26518.81	51726.47	183.60
23-May-11 13:52:00	0.57	365.29	79839.70	76761.87	26650.60	51735.93	184.25
23-May-11 13:53:00	0.52	364.66	80053.23	76757.27	26592.77	51776.06	185.24
23-May-11 13:54:00	0.50	364.26	79914.76	76910.15	26701.72	51809.95	184.19
23-May-11 13:55:00	0.35	364.55	79827.29	76866.95	26929.58	51871.93	183.45
23-May-11 13:56:00	0.32	364.72	79891.07	76737.80	26790.55	51855.38	184.31
23-May-11 13:57:00	0.48	364.81	79928.51	76681.16	26674.23	51840.86	184.87
23-May-11 13:58:00	0.49	365.52	79947.94	76795.58	26693.70	51814.33	183.83
23-May-11 13:59:00	0.51	365.66	80102.98	76791.12	26675.12	51738.61	184.58
23-May-11 14:00:00	0.48	365.29	80135.28	76953.13	26650.85	51663.14	184.39
23-May-11 14:01:00	0.44	364.95	80053.64	76935.69	26625.88	51634.99	184.22
23-May-11 14:02:00	0.57	365.19	79979.27	76836.11	26600.47	51785.28	183.28
23-May-11 14:03:00	0.60	365.00	80032.20	76861.18	26518.88	51875.73	183.97
23-May-11 14:04:00	0.62	365.24	79989.81	76901.42	26530.46	51934.09	183.43
23-May-11 14:05:00	0.63	365.28	80042.54	76874.92	26527.48	51946.36	184.33
23-May-11 14:06:00	0.59	364.59	80051.77	76928.89	26565.92	51888.24	184.73
23-May-11 14:07:00	0.42	364.15	79901.07	76972.82	26738.11	51859.77	183.73
23-May-11 14:08:00	0.29	365.11	79803.19	76764.81	26809.90	51761.36	184.88
23-May-11 14:09:00	0.48	365.50	80013.86	76547.98	26667.01	51731.17	186.60
23-May-11 14:10:00	0.62	364.99	80100.56	76838.76	26535.11	51715.86	185.39
23-May-11 14:11:00	0.52	364.84	79986.82	76997.88	26592.13	51725.10	185.21
23-May-11 14:12:00	0.45	365.56	79954.64	76815.62	26679.97	51692.61	185.23
23-May-11 14:13:00	0.57	365.32	80113.03	76755.69	26633.83	51633.90	184.14
23-May-11 14:14:00	0.50	365.49	80059.08	77006.39	26670.31	51664.42	184.07
23-May-11 14:15:00	0.49	365.08	80098.45	76891.93	26605.82	51782.11	185.40
23-May-11 14:16:00	0.52	364.78	80007.92	76893.30	26539.22	51903.34	185.25
23-May-11 14:17:00	0.51	364.76	79942.46	76819.96	26583.92	51964.44	184.97
23-May-11 14:18:00	0.37	365.52	79937.86	76766.34	26800.33	51893.76	185.67
23-May-11 14:19:00	0.27	365.30	80103.40	76734.47	26914.05	51810.08	186.08
23-May-11 14:20:00	0.25	364.87	80056.54	76865.24	26768.54	51821.54	185.89
23-May-11 14:21:00	0.41	365.45	79962.28	76722.39	26703.90	51751.85	185.82
23-May-11 14:22:00	0.52	365.33	80087.68	76744.02	26635.40	51640.70	185.45
23-May-11 14:23:00	0.39	365.59	80062.04	76922.21	26687.84	51612.89	184.74
23-May-11 14:24:00	0.48	365.68	80120.30	76783.35	26640.06	51748.27	185.86
23-May-11 14:25:00	0.72	364.88	80138.52	76907.94	26443.72	51887.38	184.19
23-May-11 14:26:00	0.64	365.19	79964.45	77086.14	26528.79	51993.32	183.84
23-May-11 14:27:00	0.52	365.06	80030.55	76861.64	26566.41	51997.27	184.27
23-May-11 14:28:00	0.59	364.92	80003.40	76836.85	26528.53	51814.13	184.18
23-May-11 14:29:00	0.57	363.14	79973.07	76860.52	26375.20	51727.31	185.62
23-May-11 14:30:00	0.47	364.67	79581.61	76799.49	26690.67	51739.76	185.39
	0.64	366.52	80326.34	77244.28	26649.62	51685.82	182.75

B Cat WGS ICR Performance Test
May 25-26, 2011

Run No.	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H ₂ O) 317P1177A	WGS Liquid to Gas Ratio (gal/MSCF) 317C_WGS_L_G_RATIO	Vol Reg FG (discfm) Or	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	CO ₂ (WGS CEMS) (% by vol. dry) 317A1109	CO (WGS CEMS) (ppmv. dry) 317A1111	O ₂ (WGS CEMS) (% by vol. dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air
1	42.37	21.53	185.07	75429	26075	52574	17.31	76.10	0.70	357.09
2	42.19	21.44	185.05	73816	25628	52052	17.32	137.88	0.54	350.16
3	41.97	21.51	183.40	76782	26383	52514	17.25	57.83	0.88	362.99
Average	42.18	21.49	184.51	75343	26029	52380	17.29	90.61	0.71	356.74

Mercury/Hexavalent Chromium

5/25/2011 11:10
5/25/2011 14:19

1m

Run 1	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FH113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FH105
25-May-11 11:10:00	77.92	42.07	21.62	120	258.47	86.32	1138.91
25-May-11 11:11:00	77.99	42.40	21.64	120	258.94	86.11	1145.81
25-May-11 11:12:00	78.12	42.63	21.75	119	258.53	86.04	1149.45
25-May-11 11:13:00	78.17	42.43	21.84	119	258.51	86.18	1141.29
25-May-11 11:14:00	78.05	42.37	21.68	119	258.36	86.26	1141.98
25-May-11 11:15:00	78.08	42.43	21.67	120	258.20	86.27	1153.43
25-May-11 11:16:00	78.01	42.54	21.69	120	257.35	86.56	1143.16
25-May-11 11:17:00	78.00	42.52	21.48	120	257.92	86.47	1141.78
25-May-11 11:18:00	77.94	42.46	21.83	120	258.35	86.13	1142.72
25-May-11 11:19:00	78.15	42.49	21.90	120	257.65	86.56	1143.02
25-May-11 11:20:00	78.02	42.62	21.61	120	257.75	86.61	1140.55
25-May-11 11:21:00	77.95	42.59	21.50	119	257.27	86.75	1141.29
25-May-11 11:22:00	77.98	42.60	21.65	119	258.97	86.22	1139.91
25-May-11 11:23:00	78.00	42.37	21.61	119	257.22	86.97	1146.29
25-May-11 11:24:00	77.97	42.49	21.62	120	257.51	86.91	1150.48
25-May-11 11:25:00	78.12	42.19	21.63	120	258.00	86.58	1142.36
25-May-11 11:26:00	78.02	42.23	21.63	119	257.06	86.62	1142.80
25-May-11 11:27:00	78.00	42.39	21.54	119	256.69	86.74	1155.16
25-May-11 11:28:00	77.82	42.56	21.60	119	256.99	87.00	1142.90
25-May-11 11:29:00	77.89	42.32	21.66	119	257.38	86.96	1145.59
25-May-11 11:30:00	78.09	42.30	21.66	119	258.43	86.52	1146.84
25-May-11 11:31:00	77.82	42.28	21.72	119	259.20	86.03	1145.42
25-May-11 11:32:00	77.80	42.57	21.59	119	257.45	86.74	1142.20
25-May-11 11:33:00	77.99	42.54	21.75	119	258.96	86.17	1142.56
25-May-11 11:34:00	78.01	42.61	21.67	119	258.21	86.57	1142.22
25-May-11 11:35:00	78.00	42.53	21.73	119	257.74	87.25	1148.75
25-May-11 11:36:00	77.96	42.30	21.70	119	259.57	86.77	1150.84
25-May-11 11:37:00	77.81	42.25	21.60	119	259.89	86.36	1136.39
25-May-11 11:38:00	77.87	42.37	21.50	119	258.52	86.71	1132.62
25-May-11 11:39:00	77.82	42.30	21.58	119	257.83	86.88	1138.10
25-May-11 11:40:00	77.92	42.52	21.53	120	256.94	87.26	1144.50
25-May-11 11:41:00	77.89	42.72	21.65	120	258.58	86.65	1145.49
25-May-11 11:42:00	77.99	42.66	21.73	120	258.19	86.84	1142.83
25-May-11 11:43:00	78.08	42.83	21.73	120	260.31	86.06	1142.56
25-May-11 11:44:00	77.91	42.70	21.49	120	260.53	85.87	1142.09
25-May-11 11:45:00	78.02	42.65	21.46	120	258.73	86.72	1140.58
25-May-11 11:46:00	78.03	42.56	21.32	120	257.92	86.96	1141.75
25-May-11 11:47:00	77.94	42.54	21.63	120	258.88	86.21	1144.98
25-May-11 11:48:00	77.90	42.69	21.65	120	258.30	86.70	1141.01
25-May-11 11:49:00	77.95	42.62	21.63	120	257.82	86.79	1133.04
25-May-11 11:50:00	78.02	42.50	21.54	120	258.41	86.18	1131.57
25-May-11 11:51:00	77.90	42.53	21.58	120	258.25	86.32	1137.80
25-May-11 11:52:00	77.89	42.43	21.74	119	258.07	86.42	1143.57
25-May-11 11:53:00	77.77	42.56	21.53	120	255.96	87.28	1144.36
25-May-11 11:54:00	77.78	42.48	21.37	120	254.54	87.82	1145.88
25-May-11 11:55:00	77.91	42.36	21.40	120	256.76	87.14	1144.24
25-May-11 11:56:00	77.93	42.28	21.36	119	256.95	87.06	1142.39
25-May-11 11:57:00	77.85	42.45	21.40	119	256.46	86.92	1141.65
25-May-11 11:58:00	77.97	42.60	21.34	120	255.21	87.39	1142.13
25-May-11 11:59:00	77.89	42.31	21.53	120	257.43	86.73	1146.82

Mercury/Hexavalent C

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TH112	Tempered Air Temp (oF) 317TH120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI09	CO (WGS CEMS) (ppmv, dry) 317AI111
25-May-11 11:10:00	1163.58	246.42	201.37	86.10	15.53	79.71	17.17	41.79
25-May-11 11:11:00	1166.84	246.45	201.49	86.02	15.53	79.51	17.17	41.41
25-May-11 11:12:00	1165.55	246.48	201.67	85.80	15.55	79.05	17.19	42.03
25-May-11 11:13:00	1161.12	246.31	201.52	85.60	15.56	78.76	17.25	43.85
25-May-11 11:14:00	1160.66	246.42	201.13	85.53	15.57	78.73	17.23	43.61
25-May-11 11:15:00	1168.29	246.31	201.01	85.50	15.55	79.10	17.27	61.55
25-May-11 11:16:00	1167.13	246.10	200.70	85.50	15.55	79.85	17.39	94.54
25-May-11 11:17:00	1165.06	246.27	200.68	85.50	15.53	79.79	17.35	83.52
25-May-11 11:18:00	1165.35	246.16	200.35	85.52	15.51	79.80	17.27	56.74
25-May-11 11:19:00	1166.21	246.12	200.39	85.60	15.53	79.91	17.24	49.93
25-May-11 11:20:00	1163.80	246.14	200.20	85.60	15.55	79.75	17.22	47.37
25-May-11 11:21:00	1164.39	246.14	199.93	85.60	15.55	79.69	17.22	45.91
25-May-11 11:22:00	1164.00	246.25	199.86	85.55	15.56	79.53	17.23	45.16
25-May-11 11:23:00	1168.74	246.17	200.00	85.60	15.59	79.43	17.22	46.48
25-May-11 11:24:00	1170.44	246.25	200.13	85.60	15.56	79.40	17.27	49.60
25-May-11 11:25:00	1162.66	246.06	200.04	85.62	15.57	78.98	17.28	47.97
25-May-11 11:26:00	1160.53	245.85	199.71	85.63	15.57	78.83	17.26	46.62
25-May-11 11:27:00	1167.36	245.74	199.53	85.53	15.55	79.13	17.34	68.28
25-May-11 11:28:00	1166.61	245.96	199.55	85.52	15.56	79.81	17.42	102.53
25-May-11 11:29:00	1168.96	246.02	199.41	85.58	15.58	80.07	17.38	91.67
25-May-11 11:30:00	1170.86	245.85	199.45	85.49	15.55	80.29	17.33	69.17
25-May-11 11:31:00	1169.68	245.75	199.37	85.42	15.54	80.29	17.28	55.02
25-May-11 11:32:00	1165.82	245.57	199.24	85.58	15.57	80.06	17.26	49.02
25-May-11 11:33:00	1165.08	245.66	198.98	85.76	15.54	79.85	17.26	48.27
25-May-11 11:34:00	1165.04	245.62	199.11	85.87	15.53	79.61	17.25	46.70
25-May-11 11:35:00	1167.23	245.56	199.10	85.98	15.55	79.32	17.24	46.31
25-May-11 11:36:00	1163.78	245.66	199.18	86.18	15.54	78.88	17.27	48.61
25-May-11 11:37:00	1157.62	245.62	199.03	86.38	15.55	78.59	17.27	47.24
25-May-11 11:38:00	1155.47	245.58	198.97	86.50	15.55	78.59	17.25	45.81
25-May-11 11:39:00	1161.40	245.71	199.11	86.42	15.51	78.96	17.33	70.88
25-May-11 11:40:00	1168.24	245.66	199.00	86.22	15.51	79.90	17.46	127.46
25-May-11 11:41:00	1168.97	245.69	198.99	86.10	15.48	80.03	17.45	121.08
25-May-11 11:42:00	1167.20	245.77	199.35	86.16	15.49	79.97	17.35	65.20
25-May-11 11:43:00	1165.87	245.86	199.69	86.28	15.45	79.89	17.31	55.52
25-May-11 11:44:00	1165.11	246.13	199.82	86.46	15.47	79.86	17.29	51.78
25-May-11 11:45:00	1164.23	246.20	200.13	86.56	15.52	79.79	17.30	53.19
25-May-11 11:46:00	1165.65	246.11	200.20	86.53	15.51	79.67	17.29	50.23
25-May-11 11:47:00	1164.56	246.14	200.35	86.42	15.50	79.35	17.28	49.16
25-May-11 11:48:00	1157.21	246.24	200.49	86.22	15.55	78.88	17.29	51.12
25-May-11 11:49:00	1156.72	246.27	200.85	86.10	15.55	78.96	17.30	49.58
25-May-11 11:50:00	1156.20	246.39	200.96	86.03	15.52	79.05	17.28	49.27
25-May-11 11:51:00	1161.47	246.50	200.98	86.06	15.54	79.12	17.37	97.04
25-May-11 11:52:00	1167.60	246.36	200.85	86.18	15.53	79.95	17.47	170.14
25-May-11 11:53:00	1168.35	246.38	200.79	86.32	15.58	80.07	17.43	138.64
25-May-11 11:54:00	1169.71	246.25	200.68	86.46	15.58	80.20	17.35	79.63
25-May-11 11:55:00	1168.37	246.21	200.25	86.50	15.56	80.17	17.30	61.51
25-May-11 11:56:00	1166.57	246.11	200.07	86.58	15.57	80.06	17.28	55.32
25-May-11 11:57:00	1164.84	246.16	199.92	86.71	15.55	79.80	17.35	68.55
25-May-11 11:58:00	1164.49	246.29	199.70	86.73	15.58	79.54	17.37	70.14
25-May-11 11:59:00	1165.65	246.23	199.41	86.63	15.54	79.39	17.31	53.16

Mercury/Hexavalent C

5/26/2011 11:10
5/26/2011 14:19

1m

O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsdcm) - Oa 317C_dryair	Vol Reg FG (dsdcm) - Or 317C_flegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 1						
25-May-11 11:10:00	0.90	361.73	79221.54	76317.29	52458.26	182.97
25-May-11 11:11:00	0.94	361.45	79272.80	76400.30	52468.20	182.72
25-May-11 11:12:00	0.85	360.28	79211.61	76479.26	52456.06	184.63
25-May-11 11:13:00	0.80	359.92	78955.97	76357.46	52498.02	184.01
25-May-11 11:14:00	0.82	361.07	78877.18	76122.68	52501.75	183.61
25-May-11 11:15:00	0.83	361.86	79129.07	76042.95	52502.44	183.08
25-May-11 11:16:00	0.77	361.33	79302.54	76354.09	52537.56	183.01
25-May-11 11:17:00	0.66	361.11	79185.39	76541.42	52515.01	181.84
25-May-11 11:18:00	0.82	361.24	79138.10	76309.13	52419.11	183.36
25-May-11 11:19:00	0.82	362.17	79165.13	76334.05	52445.47	182.36
25-May-11 11:20:00	0.81	361.49	79369.45	76325.18	52546.75	182.22
25-May-11 11:21:00	0.88	360.56	79221.72	76503.33	52684.77	180.76
25-May-11 11:22:00	0.92	361.19	79017.93	76429.88	52786.07	180.66
25-May-11 11:23:00	0.86	360.86	79155.35	76266.76	52714.23	181.19
25-May-11 11:24:00	0.74	361.36	79083.23	76327.65	52639.45	182.17
25-May-11 11:25:00	0.76	361.89	79193.03	76209.68	52674.54	182.67
25-May-11 11:26:00	0.77	360.21	79307.33	76338.36	52689.81	183.12
25-May-11 11:27:00	0.78	359.51	78940.53	76443.86	52609.39	184.02
25-May-11 11:28:00	0.69	359.77	78786.63	76179.26	52475.81	183.27
25-May-11 11:29:00	0.63	359.77	78842.81	76010.86	52480.92	183.27
25-May-11 11:30:00	0.74	360.75	78844.21	75968.86	52510.43	182.98
25-May-11 11:31:00	0.81	361.31	79058.67	76035.35	52535.77	182.98
25-May-11 11:32:00	0.78	361.13	79180.98	76251.00	52593.41	183.46
25-May-11 11:33:00	0.88	360.71	79142.72	76325.85	52551.22	183.14
25-May-11 11:34:00	0.87	360.27	79049.01	76384.44	52525.08	182.29
25-May-11 11:35:00	0.81	360.86	78952.69	76262.92	52561.13	182.08
25-May-11 11:36:00	0.84	360.31	79082.67	76124.72	52626.69	183.31
25-May-11 11:37:00	0.73	360.85	78963.21	76280.08	52688.14	182.05
25-May-11 11:38:00	0.85	361.59	79080.14	76085.01	52697.81	182.63
25-May-11 11:39:00	0.84	360.77	79243.60	76293.94	52626.97	182.14
25-May-11 11:40:00	0.65	360.10	79064.06	76508.66	52540.74	181.07
25-May-11 11:41:00	0.57	359.52	78916.01	76286.27	52453.23	181.91
25-May-11 11:42:00	0.62	360.20	78789.33	76045.90	52537.11	183.66
25-May-11 11:43:00	0.71	359.36	78939.15	75884.78	52636.82	183.89
25-May-11 11:44:00	0.76	358.27	78754.05	76073.21	52613.48	182.81
25-May-11 11:45:00	0.76	358.68	78516.15	75930.84	52645.69	182.37
25-May-11 11:46:00	0.69	358.11	78603.99	75701.71	52540.18	184.61
25-May-11 11:47:00	0.67	357.73	78479.72	75707.49	52508.22	184.47
25-May-11 11:48:00	0.72	358.63	78397.25	75565.66	52515.51	184.36
25-May-11 11:49:00	0.78	359.48	78594.60	75546.99	52528.54	183.71
25-May-11 11:50:00	0.79	359.49	78779.54	75799.00	52585.41	183.54
25-May-11 11:51:00	0.65	359.71	78783.11	75969.12	52602.06	183.37
25-May-11 11:52:00	0.54	359.31	78830.49	75936.14	52561.12	182.70
25-May-11 11:53:00	0.45	360.10	78743.67	75957.72	52497.91	182.65
25-May-11 11:54:00	0.62	359.28	78916.20	75767.53	52573.84	183.29
25-May-11 11:55:00	0.72	358.33	78735.72	76020.41	52656.29	182.53
25-May-11 11:56:00	0.72	358.91	78528.12	75876.96	52610.46	182.23
25-May-11 11:57:00	0.64	359.07	78654.80	75663.56	52603.30	182.52
25-May-11 11:58:00	0.55	359.97	78690.04	75760.93	52598.42	183.33
25-May-11 11:59:00	0.69	360.01	78887.13	75747.17	52554.36	183.67

Run 1	Scrubbing Liquid		Pump Pressure	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	Lower Circulation (psig)	Lower Circulation (psig)					
	317P1105B	317P1108	317P1177A	317FC202	317FC115	317F1113	317F1105	
25-May-11 12:00:00	77.87	42.66	21.38	121	257.42	86.67	1146.07	
25-May-11 12:01:00	77.91	42.47	21.46	121	256.67	86.83	1138.89	
25-May-11 12:02:00	77.97	42.54	21.58	120	257.02	86.46	1133.03	
25-May-11 12:03:00	77.94	42.59	21.58	120	256.74	86.83	1137.68	
25-May-11 12:04:00	77.92	42.23	21.53	120	257.56	86.44	1144.74	
25-May-11 12:05:00	78.13	41.99	21.37	120	256.03	87.18	1144.65	
25-May-11 12:06:00	78.10	42.60	21.61	120	255.16	87.48	1145.04	
25-May-11 12:07:00	78.03	42.70	21.64	120	256.90	86.86	1143.01	
25-May-11 12:08:00	78.03	42.40	21.42	119	256.66	86.92	1140.27	
25-May-11 12:09:00	78.12	42.25	21.61	120	255.23	87.27	1139.71	
25-May-11 12:10:00	77.99	42.08	21.79	121	257.39	86.79	1140.59	
25-May-11 12:11:00	77.81	42.38	21.66	120	257.83	86.60	1141.07	
25-May-11 12:12:00	77.80	42.53	21.57	120	257.23	86.90	1134.83	
25-May-11 12:13:00	77.98	42.55	21.54	120	257.36	86.92	1137.81	
25-May-11 12:14:00	78.01	42.35	21.36	119	255.55	87.15	1134.13	
25-May-11 12:15:00	77.95	42.28	21.38	120	254.74	87.42	1138.80	
25-May-11 12:16:00	77.97	42.40	21.61	119	256.02	87.35	1145.44	
25-May-11 12:17:00	78.04	42.49	21.62	119	256.50	87.27	1144.37	
25-May-11 12:18:00	77.92	42.59	21.56	120	257.40	86.72	1144.42	
25-May-11 12:19:00	77.88	42.64	21.49	120	256.12	87.12	1143.36	
25-May-11 12:20:00	78.09	42.31	21.68	120	256.28	86.86	1140.13	
25-May-11 12:21:00	77.86	42.15	21.58	120	255.70	86.93	1140.37	
25-May-11 12:22:00	77.91	42.55	21.76	120	256.72	86.58	1140.93	
25-May-11 12:23:00	78.00	42.55	21.80	120	256.28	86.71	1140.10	
25-May-11 12:24:00	78.00	42.54	21.62	120	257.06	86.77	1135.17	
25-May-11 12:25:00	78.07	42.57	21.57	120	256.68	86.92	1137.00	
25-May-11 12:26:00	78.00	42.26	21.57	120	256.95	86.99	1133.26	
25-May-11 12:27:00	78.01	42.06	21.63	120	257.87	86.71	1136.66	
25-May-11 12:28:00	77.86	42.49	21.64	120	258.48	86.59	1144.03	
25-May-11 12:29:00	78.04	42.62	21.69	120	258.52	86.81	1145.02	
25-May-11 12:30:00	78.07	42.60	21.69	120	257.89	87.11	1145.55	
25-May-11 12:31:00	77.89	42.47	21.72	119	259.09	86.46	1144.91	
25-May-11 12:32:00	77.77	42.32	21.49	120	258.79	86.38	1140.57	
25-May-11 12:33:00	77.96	42.29	21.45	120	256.49	87.21	1140.18	
25-May-11 12:34:00	78.12	42.48	21.42	120	257.29	87.11	1140.52	
25-May-11 12:35:00	78.11	42.68	21.68	121	258.21	87.07	1140.92	
25-May-11 12:36:00	78.11	42.38	21.76	120	258.37	86.91	1132.50	
25-May-11 12:37:00	77.95	42.65	21.63	119	256.31	87.57	1131.39	
25-May-11 12:38:00	78.13	42.81	21.68	119	256.26	87.27	1129.80	
25-May-11 12:39:00	78.04	42.76	21.77	119	256.64	87.46	1137.06	
25-May-11 12:40:00	77.95	42.58	21.75	120	256.29	87.90	1142.33	
25-May-11 12:41:00	78.02	42.40	21.55	120	257.54	87.26	1143.01	
25-May-11 12:42:00	77.89	42.53	21.60	120	256.86	87.47	1141.99	
25-May-11 12:43:00	77.95	42.72	21.81	120	258.18	87.04	1141.96	
25-May-11 12:44:00	77.97	42.44	21.86	120	257.48	87.32	1141.24	
25-May-11 12:45:00	77.89	42.52	21.80	121	257.17	87.29	1140.82	
25-May-11 12:46:00	78.00	42.40	21.82	121	257.92	86.77	1142.51	
25-May-11 12:47:00	78.02	42.40	21.66	121	256.78	87.00	1139.97	
25-May-11 12:48:00	78.00	42.66	21.59	120	256.43	87.02	1130.84	
25-May-11 12:49:00	77.84	42.74	21.77	121	256.73	87.00	1134.45	

Run 1	Run 1														
	#2 Stand Pipe Aeration Air to Regen (lbs/min)	317FI106	Air to Regen Temp B-1 Outlet (oF)	317TI1112	Tempered Air Temp (oF)	317TI1120	Ambient Air Temp (oF)	DWS AT	Air to Regen Pressure Blower Discharge (psig)	317PC039	Plant Air to 45lb Air (psig)	317PC088	CO2 (WGS CEMS) (% by vol. dry)	317AI109	CO (WGS CEMS) (ppmv, dry)
25-May-11 12:00:00	1159.34	246.22	199.37	86.60	15.56	78.88	17.28	51.32							
25-May-11 12:01:00	1159.43	246.25	199.18	86.65	15.56	78.78	17.28	53.09							
25-May-11 12:02:00	1155.68	246.11	198.76	86.52	15.56	78.64	17.24	45.13							
25-May-11 12:03:00	1160.89	246.01	198.83	86.32	15.60	78.94	17.28	70.44							
25-May-11 12:04:00	1169.01	245.87	198.63	86.18	15.54	80.00	17.43	144.59							
25-May-11 12:05:00	1169.12	246.09	198.57	86.17	15.58	80.14	17.41	142.16							
25-May-11 12:06:00	1169.44	246.14	198.76	86.35	15.58	80.16	17.25	55.37							
25-May-11 12:07:00	1166.46	246.26	198.88	86.60	15.55	79.92	17.23	48.01							
25-May-11 12:08:00	1163.90	246.25	199.09	86.94	15.57	79.73	17.26	50.28							
25-May-11 12:09:00	1163.84	246.14	199.24	87.20	15.57	79.70	17.27	49.07							
25-May-11 12:10:00	1164.11	246.29	199.28	87.46	15.56	79.44	17.24	44.33							
25-May-11 12:11:00	1163.00	246.25	199.23	87.50	15.58	79.17	17.25	45.44							
25-May-11 12:12:00	1155.01	246.08	199.15	87.48	15.60	78.85	17.25	45.60							
25-May-11 12:13:00	1158.25	245.66	198.91	87.39	15.62	78.77	17.29	46.74							
25-May-11 12:14:00	1157.52	245.56	198.70	87.20	15.63	78.84	17.28	45.66							
25-May-11 12:15:00	1162.05	245.48	198.57	86.92	15.60	79.09	17.32	62.15							
25-May-11 12:16:00	1169.10	245.49	198.49	86.72	15.61	80.00	17.42	121.44							
25-May-11 12:17:00	1168.38	245.53	198.22	86.52	15.60	80.01	17.43	140.12							
25-May-11 12:18:00	1168.33	245.56	197.99	86.32	15.58	80.00	17.35	79.92							
25-May-11 12:19:00	1167.89	245.53	198.01	86.12	15.60	80.03	17.33	61.11							
25-May-11 12:20:00	1164.48	245.60	198.13	86.02	15.59	79.85	17.34	57.18							
25-May-11 12:21:00	1164.80	245.52	198.23	86.20	15.58	79.73	17.33	51.89							
25-May-11 12:22:00	1163.84	245.59	198.24	86.48	15.56	79.50	17.33	54.12							
25-May-11 12:23:00	1162.52	245.77	198.31	86.75	15.56	79.28	17.31	53.43							
25-May-11 12:24:00	1156.45	246.18	198.50	86.98	15.58	79.01	17.29	48.74							
25-May-11 12:25:00	1158.76	246.14	198.56	87.18	15.59	78.88	17.35	53.43							
25-May-11 12:26:00	1156.27	246.29	198.60	87.30	15.59	78.78	17.34	53.52							
25-May-11 12:27:00	1160.14	246.20	198.87	87.23	15.55	78.97	17.38	99.60							
25-May-11 12:28:00	1167.48	246.10	199.31	87.15	15.54	79.84	17.49	191.65							
25-May-11 12:29:00	1169.15	246.14	199.28	87.20	15.55	80.03	17.44	155.13							
25-May-11 12:30:00	1169.03	246.07	199.35	87.20	15.56	80.08	17.32	66.03							
25-May-11 12:31:00	1168.45	246.10	199.30	87.12	15.52	80.10	17.30	54.03							
25-May-11 12:32:00	1164.10	246.12	199.44	87.00	15.50	79.86	17.29	53.62							
25-May-11 12:33:00	1163.10	246.05	199.50	86.92	15.52	79.67	17.28	52.48							
25-May-11 12:34:00	1165.18	246.32	199.79	86.80	15.52	79.58	17.28	49.78							
25-May-11 12:35:00	1163.60	246.69	200.01	86.80	15.55	79.38	17.28	50.27							
25-May-11 12:36:00	1154.84	246.65	200.54	86.82	15.55	79.02	17.26	47.40							
25-May-11 12:37:00	1155.11	246.72	200.47	86.88	15.60	78.81	17.27	49.06							
25-May-11 12:38:00	1154.30	246.81	200.54	86.79	15.56	78.72	17.27	47.00							
25-May-11 12:39:00	1160.15	246.64	200.56	86.70	15.57	78.88	17.32	65.26							
25-May-11 12:40:00	1166.32	246.75	200.63	86.77	15.59	79.75	17.41	121.46							
25-May-11 12:41:00	1166.94	246.73	200.69	86.82	15.53	79.88	17.43	137.44							
25-May-11 12:42:00	1165.80	246.67	200.80	86.96	15.55	79.82	17.35	77.87							
25-May-11 12:43:00	1165.40	246.87	201.11	87.08	15.53	79.81	17.29	54.09							
25-May-11 12:44:00	1164.31	247.09	201.24	87.28	15.57	79.85	17.29	51.44							
25-May-11 12:45:00	1162.98	246.93	201.34	87.46	15.54	79.77	17.29	51.84							
25-May-11 12:46:00	1166.26	247.23	201.30	87.52	15.53	79.71	17.29	51.67							
25-May-11 12:47:00	1163.20	247.05	201.15	87.61	15.55	79.48	17.27	48.56							
25-May-11 12:48:00	1152.81	247.08	201.13	87.71	15.54	79.04	17.29	50.05							
25-May-11 12:49:00	1156.19	247.42	201.24	87.82	15.55	78.97	17.33	55.51							

Run 1	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsd/m) - Oa 317C_dryair	Vol Reg FG (dsd/m) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
25-May-11 12:00:00	0.79	358.85	78896.55	76000.70	26140.78	52550.31	183.35
25-May-11 12:01:00	0.82	358.56	78643.05	76087.70	26112.02	52603.11	183.41
25-May-11 12:02:00	0.75	358.55	78678.13	75855.68	26088.05	52470.76	183.95
25-May-11 12:03:00	0.82	358.00	78576.31	75704.63	26079.38	52364.22	184.27
25-May-11 12:04:00	0.70	358.75	78455.61	75820.09	26345.30	52476.91	182.93
25-May-11 12:05:00	0.53	360.35	78619.99	75703.25	26483.47	52547.30	182.86
25-May-11 12:06:00	0.82	359.46	78970.40	75705.81	26148.43	52701.21	182.98
25-May-11 12:07:00	0.89	358.03	78776.24	76160.76	25995.81	52786.93	182.58
25-May-11 12:08:00	0.76	357.95	78462.67	76004.04	26064.02	52680.41	183.92
25-May-11 12:09:00	0.72	359.11	78445.37	75614.49	26165.74	52535.72	183.71
25-May-11 12:10:00	0.80	357.85	78699.80	75575.56	26017.58	52506.93	184.02
25-May-11 12:11:00	0.74	357.17	78424.14	75860.28	25993.48	52513.49	185.05
25-May-11 12:12:00	0.73	356.24	78273.32	75549.72	25933.89	52483.38	183.99
25-May-11 12:13:00	0.70	356.49	78069.22	75391.81	26005.91	52649.89	184.16
25-May-11 12:14:00	0.80	357.17	78124.33	75217.16	26020.18	52767.27	185.15
25-May-11 12:15:00	0.83	357.02	78273.32	75351.88	26042.53	52760.61	184.64
25-May-11 12:16:00	0.67	356.77	78240.27	75564.57	26189.29	52733.14	182.54
25-May-11 12:17:00	0.53	356.53	78185.55	75461.01	26219.30	52706.64	184.43
25-May-11 12:18:00	0.65	356.63	78134.48	75302.88	26106.42	52687.14	184.64
25-May-11 12:19:00	0.67	357.51	78155.69	75283.99	26139.86	52583.19	184.06
25-May-11 12:20:00	0.70	359.31	78348.62	75307.53	26267.64	52516.15	184.92
25-May-11 12:21:00	0.68	357.71	78743.79	75517.25	26139.37	52521.53	185.34
25-May-11 12:22:00	0.72	357.27	78392.52	75881.35	26105.77	52514.45	183.33
25-May-11 12:23:00	0.66	358.30	78296.85	75577.14	26175.86	52528.52	184.02
25-May-11 12:24:00	0.68	358.05	78520.73	75410.05	26126.82	52571.09	184.73
25-May-11 12:25:00	0.65	358.32	78467.44	75633.85	26219.84	52609.63	182.86
25-May-11 12:26:00	0.58	358.43	78526.92	75598.02	26238.38	52652.69	183.39
25-May-11 12:27:00	0.67	357.41	78550.19	75592.78	26187.79	52618.71	183.66
25-May-11 12:28:00	0.58	358.44	78326.58	75740.26	26429.66	52574.10	183.47
25-May-11 12:29:00	0.46	359.12	78552.41	75531.26	26444.06	52581.97	182.73
25-May-11 12:30:00	0.61	357.77	78700.84	75594.24	26158.96	52606.84	183.24
25-May-11 12:31:00	0.70	358.06	78404.72	75766.49	26132.38	52640.25	182.85
25-May-11 12:32:00	0.67	358.42	78469.82	75541.79	26156.29	52674.82	182.81
25-May-11 12:33:00	0.63	358.42	78547.64	75566.25	26159.54	52655.98	182.60
25-May-11 12:34:00	0.71	358.44	78546.92	75602.09	26137.10	52612.13	183.59
25-May-11 12:35:00	0.75	359.19	78552.34	75676.47	26181.90	52598.80	182.37
25-May-11 12:36:00	0.79	358.73	78717.10	75712.79	26112.86	52637.45	183.21
25-May-11 12:37:00	0.77	358.30	78616.35	75893.26	26099.42	52677.96	182.30
25-May-11 12:38:00	0.67	359.09	78521.26	75776.14	26181.44	52680.48	182.57
25-May-11 12:39:00	0.71	359.13	78694.15	75600.42	26234.82	52715.46	181.96
25-May-11 12:40:00	0.68	357.79	78704.99	75866.05	26247.18	53007.74	182.45
25-May-11 12:41:00	0.52	357.94	78408.50	75911.00	26329.67	52664.74	182.96
25-May-11 12:42:00	0.56	358.92	78442.67	75497.40	26290.58	52398.37	185.04
25-May-11 12:43:00	0.73	358.92	78658.43	75503.29	26175.72	52653.47	183.33
25-May-11 12:44:00	0.76	357.91	78658.55	75810.83	26087.74	52592.34	184.02
25-May-11 12:45:00	0.62	357.26	78436.41	75821.56	26085.84	52606.25	184.60
25-May-11 12:46:00	0.65	356.89	78293.30	75488.06	26047.66	52640.06	183.35
25-May-11 12:47:00	0.70	357.00	78211.71	75380.50	26023.53	52667.74	182.68
25-May-11 12:48:00	0.72	357.23	78237.43	75331.89	26052.59	52619.41	184.33
25-May-11 12:49:00	0.71	357.93	78287.82	75393.74	26155.86	52593.49	185.08

Run 1	Scrubbing Liquid		Pump Pressure	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	Lower Circulation (psig)	317P1108					
317P1105B	317P1108	317FC202	317FC115	317F1113	317F1105			
25-May-11 12:50:00	77.86	42.57	21.68	120	256.74	87.04	1133.02	
25-May-11 12:51:00	77.91	42.52	21.62	120	257.66	86.88	1138.63	
25-May-11 12:52:00	78.07	42.61	21.59	120	258.30	86.73	1144.83	
25-May-11 12:53:00	78.03	42.81	21.47	121	258.10	87.12	1144.55	
25-May-11 12:54:00	78.11	42.87	21.64	121	258.01	86.87	1146.11	
25-May-11 12:55:00	78.12	42.74	21.66	121	257.42	86.98	1145.34	
25-May-11 12:56:00	77.99	42.71	21.47	120	256.79	87.26	1142.10	
25-May-11 12:57:00	77.86	42.46	21.68	121	258.26	86.55	1140.79	
25-May-11 12:58:00	77.75	42.35	21.68	122	255.81	87.15	1142.10	
25-May-11 12:59:00	77.69	42.47	21.32	121	254.87	87.70	1142.84	
25-May-11 13:00:00	77.64	42.55	21.38	121	256.00	87.41	1134.75	
25-May-11 13:01:00	78.02	42.77	21.54	121	256.67	86.87	1135.89	
25-May-11 13:02:00	78.09	42.88	21.39	121	256.14	86.88	1135.06	
25-May-11 13:03:00	78.24	43.11	21.53	121	255.16	87.48	1139.96	
25-May-11 13:04:00	77.98	42.85	21.54	120	257.41	86.73	1146.58	
25-May-11 13:05:00	77.97	42.54	21.48	121	257.10	86.85	1148.54	
25-May-11 13:06:00	78.04	42.35	21.31	122	255.14	87.62	1149.09	
25-May-11 13:07:00	77.91	42.46	21.56	121	255.77	87.37	1146.64	
25-May-11 13:08:00	78.06	42.74	21.80	121	255.98	87.24	1144.09	
25-May-11 13:09:00	77.98	42.79	21.40	120	255.45	87.62	1144.06	
25-May-11 13:10:00	77.90	42.73	21.44	120	255.35	87.71	1143.96	
25-May-11 13:11:00	77.83	42.61	21.31	120	254.16	88.00	1142.04	
25-May-11 13:12:00	77.87	42.64	21.48	120	254.23	87.94	1131.87	
25-May-11 13:13:00	77.85	42.41	21.45	121	253.53	88.08	1136.76	
25-May-11 13:14:00	77.84	42.42	21.54	121	254.98	87.65	1136.61	
25-May-11 13:15:00	77.79	42.34	21.59	120	254.60	87.62	1140.31	
25-May-11 13:16:00	77.84	42.39	21.35	120	254.06	87.70	1145.85	
25-May-11 13:17:00	77.89	42.50	21.24	120	253.77	87.65	1144.32	
25-May-11 13:18:00	78.02	42.47	21.37	120	253.28	87.77	1144.38	
25-May-11 13:19:00	78.04	42.52	21.35	120	253.16	87.93	1144.08	
25-May-11 13:20:00	77.85	42.41	21.35	120	254.07	87.70	1140.78	
25-May-11 13:21:00	78.00	42.38	21.43	120	254.06	87.44	1141.69	
25-May-11 13:22:00	78.07	42.29	21.32	120	254.38	87.25	1142.83	
25-May-11 13:23:00	78.08	42.47	21.35	120	252.33	87.91	1141.79	
25-May-11 13:24:00	78.14	42.42	21.32	121	252.71	87.69	1132.59	
25-May-11 13:25:00	78.15	42.19	21.46	121	254.65	87.01	1136.16	
25-May-11 13:26:00	77.95	42.33	21.51	121	253.85	87.40	1134.65	
25-May-11 13:27:00	78.05	42.41	21.34	120	253.97	87.34	1137.85	
25-May-11 13:28:00	78.00	42.35	21.20	121	251.89	88.27	1141.96	
25-May-11 13:29:00	78.01	42.24	21.33	121	252.94	87.97	1142.24	
25-May-11 13:30:00	78.02	42.10	21.43	121	253.20	87.72	1142.09	
25-May-11 13:31:00	77.88	42.09	21.44	120	253.27	87.77	1140.75	
25-May-11 13:32:00	77.91	42.02	21.49	120	254.08	87.52	1135.64	
25-May-11 13:33:00	78.02	42.13	21.51	120	252.78	87.75	1134.52	
25-May-11 13:34:00	78.00	42.13	21.41	120	252.79	87.90	1135.43	
25-May-11 13:35:00	77.75	41.99	21.37	121	254.02	87.43	1132.12	
25-May-11 13:36:00	77.87	41.71	21.42	121	254.52	87.19	1120.21	
25-May-11 13:37:00	78.03	41.64	21.38	120	254.49	87.30	1123.10	
25-May-11 13:38:00	78.06	42.13	21.22	120	254.44	87.08	1122.57	
25-May-11 13:39:00	78.02	42.32	21.49	120	255.60	86.87	1130.36	

Run 1	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
25-May-11 12:50:00	1155.76	247.35	201.46	87.92	15.58	78.97	17.31	53.01
25-May-11 12:51:00	1161.98	247.36	201.79	88.05	15.58	79.25	17.35	95.13
25-May-11 12:52:00	1167.89	247.31	201.93	88.00	15.56	80.11	17.47	219.71
25-May-11 12:53:00	1169.14	247.55	202.00	88.02	15.59	80.20	17.47	220.01
25-May-11 12:54:00	1170.88	247.64	202.09	88.11	15.54	80.39	17.39	86.27
25-May-11 12:55:00	1169.64	247.52	201.96	88.20	15.57	80.40	17.35	71.19
25-May-11 12:56:00	1167.10	247.54	202.01	88.13	15.56	80.27	17.33	58.26
25-May-11 12:57:00	1164.48	247.54	201.99	88.02	15.56	80.01	17.32	58.59
25-May-11 12:58:00	1165.35	247.61	201.96	87.82	15.59	79.76	17.33	61.91
25-May-11 12:59:00	1165.24	247.50	201.98	87.70	15.57	79.68	17.35	61.34
25-May-11 13:00:00	1156.08	247.32	201.86	87.77	15.55	79.39	17.34	59.99
25-May-11 13:01:00	1159.12	247.38	201.60	87.87	15.53	79.45	17.34	58.90
25-May-11 13:02:00	1159.37	247.54	201.28	87.98	15.57	79.54	17.36	59.17
25-May-11 13:03:00	1164.07	247.46	201.39	88.10	15.59	79.56	16.12	128.45
25-May-11 13:04:00	1172.09	247.46	201.39	88.16	15.53	80.57	15.29	263.45
25-May-11 13:05:00	1172.50	247.61	201.61	88.12	15.55	80.67	17.43	215.40
25-May-11 13:06:00	1173.49	247.61	201.87	88.00	15.58	80.77	17.38	84.87
25-May-11 13:07:00	1171.26	247.71	201.76	88.00	15.56	80.66	17.32	64.16
25-May-11 13:08:00	1168.71	247.71	201.86	88.02	15.58	80.42	17.33	71.16
25-May-11 13:09:00	1166.40	247.63	202.07	88.08	15.59	80.26	17.37	80.61
25-May-11 13:10:00	1167.35	247.45	201.77	87.99	15.60	79.96	17.37	68.63
25-May-11 13:11:00	1165.64	247.49	201.38	87.90	15.58	79.74	17.36	70.22
25-May-11 13:12:00	1154.65	247.46	201.18	87.84	15.61	79.27	17.32	55.18
25-May-11 13:13:00	1157.02	247.39	200.91	87.72	15.61	78.94	17.34	61.75
25-May-11 13:14:00	1157.72	247.34	200.32	87.54	15.65	78.98	17.37	71.12
25-May-11 13:15:00	1163.00	247.20	199.93	87.56	15.62	79.25	17.42	101.75
25-May-11 13:16:00	1169.50	246.99	199.72	87.66	15.60	80.10	17.48	151.58
25-May-11 13:17:00	1167.85	246.79	199.40	87.77	15.57	79.93	17.42	121.45
25-May-11 13:18:00	1167.32	246.76	199.07	87.87	15.59	79.83	17.38	89.97
25-May-11 13:19:00	1167.82	246.51	198.76	87.90	15.59	79.96	17.35	70.47
25-May-11 13:20:00	1164.94	246.77	198.44	87.88	15.58	79.89	17.33	66.02
25-May-11 13:21:00	1165.13	246.83	198.07	87.72	15.55	79.86	17.37	77.62
25-May-11 13:22:00	1164.92	246.78	197.98	87.62	15.59	79.54	17.37	73.68
25-May-11 13:23:00	1162.37	246.73	197.96	87.78	15.61	79.25	17.33	57.63
25-May-11 13:24:00	1155.01	246.88	197.80	87.98	15.59	79.27	17.34	62.89
25-May-11 13:25:00	1157.54	246.91	197.55	88.18	15.60	79.10	17.34	60.75
25-May-11 13:26:00	1158.44	247.08	197.60	88.23	15.63	79.17	17.31	52.68
25-May-11 13:27:00	1161.25	247.11	197.59	88.20	15.59	79.12	17.38	91.48
25-May-11 13:28:00	1165.72	247.16	197.58	88.20	15.62	79.70	17.48	194.34
25-May-11 13:29:00	1165.16	247.14	197.44	88.27	15.61	79.62	17.45	198.15
25-May-11 13:30:00	1164.62	247.00	197.14	88.37	15.59	79.44	17.38	88.40
25-May-11 13:31:00	1163.45	246.77	196.86	88.40	15.58	79.33	17.36	84.88
25-May-11 13:32:00	1159.36	246.76	196.90	88.34	15.61	79.13	17.31	63.96
25-May-11 13:33:00	1156.95	246.89	196.98	88.22	15.61	78.85	17.32	62.13
25-May-11 13:34:00	1157.72	247.24	196.93	88.08	15.58	78.57	17.34	65.15
25-May-11 13:35:00	1154.11	247.34	197.04	87.92	15.56	78.25	17.36	76.53
25-May-11 13:36:00	1143.22	247.42	197.19	87.74	15.57	77.92	17.38	78.19
25-May-11 13:37:00	1143.63	247.39	197.51	87.70	15.59	77.50	17.33	56.36
25-May-11 13:38:00	1144.19	247.33	197.71	87.63	15.57	77.33	17.31	53.22
25-May-11 13:39:00	1152.53	247.36	197.62	87.60	15.58	77.73	17.38	78.35

Run 1	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsd/m) - Oa 317C_dryair	Vol Reg FG (dsd/m) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
25-May-11 12:50:00	0.60	358.67	78441.13	75456.39	26218.64	52615.06	183.11
25-May-11 12:51:00	0.70	357.07	78602.69	75504.35	26121.98	52651.84	183.33
25-May-11 12:52:00	0.64	356.32	78522.86	75792.86	26233.90	52651.47	183.39
25-May-11 12:53:00	0.49	356.50	78086.78	75498.96	26286.35	52746.37	184.09
25-May-11 12:54:00	0.55	356.10	78126.09	75206.43	26129.08	52796.46	185.07
25-May-11 12:55:00	0.60	356.50	78039.58	75221.28	26107.16	52677.90	186.09
25-May-11 12:56:00	0.65	357.51	78126.64	75152.05	26135.61	52653.89	185.04
25-May-11 12:57:00	0.70	358.22	78348.02	75253.30	26168.32	52677.74	185.59
25-May-11 12:58:00	0.67	357.46	78504.86	75510.20	26127.51	52614.64	183.98
25-May-11 12:59:00	0.62	356.34	78336.64	75636.63	26083.12	52565.09	184.42
25-May-11 13:00:00	0.64	356.74	78092.31	75450.78	26099.07	52609.10	182.79
25-May-11 13:01:00	0.64	355.57	78178.94	75217.27	26013.29	52610.41	185.47
25-May-11 13:02:00	0.68	355.43	77923.54	75314.19	26015.54	52639.28	187.04
25-May-11 13:03:00	2.68	355.60	77893.35	75115.05	24078.06	52646.75	186.28
25-May-11 13:04:00	4.04	356.43	77929.44	75920.26	22810.21	52581.22	183.99
25-May-11 13:05:00	0.54	357.73	78111.22	76256.23	26324.07	52702.91	182.81
25-May-11 13:06:00	0.54	356.90	78397.43	75224.08	26184.68	52793.89	185.66
25-May-11 13:07:00	0.66	355.69	78215.64	75470.75	25994.55	52727.82	184.76
25-May-11 13:08:00	0.60	355.44	77950.05	75338.71	25997.51	52706.82	185.02
25-May-11 13:09:00	0.63	356.47	77895.82	75046.23	26118.80	52697.28	185.23
25-May-11 13:10:00	0.65	355.55	78120.07	75060.25	26038.51	52603.17	186.79
25-May-11 13:11:00	0.63	356.68	77919.18	75285.98	26114.74	52527.01	186.69
25-May-11 13:12:00	0.64	355.95	78167.44	75060.76	26013.65	52530.31	186.25
25-May-11 13:13:00	0.68	354.86	78007.11	75275.39	25944.89	52572.59	185.35
25-May-11 13:14:00	0.61	355.47	77768.31	75173.48	26047.40	52567.16	185.11
25-May-11 13:15:00	0.56	355.80	77901.06	74906.93	26143.95	52671.89	187.25
25-May-11 13:16:00	0.53	356.41	77973.46	75045.62	26271.95	52826.55	185.10
25-May-11 13:17:00	0.51	356.05	78107.16	75138.73	26182.87	52798.08	184.87
25-May-11 13:18:00	0.61	355.41	78028.60	75203.25	26055.77	52691.02	186.72
25-May-11 13:19:00	0.67	355.60	77889.40	75168.90	26019.90	52631.51	188.31
25-May-11 13:20:00	0.62	354.37	77929.81	75064.62	25920.55	52529.64	186.64
25-May-11 13:21:00	0.54	353.54	77660.99	75034.66	25926.49	52433.29	186.53
25-May-11 13:22:00	0.64	354.17	77479.53	74756.13	25942.13	52437.64	186.45
25-May-11 13:23:00	0.64	354.53	77616.92	74653.06	25923.82	52424.60	186.67
25-May-11 13:24:00	0.70	355.70	77695.63	74763.94	26011.04	52475.39	186.82
25-May-11 13:25:00	0.65	356.64	77952.43	74902.00	26084.75	52608.64	186.86
25-May-11 13:26:00	0.67	355.82	78157.68	75090.05	25989.49	52661.54	186.28
25-May-11 13:27:00	0.76	354.85	77979.00	75304.28	25971.42	52623.88	185.90
25-May-11 13:28:00	0.53	354.97	77765.03	75260.51	26171.69	52580.51	185.40
25-May-11 13:29:00	0.45	354.97	77791.89	74929.41	26165.18	52614.33	186.29
25-May-11 13:30:00	0.60	355.15	77791.57	74878.64	26034.76	52675.20	187.26
25-May-11 13:31:00	0.58	355.53	77830.76	74932.07	26047.92	52611.22	188.18
25-May-11 13:32:00	0.65	355.09	77915.36	74928.13	25944.30	52505.87	188.13
25-May-11 13:33:00	0.72	354.81	77818.45	75043.35	25908.18	52418.31	187.33
25-May-11 13:34:00	0.62	353.90	77756.53	75006.59	25893.77	52419.11	187.16
25-May-11 13:35:00	0.55	353.84	77558.32	74870.93	25934.72	52440.04	187.74
25-May-11 13:36:00	0.53	355.75	77544.28	74646.32	26104.03	52459.22	187.85
25-May-11 13:37:00	0.57	355.82	77963.55	74630.88	26034.33	52489.35	187.97
25-May-11 13:38:00	0.61	355.61	77977.36	75022.01	25991.89	52485.57	187.87
25-May-11 13:39:00	0.60	355.94	77933.08	75063.73	26098.88	52539.61	188.80

Run 1	Scrubbing Liquid Upper Circulation (psig) 317P1105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317E1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317E1105
25-May-11 13:40:00	77.91	42.16	21.46	120	254.59	87.41	1136.14
25-May-11 13:41:00	77.74	42.19	21.35	121	255.20	87.07	1138.77
25-May-11 13:42:00	77.81	42.16	21.33	121	254.58	87.01	1138.70
25-May-11 13:43:00	77.82	41.97	21.41	120	253.16	87.69	1136.71
25-May-11 13:44:00	77.95	42.02	21.46	120	252.90	88.01	1134.54
25-May-11 13:45:00	77.97	42.20	21.49	120	254.64	87.22	1135.75
25-May-11 13:46:00	77.93	42.21	21.60	120	255.04	87.14	1137.38
25-May-11 13:47:00	78.03	41.75	21.46	120	255.10	87.36	1134.10
25-May-11 13:48:00	77.93	41.64	21.42	120	254.78	87.27	1124.29
25-May-11 13:49:00	77.85	41.97	21.50	120	254.66	87.05	1126.83
25-May-11 13:50:00	77.98	41.79	21.55	121	253.86	87.05	1123.75
25-May-11 13:51:00	78.04	41.85	21.51	121	254.12	87.05	1131.22
25-May-11 13:52:00	78.04	41.81	21.50	121	253.79	87.63	1138.39
25-May-11 13:53:00	77.83	42.06	21.56	121	255.09	86.82	1137.87
25-May-11 13:54:00	77.75	42.29	21.39	121	254.25	87.15	1138.06
25-May-11 13:55:00	77.73	42.13	21.53	122	254.35	86.97	1136.34
25-May-11 13:56:00	77.94	41.90	21.45	121	255.39	86.66	1132.58
25-May-11 13:57:00	78.00	41.92	21.32	122	255.14	87.12	1131.44
25-May-11 13:58:00	77.96	41.95	21.36	121	254.18	87.61	1133.19
25-May-11 13:59:00	77.91	42.20	21.48	121	254.49	87.42	1131.35
25-May-11 14:00:00	77.88	42.12	21.32	120	254.42	87.28	1119.67
25-May-11 14:01:00	77.90	42.27	21.49	121	254.85	87.03	1124.55
25-May-11 14:02:00	78.07	42.04	21.57	121	254.23	87.31	1124.26
25-May-11 14:03:00	77.98	41.75	21.66	120	254.42	87.27	1131.69
25-May-11 14:04:00	77.94	41.90	21.56	120	255.19	86.88	1140.06
25-May-11 14:05:00	78.23	42.07	21.54	120	255.20	86.99	1139.83
25-May-11 14:06:00	77.80	42.07	21.27	120	254.47	87.55	1139.58
25-May-11 14:07:00	77.92	42.09	21.33	121	253.79	87.71	1137.64
25-May-11 14:08:00	78.14	42.07	21.32	121	253.73	87.58	1134.98
25-May-11 14:09:00	77.90	42.01	21.40	120	255.45	86.90	1133.89
25-May-11 14:10:00	78.19	41.96	21.48	120	255.49	86.97	1136.92
25-May-11 14:11:00	78.25	42.02	21.36	121	254.31	87.29	1135.46
25-May-11 14:12:00	78.04	42.11	21.28	121	253.60	87.69	1124.73
25-May-11 14:13:00	77.94	41.94	21.50	120	255.83	86.72	1127.97
25-May-11 14:14:00	78.06	42.26	21.43	121	255.29	86.54	1126.49
25-May-11 14:15:00	78.03	42.21	21.41	122	254.85	86.77	1131.82
25-May-11 14:16:00	77.95	42.05	21.55	121	256.14	86.40	1138.64
25-May-11 14:17:00	78.07	41.96	21.46	121	253.26	87.67	1138.84
25-May-11 14:18:00	77.79	42.06	21.39	121	254.12	87.38	1138.91
	77.96	42.37	21.53	120.19	256.20	87.05	1139.23

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmw, dry) 317AI111
Run 1								
25-May-11 13:40:00	1160.29	247.18	197.61	87.62	15.61	78.78	17.44	118.57
25-May-11 13:41:00	1161.95	246.82	197.61	87.70	15.58	79.06	17.42	124.29
25-May-11 13:42:00	1161.72	246.73	197.51	87.77	15.57	79.09	17.35	87.98
25-May-11 13:43:00	1160.70	246.78	197.18	87.80	15.60	79.03	17.32	64.13
25-May-11 13:44:00	1157.87	246.85	196.89	87.80	15.59	79.05	17.33	61.05
25-May-11 13:45:00	1157.93	246.76	196.61	87.82	15.58	79.03	17.31	55.27
25-May-11 13:46:00	1159.80	246.71	196.36	87.90	15.59	78.88	17.29	54.91
25-May-11 13:47:00	1156.85	246.32	196.28	87.98	15.64	78.59	17.28	50.30
25-May-11 13:48:00	1147.11	246.11	196.19	88.16	15.59	78.40	17.28	49.75
25-May-11 13:49:00	1147.26	246.17	196.12	88.27	15.60	78.04	17.31	56.82
25-May-11 13:50:00	1146.18	246.22	196.11	88.30	15.59	77.79	17.31	58.10
25-May-11 13:51:00	1153.44	246.41	196.11	88.28	15.57	77.95	17.31	64.92
25-May-11 13:52:00	1160.60	246.64	196.12	88.20	15.61	78.88	17.38	110.89
25-May-11 13:53:00	1160.53	246.68	196.17	88.22	15.54	78.95	17.41	129.01
25-May-11 13:54:00	1161.34	246.80	196.37	88.32	15.56	79.08	17.33	77.99
25-May-11 13:55:00	1159.66	247.04	196.75	88.48	15.53	79.06	17.31	62.56
25-May-11 13:56:00	1155.56	247.38	197.01	88.53	15.53	78.82	17.33	65.17
25-May-11 13:57:00	1153.10	247.39	197.69	88.50	15.58	78.53	17.29	57.86
25-May-11 13:58:00	1153.70	247.39	197.97	88.44	15.57	78.20	17.29	56.10
25-May-11 13:59:00	1151.85	247.58	198.05	88.34	15.56	78.05	17.31	57.88
25-May-11 14:00:00	1142.73	247.73	198.26	88.23	15.55	77.94	17.28	52.22
25-May-11 14:01:00	1145.76	247.98	198.46	88.27	15.54	77.88	17.28	51.91
25-May-11 14:02:00	1149.54	248.05	198.68	88.28	15.57	78.06	17.29	52.84
25-May-11 14:03:00	1154.11	248.01	198.64	88.14	15.56	78.07	17.31	76.41
25-May-11 14:04:00	1162.76	247.85	198.79	88.10	15.54	79.15	17.43	169.01
25-May-11 14:05:00	1163.11	247.91	198.79	88.10	15.56	79.31	17.43	191.21
25-May-11 14:06:00	1162.78	247.99	198.85	88.18	15.59	79.30	17.35	87.12
25-May-11 14:07:00	1161.03	248.04	198.82	88.30	15.59	79.17	17.33	73.97
25-May-11 14:08:00	1158.93	248.02	198.90	88.23	15.56	79.10	17.30	63.92
25-May-11 14:09:00	1158.94	247.97	198.78	88.18	15.56	79.15	17.30	57.95
25-May-11 14:10:00	1158.44	247.97	198.80	88.10	15.57	78.91	17.29	57.59
25-May-11 14:11:00	1156.91	248.00	198.77	88.10	15.55	78.88	17.30	58.19
25-May-11 14:12:00	1149.10	248.04	198.78	88.18	15.59	78.73	17.30	57.01
25-May-11 14:13:00	1147.40	247.97	198.72	88.38	15.56	78.08	17.29	57.39
25-May-11 14:14:00	1148.34	248.02	198.88	88.56	15.57	78.00	17.28	58.85
25-May-11 14:15:00	1154.25	248.13	198.97	88.60	15.55	78.12	17.35	84.53
25-May-11 14:16:00	1162.52	248.05	198.98	88.62	15.52	79.13	17.45	159.61
25-May-11 14:17:00	1163.13	248.14	199.43	88.78	15.56	79.32	17.44	185.84
25-May-11 14:18:00	1162.96	248.59	199.58	88.96	15.53	79.35	17.36	97.19
Run 1								
25-May-11 13:40:00	1160.29	247.18	197.61	87.62	15.61	78.78	17.44	118.57
25-May-11 13:41:00	1161.95	246.82	197.61	87.70	15.58	79.06	17.42	124.29
25-May-11 13:42:00	1161.72	246.73	197.51	87.77	15.57	79.09	17.35	87.98
25-May-11 13:43:00	1160.70	246.78	197.18	87.80	15.60	79.03	17.32	64.13
25-May-11 13:44:00	1157.87	246.85	196.89	87.80	15.59	79.05	17.33	61.05
25-May-11 13:45:00	1157.93	246.76	196.61	87.82	15.58	79.03	17.31	55.27
25-May-11 13:46:00	1159.80	246.71	196.36	87.90	15.59	78.88	17.29	54.91
25-May-11 13:47:00	1156.85	246.32	196.28	87.98	15.64	78.59	17.28	50.30
25-May-11 13:48:00	1147.11	246.11	196.19	88.16	15.59	78.40	17.28	49.75
25-May-11 13:49:00	1147.26	246.17	196.12	88.27	15.60	78.04	17.31	56.82
25-May-11 13:50:00	1146.18	246.22	196.11	88.30	15.59	77.79	17.31	58.10
25-May-11 13:51:00	1153.44	246.41	196.11	88.28	15.57	77.95	17.31	64.92
25-May-11 13:52:00	1160.60	246.64	196.12	88.20	15.61	78.88	17.38	110.89
25-May-11 13:53:00	1160.53	246.68	196.17	88.22	15.54	78.95	17.41	129.01
25-May-11 13:54:00	1161.34	246.80	196.37	88.32	15.56	79.08	17.33	77.99
25-May-11 13:55:00	1159.66	247.04	196.75	88.48	15.53	79.06	17.31	62.56
25-May-11 13:56:00	1155.56	247.38	197.01	88.53	15.53	78.82	17.33	65.17
25-May-11 13:57:00	1153.10	247.39	197.69	88.50	15.58	78.53	17.29	57.86
25-May-11 13:58:00	1153.70	247.39	197.97	88.44	15.57	78.20	17.29	56.10
25-May-11 13:59:00	1151.85	247.58	198.05	88.34	15.56	78.05	17.31	57.88
25-May-11 14:00:00	1142.73	247.73	198.26	88.23	15.55	77.94	17.28	52.22
25-May-11 14:01:00	1145.76	247.98	198.46	88.27	15.54	77.88	17.28	51.91
25-May-11 14:02:00	1149.54	248.05	198.68	88.28	15.57	78.06	17.29	52.84
25-May-11 14:03:00	1154.11	248.01	198.64	88.14	15.56	78.07	17.31	76.41
25-May-11 14:04:00	1162.76	247.85	198.79	88.10	15.54	79.15	17.43	169.01
25-May-11 14:05:00	1163.11	247.91	198.79	88.10	15.56	79.31	17.43	191.21
25-May-11 14:06:00	1162.78	247.99	198.85	88.18	15.59	79.30	17.35	87.12
25-May-11 14:07:00	1161.03	248.04	198.82	88.30	15.59	79.17	17.33	73.97
25-May-11 14:08:00	1158.93	248.02	198.90	88.23	15.56	79.10	17.30	63.92
25-May-11 14:09:00	1158.94	247.97	198.78	88.18	15.56	79.15	17.30	57.95
25-May-11 14:10:00	1158.44	247.97	198.80	88.10	15.57	78.91	17.29	57.59
25-May-11 14:11:00	1156.91	248.00	198.77	88.10	15.55	78.88	17.30	58.19
25-May-11 14:12:00	1149.10	248.04	198.78	88.18	15.59	78.73	17.30	57.01
25-May-11 14:13:00	1147.40	247.97	198.72	88.38	15.56	78.08	17.29	57.39
25-May-11 14:14:00	1148.34	248.02	198.88	88.56	15.57	78.00	17.28	58.85
25-May-11 14:15:00	1154.25	248.13	198.97	88.60	15.55	78.12	17.35	84.53
25-May-11 14:16:00	1162.52	248.05	198.98	88.62	15.52	79.13	17.45	159.61
25-May-11 14:17:00	1163.13	248.14	199.43	88.78	15.56	79.32	17.44	185.84
25-May-11 14:18:00	1162.96	248.59	199.58	88.96	15.53	79.35	17.36	97.19
Run 1								
25-May-11 13:40:00	1160.29	247.18	197.61	87.62	15.61	78.78	17.44	118.57
25-May-11 13:41:00	1161.95	246.82	197.61	87.70	15.58	79.06	17.42	124.29
25-May-11 13:42:00	1161.72	246.73	197.51	87.77	15.57	79.09	17.35	87.98
25-May-11 13:43:00	1160.70	246.78	197.18	87.80	15.60	79.03	17.32	64.13
25-May-11 13:44:00	1157.87	246.85	196.89	87.80	15.59	79.05	17.33	61.05
25-May-11 13:45:00	1157.93	246.76	196.61	87.82	15.58	79.03	17.31	55.27
25-May-11 13:46:00	1159.80	246.71	196.36	87.90	15.59	78.88	17.29	54.91
25-May-11 13:47:00	1156.85	246.32	196.28	87.98	15.64	78.59	17.28	50.30
25-May-11 13:48:00	1147.11	246.11	196.19	88.16	15.59	78.40	17.28	49.75
25-May-11 13:49:00	1147.26	246.17	196.12	88.27	15.60	78.04	17.31	56.82
25-May-11 13:50:00	1146.18	246.22	196.11	88.30	15.59	77.79	17.31	58.10
25-May-11 13:51:00	1153.44	246.41	196.11	88.28	15.57	77.95	17.31	64.92
25-May-11 13:52:00	1160.60	246.64	196.12	88.20	15.61	78.88	17.38	110.89
25-May-11 13:53:00	1160.53	246.68	196.17	88.22	15.54	78.95	17.41	129.01
25-May-11 13:54:00	1161.34	246.80	196.37	88.32	15.56	79.08	17.33	77.99
25-May-11 13:55:00	1159.66	247.04	196.75	88.48	15.53	79.06	17.31	62.56
25-May-11 13:56:00	1155.56	247.38	197.01	88.53	15.53	78.82	17.33	65.17
25-May-11 13:57:00	1153.10	247.39	197.69	88.50	15.58	78.53	17.29	57.86
25-May-11 13:58:00	1153.70	247.39	197.97	88.44	15.57	78.20	17.29	56.10
25-May-11 13:59:00	1151.85	247.58	198.05	88.34	15.56	78.05	17.31	57.88
25-May-11 14:00:00	1142.73	247.73	198.26	88.23	15.55	77.94	17.28	52.22
25-May-11 14:01:00	1145.76	247.98	198.46	88.27	15.54			

Run 1	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsdcm) - Oa 317C_dryair	Vol Reg FG (dsdcm) - Or 317C_fuegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
25-May-11 13:40:00	0.51	355.45	78004.15	75076.32	26164.67	52574.67	190.57
25-May-11 13:41:00	0.42	354.80	77897.12	75115.35	26110.46	52539.64	188.83
25-May-11 13:42:00	0.45	355.35	77753.75	74905.40	26063.47	52500.35	187.03
25-May-11 13:43:00	0.60	354.05	77874.69	74746.98	25894.91	52476.71	188.14
25-May-11 13:44:00	0.63	353.77	77589.53	74960.89	25872.25	52486.73	186.87
25-May-11 13:45:00	0.73	353.84	77528.88	74721.47	25823.35	52486.77	187.48
25-May-11 13:46:00	0.74	354.07	77543.61	74736.25	25820.15	52508.78	187.84
25-May-11 13:47:00	0.66	353.85	77594.74	74741.93	25813.94	52561.05	187.30
25-May-11 13:48:00	0.63	353.09	77547.48	74694.58	25761.81	52558.48	187.01
25-May-11 13:49:00	0.67	353.42	77380.83	74633.44	25810.16	52516.36	186.40
25-May-11 13:50:00	0.64	354.98	77452.98	74533.64	25930.24	52496.44	187.62
25-May-11 13:51:00	0.71	355.11	77793.26	74583.28	25927.91	52469.50	189.48
25-May-11 13:52:00	0.61	353.92	77822.41	74983.18	25952.77	52482.71	187.34
25-May-11 13:53:00	0.44	354.47	77562.68	74968.50	26076.78	52534.42	186.98
25-May-11 13:54:00	0.63	354.48	77681.93	74605.30	25929.09	52548.42	188.02
25-May-11 13:55:00	0.72	352.82	77684.79	74819.12	25752.42	52528.65	188.76
25-May-11 13:56:00	0.64	353.28	77320.05	74869.50	25830.16	52522.91	188.60
25-May-11 13:57:00	0.69	352.70	77422.21	74464.18	25725.80	52486.49	188.72
25-May-11 13:58:00	0.71	352.51	77294.41	74581.09	25713.37	52467.17	187.99
25-May-11 13:59:00	0.64	353.96	77245.21	74478.24	25864.21	52501.12	188.12
25-May-11 14:00:00	0.69	354.05	77567.59	74379.22	25825.27	52485.57	188.35
25-May-11 14:01:00	0.75	353.27	77582.14	74722.69	25750.26	52504.96	188.24
25-May-11 14:02:00	0.70	353.40	77420.12	74780.16	25777.29	52504.06	187.27
25-May-11 14:03:00	0.60	352.30	77447.85	74571.09	25755.62	52455.26	186.92
25-May-11 14:04:00	0.49	352.60	77207.50	74545.29	25948.35	52464.87	187.08
25-May-11 14:05:00	0.43	353.17	77272.23	74320.57	26012.20	52500.53	189.42
25-May-11 14:06:00	0.57	352.37	77397.42	74338.17	25809.08	52496.75	191.40
25-May-11 14:07:00	0.51	352.89	77221.64	74502.50	25844.77	52460.99	188.74
25-May-11 14:08:00	0.52	353.09	77335.40	74282.04	25825.35	52430.78	189.46
25-May-11 14:09:00	0.67	353.45	77380.36	74358.07	25799.55	52413.90	190.71
25-May-11 14:10:00	0.72	352.41	77457.83	74529.13	25702.84	52464.36	189.38
25-May-11 14:11:00	0.68	352.11	77230.92	74644.07	25708.72	52519.82	189.79
25-May-11 14:12:00	0.65	352.94	77165.41	74387.43	25776.26	52482.12	190.28
25-May-11 14:13:00	0.66	353.07	77346.46	74311.33	25771.33	52413.90	188.54
25-May-11 14:14:00	0.60	352.17	77375.58	74463.70	25711.55	52406.51	189.71
25-May-11 14:15:00	0.62	351.71	77177.47	74449.24	25745.90	52447.49	189.71
25-May-11 14:16:00	0.46	352.18	77078.55	74334.77	25943.80	52474.65	189.37
25-May-11 14:17:00	0.46	352.31	77181.20	74186.63	25956.79	52503.67	190.65
25-May-11 14:18:00	0.56	354.67	77209.05	74290.91	25990.59	52518.31	190.94
25-May-11 14:19:00	0.70	357.09	78264.14	75428.82	26074.96	52574.08	185.07

Mercury/Hexavalent Chromium

5/25/2011 16:06
5/25/2011 19:15

1m

Run 2	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317E1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
25-May-11 16:06:00	78.11	42.65	21.25	120	251.41	87.52	1141.90
25-May-11 16:07:00	78.08	42.79	21.46	120	252.52	87.03	1139.73
25-May-11 16:08:00	78.14	42.68	21.43	120	251.80	87.34	1137.72
25-May-11 16:09:00	78.01	42.98	21.36	120	251.22	87.69	1137.70
25-May-11 16:10:00	78.11	42.71	21.27	121	250.73	87.81	1140.14
25-May-11 16:11:00	78.03	42.63	21.22	121	250.62	87.69	1145.48
25-May-11 16:12:00	78.21	42.11	21.14	120	249.86	87.80	1136.23
25-May-11 16:13:00	78.23	42.06	21.08	121	251.23	87.06	1123.78
25-May-11 16:14:00	78.18	42.56	21.22	120	251.22	87.11	1133.45
25-May-11 16:15:00	77.95	42.41	21.41	119	251.25	87.19	1137.25
25-May-11 16:16:00	78.09	42.62	21.26	119	252.78	86.70	1141.46
25-May-11 16:17:00	78.12	42.58	21.26	119	252.63	86.98	1140.63
25-May-11 16:18:00	77.93	42.57	21.07	120	251.19	87.64	1139.98
25-May-11 16:19:00	78.00	42.31	20.78	120	251.08	87.83	1141.09
25-May-11 16:20:00	78.07	42.34	21.01	119	251.54	87.62	1140.90
25-May-11 16:21:00	78.17	42.41	21.31	120	253.11	86.81	1140.25
25-May-11 16:22:00	78.01	42.40	21.24	119	253.00	86.70	1137.13
25-May-11 16:23:00	77.91	42.62	21.23	119	252.00	87.18	1139.43
25-May-11 16:24:00	77.98	42.36	21.19	119	252.52	87.11	1132.85
25-May-11 16:25:00	78.03	42.56	21.20	119	253.01	86.68	1118.45
25-May-11 16:26:00	77.91	42.49	21.13	119	251.50	87.21	1135.48
25-May-11 16:27:00	78.08	42.35	21.12	119	251.77	87.09	1138.73
25-May-11 16:28:00	77.96	42.55	21.20	119	252.31	86.98	1146.87
25-May-11 16:29:00	78.03	42.62	21.28	120	252.60	86.75	1149.50
25-May-11 16:30:00	78.18	42.33	21.13	120	250.61	87.63	1148.35
25-May-11 16:31:00	78.11	42.38	21.14	120	251.08	87.65	1148.48
25-May-11 16:32:00	77.89	42.37	21.18	120	252.66	86.78	1144.43
25-May-11 16:33:00	77.98	42.52	21.22	120	253.05	86.51	1141.59
25-May-11 16:34:00	78.01	42.60	21.29	120	253.61	86.83	1139.18
25-May-11 16:35:00	78.08	42.14	21.27	120	254.60	86.45	1139.98
25-May-11 16:36:00	78.14	42.24	21.36	120	255.35	86.11	1132.87
25-May-11 16:37:00	78.02	42.40	21.17	120	254.63	86.32	1117.42
25-May-11 16:38:00	78.00	42.45	21.31	120	253.25	86.63	1134.67
25-May-11 16:39:00	77.95	42.18	21.43	119	253.70	86.75	1136.68
25-May-11 16:40:00	77.90	42.35	21.55	119	254.45	87.01	1143.28
25-May-11 16:41:00	77.89	42.47	21.41	119	253.47	87.53	1144.54
25-May-11 16:42:00	77.92	42.62	21.37	120	254.09	86.84	1146.03
25-May-11 16:43:00	78.02	42.26	21.45	120	252.69	87.42	1147.67
25-May-11 16:44:00	78.02	42.34	21.31	120	252.67	87.42	1146.84
25-May-11 16:45:00	78.03	42.61	21.35	119	253.34	87.03	1141.86
25-May-11 16:46:00	77.99	42.37	21.42	119	254.40	86.70	1142.45
25-May-11 16:47:00	78.12	42.31	21.57	119	254.56	86.54	1141.87
25-May-11 16:48:00	78.13	42.46	21.35	119	254.81	86.33	1134.50
25-May-11 16:49:00	77.96	42.52	21.30	119	254.68	86.48	1119.22
25-May-11 16:50:00	77.76	42.13	21.37	119	253.51	87.02	1132.01
25-May-11 16:51:00	77.85	42.22	21.53	119	253.08	86.99	1137.85
25-May-11 16:52:00	77.87	42.34	21.50	120	253.25	87.24	1143.90
25-May-11 16:53:00	78.06	42.35	21.46	119	255.66	86.37	1144.20
25-May-11 16:54:00	77.92	42.37	21.47	119	255.07	86.58	1144.68
25-May-11 16:55:00	77.81	42.54	21.44	119	253.80	86.88	1145.89

Mercury/Hexavalent C

Run 2	#2 Stand Pipe Aeration Air to Regen (lbs/min)		Air to Regen Temp B-1 Outlet (oF)	Tempered Air Temp (oF)	Ambient Air Temp (oF)	Air to Regen Pressure Blower Discharge (psig)	Plant Air to 45lb Air (psig)	CO2 (WGS CEMS) (% by vol. dry)	CO (WGS CEMS) (ppmw, dry)
	317FI106	317TI112	317TI1120	DWS AT	317PC039	317PC088	317AI109	317AI111	
Run 2									
25-May-11 16:06:00	1169.03	247.84	197.27	88.42	15.56	80.28	17.38	151.53	
25-May-11 16:07:00	1168.10	247.87	197.33	88.63	15.57	80.20	17.33	119.96	
25-May-11 16:08:00	1166.46	247.89	197.41	88.86	15.59	80.14	17.30	96.36	
25-May-11 16:09:00	1166.36	247.94	197.36	89.18	15.60	80.14	17.31	98.39	
25-May-11 16:10:00	1166.18	247.80	197.40	89.30	15.62	80.05	17.31	89.48	
25-May-11 16:11:00	1170.36	247.90	197.55	89.22	15.60	80.27	17.31	79.07	
25-May-11 16:12:00	1164.88	247.78	197.63	89.10	15.57	80.48	17.30	77.03	
25-May-11 16:13:00	1153.88	247.86	197.53	89.10	15.55	80.12	17.30	80.50	
25-May-11 16:14:00	1159.53	247.90	197.58	89.08	15.60	79.91	17.31	80.34	
25-May-11 16:15:00	1162.89	247.76	197.77	88.90	15.58	79.62	17.33	78.76	
25-May-11 16:16:00	1169.10	247.83	198.15	88.54	15.56	80.32	17.38	195.18	
25-May-11 16:17:00	1167.14	248.01	198.28	88.14	15.60	80.25	17.44	321.52	
25-May-11 16:18:00	1167.39	247.99	198.44	87.82	15.60	80.25	17.35	162.79	
25-May-11 16:19:00	1168.65	248.04	198.10	87.65	15.63	80.20	17.27	80.10	
25-May-11 16:20:00	1168.41	247.98	197.83	87.71	15.60	80.21	17.29	80.36	
25-May-11 16:21:00	1168.00	247.87	197.64	87.82	15.57	80.22	17.33	94.85	
25-May-11 16:22:00	1164.10	247.90	197.66	87.83	15.57	79.82	17.35	100.73	
25-May-11 16:23:00	1166.70	247.68	197.64	87.87	15.59	79.86	17.36	102.00	
25-May-11 16:24:00	1166.70	247.48	197.66	87.85	15.59	80.42	17.34	87.20	
25-May-11 16:25:00	1159.58	247.44	197.56	87.90	15.58	80.38	17.32	80.22	
25-May-11 16:26:00	1166.25	247.51	197.44	87.90	15.63	80.20	17.34	100.09	
25-May-11 16:27:00	1166.26	247.54	197.34	87.90	15.58	79.92	17.39	148.74	
25-May-11 16:28:00	1174.74	247.47	197.13	87.90	15.59	80.87	17.48	279.53	
25-May-11 16:29:00	1177.34	247.42	197.11	87.82	15.57	81.31	17.47	278.72	
25-May-11 16:30:00	1177.17	247.42	196.96	87.62	15.60	81.49	17.38	132.61	
25-May-11 16:31:00	1176.24	247.39	197.00	87.42	15.58	81.40	17.34	111.08	
25-May-11 16:32:00	1172.67	247.29	197.10	87.30	15.56	81.08	17.32	83.57	
25-May-11 16:33:00	1169.75	247.24	197.15	87.25	15.55	80.67	17.31	76.49	
25-May-11 16:34:00	1166.97	247.29	197.34	87.23	15.56	80.29	17.34	88.98	
25-May-11 16:35:00	1167.16	247.38	197.50	87.20	15.52	80.11	17.35	91.49	
25-May-11 16:36:00	1164.03	247.27	197.53	87.20	15.51	80.28	17.34	83.78	
25-May-11 16:37:00	1153.64	247.21	197.61	87.18	15.54	79.86	17.33	81.87	
25-May-11 16:38:00	1160.35	247.28	197.72	87.02	15.52	79.53	17.35	87.82	
25-May-11 16:39:00	1161.41	247.20	197.98	86.89	15.53	79.27	17.37	123.23	
25-May-11 16:40:00	1168.52	247.19	198.04	86.72	15.57	80.23	17.46	478.11	
25-May-11 16:41:00	1171.08	247.36	198.04	86.60	15.58	80.56	17.52	818.80	
25-May-11 16:42:00	1171.27	247.28	197.91	86.53	15.53	80.64	17.45	385.44	
25-May-11 16:43:00	1172.41	247.38	197.91	86.48	15.53	80.68	17.38	125.35	
25-May-11 16:44:00	1173.80	247.38	197.91	86.39	15.54	80.89	17.37	111.04	
25-May-11 16:45:00	1169.96	247.34	197.89	86.35	15.53	80.75	17.38	120.88	
25-May-11 16:46:00	1168.12	247.20	197.81	86.37	15.54	80.33	17.37	116.66	
25-May-11 16:47:00	1168.02	246.99	197.76	86.34	15.54	80.12	17.36	90.78	
25-May-11 16:48:00	1165.96	246.74	197.57	86.37	15.53	80.30	17.32	79.42	
25-May-11 16:49:00	1158.01	246.70	197.17	86.42	15.53	80.16	17.34	92.08	
25-May-11 16:50:00	1161.96	246.67	197.28	86.51	15.55	79.82	17.37	102.26	
25-May-11 16:51:00	1164.08	246.94	197.37	86.58	15.50	79.63	17.41	165.16	
25-May-11 16:52:00	1169.68	247.44	197.71	86.52	15.52	80.38	17.48	420.41	
25-May-11 16:53:00	1169.41	247.42	198.11	86.60	15.50	80.38	17.51	527.64	
25-May-11 16:54:00	1170.82	247.56	198.35	86.58	15.52	80.50	17.43	211.05	
25-May-11 16:55:00	1171.38	247.76	198.59	86.52	15.53	80.57	17.41	180.86	

Mercury/Hexavalent C

5/26/2011 16:06
5/26/2011 19:15

1m

Oz (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2						
25-May-11 16:06:00	0.48	351.01	77012.07	25779.37	52255.71	184.37
25-May-11 16:07:00	0.44	350.27	76924.62	25678.96	52317.00	184.49
25-May-11 16:08:00	0.53	350.30	76761.83	25616.96	52301.22	185.02
25-May-11 16:09:00	0.53	351.02	76769.03	25684.41	52267.33	185.31
25-May-11 16:10:00	0.46	351.46	76926.10	25733.89	52253.81	185.19
25-May-11 16:11:00	0.48	351.26	77022.06	25705.96	52144.89	185.27
25-May-11 16:12:00	0.53	351.43	76978.58	25692.14	52072.59	184.53
25-May-11 16:13:00	0.57	351.43	77016.79	25691.61	52087.73	184.45
25-May-11 16:14:00	0.53	351.80	77017.05	25735.67	52068.35	184.02
25-May-11 16:15:00	0.55	350.80	77096.10	25672.39	52142.31	183.92
25-May-11 16:16:00	0.55	349.43	76877.91	25645.61	52264.90	183.62
25-May-11 16:17:00	0.39	349.75	76678.58	25797.31	52313.76	183.74
25-May-11 16:18:00	0.39	350.22	76647.23	25710.94	52287.40	184.79
25-May-11 16:19:00	0.50	349.73	76750.57	25550.15	52234.49	184.54
25-May-11 16:20:00	0.60	349.39	76643.32	25519.06	52223.00	184.61
25-May-11 16:21:00	0.52	349.88	76569.50	25620.50	52247.67	184.55
25-May-11 16:22:00	0.55	349.25	76676.72	25585.21	52135.35	184.97
25-May-11 16:23:00	0.55	349.19	76537.34	25599.59	52066.40	184.69
25-May-11 16:24:00	0.53	350.40	76525.02	25661.86	52040.57	184.97
25-May-11 16:25:00	0.52	349.65	76789.66	25594.96	52037.32	185.62
25-May-11 16:26:00	0.53	349.80	76625.83	25630.21	52214.78	184.66
25-May-11 16:27:00	0.47	350.34	76658.19	25746.77	52338.58	185.12
25-May-11 16:28:00	0.38	349.98	76777.25	25852.61	52308.67	185.09
25-May-11 16:29:00	0.29	349.64	76698.19	25844.26	52253.82	184.74
25-May-11 16:30:00	0.43	349.11	76623.06	25650.10	52258.85	184.84
25-May-11 16:31:00	0.57	349.40	76508.09	25866.73	52344.12	184.98
25-May-11 16:32:00	0.48	350.51	76571.07	25662.85	52391.98	184.91
25-May-11 16:33:00	0.57	349.40	76815.06	25550.38	52305.90	185.43
25-May-11 16:34:00	0.53	348.19	76571.69	25501.60	52268.50	184.68
25-May-11 16:35:00	0.46	348.62	76305.71	25569.88	52292.73	185.03
25-May-11 16:36:00	0.44	349.89	76399.48	25647.52	52309.56	186.11
25-May-11 16:37:00	0.49	349.75	76678.51	25614.65	52288.34	186.03
25-May-11 16:38:00	0.48	349.07	76648.45	25591.03	52203.36	184.69
25-May-11 16:39:00	0.56	348.61	76498.47	25565.04	52186.40	184.31
25-May-11 16:40:00	0.42	347.84	76397.65	25692.85	52230.88	184.46
25-May-11 16:41:00	0.20	348.69	76230.18	25926.00	52226.42	184.78
25-May-11 16:42:00	0.23	350.01	76416.49	25881.20	52199.10	185.24
25-May-11 16:43:00	0.38	348.87	76704.77	25647.97	52183.86	185.42
25-May-11 16:44:00	0.47	348.30	76455.17	25568.83	52149.61	184.88
25-May-11 16:45:00	0.45	348.77	76330.74	25612.79	52117.07	185.17
25-May-11 16:46:00	0.55	349.13	76433.40	25609.71	52139.70	185.98
25-May-11 16:47:00	0.55	350.12	76512.96	25657.74	52329.93	184.93
25-May-11 16:48:00	0.53	349.49	76729.79	25579.62	52417.73	185.08
25-May-11 16:49:00	0.44	349.09	76591.52	25601.69	52327.04	184.25
25-May-11 16:50:00	0.51	348.39	76502.80	25559.25	52292.96	184.80
25-May-11 16:51:00	0.47	348.27	76349.21	25607.50	52320.30	184.84
25-May-11 16:52:00	0.29	349.21	76322.68	25841.03	52290.54	185.21
25-May-11 16:53:00	0.27	349.13	76529.64	25890.19	52245.34	185.60
25-May-11 16:54:00	0.36	349.38	76511.80	25750.11	52274.64	185.15
25-May-11 16:55:00	0.35	349.92	76565.91	25768.91	52318.93	185.24

Scrubbing Liquid		Pump Pressure	Agglo-Filtering Module (AFM)		Stripped Sour Water	Carrying Air	Air to Rings		#1 Stand Pipe Aeration
Upper Circulation (psig)	317P1105B	Lower Circulation (psig)	317P1108	and Cyclolabs Pressure (in. H2O)	317FC202	317FC115	317F1113	317F1105	
Run 2									
25-May-11 16:56:00	77.89	42.76	21.45		119	253.62	86.83		1144.56
25-May-11 16:57:00	77.86	42.54	21.54		118	254.07	86.77		1142.27
25-May-11 16:58:00	77.98	42.31	21.37		118	253.84	86.94		1138.18
25-May-11 16:59:00	78.12	42.26	21.42		119	255.70	86.15		1141.91
25-May-11 17:00:00	78.09	42.26	21.46		119	254.12	86.74		1140.43
25-May-11 17:01:00	77.84	42.50	21.25		119	253.80	86.70		1135.09
25-May-11 17:02:00	77.82	42.44	21.28		120	253.29	86.91		1141.57
25-May-11 17:03:00	77.94	42.12	21.29		119	252.81	86.94		1141.14
25-May-11 17:04:00	78.04	42.17	21.20		118	255.58	86.21		1148.84
25-May-11 17:05:00	77.80	42.08	21.05		118	254.23	86.93		1146.23
25-May-11 17:06:00	77.94	42.20	21.23		119	254.02	86.90		1143.82
25-May-11 17:07:00	78.06	42.08	21.39		119	255.10	86.45		1142.25
25-May-11 17:08:00	77.66	42.37	21.40		119	255.77	85.97		1142.87
25-May-11 17:09:00	77.65	42.33	21.57		119	256.63	85.79		1141.12
25-May-11 17:10:00	77.97	41.94	21.29		119	255.88	86.23		1137.90
25-May-11 17:11:00	77.90	42.14	21.29		118	255.11	86.58		1141.00
25-May-11 17:12:00	78.01	42.38	21.37		118	255.71	86.38		1143.33
25-May-11 17:13:00	78.12	42.31	21.32		118	254.69	86.73		1144.10
25-May-11 17:14:00	78.13	42.14	21.23		119	253.12	86.77		1143.11
25-May-11 17:15:00	78.03	42.00	21.42		119	252.04	87.46		1139.53
25-May-11 17:16:00	77.99	42.18	21.30		119	253.89	86.68		1145.79
25-May-11 17:17:00	78.09	42.33	21.31		119	254.82	86.43		1145.43
25-May-11 17:18:00	78.09	42.31	21.46		118	255.32	86.40		1146.23
25-May-11 17:19:00	77.97	41.86	21.29		119	255.21	86.41		1146.78
25-May-11 17:20:00	78.05	41.98	21.29		118	253.66	86.83		1146.24
25-May-11 17:21:00	77.87	42.03	21.16		118	254.38	86.47		1146.22
25-May-11 17:22:00	77.83	42.15	21.20		118	254.31	86.78		1141.78
25-May-11 17:23:00	77.87	42.17	21.20		119	254.38	86.87		1141.81
25-May-11 17:24:00	77.78	42.07	21.55		119	254.98	86.86		1139.41
25-May-11 17:25:00	77.93	42.10	21.67		119	254.59	86.93		1126.13
25-May-11 17:26:00	77.96	41.97	21.49		119	254.85	86.65		1135.34
25-May-11 17:27:00	77.96	42.16	21.43		119	254.93	86.50		1137.56
25-May-11 17:28:00	77.85	42.23	21.31		120	255.15	86.48		1144.38
25-May-11 17:29:00	78.00	42.15	21.64		119	256.40	86.24		1145.91
25-May-11 17:30:00	78.07	42.15	21.71		119	255.99	86.50		1145.88
25-May-11 17:31:00	77.98	41.98	21.57		119	254.89	86.95		1146.89
25-May-11 17:32:00	77.83	41.98	21.66		119	255.67	86.87		1145.11
25-May-11 17:33:00	77.94	42.15	21.53		119	256.30	86.54		1144.11
25-May-11 17:34:00	77.96	42.23	21.60		118	256.91	86.14		1143.63
25-May-11 17:35:00	77.99	42.25	21.68		118	256.10	86.38		1144.05
25-May-11 17:36:00	77.93	42.00	21.42		119	255.57	86.55		1145.78
25-May-11 17:37:00	77.93	42.08	21.50		119	254.62	86.95		1143.14
25-May-11 17:38:00	78.12	42.10	21.51		119	253.39	87.56		1138.94
25-May-11 17:39:00	78.05	42.23	21.51		118	255.26	86.86		1141.59
25-May-11 17:40:00	77.85	42.01	21.54		119	256.33	86.29		1146.73
25-May-11 17:41:00	78.10	42.08	21.62		119	255.39	86.79		1146.76
25-May-11 17:42:00	78.02	42.00	21.50		119	256.28	86.52		1145.83
25-May-11 17:43:00	77.90	41.94	21.51		119	257.30	86.14		1145.00
25-May-11 17:44:00	77.77	42.36	21.53		118	256.58	86.60		1145.60
25-May-11 17:45:00	77.95	42.43	21.41		118	255.65	86.89		1143.21

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv. dry) 317AI111
Run 2							
25-May-11 16:56:00	1171.22	247.84	86.60	15.51	80.57	17.39	158.67
25-May-11 16:57:00	1169.44	247.87	86.53	15.49	80.40	17.38	113.29
25-May-11 16:58:00	1165.29	247.87	86.52	15.51	79.99	17.39	113.56
25-May-11 16:59:00	1166.75	247.80	86.53	15.51	79.95	17.37	97.27
25-May-11 17:00:00	1169.31	247.34	86.48	15.55	80.28	17.35	97.51
25-May-11 17:01:00	1169.26	247.06	86.40	15.56	80.50	17.37	113.30
25-May-11 17:02:00	1169.32	246.70	86.40	15.60	80.25	17.38	110.97
25-May-11 17:03:00	1167.44	246.55	86.47	15.56	79.93	16.16	126.95
25-May-11 17:04:00	1176.09	246.63	86.56	15.55	80.97	15.32	457.04
25-May-11 17:05:00	1173.95	246.76	86.66	15.56	80.95	17.45	720.09
25-May-11 17:06:00	1170.82	247.29	86.63	15.53	80.68	17.43	224.83
25-May-11 17:07:00	1169.21	247.48	86.60	15.51	80.44	17.38	129.71
25-May-11 17:08:00	1168.82	247.55	86.58	15.49	80.28	17.36	108.21
25-May-11 17:09:00	1167.66	247.69	86.49	15.52	80.21	17.36	97.59
25-May-11 17:10:00	1164.43	247.69	86.39	15.54	79.94	17.36	119.31
25-May-11 17:11:00	1165.90	247.69	86.24	15.55	79.89	17.36	101.29
25-May-11 17:12:00	1168.57	247.38	86.18	15.54	80.24	17.38	125.28
25-May-11 17:13:00	1167.69	247.33	86.12	15.57	80.26	17.42	180.63
25-May-11 17:14:00	1168.26	247.34	86.28	15.54	80.08	17.45	222.24
25-May-11 17:15:00	1165.08	247.29	86.48	15.60	79.78	17.45	184.05
25-May-11 17:16:00	1172.72	247.36	86.68	15.53	80.66	17.47	462.93
25-May-11 17:17:00	1171.36	247.22	86.86	15.55	80.62	17.51	912.94
25-May-11 17:18:00	1171.20	247.24	86.98	15.55	80.67	17.48	600.83
25-May-11 17:19:00	1172.46	247.34	87.03	15.55	80.83	17.43	227.12
25-May-11 17:20:00	1171.78	247.19	86.98	15.55	80.77	17.41	137.01
25-May-11 17:21:00	1171.31	247.19	86.89	15.53	80.74	17.42	158.02
25-May-11 17:22:00	1166.71	247.12	86.72	15.59	80.31	17.43	167.58
25-May-11 17:23:00	1166.61	247.16	86.52	15.58	80.04	17.41	132.62
25-May-11 17:24:00	1168.71	247.14	86.30	15.62	80.44	17.40	131.29
25-May-11 17:25:00	1162.43	247.04	86.02	15.62	80.29	17.41	158.38
25-May-11 17:26:00	1162.15	247.05	85.90	15.59	79.78	17.38	126.20
25-May-11 17:27:00	1161.52	247.23	85.90	15.54	79.41	17.39	126.40
25-May-11 17:28:00	1168.69	246.92	85.88	15.53	80.20	17.44	280.28
25-May-11 17:29:00	1170.57	247.00	85.74	15.53	80.39	17.48	425.39
25-May-11 17:30:00	1170.64	247.27	85.70	15.56	80.48	17.41	205.90
25-May-11 17:31:00	1171.56	247.39	85.63	15.56	80.58	17.36	124.90
25-May-11 17:32:00	1170.35	247.41	85.60	15.57	80.56	17.34	99.42
25-May-11 17:33:00	1170.01	247.38	85.60	15.54	80.54	17.32	88.71
25-May-11 17:34:00	1168.83	247.34	85.60	15.52	80.37	17.34	97.01
25-May-11 17:35:00	1168.97	247.26	85.60	15.50	80.33	17.37	126.20
25-May-11 17:36:00	1170.92	247.31	85.62	15.49	80.71	17.35	106.58
25-May-11 17:37:00	1167.24	247.31	85.70	15.54	80.36	17.32	84.39
25-May-11 17:38:00	1164.21	247.49	85.63	15.57	79.92	17.31	80.78
25-May-11 17:39:00	1165.79	247.79	85.52	15.55	79.80	17.34	86.87
25-May-11 17:40:00	1171.98	247.37	85.32	15.55	80.66	17.40	146.04
25-May-11 17:41:00	1172.60	247.17	85.20	15.54	80.75	17.43	224.35
25-May-11 17:42:00	1171.54	247.18	85.28	15.53	80.67	17.36	172.12
25-May-11 17:43:00	1170.33	247.28	85.42	15.52	80.60	17.30	87.46
25-May-11 17:44:00	1170.98	247.39	85.56	15.56	80.61	17.28	75.08
25-May-11 17:45:00	1168.38	247.35	85.60	15.54	80.41	17.29	82.51

	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsdcm) - Qa 317C_dryair	Vol Reg FG (dsdcm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2							
25-May-11 16:56:00	0.50	349.28	76684.43	73570.61	25659.17	52327.78	184.92
25-May-11 16:57:00	0.56	349.03	76543.92	73802.95	25607.77	52267.74	184.13
25-May-11 16:58:00	0.44	349.55	76490.46	73697.98	25690.93	52212.68	184.31
25-May-11 16:59:00	0.43	349.29	76604.94	73547.05	25643.50	52210.79	184.77
25-May-11 17:00:00	0.47	349.55	76546.55	73634.56	25635.51	52269.99	184.70
25-May-11 17:01:00	0.38	349.88	76604.80	73589.68	25699.97	52299.69	184.63
25-May-11 17:02:00	0.36	349.04	76676.61	73583.67	25664.70	52322.27	184.78
25-May-11 17:03:00	2.47	348.65	76492.93	73655.57	23710.58	52263.39	184.57
25-May-11 17:04:00	3.86	349.40	76407.10	74401.81	22475.15	52202.17	183.14
25-May-11 17:05:00	0.35	349.09	76570.78	74642.00	25831.34	52250.73	181.51
25-May-11 17:06:00	0.41	349.18	76504.31	73640.20	25728.17	52285.59	184.53
25-May-11 17:07:00	0.44	349.57	76523.26	73580.03	25675.95	52200.25	185.09
25-May-11 17:08:00	0.44	349.45	76609.50	73569.54	25648.07	52132.59	184.44
25-May-11 17:09:00	0.47	349.29	76581.64	73644.70	25619.84	52172.64	184.66
25-May-11 17:10:00	0.41	349.73	76548.20	73626.72	25678.64	52188.91	184.62
25-May-11 17:11:00	0.46	349.03	76642.99	73555.38	25603.73	52187.77	185.07
25-May-11 17:12:00	0.39	348.76	76489.92	73680.33	25633.39	52182.62	184.38
25-May-11 17:13:00	0.38	348.30	76431.08	73497.97	25648.26	52240.12	185.16
25-May-11 17:14:00	0.39	349.17	76330.90	73472.11	25748.23	52285.55	184.88
25-May-11 17:15:00	0.43	349.41	76520.41	73412.47	25751.15	52289.63	185.25
25-May-11 17:16:00	0.39	348.38	76573.54	73628.66	25749.66	52248.72	184.61
25-May-11 17:17:00	0.22	348.17	76347.01	73682.70	25880.32	52220.48	183.86
25-May-11 17:18:00	0.18	349.18	76301.53	73380.55	25894.73	52206.77	184.82
25-May-11 17:19:00	0.26	349.11	76522.44	73257.98	25764.07	52186.86	185.41
25-May-11 17:20:00	0.39	347.98	76508.25	73468.66	25606.03	52244.50	184.71
25-May-11 17:21:00	0.47	347.61	76259.37	73545.87	25675.79	52331.33	184.41
25-May-11 17:22:00	0.46	349.27	76177.90	73385.56	25714.21	52398.99	185.16
25-May-11 17:23:00	0.54	349.47	76542.59	73306.85	25677.77	52212.83	185.77
25-May-11 17:24:00	0.50	349.07	76585.68	73711.65	25650.38	52098.01	184.72
25-May-11 17:25:00	0.37	349.65	76499.88	73690.84	25746.28	52339.62	184.63
25-May-11 17:26:00	0.48	350.19	76625.18	73524.77	25714.00	52411.78	185.52
25-May-11 17:27:00	0.45	350.19	76743.81	73707.31	25732.58	52356.40	184.87
25-May-11 17:28:00	0.39	349.79	76744.08	73799.75	25798.88	52309.69	184.58
25-May-11 17:29:00	0.33	350.30	76656.59	73810.23	25916.36	52218.21	183.98
25-May-11 17:30:00	0.39	350.89	76767.72	73719.73	25835.89	52176.22	184.37
25-May-11 17:31:00	0.44	351.30	76897.77	73793.64	25785.71	52140.31	184.33
25-May-11 17:32:00	0.56	351.27	76987.03	73928.10	25724.57	52112.16	183.98
25-May-11 17:33:00	0.59	350.95	76982.05	74085.16	25671.83	52139.54	183.45
25-May-11 17:34:00	0.59	349.48	76910.70	74096.76	25583.37	52217.22	183.50
25-May-11 17:35:00	0.51	350.33	76588.23	74040.63	25707.79	52218.95	183.41
25-May-11 17:36:00	0.50	351.20	76774.59	73886.17	25742.11	52114.32	184.20
25-May-11 17:37:00	0.54	350.16	76965.09	73839.57	25620.38	52036.25	184.24
25-May-11 17:38:00	0.60	350.02	76736.73	74036.68	25583.74	52217.42	183.40
25-May-11 17:39:00	0.55	351.36	76707.45	73858.83	25726.53	52322.29	184.24
25-May-11 17:40:00	0.47	351.28	77000.00	73802.91	25823.52	52237.54	184.56
25-May-11 17:41:00	0.41	350.03	76983.75	74086.21	25789.41	52224.43	184.09
25-May-11 17:42:00	0.36	351.27	76709.82	74025.46	25807.76	52144.70	183.45
25-May-11 17:43:00	0.50	351.32	76981.20	73665.34	25692.88	52030.81	185.24
25-May-11 17:44:00	0.54	349.98	76991.74	73993.30	25561.52	52019.67	184.17
25-May-11 17:45:00	0.49	348.85	76699.02	74015.12	25504.38	52055.05	183.97

Run 2	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B						
25-May-11 17:46:00	77.98	42.38	21.58	119	255.65	86.87	1140.34	
25-May-11 17:47:00	77.92	42.19	21.37	120	255.95	86.63	1140.74	
25-May-11 17:48:00	78.11	42.12	21.20	120	255.46	86.99	1143.08	
25-May-11 17:49:00	77.96	41.89	21.43	120	256.24	86.33	1143.85	
25-May-11 17:50:00	78.06	42.24	21.60	120	256.77	86.03	1143.69	
25-May-11 17:51:00	78.06	42.23	21.56	120	255.67	86.81	1141.91	
25-May-11 17:52:00	78.02	42.40	21.67	119	255.14	87.02	1148.00	
25-May-11 17:53:00	77.99	42.22	21.56	119	255.87	86.70	1148.87	
25-May-11 17:54:00	78.04	42.15	21.61	119	255.55	86.82	1150.81	
25-May-11 17:55:00	77.74	41.87	21.41	119	255.75	86.67	1149.97	
25-May-11 17:56:00	77.66	41.68	21.23	119	255.47	86.74	1148.91	
25-May-11 17:57:00	77.92	41.63	21.54	119	254.81	86.95	1146.85	
25-May-11 17:58:00	77.87	42.15	21.62	119	255.98	86.69	1142.98	
25-May-11 17:59:00	78.03	42.30	21.43	119	257.20	86.20	1144.56	
25-May-11 18:00:00	78.26	42.40	21.36	119	256.49	86.30	1146.65	
25-May-11 18:01:00	78.33	42.21	21.52	120	255.25	86.95	1145.27	
25-May-11 18:02:00	78.17	42.36	21.50	120	254.80	87.06	1143.86	
25-May-11 18:03:00	77.97	42.13	21.57	120	254.57	87.02	1141.75	
25-May-11 18:04:00	77.93	41.92	21.62	120	254.89	86.98	1148.40	
25-May-11 18:05:00	77.86	42.05	21.43	121	253.62	87.66	1146.57	
25-May-11 18:06:00	77.79	42.24	21.47	121	255.49	86.83	1146.87	
25-May-11 18:07:00	77.79	42.03	21.46	121	256.28	86.57	1146.67	
25-May-11 18:08:00	77.91	42.28	21.40	121	255.14	87.06	1147.03	
25-May-11 18:09:00	77.77	42.25	21.61	120	255.72	86.31	1145.64	
25-May-11 18:10:00	77.84	42.38	21.61	120	255.49	86.20	1142.02	
25-May-11 18:11:00	78.23	42.27	21.56	120	255.61	86.75	1142.72	
25-May-11 18:12:00	77.98	42.28	21.37	120	256.42	86.53	1145.32	
25-May-11 18:13:00	77.96	41.96	21.33	121	255.59	86.78	1145.15	
25-May-11 18:14:00	77.88	42.02	21.50	121	256.09	86.49	1145.70	
25-May-11 18:15:00	77.97	42.36	21.50	121	256.56	86.18	1142.18	
25-May-11 18:16:00	78.03	42.24	21.43	121	255.29	86.75	1148.35	
25-May-11 18:17:00	77.77	42.10	21.45	121	255.37	86.82	1147.21	
25-May-11 18:18:00	77.72	42.25	21.37	121	254.73	86.98	1147.97	
25-May-11 18:19:00	77.71	42.25	21.46	120	254.93	86.86	1148.95	
25-May-11 18:20:00	77.84	42.21	21.44	120	257.37	86.03	1147.61	
25-May-11 18:21:00	77.56	42.19	21.43	119	256.28	86.71	1145.46	
25-May-11 18:22:00	77.47	42.40	21.40	119	254.78	87.02	1140.98	
25-May-11 18:23:00	77.80	42.19	21.48	119	255.14	86.90	1143.43	
25-May-11 18:24:00	77.82	42.07	21.39	119	256.52	86.30	1146.66	
25-May-11 18:25:00	77.73	42.18	21.33	119	255.38	86.66	1141.25	
25-May-11 18:26:00	77.99	42.38	21.36	120	254.17	87.04	1138.10	
25-May-11 18:27:00	78.09	42.46	21.34	120	254.95	86.85	1140.83	
25-May-11 18:28:00	78.11	42.16	21.48	120	255.24	86.75	1148.17	
25-May-11 18:29:00	77.92	41.97	21.48	120	254.12	87.19	1149.26	
25-May-11 18:30:00	77.87	42.15	21.50	119	255.11	86.97	1147.77	
25-May-11 18:31:00	77.93	42.10	21.45	119	255.65	86.86	1146.71	
25-May-11 18:32:00	78.14	41.91	21.33	120	254.43	87.40	1145.04	
25-May-11 18:33:00	77.97	42.09	21.50	120	254.61	87.15	1144.26	
25-May-11 18:34:00	77.80	41.98	21.44	120	255.24	86.90	1142.89	
25-May-11 18:35:00	77.95	42.19	21.54	119	254.77	87.22	1143.01	

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv. dry) 317AI111
Run 2							
25-May-11 17:46:00	247.23	200.72	85.68	15.55	80.13	17.28	73.91
25-May-11 17:47:00	247.39	200.75	85.80	15.53	80.00	17.30	81.53
25-May-11 17:48:00	247.37	201.08	85.87	15.55	80.37	17.28	72.12
25-May-11 17:49:00	247.29	201.12	85.88	15.51	80.47	17.25	59.63
25-May-11 17:50:00	247.36	201.30	85.80	15.55	80.12	17.28	66.28
25-May-11 17:51:00	247.22	201.59	85.73	15.59	79.91	17.30	76.00
25-May-11 17:52:00	247.23	201.64	85.70	15.53	80.85	17.36	161.67
25-May-11 17:53:00	247.39	201.67	85.70	15.54	81.05	17.42	237.95
25-May-11 17:54:00	247.37	201.71	85.70	15.55	81.21	17.35	130.34
25-May-11 17:55:00	247.26	201.22	85.70	15.53	81.21	17.31	84.01
25-May-11 17:56:00	247.17	201.20	85.63	15.56	81.15	17.30	75.43
25-May-11 17:57:00	246.78	200.99	85.58	15.57	80.88	17.32	83.42
25-May-11 17:58:00	246.64	200.73	85.49	15.55	80.49	17.30	68.97
25-May-11 17:59:00	246.74	200.43	85.32	15.52	80.44	17.30	72.08
25-May-11 18:00:00	246.74	200.56	85.14	15.53	80.79	17.30	73.99
25-May-11 18:01:00	246.76	200.56	85.05	15.57	80.86	17.28	64.01
25-May-11 18:02:00	246.76	200.46	85.05	15.57	80.41	17.29	69.82
25-May-11 18:03:00	246.76	200.46	85.10	15.56	80.02	17.31	86.73
25-May-11 18:04:00	246.76	200.29	85.16	15.54	80.93	17.41	231.77
25-May-11 18:05:00	246.76	200.07	85.28	15.55	81.06	17.48	351.43
25-May-11 18:06:00	246.66	200.10	85.42	15.50	81.11	17.38	162.85
25-May-11 18:07:00	246.50	200.36	85.56	15.52	80.94	17.29	78.19
25-May-11 18:08:00	246.76	200.19	85.66	15.56	80.86	17.27	74.41
25-May-11 18:09:00	246.79	200.07	85.70	15.51	80.77	17.30	85.20
25-May-11 18:10:00	246.45	199.85	85.63	15.53	80.41	17.31	79.34
25-May-11 18:11:00	246.26	199.64	85.60	15.54	80.35	17.28	71.00
25-May-11 18:12:00	246.20	199.77	85.58	15.53	80.68	17.28	67.79
25-May-11 18:13:00	246.12	199.70	85.50	15.55	80.74	17.29	74.13
25-May-11 18:14:00	246.20	199.73	85.48	15.54	80.54	17.27	63.98
25-May-11 18:15:00	246.05	199.69	85.32	15.54	80.17	17.30	78.96
25-May-11 18:16:00	246.04	199.50	85.18	15.54	80.98	17.39	244.05
25-May-11 18:17:00	246.31	199.69	85.10	15.51	80.97	17.45	369.36
25-May-11 18:18:00	246.32	199.64	85.10	15.52	80.92	17.35	129.71
25-May-11 18:19:00	246.32	199.53	85.08	15.52	81.05	17.31	90.40
25-May-11 18:20:00	246.35	199.60	84.92	15.51	80.98	17.29	77.24
25-May-11 18:21:00	246.38	199.52	84.80	15.56	80.85	17.26	67.21
25-May-11 18:22:00	246.25	199.41	84.80	15.55	80.31	17.27	67.79
25-May-11 18:23:00	246.20	199.24	84.73	15.54	80.28	17.29	68.61
25-May-11 18:24:00	246.08	198.84	84.70	15.52	80.90	17.27	63.21
25-May-11 18:25:00	246.12	198.82	84.77	15.54	80.82	17.26	63.88
25-May-11 18:26:00	246.24	198.84	84.80	15.56	80.43	17.24	59.07
25-May-11 18:27:00	246.41	198.89	84.87	15.54	80.04	17.26	71.87
25-May-11 18:28:00	246.35	198.87	84.97	15.54	80.95	17.39	241.45
25-May-11 18:29:00	246.20	198.80	85.00	15.54	81.10	17.47	377.59
25-May-11 18:30:00	246.14	198.75	84.92	15.54	81.00	17.36	161.12
25-May-11 18:31:00	246.24	198.81	84.79	15.58	81.08	17.30	97.50
25-May-11 18:32:00	246.03	198.87	84.64	15.61	80.86	17.28	86.11
25-May-11 18:33:00	245.96	198.68	84.52	15.55	80.58	17.28	76.46
25-May-11 18:34:00	246.00	198.54	84.34	15.53	80.48	17.28	71.92
25-May-11 18:35:00	245.87	198.13	84.28	15.58	80.41	17.25	60.31

O ₂ (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (lb/hr) - Q _a 317C_dryair	Vol Reg FG (dscfm) - Q _r 317C_fluegas	EPA Coke Make (lb/hr) Rc	Cat Feed Rate (BPD) 317C_B_Cat_Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2						
25-May-11 17:46:00	348.94	76451.05	73701.17	25483.83	52020.74	184.58
25-May-11 17:47:00	349.82	76471.33	73510.92	25571.36	51960.90	185.01
25-May-11 17:48:00	350.49	76663.98	73565.47	25601.94	51969.99	184.81
25-May-11 17:49:00	349.97	76809.63	73711.28	25508.58	52009.99	185.16
25-May-11 17:50:00	350.49	76891.70	73899.63	25601.89	52023.20	184.33
25-May-11 17:51:00	350.70	76807.66	73725.70	25643.01	52020.70	184.59
25-May-11 17:52:00	350.19	76855.35	73838.63	25695.47	52001.10	184.75
25-May-11 17:53:00	349.73	76744.79	73925.53	25744.17	51981.53	184.53
25-May-11 17:54:00	349.86	76643.29	73872.42	25653.06	51977.04	184.43
25-May-11 17:55:00	349.19	76671.55	73731.07	25544.04	51988.85	184.20
25-May-11 17:56:00	348.44	76525.79	73755.56	25466.04	52201.69	184.50
25-May-11 17:57:00	349.11	76360.78	73638.10	25554.73	52271.78	185.15
25-May-11 17:58:00	349.62	76506.81	73405.63	25577.21	52044.30	185.16
25-May-11 17:59:00	349.89	76618.38	73515.11	25585.48	51990.66	185.35
25-May-11 18:00:00	350.35	76679.45	73671.66	25605.37	51988.20	184.94
25-May-11 18:01:00	349.53	76778.97	73763.70	25514.60	51932.87	184.90
25-May-11 18:02:00	348.82	76599.86	73868.42	25480.15	52002.18	184.28
25-May-11 18:03:00	348.06	76444.60	73694.98	25459.29	52095.91	185.02
25-May-11 18:04:00	349.18	76276.54	73533.90	25677.93	52071.18	185.12
25-May-11 18:05:00	349.92	76522.20	73425.90	25857.57	51999.88	185.80
25-May-11 18:06:00	350.18	76684.91	73627.41	25743.50	52020.59	185.32
25-May-11 18:07:00	349.51	76742.30	73690.81	25542.66	52055.36	185.57
25-May-11 18:08:00	349.75	76594.78	73789.95	25526.48	52074.45	185.28
25-May-11 18:09:00	349.33	76648.29	73669.66	25557.16	52096.41	185.40
25-May-11 18:10:00	349.30	76556.97	73657.43	25554.75	52094.00	185.47
25-May-11 18:11:00	349.81	76549.96	73603.98	25529.47	52073.46	185.52
25-May-11 18:12:00	348.60	76660.14	73676.13	25427.42	52054.06	185.86
25-May-11 18:13:00	349.45	76395.89	73825.82	25515.00	52079.95	185.36
25-May-11 18:14:00	350.67	76581.34	73545.30	25580.65	51750.82	186.15
25-May-11 18:15:00	350.81	76850.02	73706.11	25631.13	51669.17	185.73
25-May-11 18:16:00	350.49	76880.99	73972.60	25768.46	51920.18	184.65
25-May-11 18:17:00	350.39	76909.31	73952.55	25871.29	52028.54	184.73
25-May-11 18:18:00	350.36	76787.80	73855.40	25720.86	52087.12	184.63
25-May-11 18:19:00	350.74	76781.39	73758.11	25663.84	52033.31	184.78
25-May-11 18:20:00	351.07	76865.51	73837.70	25636.14	51976.66	184.58
25-May-11 18:21:00	351.44	76936.51	73963.54	25620.34	51897.52	183.96
25-May-11 18:22:00	351.52	77018.44	74028.36	25635.91	51823.91	184.34
25-May-11 18:23:00	351.80	77035.90	74112.29	25698.01	51744.44	184.01
25-May-11 18:24:00	351.12	77098.28	74099.43	25628.85	51754.76	184.13
25-May-11 18:25:00	351.34	76948.51	74156.47	25615.69	51922.79	183.92
25-May-11 18:26:00	350.78	76997.29	74029.27	25542.19	51988.44	184.21
25-May-11 18:27:00	350.48	76874.41	74096.08	25547.71	51864.99	184.35
25-May-11 18:28:00	350.52	76807.64	73980.09	25763.23	51771.98	184.41
25-May-11 18:29:00	351.11	76817.20	73918.55	25943.90	51699.52	184.45
25-May-11 18:30:00	351.17	76945.63	73876.63	25786.73	51680.94	184.52
25-May-11 18:31:00	350.61	76958.80	73943.23	25641.43	51763.97	184.41
25-May-11 18:32:00	350.88	76835.95	73983.15	25621.85	51807.73	184.28
25-May-11 18:33:00	350.86	76896.26	73901.41	25621.98	51758.70	184.43
25-May-11 18:34:00	351.52	76890.95	73949.65	25683.14	51745.41	184.33
25-May-11 18:35:00	352.72	77035.88	73919.86	25727.08	51740.67	184.03

Run 2	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air		Air to Rings	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B				317FC202	317F115		
25-May-11 18:36:00	77.93		41.85	21.52	119		255.76	86.85	1147.56
25-May-11 18:37:00	77.73		41.89	21.60	119		255.54	86.76	1146.46
25-May-11 18:38:00	77.92		41.87	21.60	119		255.76	87.23	1144.35
25-May-11 18:39:00	78.21		41.85	21.58	119		254.34	87.01	1144.47
25-May-11 18:40:00	78.18		41.99	21.75	120		255.48	86.72	1149.44
25-May-11 18:41:00	78.16		41.83	21.52	120		254.48	87.24	1148.13
25-May-11 18:42:00	78.02		41.81	21.25	120		254.69	87.03	1145.48
25-May-11 18:43:00	78.05		42.11	21.36	120		254.43	86.85	1144.74
25-May-11 18:44:00	77.70		42.13	21.59	119		255.09	86.64	1145.65
25-May-11 18:45:00	77.75		42.04	21.57	119		256.52	86.40	1143.77
25-May-11 18:46:00	77.88		42.15	21.65	120		256.19	86.49	1142.00
25-May-11 18:47:00	77.83		42.05	21.44	120		255.90	86.83	1141.97
25-May-11 18:48:00	77.83		41.89	21.29	120		255.08	87.41	1144.48
25-May-11 18:49:00	77.79		41.87	21.43	119		254.60	87.50	1143.84
25-May-11 18:50:00	77.67		41.99	21.44	119		253.79	87.23	1143.98
25-May-11 18:51:00	77.78		41.86	21.52	119		251.53	87.74	1142.56
25-May-11 18:52:00	77.98		42.02	21.49	119		252.40	87.42	1147.52
25-May-11 18:53:00	77.87		42.16	21.62	119		250.94	87.25	1146.54
25-May-11 18:54:00	77.93		41.96	21.80	120		252.48	87.21	1146.85
25-May-11 18:55:00	77.93		41.97	21.69	120		253.57	86.92	1144.36
25-May-11 18:56:00	77.98		41.98	21.78	119		253.52	86.38	1142.00
25-May-11 18:57:00	77.98		41.77	22.07	118		254.84	87.26	1142.39
25-May-11 18:58:00	77.92		41.79	21.85	119		254.76	87.60	1141.19
25-May-11 18:59:00	78.05		42.09	21.94	119		256.47	87.01	1141.86
25-May-11 19:00:00	78.17		42.13	21.84	119		257.59	86.40	1142.74
25-May-11 19:01:00	78.10		42.22	21.79	119		256.45	86.54	1140.31
25-May-11 19:02:00	78.10		41.68	21.86	120		254.26	87.68	1140.22
25-May-11 19:03:00	78.08		41.50	21.78	120		253.74	87.98	1138.72
25-May-11 19:04:00	77.96		41.89	21.80	119		256.08	87.71	1146.39
25-May-11 19:05:00	77.72		41.92	21.65	119		255.02	88.09	1147.02
25-May-11 19:06:00	77.83		42.04	21.61	119		254.78	87.78	1146.69
25-May-11 19:07:00	78.20		41.72	21.56	119		254.98	87.30	1146.26
25-May-11 19:08:00	78.13		41.74	21.45	118		255.81	86.96	1148.31
25-May-11 19:09:00	78.09		41.71	21.49	118		256.40	86.56	1147.67
25-May-11 19:10:00	78.18		41.75	21.63	119		255.94	86.51	1145.04
25-May-11 19:11:00	78.06		41.89	21.60	119		254.78	87.14	1145.24
25-May-11 19:12:00	77.76		41.97	21.48	119		254.64	87.21	1145.18
25-May-11 19:13:00	77.71		42.10	21.45	119		254.26	87.20	1142.87
25-May-11 19:14:00	77.94		41.92	21.58	120		254.41	86.76	1144.21
	77.96		42.19	21.44	119.37		254.48	86.87	1142.84

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 2							
25-May-11 18:36:00	1172.97	245.87	84.27	15.56	80.87	17.23	51.68
25-May-11 18:37:00	1171.08	245.70	84.28	15.57	80.80	17.25	56.16
25-May-11 18:38:00	1169.84	245.52	84.20	15.59	80.44	17.25	56.05
25-May-11 18:39:00	1168.92	245.54	84.20	15.55	80.20	17.28	63.59
25-May-11 18:40:00	1175.16	245.59	84.20	15.56	81.06	17.37	129.21
25-May-11 18:41:00	1173.80	245.61	84.27	15.58	81.09	17.40	175.46
25-May-11 18:42:00	1170.90	245.64	84.30	15.57	80.69	17.33	92.45
25-May-11 18:43:00	1171.28	245.61	84.30	15.55	80.74	17.30	77.82
25-May-11 18:44:00	1172.01	245.64	84.37	15.51	80.81	17.27	60.53
25-May-11 18:45:00	1169.88	245.59	84.47	15.52	80.64	17.28	58.98
25-May-11 18:46:00	1167.96	245.77	84.48	15.53	80.46	17.29	62.65
25-May-11 18:47:00	1166.55	246.23	84.40	15.57	80.20	17.26	54.59
25-May-11 18:48:00	1170.16	246.21	84.38	15.56	80.53	17.26	53.21
25-May-11 18:49:00	1170.60	246.17	84.24	15.53	80.59	17.26	52.55
25-May-11 18:50:00	1168.84	246.25	84.18	15.64	80.24	17.25	49.98
25-May-11 18:51:00	1166.50	246.17	84.02	15.66	79.94	17.22	48.71
25-May-11 18:52:00	1172.28	246.31	83.90	15.63	80.64	17.30	120.15
25-May-11 18:53:00	1171.60	246.25	83.90	15.69	80.63	17.41	196.88
25-May-11 18:54:00	1171.84	245.96	83.92	15.58	80.65	17.33	109.51
25-May-11 18:55:00	1169.67	245.63	84.00	15.62	80.56	17.27	69.74
25-May-11 18:56:00	1168.23	245.56	84.00	15.64	80.34	17.21	55.55
25-May-11 18:57:00	1167.69	245.61	84.02	15.56	80.17	17.20	51.72
25-May-11 18:58:00	1166.00	245.54	84.10	15.58	79.93	17.20	49.58
25-May-11 18:59:00	1166.98	245.49	84.10	15.51	79.92	17.21	50.61
25-May-11 19:00:00	1168.93	245.03	84.10	15.53	80.24	17.22	50.69
25-May-11 19:01:00	1166.91	244.86	84.10	15.54	80.13	17.21	49.64
25-May-11 19:02:00	1165.05	244.95	84.05	15.62	79.63	17.17	43.92
25-May-11 19:03:00	1163.56	245.12	84.10	15.56	79.38	17.20	48.88
25-May-11 19:04:00	1173.24	244.99	84.08	15.52	80.48	17.33	137.71
25-May-11 19:05:00	1173.61	244.73	84.05	15.54	80.78	17.41	208.69
25-May-11 19:06:00	1172.80	244.28	83.94	15.55	80.84	17.28	81.96
25-May-11 19:07:00	1172.55	244.41	83.88	15.56	80.87	17.24	59.90
25-May-11 19:08:00	1174.06	244.45	83.74	15.57	80.97	17.24	57.67
25-May-11 19:09:00	1173.40	244.51	83.62	15.55	80.89	17.21	47.29
25-May-11 19:10:00	1171.16	244.49	83.50	15.55	80.68	17.21	47.47
25-May-11 19:11:00	1171.41	244.43	83.44	15.57	80.60	17.23	48.99
25-May-11 19:12:00	1171.84	244.28	83.40	15.55	80.77	17.20	45.79
25-May-11 19:13:00	1170.66	244.31	83.34	15.55	80.72	17.20	47.34
25-May-11 19:14:00	1169.56	244.37	83.30	15.56	80.32	17.21	47.15
1169.31	246.76	198.67	85.84	15.55	80.46	17.32	137.88

Run 2	O ₂ (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (discfm) - Qa 317C_dryair	Vol Reg FG (discfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
25-May-11 18:36:00	0.64	351.40	77299.18	74055.99	25582.90	51734.34	184.35
25-May-11 18:37:00	0.63	350.33	77010.06	74358.79	25528.58	51770.72	183.23
25-May-11 18:38:00	0.60	350.08	76779.22	74053.93	25522.93	51779.64	184.57
25-May-11 18:39:00	0.55	350.67	76721.16	73768.77	25613.81	51808.21	185.12
25-May-11 18:40:00	0.57	351.42	76861.28	73785.01	25764.53	51919.75	185.17
25-May-11 18:41:00	0.43	350.88	77013.94	74001.01	25806.95	51973.35	185.23
25-May-11 18:42:00	0.43	350.02	76896.25	74046.07	25654.37	51917.11	184.82
25-May-11 18:43:00	0.56	349.54	76706.33	73881.09	25548.24	51831.18	184.85
25-May-11 18:44:00	0.67	348.51	76601.03	73783.30	25412.35	51823.61	185.32
25-May-11 18:45:00	0.68	349.14	76376.57	73757.59	25468.58	51780.75	185.10
25-May-11 18:46:00	0.56	349.46	76514.63	73546.04	25528.50	51721.37	185.53
25-May-11 18:47:00	0.57	349.02	76585.08	73582.63	25462.48	51750.07	186.06
25-May-11 18:48:00	0.62	350.57	76488.02	73634.99	25560.51	51709.61	185.27
25-May-11 18:49:00	0.71	350.60	76828.48	73596.32	25542.80	51637.14	186.06
25-May-11 18:50:00	0.70	351.04	76834.04	74004.51	25564.36	51637.86	185.02
25-May-11 18:51:00	0.69	351.44	76930.85	73977.74	25558.23	51620.08	184.97
25-May-11 18:52:00	0.67	350.95	77017.80	74042.29	25629.23	51668.55	184.55
25-May-11 18:53:00	0.50	351.00	76909.83	74186.69	25807.04	51765.16	184.25
25-May-11 18:54:00	0.53	352.17	76920.85	74024.55	25787.03	51702.03	184.78
25-May-11 18:55:00	0.62	353.10	77179.13	73991.47	25755.57	51791.77	184.95
25-May-11 18:56:00	0.58	353.43	77381.44	74247.49	25729.00	51885.30	184.55
25-May-11 18:57:00	0.64	353.35	77453.57	74368.86	25689.83	51725.62	184.61
25-May-11 18:58:00	0.70	352.73	77436.91	74479.44	25626.45	51698.94	184.33
25-May-11 18:59:00	0.66	352.41	77301.51	74514.28	25632.81	51732.65	184.01
25-May-11 19:00:00	0.60	352.31	77230.74	74353.48	25646.04	51751.31	184.29
25-May-11 19:01:00	0.61	352.66	77208.94	74246.09	25666.09	51727.80	184.51
25-May-11 19:02:00	0.70	351.76	77285.71	74223.07	25528.43	51665.87	186.21
25-May-11 19:03:00	0.81	351.41	77089.33	74360.37	25505.57	51677.54	189.40
25-May-11 19:04:00	0.65	352.10	77011.34	74280.63	25753.63	51702.40	189.28
25-May-11 19:05:00	0.44	352.02	77163.05	74182.67	25897.70	51623.38	189.99
25-May-11 19:06:00	0.47	351.54	77145.78	74208.96	25699.75	51520.60	190.04
25-May-11 19:07:00	0.65	352.17	77039.33	74117.78	25654.04	51568.44	190.26
25-May-11 19:08:00	0.67	353.41	77178.44	74127.99	25731.47	51678.16	189.69
25-May-11 19:09:00	0.70	352.38	77450.67	74275.59	25615.58	51687.02	189.15
25-May-11 19:10:00	0.71	351.51	77224.88	74534.95	25548.79	51665.26	188.78
25-May-11 19:11:00	0.69	351.90	77033.73	74335.91	25601.42	51693.75	189.43
25-May-11 19:12:00	0.70	351.06	77120.09	74140.20	25511.40	51733.31	190.95
25-May-11 19:13:00	0.77	350.61	76935.89	74211.54	25459.12	51767.40	190.59
25-May-11 19:14:00	0.75	351.75	76836.86	74106.63	25553.13	51729.12	190.37
	0.54	350.16	76736.89	73816.24	25628.32	52052.30	185.05

Mercury/Hexavalent Chromium

5/26/2011 8:45
5/26/2011 11:58

1m

Run 3	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317E1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
26-May-11 08:45:00	77.90	41.60	21.64	121	259.11	87.24	1141.07
26-May-11 08:46:00	77.90	41.84	21.59	121	259.05	87.11	1140.07
26-May-11 08:47:00	78.03	41.81	21.52	120	259.51	87.08	1136.05
26-May-11 08:48:00	77.98	41.53	21.58	121	258.63	87.63	1127.06
26-May-11 08:49:00	77.97	41.33	21.65	122	258.60	87.23	1118.85
26-May-11 08:50:00	77.98	41.56	21.70	121	259.22	86.75	1125.95
26-May-11 08:51:00	77.98	41.42	21.55	121	257.68	87.38	1131.89
26-May-11 08:52:00	77.96	41.33	21.52	121	257.62	87.55	1143.58
26-May-11 08:53:00	78.02	41.39	21.55	122	257.52	87.70	1145.79
26-May-11 08:54:00	77.95	41.45	21.52	122	256.43	87.81	1148.09
26-May-11 08:55:00	77.79	41.65	21.42	122	257.39	87.53	1147.38
26-May-11 08:56:00	77.80	41.62	21.60	121	258.81	86.96	1143.84
26-May-11 08:57:00	77.66	41.43	21.68	121	258.80	86.80	1142.41
26-May-11 08:58:00	77.66	41.61	21.61	121	258.18	87.09	1140.88
26-May-11 08:59:00	77.97	41.42	21.59	121	258.54	86.89	1139.61
26-May-11 09:00:00	78.16	41.35	21.32	122	258.62	86.94	1128.20
26-May-11 09:01:00	78.01	41.42	21.37	123	258.47	86.93	1117.94
26-May-11 09:02:00	77.98	41.52	21.44	122	257.60	87.36	1130.67
26-May-11 09:03:00	77.91	41.42	21.55	122	257.77	87.31	1135.67
26-May-11 09:04:00	78.02	41.36	21.63	122	256.80	87.81	1144.53
26-May-11 09:05:00	77.91	41.70	21.36	121	257.89	87.62	1146.67
26-May-11 09:06:00	77.86	41.75	21.19	123	259.05	87.33	1146.09
26-May-11 09:07:00	77.92	41.85	21.15	122	257.67	87.90	1146.38
26-May-11 09:08:00	78.04	41.71	21.32	122	257.66	88.01	1146.23
26-May-11 09:09:00	78.06	41.61	21.66	122	258.02	87.76	1146.89
26-May-11 09:10:00	77.98	41.84	21.57	121	256.70	87.61	1147.49
26-May-11 09:11:00	78.01	41.87	21.42	122	255.97	87.88	1144.40
26-May-11 09:12:00	78.09	41.47	21.36	123	253.97	87.95	1134.04
26-May-11 09:13:00	77.92	41.43	21.61	122	253.87	87.86	1123.30
26-May-11 09:14:00	77.88	41.62	21.92	121	255.25	87.11	1126.97
26-May-11 09:15:00	77.88	41.87	21.81	121	257.45	87.79	1136.10
26-May-11 09:16:00	77.74	42.00	21.61	121	257.10	88.13	1145.07
26-May-11 09:17:00	77.96	41.64	21.81	121	258.44	88.18	1145.38
26-May-11 09:18:00	77.95	41.63	21.65	121	258.42	88.15	1146.93
26-May-11 09:19:00	77.82	41.44	21.58	121	257.22	88.21	1148.19
26-May-11 09:20:00	77.77	41.44	21.59	121	255.25	88.39	1146.41
26-May-11 09:21:00	77.81	41.50	21.63	121	256.60	88.13	1143.67
26-May-11 09:22:00	77.85	41.55	21.79	121	258.89	87.23	1142.82
26-May-11 09:23:00	78.05	41.63	21.78	120	259.30	87.07	1143.95
26-May-11 09:24:00	78.08	41.74	21.54	120	258.25	87.36	1132.90
26-May-11 09:25:00	77.99	41.63	21.49	120	257.35	87.92	1119.79
26-May-11 09:26:00	78.03	41.41	21.50	121	256.18	87.97	1135.92
26-May-11 09:27:00	77.89	41.50	21.34	120	256.46	87.80	1140.57
26-May-11 09:28:00	77.84	41.53	21.50	121	257.10	87.73	1148.94
26-May-11 09:29:00	77.75	41.60	21.44	121	257.73	87.34	1150.58
26-May-11 09:30:00	77.88	41.52	21.43	120	258.43	87.03	1149.14
26-May-11 09:31:00	77.95	41.04	21.29	120	257.36	87.72	1147.65
26-May-11 09:32:00	77.98	41.71	21.45	120	256.69	87.74	1143.89
26-May-11 09:33:00	77.96	41.58	21.38	120	256.07	87.63	1139.41
26-May-11 09:34:00	77.96	41.62	21.49	121	256.68	87.39	1140.79

Mercury/Hexavalent C

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 3							
26-May-11 08:45:00	1167.90	250.57	79.23	15.55	81.32	17.18	43.52
26-May-11 08:46:00	1167.28	250.66	79.20	15.56	81.35	17.17	42.86
26-May-11 08:47:00	1164.69	250.63	79.20	15.55	81.23	17.20	44.85
26-May-11 08:48:00	1155.23	250.88	79.20	15.58	80.68	17.21	45.41
26-May-11 08:49:00	1146.89	250.97	79.20	15.57	80.18	17.21	44.11
26-May-11 08:50:00	1155.23	250.99	79.27	15.61	80.10	17.24	46.72
26-May-11 08:51:00	1159.08	250.99	79.37	15.62	80.08	17.32	66.52
26-May-11 08:52:00	1171.70	250.90	79.40	15.60	81.62	17.40	94.98
26-May-11 08:53:00	1174.01	250.97	79.42	15.62	82.02	17.34	79.21
26-May-11 08:54:00	1176.37	251.11	79.51	15.60	82.42	17.27	57.13
26-May-11 08:55:00	1175.88	251.45	79.60	15.58	82.53	17.24	49.80
26-May-11 08:56:00	1172.68	251.50	79.60	15.57	82.27	17.25	49.83
26-May-11 08:57:00	1170.98	251.34	79.60	15.59	81.91	17.24	47.41
26-May-11 08:58:00	1168.63	251.08	79.60	15.58	81.61	17.22	44.96
26-May-11 08:59:00	1168.54	251.30	79.60	15.58	81.59	17.23	47.03
26-May-11 09:00:00	1157.66	251.66	79.62	15.57	81.09	17.26	49.20
26-May-11 09:01:00	1146.52	251.51	79.71	15.58	80.29	17.25	46.48
26-May-11 09:02:00	1158.66	251.67	79.80	15.61	80.04	17.25	46.29
26-May-11 09:03:00	1162.49	251.63	79.87	15.58	80.08	16.16	90.30
26-May-11 09:04:00	1173.44	251.45	79.90	15.57	81.74	15.41	139.88
26-May-11 09:05:00	1174.76	251.96	79.92	15.58	82.13	17.31	81.44
26-May-11 09:06:00	1174.43	252.13	80.00	15.57	82.15	17.29	59.39
26-May-11 09:07:00	1174.21	251.98	80.02	15.57	82.06	17.27	52.05
26-May-11 09:08:00	1174.08	252.47	80.11	15.59	82.08	17.24	48.40
26-May-11 09:09:00	1175.74	252.64	80.26	15.57	82.26	17.26	50.48
26-May-11 09:10:00	1176.52	252.64	80.30	15.63	82.28	17.27	48.73
26-May-11 09:11:00	1173.91	252.57	80.37	15.67	82.12	17.28	47.97
26-May-11 09:12:00	1163.27	252.78	80.47	15.68	81.53	17.30	48.77
26-May-11 09:13:00	1150.76	253.11	80.52	15.67	80.80	17.31	49.79
26-May-11 09:14:00	1154.94	253.38	80.60	15.65	80.39	17.35	55.17
26-May-11 09:15:00	1162.25	253.43	80.60	15.57	80.38	17.44	104.77
26-May-11 09:16:00	1173.71	253.25	80.66	15.57	81.81	17.51	149.42
26-May-11 09:17:00	1174.20	253.15	80.63	15.47	81.93	17.41	90.19
26-May-11 09:18:00	1175.08	253.12	80.60	15.53	82.08	17.35	68.10
26-May-11 09:19:00	1175.80	253.24	80.60	15.58	82.23	17.31	58.11
26-May-11 09:20:00	1174.58	253.45	80.53	15.60	82.11	17.33	60.47
26-May-11 09:21:00	1172.67	253.63	80.50	15.54	81.86	17.33	57.50
26-May-11 09:22:00	1172.31	253.92	80.50	15.53	81.69	17.33	57.60
26-May-11 09:23:00	1172.75	254.06	80.50	15.55	81.73	17.33	58.62
26-May-11 09:24:00	1166.29	254.18	80.56	15.55	81.69	17.31	53.75
26-May-11 09:25:00	1157.40	254.60	80.62	15.58	81.29	17.30	51.60
26-May-11 09:26:00	1164.70	254.86	80.70	15.58	80.80	17.31	52.68
26-May-11 09:27:00	1166.10	255.31	80.63	15.55	80.43	17.39	101.68
26-May-11 09:28:00	1176.87	255.42	80.66	15.57	81.92	17.51	162.35
26-May-11 09:29:00	1178.40	255.72	80.72	15.54	82.33	17.43	110.97
26-May-11 09:30:00	1177.89	255.89	80.86	15.56	82.32	17.37	72.11
26-May-11 09:31:00	1176.91	255.81	80.92	15.62	82.12	17.33	62.80
26-May-11 09:32:00	1172.87	255.74	81.06	15.61	81.51	17.29	52.74
26-May-11 09:33:00	1167.17	255.71	81.16	15.62	80.86	17.31	56.00
26-May-11 09:34:00	1169.00	255.76	81.20	15.59	80.92	17.32	56.64

Mercury/Hexavalent C

5/26/2011 8:45
5/26/2011 11:58

1m

O2 (WGS CEMS) (% by vol, dry) 317AI07	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dhAir	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3						
26-May-11 08:45:00	1.07	366.23	77601.67	26477.11	52577.95	183.35
26-May-11 08:46:00	1.04	365.67	77682.65	26441.27	52545.00	181.93
26-May-11 08:47:00	0.97	365.51	77528.67	26483.89	52552.19	182.23
26-May-11 08:48:00	0.91	366.01	77361.04	26541.87	52569.34	183.87
26-May-11 08:49:00	0.93	365.61	77287.41	26505.97	52581.13	185.23
26-May-11 08:50:00	0.89	365.15	77412.61	26523.27	52532.07	183.86
26-May-11 08:51:00	0.86	365.47	77311.11	26652.56	52389.26	184.54
26-May-11 08:52:00	0.85	364.62	77280.83	26692.88	52377.54	185.41
26-May-11 08:53:00	0.77	364.84	77400.99	26659.22	52573.29	184.46
26-May-11 08:54:00	0.86	364.80	77096.69	26547.31	52659.06	185.01
26-May-11 08:55:00	0.90	363.72	77947.12	26419.97	52629.20	184.28
26-May-11 08:56:00	0.90	364.28	77708.41	26468.51	52517.84	184.00
26-May-11 08:57:00	0.89	365.04	77832.26	26511.34	52398.11	185.79
26-May-11 08:58:00	0.91	364.95	77997.66	26703.62	52436.90	184.78
26-May-11 08:59:00	0.90	364.65	77978.56	26480.70	52444.72	185.04
26-May-11 09:00:00	0.82	364.72	77913.13	26540.90	52411.13	185.12
26-May-11 09:01:00	0.84	364.72	77928.10	26518.32	52373.57	185.21
26-May-11 09:02:00	0.95	364.62	77928.88	26484.78	52405.69	184.74
26-May-11 09:03:00	2.47	364.35	77907.05	24773.18	52571.79	185.01
26-May-11 09:04:00	3.44	364.32	77650.86	23628.77	52677.46	184.52
26-May-11 09:05:00	0.86	363.89	77840.13	26531.23	52689.39	182.24
26-May-11 09:06:00	0.92	364.84	77747.03	26557.47	52570.85	183.68
26-May-11 09:07:00	0.86	365.55	77954.25	26595.96	52476.15	183.35
26-May-11 09:08:00	0.82	364.72	80110.02	26511.64	52445.61	183.71
26-May-11 09:09:00	0.84	364.96	77249.88	26552.15	52384.93	183.93
26-May-11 09:10:00	0.83	364.73	77980.61	26546.25	52353.02	183.21
26-May-11 09:11:00	0.92	363.81	77929.98	26468.06	52318.92	183.02
26-May-11 09:12:00	0.88	363.23	77728.71	26458.26	52487.08	184.39
26-May-11 09:13:00	0.91	361.44	77903.05	26328.39	52635.55	185.65
26-May-11 09:14:00	0.89	360.88	77209.48	26340.46	52662.14	184.71
26-May-11 09:15:00	0.81	361.79	77087.66	26542.13	52620.27	184.63
26-May-11 09:16:00	0.72	364.13	77285.78	26827.56	52574.97	184.16
26-May-11 09:17:00	0.64	364.19	77798.44	26726.70	52563.69	185.69
26-May-11 09:18:00	0.77	365.05	77812.94	26685.55	52519.81	184.66
26-May-11 09:19:00	0.82	365.38	80001.43	26646.99	52480.46	185.47
26-May-11 09:20:00	0.83	364.32	80072.41	26581.18	52443.30	185.10
26-May-11 09:21:00	0.78	362.68	77941.78	26476.85	52473.32	184.45
26-May-11 09:22:00	0.77	363.38	77480.74	26540.08	52549.87	184.64
26-May-11 09:23:00	0.75	364.74	77963.84	26644.47	52581.72	185.17
26-May-11 09:24:00	0.89	364.92	77932.11	26589.81	52454.49	184.46
26-May-11 09:25:00	0.88	364.20	77971.90	26532.64	52294.68	183.96
26-May-11 09:26:00	0.84	363.81	77813.58	26521.38	52295.90	184.73
26-May-11 09:27:00	0.85	362.60	77928.93	26534.58	52418.66	184.98
26-May-11 09:28:00	0.75	362.63	77463.33	26702.55	52549.78	184.78
26-May-11 09:29:00	0.66	363.23	77469.69	26679.13	52565.80	185.14
26-May-11 09:30:00	0.76	363.24	77901.60	26572.54	52535.40	185.70
26-May-11 09:31:00	0.73	363.80	77905.16	26578.49	52543.68	187.75
26-May-11 09:32:00	0.79	363.73	77927.34	26510.35	52441.43	184.70
26-May-11 09:33:00	0.87	362.93	77711.69	26452.92	52387.22	184.94
26-May-11 09:34:00	0.76	362.26	779535.39	26445.95	52395.76	184.57

Run 3	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B	317P1108	317P1177A	317FC202	317FC115	317F1113	317F1105
26-May-11 09:35:00	77.92		41.74	21.56	121	256.98	87.45	1140.75
26-May-11 09:36:00	78.08		41.34	21.54	120	258.13	87.07	1130.04
26-May-11 09:37:00	77.99		41.53	21.45	121	256.81	87.55	1118.54
26-May-11 09:38:00	78.00		41.54	21.53	120	256.53	87.72	1127.06
26-May-11 09:39:00	77.98		41.65	21.57	121	258.51	86.95	1130.51
26-May-11 09:40:00	78.08		41.59	21.48	122	258.59	86.82	1138.82
26-May-11 09:41:00	78.03		41.48	21.40	122	258.32	87.05	1138.31
26-May-11 09:42:00	77.93		41.86	21.22	121	257.77	87.24	1137.62
26-May-11 09:43:00	77.95		41.69	21.24	121	255.75	88.00	1138.36
26-May-11 09:44:00	77.99		41.61	21.57	122	257.37	87.57	1138.44
26-May-11 09:45:00	77.82		42.01	21.57	121	259.05	87.13	1136.96
26-May-11 09:46:00	77.88		42.02	21.49	121	257.98	87.51	1136.22
26-May-11 09:47:00	78.06		41.58	21.46	121	257.16	87.86	1136.35
26-May-11 09:48:00	78.12		41.71	21.64	120	258.09	87.20	1128.82
26-May-11 09:49:00	78.00		41.76	21.70	120	258.98	87.17	1117.55
26-May-11 09:50:00	77.79		41.94	21.65	120	257.75	87.63	1122.40
26-May-11 09:51:00	77.77		41.96	21.52	120	257.46	87.95	1129.62
26-May-11 09:52:00	77.80		41.65	21.51	121	258.99	87.50	1139.89
26-May-11 09:53:00	77.71		41.72	21.49	121	258.50	87.69	1141.33
26-May-11 09:54:00	77.70		41.98	21.48	121	258.28	87.83	1142.97
26-May-11 09:55:00	77.84		41.97	21.53	120	258.23	87.91	1141.00
26-May-11 09:56:00	77.97		41.92	21.76	120	259.30	87.25	1138.18
26-May-11 09:57:00	77.87		41.85	21.71	121	260.52	86.48	1138.77
26-May-11 09:58:00	77.73		41.87	21.56	120	259.52	86.75	1138.93
26-May-11 09:59:00	77.77		41.85	21.60	120	258.70	87.33	1139.43
26-May-11 10:00:00	77.94		41.46	21.56	121	258.50	87.34	1128.24
26-May-11 10:01:00	78.14		41.41	21.61	122	258.50	87.37	1116.61
26-May-11 10:02:00	78.05		41.69	21.37	121	258.91	87.04	1129.10
26-May-11 10:03:00	77.94		41.75	21.39	121	258.63	87.06	1129.75
26-May-11 10:04:00	77.94		41.81	21.51	121	257.41	87.73	1143.09
26-May-11 10:05:00	78.04		41.99	21.69	121	256.92	88.32	1141.71
26-May-11 10:06:00	78.04		42.08	21.59	121	257.68	88.18	1140.35
26-May-11 10:07:00	77.96		42.01	21.44	121	257.44	87.67	1139.98
26-May-11 10:08:00	77.98		41.62	21.31	122	256.81	87.81	1138.58
26-May-11 10:09:00	77.80		41.95	21.37	121	257.51	87.51	1140.17
26-May-11 10:10:00	77.97		41.85	21.56	121	257.61	87.27	1140.37
26-May-11 10:11:00	77.92		41.65	21.58	120	257.24	87.75	1138.17
26-May-11 10:12:00	77.75		41.38	21.52	120	257.58	87.75	1126.60
26-May-11 10:13:00	77.94		41.45	21.47	120	256.91	87.90	1115.38
26-May-11 10:14:00	77.74		41.82	21.65	121	257.35	87.26	1130.06
26-May-11 10:15:00	77.78		41.90	21.66	120	257.53	87.20	1128.52
26-May-11 10:16:00	77.87		42.05	21.73	120	257.82	86.76	1136.34
26-May-11 10:17:00	77.94		42.01	21.68	121	258.27	86.63	1136.57
26-May-11 10:18:00	78.03		41.93	21.35	122	256.94	87.47	1136.63
26-May-11 10:19:00	78.04		42.14	21.45	122	257.35	87.51	1138.30
26-May-11 10:20:00	77.88		42.09	21.58	122	258.48	87.14	1139.98
26-May-11 10:21:00	77.74		42.04	21.68	122	258.56	87.03	1138.61
26-May-11 10:22:00	77.85		42.00	21.70	122	259.12	86.75	1137.48
26-May-11 10:23:00	77.92		41.93	21.49	122	258.60	87.13	1136.87
26-May-11 10:24:00	77.94		41.96	21.45	122	257.40	87.66	1125.69

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv. dry) 317AI111
Run 3							
26-May-11 09:35:00	1168.13	255.96	81.20	15.61	80.91	17.31	50.69
26-May-11 09:36:00	1158.51	255.94	81.27	15.61	80.47	17.29	48.38
26-May-11 09:37:00	1146.89	256.06	81.32	15.62	79.70	17.28	47.22
26-May-11 09:38:00	1153.87	256.07	81.40	15.65	79.26	17.27	44.77
26-May-11 09:39:00	1155.42	255.68	81.40	15.59	79.14	17.34	82.40
26-May-11 09:40:00	1166.31	255.69	81.40	15.60	80.54	17.44	130.63
26-May-11 09:41:00	1165.82	255.74	81.40	15.60	80.72	17.37	87.31
26-May-11 09:42:00	1164.94	255.51	81.42	15.60	80.64	17.31	58.63
26-May-11 09:43:00	1165.28	255.10	81.48	15.61	80.65	17.27	53.17
26-May-11 09:44:00	1165.84	255.00	81.47	15.61	80.73	17.24	46.88
26-May-11 09:45:00	1163.86	255.00	81.52	15.62	80.54	17.28	48.01
26-May-11 09:46:00	1163.10	255.03	81.60	15.59	80.40	17.28	46.31
26-May-11 09:47:00	1162.30	255.11	81.66	15.59	80.30	17.25	45.12
26-May-11 09:48:00	1156.52	255.02	81.77	15.53	80.15	17.28	46.90
26-May-11 09:49:00	1148.15	254.91	81.88	15.58	79.93	17.29	47.46
26-May-11 09:50:00	1152.15	255.14	82.00	15.61	79.45	17.26	44.17
26-May-11 09:51:00	1154.58	255.06	82.06	15.60	79.14	17.33	66.96
26-May-11 09:52:00	1166.16	255.08	82.10	15.59	80.52	17.44	99.80
26-May-11 09:53:00	1168.38	255.08	82.10	15.59	80.89	17.35	75.12
26-May-11 09:54:00	1169.89	254.65	82.16	15.59	81.08	17.28	53.71
26-May-11 09:55:00	1168.22	254.55	82.22	15.59	80.97	17.25	47.84
26-May-11 09:56:00	1165.16	254.55	82.36	15.54	80.64	17.22	45.54
26-May-11 09:57:00	1164.65	254.42	82.47	15.54	80.48	17.24	46.01
26-May-11 09:58:00	1164.88	254.40	82.50	15.54	80.51	17.22	44.44
26-May-11 09:59:00	1166.34	254.56	82.50	15.55	80.63	17.19	41.19
26-May-11 10:00:00	1157.96	254.79	82.50	15.53	80.38	17.21	42.94
26-May-11 10:01:00	1148.33	255.10	82.50	15.55	79.84	17.22	44.97
26-May-11 10:02:00	1155.55	255.11	82.50	15.56	79.38	17.23	44.04
26-May-11 10:03:00	1155.59	255.08	82.50	15.56	79.16	17.29	58.32
26-May-11 10:04:00	1169.67	255.08	82.56	15.57	80.82	17.37	80.62
26-May-11 10:05:00	1168.64	255.21	82.68	15.58	81.09	17.32	66.85
26-May-11 10:06:00	1167.72	255.14	82.86	15.60	81.01	17.26	52.45
26-May-11 10:07:00	1167.06	255.16	82.92	15.54	80.93	17.25	48.22
26-May-11 10:08:00	1166.37	255.11	83.00	15.56	80.82	17.22	43.68
26-May-11 10:09:00	1167.32	255.11	83.08	15.58	80.93	17.23	43.30
26-May-11 10:10:00	1166.75	255.11	83.21	15.57	80.96	17.25	43.75
26-May-11 10:11:00	1164.67	254.92	83.38	15.62	80.87	17.23	42.64
26-May-11 10:12:00	1157.27	254.46	83.56	15.63	80.54	17.21	41.37
26-May-11 10:13:00	1151.12	254.39	83.73	15.64	80.27	17.23	42.12
26-May-11 10:14:00	1157.84	254.30	83.88	15.62	79.95	17.23	42.52
26-May-11 10:15:00	1154.36	254.29	84.06	15.62	79.42	17.30	56.02
26-May-11 10:16:00	1162.74	254.44	84.18	15.56	80.39	17.39	79.16
26-May-11 10:17:00	1162.56	254.16	84.30	15.58	80.50	17.35	74.77
26-May-11 10:18:00	1162.88	253.85	84.37	15.60	80.64	17.29	54.62
26-May-11 10:19:00	1165.10	253.76	84.48	15.59	80.86	17.24	45.67
26-May-11 10:20:00	1165.41	253.71	84.68	15.61	80.95	17.25	44.48
26-May-11 10:21:00	1164.18	253.61	84.88	15.62	80.94	17.23	43.26
26-May-11 10:22:00	1163.32	253.61	85.08	15.57	80.79	17.21	41.33
26-May-11 10:23:00	1163.30	253.61	85.28	15.54	80.71	17.22	41.90
26-May-11 10:24:00	1159.44	253.65	85.46	15.53	80.67	17.21	41.93

	O2 (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3							
26-May-11 09:35:00	0.78	362.44	79390.22	76709.81	26436.17	52356.06	184.41
26-May-11 09:36:00	0.84	362.96	79428.24	76574.60	26440.30	52527.56	186.76
26-May-11 09:37:00	0.94	363.64	79543.04	76658.59	26454.27	52651.65	185.69
26-May-11 09:38:00	0.95	362.81	79692.58	76847.06	26373.79	52557.07	185.34
26-May-11 09:39:00	0.89	362.89	79510.37	76986.96	26484.76	52520.00	184.39
26-May-11 09:40:00	0.76	363.85	79527.59	76831.02	26711.60	52450.61	184.84
26-May-11 09:41:00	0.68	363.85	79738.40	76804.60	26641.27	52395.81	185.64
26-May-11 09:42:00	0.80	363.85	79737.99	76882.26	26532.52	52415.86	183.79
26-May-11 09:43:00	0.83	363.47	79738.90	76926.06	26458.56	52511.19	184.28
26-May-11 09:44:00	0.90	362.39	79654.00	76921.57	26319.35	52556.74	184.88
26-May-11 09:45:00	0.87	363.75	79418.40	76875.38	26479.87	52527.56	183.12
26-May-11 09:46:00	0.82	364.84	79716.70	76652.60	26570.96	52518.69	183.44
26-May-11 09:47:00	0.88	364.03	79954.00	76903.29	26459.61	52475.44	185.06
26-May-11 09:48:00	0.87	363.39	79777.68	77166.98	26442.48	52456.03	183.61
26-May-11 09:49:00	0.78	363.52	79636.06	76996.29	26492.11	52448.63	183.80
26-May-11 09:50:00	0.91	364.56	79664.91	76789.79	26500.18	52422.04	183.63
26-May-11 09:51:00	0.94	363.91	79893.06	76922.84	26534.22	52433.09	183.45
26-May-11 09:52:00	0.69	363.99	79751.28	77228.75	26732.65	52491.23	183.90
26-May-11 09:53:00	0.67	365.01	79768.76	76948.43	26711.72	52507.80	184.24
26-May-11 09:54:00	0.85	364.73	79992.87	76880.88	26553.38	52499.61	183.57
26-May-11 09:55:00	0.93	364.78	79931.13	77200.48	26501.39	52512.18	182.60
26-May-11 09:56:00	0.90	364.67	79942.62	77174.66	26468.79	52483.93	182.69
26-May-11 09:57:00	0.90	364.86	79917.54	77146.58	26502.67	52466.13	183.18
26-May-11 09:58:00	0.90	365.22	79959.07	77127.30	26508.70	52469.11	183.22
26-May-11 09:59:00	0.93	364.61	80037.24	77157.30	26419.84	52496.46	183.27
26-May-11 10:00:00	0.92	364.32	79903.59	77216.61	26420.10	52527.09	184.60
26-May-11 10:01:00	0.97	363.92	79841.58	77115.22	26389.39	52528.02	185.24
26-May-11 10:02:00	0.85	364.02	79753.56	77096.49	26445.94	52590.61	183.90
26-May-11 10:03:00	0.90	364.13	79774.33	76922.25	26513.86	52620.54	184.15
26-May-11 10:04:00	0.80	363.89	79799.72	77049.30	26620.18	52546.90	183.70
26-May-11 10:05:00	0.68	363.46	79747.78	77037.48	26552.37	52494.00	182.65
26-May-11 10:06:00	0.75	363.74	79653.51	76823.34	26492.16	52509.77	182.76
26-May-11 10:07:00	0.83	364.31	79714.76	76762.47	26498.49	52471.38	183.14
26-May-11 10:08:00	0.82	363.21	79839.57	76880.40	26384.19	52429.52	184.97
26-May-11 10:09:00	0.86	362.92	79597.59	76956.46	26356.90	52465.61	183.18
26-May-11 10:10:00	0.94	363.35	79534.06	76781.70	26389.85	52461.20	183.94
26-May-11 10:11:00	0.91	363.28	79627.38	76800.46	26369.59	52456.95	184.83
26-May-11 10:12:00	0.98	363.72	79614.05	76846.72	26357.31	52506.51	186.20
26-May-11 10:13:00	0.97	364.17	79710.52	76880.95	26413.36	52523.77	185.76
26-May-11 10:14:00	0.93	363.48	79807.26	76979.16	26384.10	52545.65	183.93
26-May-11 10:15:00	0.94	363.32	79657.65	77055.52	26454.12	52519.47	183.33
26-May-11 10:16:00	0.79	363.26	79621.23	76974.23	26591.19	52444.34	182.64
26-May-11 10:17:00	0.76	362.88	79608.10	76881.44	26526.44	52430.73	182.97
26-May-11 10:18:00	0.87	363.40	79524.31	76811.05	26460.27	52588.41	183.43
26-May-11 10:19:00	0.96	363.03	79639.10	76770.88	26354.39	52697.45	182.65
26-May-11 10:20:00	0.96	363.49	79559.03	76920.37	26393.33	52604.27	182.53
26-May-11 10:21:00	0.95	364.39	79658.82	76844.97	26442.35	52463.61	183.08
26-May-11 10:22:00	0.99	364.33	79856.39	76921.01	26401.23	52437.27	183.07
26-May-11 10:23:00	0.97	364.35	79843.52	77123.86	26422.92	52515.48	182.90
26-May-11 10:24:00	0.85	363.95	79846.92	77097.76	26417.10	52498.86	182.59

Run 3	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B						
26-May-11 10:25:00	77.74	41.90	21.60	121	257.83	87.28	1113.27	
26-May-11 10:26:00	77.95	42.24	21.59	121	257.22	87.32	1128.64	
26-May-11 10:27:00	78.02	42.18	21.52	122	257.48	87.40	1126.67	
26-May-11 10:28:00	78.09	42.09	21.52	121	258.91	86.92	1135.50	
26-May-11 10:29:00	78.09	41.96	21.54	122	259.22	87.09	1137.43	
26-May-11 10:30:00	77.95	41.94	21.55	122	259.22	87.25	1137.75	
26-May-11 10:31:00	77.96	41.94	21.56	122	259.16	87.32	1136.18	
26-May-11 10:32:00	77.96	41.89	21.65	122	257.75	88.10	1136.38	
26-May-11 10:33:00	78.06	42.14	21.74	122	258.08	87.85	1136.81	
26-May-11 10:34:00	78.16	42.28	21.78	121	259.10	87.67	1138.88	
26-May-11 10:35:00	78.04	42.16	21.75	121	259.65	87.27	1139.43	
26-May-11 10:36:00	77.91	42.00	21.77	122	258.07	87.88	1128.18	
26-May-11 10:37:00	77.80	41.93	21.72	121	257.33	88.03	1113.86	
26-May-11 10:38:00	77.86	41.86	21.67	121	257.82	87.62	1124.13	
26-May-11 10:39:00	77.99	42.03	21.56	121	258.65	87.16	1131.62	
26-May-11 10:40:00	78.07	42.13	21.58	121	258.16	87.53	1139.22	
26-May-11 10:41:00	78.15	41.88	21.81	122	258.65	87.44	1136.05	
26-May-11 10:42:00	77.96	42.18	21.78	122	259.97	86.93	1138.28	
26-May-11 10:43:00	78.02	41.85	21.61	121	259.91	86.97	1139.01	
26-May-11 10:44:00	78.00	41.44	21.65	122	258.09	87.53	1140.54	
26-May-11 10:45:00	78.02	42.10	21.59	122	258.35	87.66	1141.59	
26-May-11 10:46:00	77.85	42.20	21.56	121	259.01	87.48	1139.29	
26-May-11 10:47:00	77.90	42.58	21.64	121	259.23	87.24	1136.62	
26-May-11 10:48:00	77.94	42.42	21.72	121	258.58	87.43	1132.80	
26-May-11 10:49:00	78.15	42.17	21.72	121	257.63	87.80	1128.68	
26-May-11 10:50:00	78.04	42.05	21.89	121	259.77	87.03	1130.33	
26-May-11 10:51:00	78.00	42.44	21.72	120	259.96	86.97	1128.88	
26-May-11 10:52:00	78.01	42.57	21.59	120	258.89	87.42	1139.71	
26-May-11 10:53:00	78.09	42.30	21.79	121	259.87	87.27	1141.30	
26-May-11 10:54:00	78.02	42.17	21.68	121	258.15	87.49	1141.70	
26-May-11 10:55:00	78.12	42.05	21.45	121	256.86	87.56	1140.84	
26-May-11 10:56:00	78.14	42.09	21.37	120	258.22	86.96	1139.33	
26-May-11 10:57:00	78.03	42.45	21.34	121	258.76	86.73	1138.92	
26-May-11 10:58:00	78.17	42.41	21.47	120	258.52	86.68	1139.24	
26-May-11 10:59:00	78.18	42.11	21.33	120	259.51	86.46	1139.43	
26-May-11 11:00:00	78.14	42.19	21.45	120	258.29	86.95	1127.18	
26-May-11 11:01:00	78.12	42.32	21.45	121	256.97	87.29	1111.32	
26-May-11 11:02:00	78.08	42.32	21.49	121	257.48	86.64	1125.19	
26-May-11 11:03:00	77.96	42.31	21.62	121	257.36	86.80	1127.65	
26-May-11 11:04:00	78.13	42.14	21.68	121	256.59	87.52	1140.16	
26-May-11 11:05:00	78.11	42.37	21.65	122	255.98	87.58	1140.35	
26-May-11 11:06:00	78.12	42.32	21.46	121	255.90	87.55	1137.86	
26-May-11 11:07:00	77.96	42.14	21.50	121	256.32	87.40	1137.33	
26-May-11 11:08:00	78.02	42.20	21.44	121	256.68	87.22	1138.05	
26-May-11 11:09:00	78.11	42.13	21.52	121	256.76	87.16	1139.25	
26-May-11 11:10:00	78.15	42.30	21.36	121	256.39	87.33	1139.32	
26-May-11 11:11:00	78.22	42.27	21.47	121	255.55	87.18	1137.20	
26-May-11 11:12:00	78.07	41.86	21.32	121	255.41	86.98	1127.76	
26-May-11 11:13:00	78.13	42.03	21.45	121	256.65	86.75	1118.14	
26-May-11 11:14:00	78.23	42.23	21.55	121	257.11	86.88	1128.02	

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 3							
26-May-11 10:25:00	1153.77	253.92	85.48	15.52	80.39	17.20	40.21
26-May-11 10:26:00	1154.41	254.28	85.40	15.53	79.67	17.22	41.68
26-May-11 10:27:00	1151.11	254.22	85.38	15.53	79.07	17.26	53.43
26-May-11 10:28:00	1161.49	254.29	85.30	15.50	80.31	17.36	76.18
26-May-11 10:29:00	1163.53	254.34	85.30	15.56	80.66	17.32	70.99
26-May-11 10:30:00	1164.34	254.30	85.23	15.56	80.75	17.23	52.01
26-May-11 10:31:00	1163.09	254.24	85.20	15.55	80.72	17.20	45.02
26-May-11 10:32:00	1161.60	254.39	85.20	15.60	80.55	17.19	42.52
26-May-11 10:33:00	1162.10	254.47	85.13	15.57	80.53	17.19	41.60
26-May-11 10:34:00	1163.96	254.40	85.08	15.59	80.68	17.20	42.42
26-May-11 10:35:00	1164.95	254.43	85.00	15.56	80.79	17.18	41.26
26-May-11 10:36:00	1157.65	254.20	85.02	15.59	80.58	17.19	41.27
26-May-11 10:37:00	1147.66	254.24	85.11	15.61	80.07	17.16	40.11
26-May-11 10:38:00	1151.95	254.30	85.28	15.61	79.50	17.16	40.85
26-May-11 10:39:00	1155.83	254.20	85.48	15.55	79.37	17.25	61.15
26-May-11 10:40:00	1165.06	254.24	85.61	15.57	80.71	17.34	83.93
26-May-11 10:41:00	1163.39	254.30	85.70	15.58	80.80	17.25	59.43
26-May-11 10:42:00	1164.87	254.24	85.77	15.55	80.70	17.19	47.10
26-May-11 10:43:00	1164.98	254.34	85.88	15.58	80.80	17.15	42.47
26-May-11 10:44:00	1166.49	254.30	86.00	15.58	81.00	17.11	40.04
26-May-11 10:45:00	1166.78	254.24	86.00	15.58	81.12	17.11	39.24
26-May-11 10:46:00	1165.04	254.32	86.00	15.57	80.97	17.14	39.53
26-May-11 10:47:00	1162.56	254.25	86.06	15.57	80.68	17.13	39.23
26-May-11 10:48:00	1160.62	254.12	86.16	15.57	80.56	17.09	38.20
26-May-11 10:49:00	1158.56	254.08	86.27	15.61	80.42	17.07	37.23
26-May-11 10:50:00	1155.45	254.31	86.30	15.58	79.70	17.10	37.69
26-May-11 10:51:00	1153.92	254.09	86.23	15.59	79.28	17.20	50.29
26-May-11 10:52:00	1165.51	254.12	86.20	15.60	80.55	17.28	68.34
26-May-11 10:53:00	1166.21	254.12	86.20	15.60	80.86	17.21	60.34
26-May-11 10:54:00	1167.74	253.82	86.20	15.60	81.06	17.15	47.53
26-May-11 10:55:00	1167.45	253.54	86.13	15.52	81.04	17.09	41.43
26-May-11 10:56:00	1165.93	253.74	86.15	15.45	80.93	17.08	39.79
26-May-11 10:57:00	1164.55	254.16	86.10	15.47	80.80	17.11	39.49
26-May-11 10:58:00	1165.18	254.34	86.12	15.48	80.88	17.10	38.00
26-May-11 10:59:00	1166.35	254.30	86.20	15.50	81.05	17.08	37.40
26-May-11 11:00:00	1159.29	254.54	86.22	15.55	80.84	17.08	37.35
26-May-11 11:01:00	1150.53	254.62	86.30	15.56	80.30	17.08	37.13
26-May-11 11:02:00	1152.68	254.69	86.37	15.53	79.53	17.08	37.60
26-May-11 11:03:00	1152.18	254.79	86.42	15.55	79.23	17.20	50.53
26-May-11 11:04:00	1165.88	254.90	86.56	15.59	80.84	17.30	67.39
26-May-11 11:05:00	1165.78	254.84	86.62	15.57	81.09	17.21	57.00
26-May-11 11:06:00	1163.67	254.85	86.70	15.54	80.95	17.18	47.26
26-May-11 11:07:00	1162.67	255.12	86.70	15.52	80.77	17.20	46.01
26-May-11 11:08:00	1163.40	255.40	86.70	15.52	80.77	17.20	43.33
26-May-11 11:09:00	1165.45	255.33	86.77	15.55	81.04	17.18	42.34
26-May-11 11:10:00	1165.72	255.38	86.75	15.56	81.12	17.17	41.79
26-May-11 11:11:00	1164.04	255.66	86.80	15.54	81.02	17.17	41.41
26-May-11 11:12:00	1159.94	256.06	86.87	15.55	80.77	17.19	42.03
26-May-11 11:13:00	1155.54	256.12	86.97	15.55	80.47	17.25	43.85
26-May-11 11:14:00	1155.25	256.21	87.08	15.60	79.87	17.23	43.61

	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dvair	Vol Reg FG (dscfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3							
26-May-11 10:25:00	0.90	363.24	79760.20	76986.98	26331.18	52462.31	183.49
26-May-11 10:26:00	1.00	363.02	79603.82	76951.72	26321.89	52431.63	181.76
26-May-11 10:27:00	0.92	362.55	79557.07	76895.39	26354.25	52406.89	182.01
26-May-11 10:28:00	0.83	362.82	79452.95	76822.85	26511.42	52447.75	182.55
26-May-11 10:29:00	0.73	363.76	79512.86	76719.77	26563.01	52525.18	183.38
26-May-11 10:30:00	0.83	364.59	79718.86	76652.22	26497.09	52528.59	183.87
26-May-11 10:31:00	0.95	364.66	79899.25	76871.95	26428.54	52516.94	183.41
26-May-11 10:32:00	1.00	364.76	79916.55	77118.90	26401.89	52499.67	182.95
26-May-11 10:33:00	1.07	364.24	79936.50	77181.40	26350.96	52459.34	181.69
26-May-11 10:34:00	0.95	364.25	79824.09	77263.30	26397.55	52492.84	180.61
26-May-11 10:35:00	0.95	365.15	79825.27	77042.62	26433.74	52553.72	181.64
26-May-11 10:36:00	1.00	365.17	80023.09	77042.01	26435.91	52448.73	182.71
26-May-11 10:37:00	1.01	364.35	80027.71	77269.21	26343.47	52360.03	182.55
26-May-11 10:38:00	1.06	363.80	79847.21	77273.96	26291.38	52455.12	182.83
26-May-11 10:39:00	0.92	363.84	79727.63	77129.00	26431.15	52498.56	182.19
26-May-11 10:40:00	0.89	363.91	79736.08	76992.94	26554.43	52585.74	182.00
26-May-11 10:41:00	0.80	364.02	79751.54	77023.96	26476.07	52587.25	183.02
26-May-11 10:42:00	0.91	364.36	79775.61	76887.69	26401.96	52505.35	182.17
26-May-11 10:43:00	0.88	365.15	79850.79	76942.74	26425.02	52491.59	183.27
26-May-11 10:44:00	0.98	365.12	80021.98	76967.29	26348.22	52482.18	185.61
26-May-11 10:45:00	0.99	363.93	80016.90	77185.68	26259.35	52472.67	181.93
26-May-11 10:46:00	0.91	364.32	79755.95	77186.09	26342.48	52483.21	181.37
26-May-11 10:47:00	0.99	364.67	79840.96	76884.86	26331.59	52536.91	180.34
26-May-11 10:48:00	1.07	364.63	79917.84	77040.24	26266.43	52485.24	180.80
26-May-11 10:49:00	1.06	364.21	79909.65	77141.58	26213.83	52383.51	181.36
26-May-11 10:50:00	1.11	363.84	79816.19	77114.37	26211.15	52405.08	182.29
26-May-11 10:51:00	1.05	365.08	79735.96	77103.85	26428.19	52468.30	180.46
26-May-11 10:52:00	0.86	365.12	80006.59	77053.78	26579.54	52457.20	179.98
26-May-11 10:53:00	0.87	364.77	80017.02	77212.98	26476.09	52421.63	180.79
26-May-11 10:54:00	0.99	365.49	79939.25	77177.56	26417.84	52423.61	181.36
26-May-11 10:55:00	1.06	363.89	80097.82	77147.61	26209.03	52469.39	182.16
26-May-11 10:56:00	1.10	362.29	79747.35	77318.42	26068.89	52487.09	181.55
26-May-11 10:57:00	1.03	362.78	79397.14	77001.59	26166.45	52439.73	180.47
26-May-11 10:58:00	1.03	362.97	79503.11	76625.33	26162.70	52429.35	181.49
26-May-11 10:59:00	1.10	362.82	79546.02	76724.99	26118.04	52406.73	182.89
26-May-11 11:00:00	1.12	363.72	79513.03	76811.57	26176.72	52529.45	182.21
26-May-11 11:01:00	1.13	363.13	79708.79	76798.38	26122.31	52672.85	181.72
26-May-11 11:02:00	1.02	362.08	79580.33	76986.41	26086.09	52629.87	181.28
26-May-11 11:03:00	0.88	361.78	79350.53	76755.56	26234.09	52642.12	181.71
26-May-11 11:04:00	0.91	362.04	79284.21	76539.14	26358.51	52612.66	183.19
26-May-11 11:05:00	0.98	362.18	79340.61	76581.38	26246.89	52573.11	181.95
26-May-11 11:06:00	0.99	361.48	79372.92	76621.09	26161.06	52511.73	182.08
26-May-11 11:07:00	0.85	361.21	79218.93	76617.42	26209.30	52400.71	182.94
26-May-11 11:08:00	0.89	361.33	79159.94	76381.88	26201.32	52426.04	183.26
26-May-11 11:09:00	0.85	361.49	79185.85	76351.02	26204.05	52446.35	183.63
26-May-11 11:10:00	0.90	361.73	79221.54	76317.29	26191.37	52458.26	182.97
26-May-11 11:11:00	0.94	361.45	79272.80	76400.30	26166.91	52468.20	182.72
26-May-11 11:12:00	0.85	360.28	79211.61	76479.26	26128.16	52456.06	184.63
26-May-11 11:13:00	0.80	359.92	78955.97	76357.46	26179.07	52498.02	184.01
26-May-11 11:14:00	0.82	361.07	78877.18	76122.68	26240.22	52501.75	183.61

Run 3	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B	317P1108	317P1177A	317FC202	317FC115	317F1113	317F1105
26-May-11 11:15:00	78.14		42.40	21.39	121	255.87	87.52	1128.48
26-May-11 11:16:00	78.15		42.32	21.54	120	256.29	87.20	1137.13
26-May-11 11:17:00	78.10		42.38	21.71	120	256.74	86.80	1136.51
26-May-11 11:18:00	78.17		42.21	21.60	120	256.75	87.25	1136.06
26-May-11 11:19:00	78.12		42.41	21.39	119	255.63	87.83	1136.16
26-May-11 11:20:00	78.08		42.48	21.31	119	254.77	87.81	1136.17
26-May-11 11:21:00	78.19		42.68	21.38	119	255.31	87.86	1135.35
26-May-11 11:22:00	78.06		42.72	21.37	120	255.07	87.85	1134.51
26-May-11 11:23:00	78.03		42.71	21.25	120	255.94	87.41	1134.90
26-May-11 11:24:00	77.99		42.46	21.39	120	256.77	87.17	1135.05
26-May-11 11:25:00	78.09		42.40	21.47	120	254.93	87.60	1131.28
26-May-11 11:26:00	78.18		42.24	21.60	120	255.12	87.04	1126.03
26-May-11 11:27:00	78.13		41.99	21.43	121	255.39	86.90	1125.22
26-May-11 11:28:00	78.01		42.30	21.27	120	254.11	87.92	1136.38
26-May-11 11:29:00	78.14		42.38	21.43	119	255.70	87.48	1138.45
26-May-11 11:30:00	78.14		42.46	21.42	119	256.96	86.94	1137.61
26-May-11 11:31:00	78.09		42.44	21.49	119	256.72	86.95	1135.51
26-May-11 11:32:00	78.07		42.23	21.40	120	256.58	86.88	1136.93
26-May-11 11:33:00	78.00		42.26	21.38	120	255.49	87.30	1137.37
26-May-11 11:34:00	77.98		42.43	21.34	120	255.05	88.06	1137.59
26-May-11 11:35:00	78.12		42.45	21.52	120	255.60	87.50	1137.67
26-May-11 11:36:00	78.14		42.33	21.45	120	256.25	87.17	1134.62
26-May-11 11:37:00	78.13		42.49	21.38	121	256.53	87.50	1131.14
26-May-11 11:38:00	78.14		42.47	21.52	120	255.06	88.01	1126.81
26-May-11 11:39:00	78.21		42.50	21.65	120	254.53	87.97	1127.89
26-May-11 11:40:00	78.06		42.60	21.27	120	254.15	87.85	1138.22
26-May-11 11:41:00	77.88		42.54	21.27	120	255.24	87.59	1138.35
26-May-11 11:42:00	78.02		42.26	21.11	120	254.51	87.65	1137.66
26-May-11 11:43:00	78.06		42.33	21.01	120	252.97	87.98	1137.41
26-May-11 11:44:00	77.97		42.49	21.11	120	253.46	87.81	1138.32
26-May-11 11:45:00	77.93		42.59	21.06	120	252.79	88.03	1136.39
26-May-11 11:46:00	77.98		42.26	21.14	119	252.94	87.75	1134.39
26-May-11 11:47:00	78.05		42.27	21.08	120	254.25	87.17	1134.12
26-May-11 11:48:00	78.13		42.37	21.28	119	255.41	86.79	1132.55
26-May-11 11:49:00	78.11		42.53	21.03	119	254.33	87.49	1131.34
26-May-11 11:50:00	78.29		42.43	21.40	119	254.71	87.36	1128.05
26-May-11 11:51:00	78.10		42.39	21.38	120	254.34	87.29	1123.19
26-May-11 11:52:00	78.17		42.56	21.26	119	254.96	87.31	1132.81
26-May-11 11:53:00	78.22		42.48	21.24	119	254.88	87.03	1135.13
26-May-11 11:54:00	78.14		42.50	21.31	119	254.01	86.99	1136.71
26-May-11 11:55:00	78.07		42.55	21.35	120	253.33	87.70	1135.83
26-May-11 11:56:00	78.06		42.65	21.61	121	253.33	87.92	1134.01
26-May-11 11:57:00	78.15		42.72	21.40	121	255.68	86.89	1133.26
26-May-11 11:57:00	77.99		41.97	21.51	120.82	257.23	87.42	1135.57

#2 Stand Pipe Aeration Air to Regen (lbs/min)	Air to Regen Temp B-1 Outlet (oF)	Tempered Air Temp (oF)	Ambient Air Temp (oF)	Air to Regen Pressure Blower Discharge (psig)	Plant Air to 45lb Air (psig)	CO2 (WGS CEMS) (% by vol. dry)	CO (WGS CEMS) (ppmv. dry)
317FI106	317TI1112	317TI1120	DWS AT	317PC039	317PC088	317AI109	317AI111
Run 3							
26-May-11 11:15:00	1153.34	219.43	87.28	15.62	79.48	17.27	61.55
26-May-11 11:16:00	1163.10	219.60	87.42	15.56	80.79	17.39	94.54
26-May-11 11:17:00	1162.27	219.48	87.58	15.55	80.96	17.35	83.52
26-May-11 11:18:00	1161.94	219.46	87.80	15.62	81.01	17.27	56.74
26-May-11 11:19:00	1162.02	219.41	88.08	15.64	81.11	17.24	49.93
26-May-11 11:20:00	1161.69	219.42	88.34	15.59	81.09	17.22	47.37
26-May-11 11:21:00	1160.71	219.43	88.63	15.60	81.04	17.22	45.91
26-May-11 11:22:00	1160.65	219.28	88.85	15.60	81.02	17.23	45.16
26-May-11 11:23:00	1161.07	219.23	89.00	15.59	81.06	17.22	46.48
26-May-11 11:24:00	1161.85	219.60	89.00	15.60	81.15	17.27	49.60
26-May-11 11:25:00	1158.64	220.02	88.98	15.60	80.79	17.28	47.97
26-May-11 11:26:00	1151.00	219.94	88.84	15.54	79.83	17.26	46.62
26-May-11 11:27:00	1148.83	220.30	88.72	15.54	79.32	17.34	68.28
26-May-11 11:28:00	1161.26	220.46	88.58	15.58	80.74	17.42	102.53
26-May-11 11:29:00	1163.70	220.42	88.44	15.55	81.25	17.38	91.67
26-May-11 11:30:00	1163.99	220.47	88.40	15.54	81.35	17.33	69.17
26-May-11 11:31:00	1161.84	220.60	88.40	15.55	81.19	17.28	55.02
26-May-11 11:32:00	1161.44	220.91	88.47	15.55	81.03	17.26	49.02
26-May-11 11:33:00	1162.09	221.05	88.56	15.54	81.04	17.26	48.27
26-May-11 11:34:00	1163.90	221.03	88.66	15.62	81.23	17.25	46.70
26-May-11 11:35:00	1163.93	221.00	88.77	15.54	81.27	17.24	46.31
26-May-11 11:36:00	1160.55	221.03	88.87	15.54	81.02	17.27	48.61
26-May-11 11:37:00	1155.81	221.00	88.97	15.60	80.39	17.27	47.24
26-May-11 11:38:00	1151.82	221.09	88.92	15.63	79.58	17.25	45.81
26-May-11 11:39:00	1152.27	221.13	88.80	15.63	79.48	17.33	70.88
26-May-11 11:40:00	1163.52	221.05	88.80	15.59	80.91	17.46	127.46
26-May-11 11:41:00	1163.16	221.19	88.87	15.56	81.16	17.45	121.08
26-May-11 11:42:00	1163.06	221.20	88.92	15.56	81.08	17.35	65.20
26-May-11 11:43:00	1162.32	221.12	89.01	15.56	80.98	17.31	55.52
26-May-11 11:44:00	1163.21	221.00	89.11	15.58	81.06	17.29	51.78
26-May-11 11:45:00	1162.12	221.20	89.21	15.59	80.96	17.30	53.19
26-May-11 11:46:00	1160.27	221.22	89.32	15.55	80.77	17.29	50.23
26-May-11 11:47:00	1159.16	221.21	89.54	15.56	80.58	17.28	49.16
26-May-11 11:48:00	1158.19	221.16	89.78	15.58	80.52	17.29	51.12
26-May-11 11:49:00	1157.95	221.05	89.90	15.62	80.47	17.30	49.58
26-May-11 11:50:00	1153.20	221.15	89.88	15.65	79.77	17.28	49.27
26-May-11 11:51:00	1149.20	221.11	89.79	15.63	79.34	17.37	97.04
26-May-11 11:52:00	1159.37	221.18	89.68	15.65	80.61	17.47	170.14
26-May-11 11:53:00	1160.46	221.16	89.54	15.60	80.97	17.43	138.64
26-May-11 11:54:00	1162.64	221.19	89.44	15.55	81.32	17.35	79.63
26-May-11 11:55:00	1162.02	221.23	89.38	15.65	81.31	17.30	61.51
26-May-11 11:56:00	1159.48	221.27	89.35	15.66	81.02	17.28	55.32
26-May-11 11:57:00	1158.62	221.30	89.30	15.59	80.80	17.35	68.55
1162.84	254.65	216.40	84.27	15.58	80.79	17.25	57.83

Run 3	O ₂ (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Q _a 317C_dryair	Vol Reg FG (dscfm) - Q _r 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
26-May-11 11:15:00	0.83	361.86	79129.07	76042.95	26342.31	52502.44	183.08
26-May-11 11:16:00	0.77	361.33	79302.54	76354.09	26454.82	52537.56	183.01
26-May-11 11:17:00	0.66	361.11	79185.39	76541.42	26421.51	52515.01	181.84
26-May-11 11:18:00	0.82	361.24	79138.10	76309.13	26298.49	52419.11	183.36
26-May-11 11:19:00	0.82	362.17	79165.13	76334.05	26325.88	52445.47	182.36
26-May-11 11:20:00	0.81	361.49	79369.45	76325.18	26254.59	52546.75	182.22
26-May-11 11:21:00	0.88	360.56	79221.72	76503.33	26176.93	52684.77	180.76
26-May-11 11:22:00	0.92	361.19	79017.93	76429.88	26212.70	52786.07	180.66
26-May-11 11:23:00	0.86	360.86	79155.35	76266.76	26202.06	52714.23	181.19
26-May-11 11:24:00	0.74	361.36	79083.23	76327.65	26324.70	52639.45	182.17
26-May-11 11:25:00	0.76	361.89	79193.03	76209.68	26374.54	52646.21	182.67
26-May-11 11:26:00	0.77	360.21	79307.33	76338.36	26225.51	52689.81	183.12
26-May-11 11:27:00	0.78	359.51	78940.53	76443.86	26263.02	52609.39	184.02
26-May-11 11:28:00	0.69	359.77	78786.63	76179.26	26404.78	52475.81	183.27
26-May-11 11:29:00	0.63	359.77	78842.81	76010.86	26369.66	52480.92	183.27
26-May-11 11:30:00	0.74	360.75	78844.21	75968.86	26352.51	52510.43	182.98
26-May-11 11:31:00	0.81	361.31	79058.67	76035.35	26315.82	52535.77	182.98
26-May-11 11:32:00	0.78	361.13	79180.98	76251.00	26287.97	52593.41	183.46
26-May-11 11:33:00	0.88	360.71	79142.72	76325.85	26228.63	52551.22	183.14
26-May-11 11:34:00	0.87	360.27	79049.01	76384.44	26183.08	52525.08	182.29
26-May-11 11:35:00	0.81	360.86	78952.69	76262.92	26233.86	52561.13	182.08
26-May-11 11:36:00	0.84	360.31	79082.67	76124.72	26220.61	52626.69	183.31
26-May-11 11:37:00	0.73	360.85	78963.21	76280.08	26291.61	52688.14	182.05
26-May-11 11:38:00	0.85	361.59	79080.14	76085.01	26293.88	52697.81	182.63
26-May-11 11:39:00	0.84	360.77	79243.60	76293.94	26323.08	52626.97	182.14
26-May-11 11:40:00	0.65	360.10	79064.06	76508.66	26490.15	52540.74	181.07
26-May-11 11:41:00	0.57	359.52	78916.01	76286.27	26453.23	52549.80	181.91
26-May-11 11:42:00	0.62	360.20	78789.33	76045.90	26366.88	52537.11	183.66
26-May-11 11:43:00	0.71	359.36	78939.15	75884.78	26236.82	52531.75	183.89
26-May-11 11:44:00	0.76	358.27	78754.05	76073.21	26119.47	52613.48	182.81
26-May-11 11:45:00	0.76	358.68	78516.15	75930.84	26164.87	52645.69	182.37
26-May-11 11:46:00	0.69	358.11	78603.99	75701.71	26129.49	52540.18	184.61
26-May-11 11:47:00	0.67	357.73	78479.72	75707.49	26087.95	52508.22	184.47
26-May-11 11:48:00	0.72	358.63	78397.25	75565.66	26162.69	52515.51	184.36
26-May-11 11:49:00	0.78	359.48	78594.60	75546.99	26212.33	52528.54	183.71
26-May-11 11:50:00	0.79	359.49	78779.54	75799.00	26192.93	52585.41	183.54
26-May-11 11:51:00	0.65	359.71	78783.11	75959.12	26347.03	52602.06	183.37
26-May-11 11:52:00	0.54	359.31	78830.49	75936.14	26475.80	52561.12	182.70
26-May-11 11:53:00	0.45	360.10	78743.67	75957.72	26503.69	52497.91	182.65
26-May-11 11:54:00	0.62	359.28	78916.20	75767.53	26308.25	52573.84	183.29
26-May-11 11:55:00	0.72	358.33	78735.72	76020.41	26149.23	52656.29	182.53
26-May-11 11:56:00	0.72	358.91	78528.12	75876.96	26170.96	52610.46	182.23
26-May-11 11:57:00	0.64	359.07	78654.80	75663.56	26280.23	52603.30	182.52
	0.88	362.99	79557.43	76782.48	26383.33	52513.53	183.40

B Cat WGS ICR Performance Test
May 26-27, 2011

Run No.	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H ₂ O) 317P1177A	WGS Liquid to Gas Ratio (gal/MSCF) 317C_WGS_L_G_RATIO	Vol Reg FG (discfm) Or	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	CO ₂ (WGS CEMS) (% by vol. dry) 317A1109	CO (WGS CEMS) (ppmv. dry) 317A1111	O ₂ (WGS CEMS) (% by vol. dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air
1	43.24	20.47	186.22	73596	25168	52014	16.87	132.40	0.65	350.29
2	43.59	21.97	174.95	77485	26777	52905	17.27	100.88	0.66	367.21
3	43.05	21.89	178.46	76970	26585	52356	17.16	119.36	0.56	365.78
Average	43.29	21.44	179.88	76017	26176	52425	17.10	117.55	0.62	361.09

PM/PM2.5/Ammonia

5/26/2011 16:15
5/26/2011 19:30

1m

Run 1	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FI113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FI105
26-May-11 16:15:00	78.28	43.34	20.43	122	248.13	86.55	1130.92
26-May-11 16:16:00	78.38	43.33	20.51	122	248.33	86.67	1141.28
26-May-11 16:17:00	78.33	43.34	20.45	122	249.38	86.33	1137.83
26-May-11 16:18:00	78.19	43.37	20.47	122	248.15	86.86	1139.93
26-May-11 16:19:00	78.42	43.41	20.42	122	247.25	87.24	1141.87
26-May-11 16:20:00	78.34	43.34	20.20	122	247.94	87.03	1141.87
26-May-11 16:21:00	78.40	43.32	20.19	122	247.51	86.98	1139.96
26-May-11 16:22:00	78.45	43.30	20.40	122	247.65	86.71	1139.18
26-May-11 16:23:00	78.30	43.31	20.52	122	248.91	86.52	1139.16
26-May-11 16:24:00	78.45	43.25	20.54	122	247.21	87.22	1139.22
26-May-11 16:25:00	78.49	43.20	20.26	122	247.37	87.22	1137.20
26-May-11 16:26:00	78.30	43.28	20.32	122	248.71	86.57	1128.33
26-May-11 16:27:00	78.25	43.27	20.44	122	248.63	86.44	1121.98
26-May-11 16:28:00	78.41	43.26	20.39	122	248.37	86.36	1131.78
26-May-11 16:29:00	78.35	43.25	20.46	122	247.52	86.81	1132.48
26-May-11 16:30:00	78.52	43.28	20.43	122	247.59	86.92	1133.00
26-May-11 16:31:00	78.54	43.30	20.42	122	249.20	86.47	1131.38
26-May-11 16:32:00	78.36	43.32	20.50	122	248.30	86.42	1132.09
26-May-11 16:33:00	78.41	43.28	20.45	122	246.81	86.63	1133.62
26-May-11 16:34:00	78.47	43.23	20.28	122	246.77	86.86	1136.57
26-May-11 16:35:00	78.44	43.27	20.56	121	248.12	86.68	1136.94
26-May-11 16:36:00	78.34	43.23	20.47	121	247.97	86.70	1137.46
26-May-11 16:37:00	78.13	43.31	20.26	121	246.89	87.00	1139.00
26-May-11 16:38:00	78.28	43.39	20.21	121	246.58	86.91	1132.76
26-May-11 16:39:00	78.65	43.41	20.23	121	245.85	87.01	1129.02
26-May-11 16:40:00	78.63	43.41	20.31	122	246.68	86.98	1142.51
26-May-11 16:41:00	78.60	43.38	20.23	122	248.09	86.89	1137.57
26-May-11 16:42:00	78.42	43.46	20.25	121	246.54	87.34	1136.92
26-May-11 16:43:00	78.37	43.44	20.35	121	245.40	87.69	1136.94
26-May-11 16:44:00	78.26	43.37	20.38	121	246.29	87.51	1138.95
26-May-11 16:45:00	78.19	43.36	20.36	121	247.29	86.97	1139.55
26-May-11 16:46:00	78.32	43.32	20.25	120	249.00	86.35	1138.54
26-May-11 16:47:00	78.32	43.40	20.28	120	248.39	86.51	1136.98
26-May-11 16:48:00	78.42	43.37	20.43	120	247.45	86.83	1136.95
26-May-11 16:49:00	78.37	43.43	20.34	120	245.67	87.72	1137.77
26-May-11 16:50:00	78.28	43.44	20.44	120	246.27	87.16	1131.31
26-May-11 16:51:00	78.38	43.42	20.38	120	247.58	86.71	1125.26
26-May-11 16:52:00	78.32	43.39	20.36	120	247.24	86.93	1137.19
26-May-11 16:53:00	78.38	43.40	20.72	120	247.67	86.88	1136.45
26-May-11 16:54:00	78.35	43.36	20.55	121	248.42	86.54	1138.47
26-May-11 16:55:00	78.29	43.36	20.24	121	247.32	87.00	1138.48
26-May-11 16:56:00	78.37	43.44	20.25	120	247.56	86.70	1138.27
26-May-11 16:57:00	78.55	43.44	20.28	120	248.74	86.18	1137.66
26-May-11 16:58:00	78.43	43.44	20.10	120	248.20	86.35	1137.70
26-May-11 16:59:00	78.47	43.44	20.07	120	248.16	86.60	1138.74
26-May-11 17:00:00	78.55	43.39	20.48	120	248.72	86.39	1139.72
26-May-11 17:01:00	78.46	43.44	20.31	120	247.43	86.82	1139.41
26-May-11 17:02:00	78.24	43.46	20.36	120	246.76	87.04	1129.78
26-May-11 17:03:00	78.21	43.48	20.37	120	248.30	86.36	1124.36
26-May-11 17:04:00	78.23	43.48	20.16	119	247.96	86.38	1138.42
26-May-11 17:05:00	78.35	43.47	20.42	119	247.76	86.71	1136.55

PM/PM2.5/Ammonia

	Run 1							
	#2 Stand Pipe Aeration Air to Regen (lbs/min)	Air to Regen Temp B-1 Outlet (oF)	Tempered Air Temp (oF)	Ambient Air Temp (oF)	Air to Regen Pressure Blower Discharge (psig)	Plant Air to 45lb Air (psig)	CO2 (WGS CEMS) (% by vol. dry)	CO (WGS CEMS) (ppmv, dry)
	317FI106	317TH112	317TH120	DWS AT	317PC039	317PC088	317AI109	317AI111
Run 1								
26-May-11 16:15:00	1158.87	266.70	224.30	94.42	15.49	79.85	17.33	78.76
26-May-11 16:16:00	1171.77	266.76	224.42	94.48	15.49	80.85	17.38	195.18
26-May-11 16:17:00	1166.73	266.78	224.42	94.48	15.45	81.18	17.44	321.52
26-May-11 16:18:00	1168.08	266.86	224.46	94.60	15.49	81.34	17.35	162.79
26-May-11 16:19:00	1170.48	267.20	224.54	94.60	15.52	81.66	17.27	80.10
26-May-11 16:20:00	1171.35	267.39	224.45	94.60	15.53	81.80	17.29	80.36
26-May-11 16:21:00	1170.31	267.27	224.35	94.60	15.52	81.78	17.33	94.85
26-May-11 16:22:00	1169.55	267.22	224.41	94.65	15.50	81.69	17.35	100.73
26-May-11 16:23:00	1168.02	267.14	224.47	94.67	15.53	81.56	17.36	102.00
26-May-11 16:24:00	1168.30	267.19	224.23	94.70	15.58	81.37	17.34	87.20
26-May-11 16:25:00	1166.72	266.93	224.15	94.68	15.57	80.83	17.32	80.22
26-May-11 16:26:00	1156.14	266.71	224.09	94.60	15.55	79.72	17.34	100.09
26-May-11 16:27:00	1149.13	266.66	224.05	94.60	15.54	78.84	17.39	148.74
26-May-11 16:28:00	1161.12	266.44	223.95	94.60	15.51	79.69	17.48	279.53
26-May-11 16:29:00	1160.64	266.55	223.93	94.60	15.50	80.22	17.47	278.72
26-May-11 16:30:00	1161.22	266.83	223.89	94.53	15.50	80.42	17.38	132.61
26-May-11 16:31:00	1159.25	266.73	223.91	94.56	15.51	80.35	17.34	111.08
26-May-11 16:32:00	1159.55	266.45	224.04	94.60	15.49	80.27	17.32	83.57
26-May-11 16:33:00	1160.95	266.19	223.86	94.58	15.48	80.39	17.31	76.49
26-May-11 16:34:00	1164.30	266.10	223.71	94.44	15.49	80.79	17.34	88.98
26-May-11 16:35:00	1165.34	266.06	223.95	94.34	15.52	81.01	17.35	91.49
26-May-11 16:36:00	1165.14	266.01	223.99	94.30	15.53	80.89	17.34	83.78
26-May-11 16:37:00	1166.22	266.08	223.77	94.30	15.54	80.41	17.33	81.87
26-May-11 16:38:00	1158.74	265.91	223.76	94.30	15.54	79.64	17.35	87.82
26-May-11 16:39:00	1157.08	265.85	223.76	94.23	15.52	79.55	17.37	123.23
26-May-11 16:40:00	1172.32	266.04	223.76	94.13	15.49	80.50	17.46	478.11
26-May-11 16:41:00	1165.49	266.21	223.81	94.02	15.51	81.01	17.52	818.80
26-May-11 16:42:00	1165.04	266.58	223.89	93.84	15.54	81.05	17.45	385.44
26-May-11 16:43:00	1166.22	266.69	223.77	93.78	15.55	81.08	17.38	125.35
26-May-11 16:44:00	1167.58	266.60	223.80	93.70	15.53	81.27	17.37	111.04
26-May-11 16:45:00	1167.40	266.69	223.93	93.72	15.49	81.30	17.38	120.88
26-May-11 16:46:00	1166.02	266.63	223.98	93.88	15.49	81.18	17.37	116.66
26-May-11 16:47:00	1164.32	266.85	223.98	94.01	15.48	80.94	17.36	90.78
26-May-11 16:48:00	1164.27	266.96	224.07	94.10	15.49	80.70	17.32	79.42
26-May-11 16:49:00	1166.18	267.15	223.68	94.10	15.55	80.43	17.34	92.08
26-May-11 16:50:00	1159.09	267.03	223.25	94.16	15.50	79.71	17.37	102.26
26-May-11 16:51:00	1153.56	266.84	223.20	94.13	15.52	79.31	17.41	165.16
26-May-11 16:52:00	1166.22	266.81	223.28	94.08	15.52	80.30	17.48	420.41
26-May-11 16:53:00	1164.40	266.89	223.33	94.00	15.49	80.77	17.51	527.64
26-May-11 16:54:00	1166.42	266.82	223.25	94.02	15.50	81.14	17.43	211.05
26-May-11 16:55:00	1166.59	266.83	223.28	94.08	15.53	81.24	17.41	180.86
26-May-11 16:56:00	1165.29	266.77	223.41	94.00	15.48	81.16	17.39	158.67
26-May-11 16:57:00	1164.45	266.81	223.48	94.00	15.47	81.03	17.38	113.29
26-May-11 16:58:00	1164.96	266.90	223.36	94.00	15.48	81.00	17.39	113.56
26-May-11 16:59:00	1166.95	267.11	223.60	94.00	15.50	81.19	17.37	97.27
26-May-11 17:00:00	1167.96	267.43	223.57	94.05	15.50	81.13	17.35	97.51
26-May-11 17:01:00	1165.97	267.55	223.42	94.00	15.53	80.35	17.37	113.30
26-May-11 17:02:00	1155.03	267.46	223.33	94.00	15.52	79.25	17.38	110.97
26-May-11 17:03:00	1151.75	267.51	223.30	93.95	15.52	79.12	16.16	126.95
26-May-11 17:04:00	1168.45	267.73	223.43	94.00	15.51	80.33	15.32	457.04
26-May-11 17:05:00	1165.53	267.95	223.52	94.02	15.51	80.85	17.45	720.09

PM/PM2.5/Ammonia

5/26/2011 16:15
5/26/2011 19:30

1m

	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsdcm) - Oa 317C_dryair	Vol Reg FG (dsdcm) - Or 317C_flegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 1							
26-May-11 16:15:00	0.55	350.80	77096.10	74065.91	25672.39	52142.31	183.92
26-May-11 16:16:00	0.55	349.43	76877.91	74180.20	25645.61	52264.90	183.62
26-May-11 16:17:00	0.39	349.75	76578.58	74014.74	25797.31	52313.76	183.74
26-May-11 16:18:00	0.39	350.22	76647.23	73641.84	25710.94	52287.40	184.79
26-May-11 16:19:00	0.50	349.73	76750.57	73615.63	25550.15	52234.49	184.54
26-May-11 16:20:00	0.60	349.39	76643.32	73757.60	25519.06	52223.00	184.61
26-May-11 16:21:00	0.52	349.88	76569.50	73744.81	25620.50	52247.67	184.55
26-May-11 16:22:00	0.55	349.25	76676.72	73644.53	25586.21	52135.35	184.97
26-May-11 16:23:00	0.55	349.19	76537.34	73791.45	25599.59	52066.40	184.69
26-May-11 16:24:00	0.53	350.40	76525.02	73661.86	25669.93	52040.57	184.97
26-May-11 16:25:00	0.52	349.65	76789.66	73610.87	25594.96	52037.32	185.62
26-May-11 16:26:00	0.53	349.80	76625.83	73847.68	25630.21	52214.78	184.66
26-May-11 16:27:00	0.47	350.34	76658.19	73715.36	25746.77	52338.58	185.12
26-May-11 16:28:00	0.38	349.98	76777.25	73748.63	25852.61	52308.67	185.09
26-May-11 16:29:00	0.29	349.64	76698.19	73860.58	25844.26	52253.82	184.74
26-May-11 16:30:00	0.43	349.11	76623.06	73690.85	25650.10	52258.85	184.84
26-May-11 16:31:00	0.57	349.40	76508.09	73671.40	25586.73	52344.12	184.98
26-May-11 16:32:00	0.48	350.51	76571.07	73622.79	25662.85	52391.98	184.91
26-May-11 16:33:00	0.57	349.40	76815.06	73604.45	25550.38	52305.90	185.43
26-May-11 16:34:00	0.53	348.19	76571.69	73907.01	25501.60	52268.50	184.68
26-May-11 16:35:00	0.46	348.62	76305.71	73660.29	25569.88	52292.73	185.03
26-May-11 16:36:00	0.44	349.89	76399.48	73351.56	25647.52	52309.56	186.11
26-May-11 16:37:00	0.49	349.75	76678.51	73419.20	25614.65	52288.34	186.03
26-May-11 16:38:00	0.48	349.07	76648.45	73715.40	25591.03	52203.36	184.69
26-May-11 16:39:00	0.56	348.61	76498.47	73699.53	25565.04	52186.40	184.31
26-May-11 16:40:00	0.42	347.84	76397.65	73655.95	25692.85	52230.88	184.46
26-May-11 16:41:00	0.20	348.69	76230.18	73533.22	25926.00	52226.42	184.78
26-May-11 16:42:00	0.23	350.01	76416.49	73260.18	25881.20	52199.10	185.24
26-May-11 16:43:00	0.38	348.87	76704.77	73365.70	25647.97	52183.86	185.42
26-May-11 16:44:00	0.47	348.30	76455.17	73712.81	25568.83	52149.61	184.88
26-May-11 16:45:00	0.45	348.77	76330.74	73525.85	25612.79	52117.07	185.17
26-May-11 16:46:00	0.55	349.13	76433.40	73403.52	25609.71	52139.70	185.98
26-May-11 16:47:00	0.55	350.12	76512.96	73579.81	25657.74	52329.93	184.93
26-May-11 16:48:00	0.53	349.49	76729.79	73642.11	25579.62	52417.73	185.08
26-May-11 16:49:00	0.44	349.09	76591.52	73791.58	25601.69	52327.04	184.25
26-May-11 16:50:00	0.51	348.39	76502.80	73604.80	25559.25	52292.96	184.80
26-May-11 16:51:00	0.47	348.27	76349.21	73610.41	25607.50	52320.30	184.84
26-May-11 16:52:00	0.29	349.21	76322.68	73455.91	25841.03	52290.54	185.21
26-May-11 16:53:00	0.27	349.13	76529.64	73359.33	25890.19	52245.34	185.60
26-May-11 16:54:00	0.36	349.38	76511.80	73582.36	25750.11	52274.64	185.15
26-May-11 16:55:00	0.35	349.92	76565.91	73536.34	25768.91	52318.93	185.24
26-May-11 16:56:00	0.50	349.28	76684.43	73570.61	25659.17	52327.78	184.92
26-May-11 16:57:00	0.56	349.03	76543.92	73802.95	25607.77	52267.74	184.13
26-May-11 16:58:00	0.44	349.55	76490.46	73697.98	25690.93	52212.68	184.31
26-May-11 16:59:00	0.43	349.29	76604.94	73547.05	25643.50	52210.79	184.77
26-May-11 17:00:00	0.47	349.55	76546.55	73634.56	25635.51	52269.99	184.70
26-May-11 17:01:00	0.38	349.88	76604.80	73589.68	25699.97	52299.69	184.63
26-May-11 17:02:00	0.36	349.04	76676.61	73583.67	25664.70	52322.27	184.78
26-May-11 17:03:00	2.47	348.65	76492.93	73655.57	23710.58	52263.39	184.57
26-May-11 17:04:00	3.86	349.40	76407.10	74401.81	22475.15	52202.17	183.14
26-May-11 17:05:00	0.35	349.09	76570.78	74642.00	25831.34	52250.73	181.51

Run 1	Scrubbing Liquid Upper Circulation (psig) 317P1105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FI113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FI105
26-May-11 17:06:00	78.38	43.41	20.51	120	248.68	86.28	1135.87
26-May-11 17:07:00	78.31	43.39	20.45	120	248.86	86.03	1136.48
26-May-11 17:08:00	78.43	43.49	20.32	120	247.94	86.57	1136.81
26-May-11 17:09:00	78.54	43.40	20.45	120	248.69	86.27	1137.76
26-May-11 17:10:00	78.58	43.36	20.38	120	247.23	86.87	1138.74
26-May-11 17:11:00	78.34	43.40	20.46	120	246.37	87.56	1136.22
26-May-11 17:12:00	78.41	43.41	20.40	120	246.19	87.44	1134.86
26-May-11 17:13:00	78.35	43.39	20.48	120	248.04	86.58	1138.01
26-May-11 17:14:00	78.44	43.43	20.48	120	248.38	86.30	1131.43
26-May-11 17:15:00	78.52	43.39	20.27	120	245.40	87.73	1128.74
26-May-11 17:16:00	78.45	43.44	20.28	120	244.56	88.31	1142.89
26-May-11 17:17:00	78.53	43.51	20.54	120	246.83	87.37	1133.32
26-May-11 17:18:00	78.49	43.44	20.64	119	247.19	87.01	1134.32
26-May-11 17:19:00	78.43	43.45	20.38	119	245.87	87.25	1136.09
26-May-11 17:20:00	78.26	43.50	20.11	119	245.44	87.16	1136.75
26-May-11 17:21:00	78.33	43.50	20.17	120	247.63	86.58	1135.53
26-May-11 17:22:00	78.35	43.38	20.39	120	248.05	86.53	1135.16
26-May-11 17:23:00	78.24	43.37	20.55	120	247.30	86.77	1135.36
26-May-11 17:24:00	78.35	43.37	20.44	120	247.86	86.72	1136.96
26-May-11 17:25:00	78.39	43.32	20.19	119	248.50	86.59	1136.65
26-May-11 17:26:00	78.30	43.30	20.49	119	249.38	85.95	1128.22
26-May-11 17:27:00	78.06	43.37	20.60	119	248.72	86.22	1122.77
26-May-11 17:28:00	78.14	43.39	20.36	120	249.03	86.53	1135.73
26-May-11 17:29:00	78.46	43.41	20.38	120	249.57	86.44	1136.17
26-May-11 17:30:00	78.40	43.41	20.34	119	249.96	86.49	1137.06
26-May-11 17:31:00	78.31	43.39	20.41	119	250.21	86.31	1135.87
26-May-11 17:32:00	78.40	43.40	20.46	119	249.70	86.51	1135.73
26-May-11 17:33:00	78.39	43.41	20.33	119	247.74	87.11	1136.61
26-May-11 17:34:00	78.36	43.43	20.49	119	248.63	86.86	1137.87
26-May-11 17:35:00	78.35	43.43	20.46	119	249.68	86.72	1137.57
26-May-11 17:36:00	78.47	43.44	20.29	118	248.60	86.80	1137.19
26-May-11 17:37:00	78.36	43.42	20.47	118	248.57	86.78	1136.88
26-May-11 17:38:00	78.21	43.48	20.78	118	250.29	86.26	1129.28
26-May-11 17:39:00	78.36	43.37	20.58	118	249.89	86.52	1126.02
26-May-11 17:40:00	78.51	43.32	20.58	118	247.98	87.18	1139.70
26-May-11 17:41:00	78.57	43.31	20.57	118	250.38	86.31	1132.83
26-May-11 17:42:00	78.46	43.38	20.60	118	249.99	86.50	1133.01
26-May-11 17:43:00	78.24	43.31	20.42	118	247.80	87.33	1133.33
26-May-11 17:44:00	78.33	43.34	20.51	118	246.93	87.19	1134.48
26-May-11 17:45:00	78.32	43.34	20.37	118	246.67	87.51	1133.88
26-May-11 17:46:00	78.34	43.35	20.48	118	248.52	86.78	1132.28
26-May-11 17:47:00	78.62	43.37	20.66	118	249.77	86.19	1131.69
26-May-11 17:48:00	78.53	43.37	20.57	118	248.62	86.56	1134.16
26-May-11 17:49:00	78.36	43.30	20.57	118	248.98	86.56	1137.56
26-May-11 17:50:00	78.10	43.39	20.61	118	249.44	86.27	1129.85
26-May-11 17:51:00	78.09	43.44	20.53	119	248.71	86.42	1124.56
26-May-11 17:52:00	78.19	43.33	20.46	119	247.53	86.98	1137.40
26-May-11 17:53:00	78.19	43.32	20.53	119	248.44	86.53	1135.29
26-May-11 17:54:00	78.22	43.35	20.51	119	247.83	86.37	1137.38
26-May-11 17:55:00	78.44	43.45	20.42	119	246.41	87.03	1138.03
26-May-11 17:56:00	78.23	43.41	20.45	119	248.00	86.15	1136.85
26-May-11 17:57:00	78.15	43.33	20.33	120	247.94	86.54	1136.13
26-May-11 17:58:00	78.51	43.40	20.45	120	248.16	86.60	1136.83
26-May-11 17:59:00	78.43	43.35	20.52	120	249.66	85.79	1138.15

Run 1	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
26-May-11 17:06:00	1164.63	268.00	223.89	94.08	15.50	80.86	17.43	224.83
26-May-11 17:07:00	1164.16	267.98	224.17	94.02	15.50	80.78	17.38	129.71
26-May-11 17:08:00	1163.53	268.08	224.02	94.10	15.52	80.79	17.36	108.21
26-May-11 17:09:00	1165.85	268.01	224.09	94.10	15.54	81.02	17.36	97.59
26-May-11 17:10:00	1165.94	267.96	223.93	94.13	15.54	81.13	17.36	119.31
26-May-11 17:11:00	1163.82	268.00	224.03	94.10	15.55	81.01	17.36	101.29
26-May-11 17:12:00	1163.34	267.93	224.17	94.10	15.52	80.66	17.38	125.28
26-May-11 17:13:00	1165.46	267.93	224.00	94.08	15.49	80.07	17.42	180.63
26-May-11 17:14:00	1157.65	267.93	224.13	94.00	15.52	79.50	17.45	222.24
26-May-11 17:15:00	1154.93	267.93	224.10	94.00	15.62	79.21	17.45	184.05
26-May-11 17:16:00	1169.07	267.80	223.71	93.94	15.60	79.93	17.47	462.93
26-May-11 17:17:00	1161.97	267.44	223.51	93.98	15.55	80.56	17.51	912.94
26-May-11 17:18:00	1163.11	267.38	223.49	94.11	15.53	80.73	17.48	600.83
26-May-11 17:19:00	1165.93	267.20	223.41	94.20	15.53	81.07	17.43	227.12
26-May-11 17:20:00	1166.44	266.61	223.38	94.20	15.51	81.23	17.41	137.01
26-May-11 17:21:00	1164.81	266.79	223.41	94.22	15.53	81.14	17.42	158.02
26-May-11 17:22:00	1163.53	266.92	223.43	94.30	15.52	81.04	17.43	167.58
26-May-11 17:23:00	1164.04	266.66	223.58	94.30	15.52	81.06	17.41	132.62
26-May-11 17:24:00	1165.96	266.86	223.53	94.30	15.53	81.06	17.40	131.29
26-May-11 17:25:00	1166.32	266.69	223.52	94.30	15.54	80.51	17.41	158.38
26-May-11 17:26:00	1156.29	266.68	223.52	94.32	15.53	79.52	17.38	126.20
26-May-11 17:27:00	1149.92	266.70	223.94	94.42	15.51	78.90	17.39	126.40
26-May-11 17:28:00	1164.15	266.73	224.02	94.48	15.49	79.94	17.44	280.28
26-May-11 17:29:00	1163.49	266.74	223.86	94.40	15.49	80.71	17.48	425.39
26-May-11 17:30:00	1165.24	266.86	224.01	94.40	15.51	81.04	17.41	205.90
26-May-11 17:31:00	1164.47	266.87	224.26	94.34	15.48	81.08	17.36	124.90
26-May-11 17:32:00	1163.60	266.91	224.33	94.23	15.50	81.01	17.34	99.42
26-May-11 17:33:00	1164.43	266.95	224.54	94.18	15.48	81.04	17.32	88.71
26-May-11 17:34:00	1165.97	266.82	224.67	94.10	15.48	81.25	17.34	97.01
26-May-11 17:35:00	1166.10	266.86	224.65	94.10	15.51	81.32	17.37	126.20
26-May-11 17:36:00	1165.21	266.82	224.60	94.10	15.50	81.02	17.35	106.58
26-May-11 17:37:00	1164.11	266.74	224.62	94.16	15.48	80.32	17.32	84.39
26-May-11 17:38:00	1154.56	266.81	224.59	94.22	15.49	79.42	17.31	80.78
26-May-11 17:39:00	1152.84	266.81	224.74	94.23	15.54	79.11	17.34	86.87
26-May-11 17:40:00	1168.36	267.04	224.56	94.20	15.52	80.15	17.40	146.04
26-May-11 17:41:00	1160.88	266.89	224.57	94.20	15.47	80.66	17.43	224.35
26-May-11 17:42:00	1160.31	266.74	224.78	94.22	15.49	80.64	17.36	172.12
26-May-11 17:43:00	1161.17	266.27	224.85	94.30	15.53	80.67	17.30	87.46
26-May-11 17:44:00	1162.01	266.33	224.81	94.28	15.47	80.80	17.28	75.08
26-May-11 17:45:00	1162.34	266.24	224.88	94.20	15.49	80.84	17.29	82.51
26-May-11 17:46:00	1160.88	266.25	224.71	94.27	15.44	80.67	17.28	73.91
26-May-11 17:47:00	1159.82	266.65	224.44	94.37	15.46	80.48	17.30	81.53
26-May-11 17:48:00	1161.68	266.94	224.09	94.40	15.49	80.39	17.28	72.12
26-May-11 17:49:00	1164.87	266.86	224.04	94.40	15.52	80.14	17.25	59.63
26-May-11 17:50:00	1156.43	266.95	224.05	94.40	15.55	79.47	17.28	66.28
26-May-11 17:51:00	1151.87	266.75	224.01	94.38	15.55	79.22	17.30	76.00
26-May-11 17:52:00	1166.29	266.67	223.98	94.24	15.57	80.11	17.36	161.67
26-May-11 17:53:00	1162.51	266.67	223.49	94.13	15.52	80.71	17.42	237.95
26-May-11 17:54:00	1164.87	266.37	223.49	94.13	15.51	81.13	17.35	130.34
26-May-11 17:55:00	1165.87	266.33	223.36	93.92	15.53	81.30	17.31	84.01
26-May-11 17:56:00	1164.66	266.21	223.46	93.80	15.49	81.27	17.30	75.43
26-May-11 17:57:00	1164.10	266.14	223.36	93.80	15.53	81.17	17.32	83.42
26-May-11 17:58:00	1164.48	266.37	223.36	93.80	15.53	81.17	17.30	68.97
26-May-11 17:59:00	1165.83	266.27	223.40	93.80	15.51	81.36	17.30	72.08

Run 1	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsd/m) - Oa 317C_dryair	Vol Reg FG (dsd/m) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G RATIO
26-May-11 17:06:00	0.41	349.18	76504.31	73640.20	25728.17	52285.59	184.53
26-May-11 17:07:00	0.44	349.57	76523.26	73580.03	25675.95	52200.25	185.09
26-May-11 17:08:00	0.44	349.45	76609.50	73569.54	25648.07	52132.59	184.44
26-May-11 17:09:00	0.47	349.29	76581.64	73644.70	25619.84	52172.64	184.66
26-May-11 17:10:00	0.41	349.73	76548.20	73626.72	25678.64	52188.91	184.62
26-May-11 17:11:00	0.46	349.03	76642.99	73555.38	25603.73	52187.77	185.07
26-May-11 17:12:00	0.39	348.76	76499.92	73680.33	25633.39	52182.62	184.38
26-May-11 17:13:00	0.38	348.30	76431.08	73497.97	25648.26	52240.12	185.16
26-May-11 17:14:00	0.39	349.17	76330.90	73472.11	25748.23	52285.55	184.88
26-May-11 17:15:00	0.43	349.41	76520.41	73412.47	25751.15	52289.63	185.25
26-May-11 17:16:00	0.39	348.38	76573.54	73628.66	25749.66	52248.72	184.61
26-May-11 17:17:00	0.22	348.17	76347.01	73682.70	25880.32	52220.48	183.86
26-May-11 17:18:00	0.18	349.18	76301.53	73380.55	25894.73	52206.77	184.82
26-May-11 17:19:00	0.26	349.11	76522.44	73257.98	25764.07	52186.86	185.41
26-May-11 17:20:00	0.39	347.98	76508.25	73468.66	25606.03	52244.50	184.71
26-May-11 17:21:00	0.47	347.61	76259.37	73545.87	25575.79	52331.33	184.41
26-May-11 17:22:00	0.46	349.27	76177.90	73385.56	25714.21	52398.99	185.16
26-May-11 17:23:00	0.54	349.47	76542.59	73306.85	25677.77	5212.83	185.77
26-May-11 17:24:00	0.50	349.07	76585.68	73711.65	25650.38	52098.01	184.72
26-May-11 17:25:00	0.37	349.65	76499.88	73690.84	25746.28	52339.62	184.63
26-May-11 17:26:00	0.48	350.19	76625.18	73524.77	25714.00	52411.78	185.52
26-May-11 17:27:00	0.45	350.19	76743.81	73707.31	25732.58	52356.40	184.87
26-May-11 17:28:00	0.39	349.79	76744.08	73799.75	25798.88	52309.69	184.58
26-May-11 17:29:00	0.33	350.30	76656.59	73810.23	25916.36	52218.21	183.98
26-May-11 17:30:00	0.39	350.89	76767.72	73719.73	25835.89	52176.22	184.37
26-May-11 17:31:00	0.44	351.30	76897.77	73793.64	25785.71	52140.31	184.33
26-May-11 17:32:00	0.56	351.27	76987.03	73928.10	25724.57	52112.16	183.98
26-May-11 17:33:00	0.59	350.95	76982.05	74085.16	25671.83	52139.54	183.45
26-May-11 17:34:00	0.59	349.48	76910.70	74096.76	25583.37	52217.22	183.50
26-May-11 17:35:00	0.51	350.33	76588.23	74040.63	25707.79	52218.95	183.41
26-May-11 17:36:00	0.50	351.20	76774.59	73686.17	25742.11	52114.32	184.20
26-May-11 17:37:00	0.54	350.16	76965.09	73839.57	25620.38	52036.25	184.24
26-May-11 17:38:00	0.60	350.02	76736.73	74036.68	25583.74	52217.42	183.40
26-May-11 17:39:00	0.55	351.36	76707.45	73858.83	25726.53	52322.29	184.24
26-May-11 17:40:00	0.47	351.28	77000.00	73802.91	25823.52	52237.54	184.56
26-May-11 17:41:00	0.41	350.03	76983.75	74086.21	25789.41	52224.43	184.09
26-May-11 17:42:00	0.36	351.27	76709.82	74025.46	25807.76	52144.70	183.45
26-May-11 17:43:00	0.50	351.32	76981.20	73665.34	25692.88	52030.81	185.24
26-May-11 17:44:00	0.54	349.98	76991.74	73993.30	25561.52	52019.67	184.17
26-May-11 17:45:00	0.49	348.85	76699.02	74015.12	25504.38	52055.05	183.97
26-May-11 17:46:00	0.55	348.94	76451.05	73701.17	25483.83	52020.74	184.58
26-May-11 17:47:00	0.58	349.82	76471.33	73510.92	25571.36	51960.90	185.01
26-May-11 17:48:00	0.54	350.49	76663.98	73565.47	25601.94	51969.99	184.81
26-May-11 17:49:00	0.62	349.97	76809.63	73711.28	25508.58	52009.99	185.16
26-May-11 17:50:00	0.53	350.49	76691.70	73899.63	25601.89	52023.20	184.33
26-May-11 17:51:00	0.51	350.70	76807.66	73725.70	25643.01	52020.70	184.59
26-May-11 17:52:00	0.49	350.19	76855.35	73838.63	25695.47	52001.10	184.75
26-May-11 17:53:00	0.48	349.73	76744.79	73925.53	25744.17	51981.53	184.53
26-May-11 17:54:00	0.52	349.86	76643.29	73872.42	25653.06	51977.04	184.43
26-May-11 17:55:00	0.55	349.19	76671.55	73731.07	25544.04	51988.85	184.20
26-May-11 17:56:00	0.59	348.44	76525.79	73765.56	25466.04	52201.69	184.50
26-May-11 17:57:00	0.50	349.11	76360.78	73638.10	25554.73	52271.78	185.15
26-May-11 17:58:00	0.48	349.62	76506.81	73405.63	25577.21	52044.30	185.16
26-May-11 17:59:00	0.53	349.89	76618.38	73515.11	25585.48	51990.66	185.35

Run 1	Scrubbing Liquid Upper Circulation (psig) 317P105B		Pump Pressure Lower Circulation (psig) 317P108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FI113	#1 Stand Pipe Aeration Air to Regen (lbs/hr) 317FI105
26-May-11 18:00:00	78.47	43.31	20.65	120	248.73	85.83	1138.92	
26-May-11 18:01:00	78.54	43.30	20.49	120	247.73	86.22	1137.90	
26-May-11 18:02:00	78.48	43.33	20.41	120	246.23	86.67	1127.31	
26-May-11 18:03:00	78.40	43.30	20.55	120	247.47	86.46	1128.06	
26-May-11 18:04:00	78.40	43.33	20.35	120	248.35	86.40	1148.01	
26-May-11 18:05:00	78.34	43.31	20.40	120	249.04	86.20	1137.02	
26-May-11 18:06:00	78.47	43.25	20.47	120	247.79	86.54	1135.60	
26-May-11 18:07:00	78.30	43.21	20.58	120	246.88	87.36	1134.93	
26-May-11 18:08:00	78.27	43.20	20.45	120	247.03	87.18	1136.31	
26-May-11 18:09:00	78.43	43.21	20.16	121	247.32	86.84	1138.09	
26-May-11 18:10:00	78.35	43.23	20.39	121	247.77	86.76	1137.98	
26-May-11 18:11:00	78.32	43.23	20.26	121	246.23	87.08	1136.49	
26-May-11 18:12:00	78.18	43.20	20.49	121	247.46	86.65	1138.24	
26-May-11 18:13:00	78.28	43.13	20.48	121	248.74	86.62	1140.53	
26-May-11 18:14:00	78.21	43.14	20.63	121	249.26	86.52	1134.08	
26-May-11 18:15:00	78.41	43.17	20.52	122	249.34	86.16	1130.63	
26-May-11 18:16:00	78.36	43.23	20.48	122	249.06	86.40	1145.21	
26-May-11 18:17:00	78.33	43.22	20.49	122	248.56	86.80	1135.30	
26-May-11 18:18:00	78.35	43.29	20.48	122	249.78	86.15	1136.33	
26-May-11 18:19:00	78.25	43.32	20.54	122	249.84	86.15	1138.84	
26-May-11 18:20:00	78.22	43.37	20.40	122	249.49	86.81	1140.07	
26-May-11 18:21:00	78.22	43.40	20.56	121	249.36	86.98	1139.68	
26-May-11 18:22:00	78.33	43.29	20.57	121	250.01	86.74	1138.11	
26-May-11 18:23:00	78.39	43.27	20.42	121	249.49	86.75	1139.17	
26-May-11 18:24:00	78.48	43.28	20.44	121	250.28	86.33	1141.04	
26-May-11 18:25:00	78.45	43.25	20.41	120	249.15	86.73	1141.05	
26-May-11 18:26:00	78.46	43.29	20.45	120	248.39	87.10	1130.18	
26-May-11 18:27:00	78.43	43.21	20.45	120	248.67	86.82	1128.65	
26-May-11 18:28:00	78.29	43.29	20.43	120	249.56	86.48	1145.42	
26-May-11 18:29:00	78.47	43.28	20.63	120	249.73	86.37	1139.19	
26-May-11 18:30:00	78.48	43.30	20.65	120	248.99	86.56	1139.41	
26-May-11 18:31:00	78.38	43.31	20.57	120	249.23	86.58	1138.83	
26-May-11 18:32:00	78.44	43.29	20.54	120	249.16	86.74	1138.89	
26-May-11 18:33:00	78.51	43.28	20.62	120	250.21	86.25	1138.80	
26-May-11 18:34:00	78.52	43.30	20.51	120	251.42	86.03	1140.03	
26-May-11 18:35:00	78.37	43.37	20.70	120	249.60	86.62	1139.34	
26-May-11 18:36:00	78.29	43.31	20.57	120	248.90	86.37	1137.39	
26-May-11 18:37:00	78.26	43.33	20.40	120	248.43	86.50	1139.11	
26-May-11 18:38:00	78.26	43.20	20.34	120	248.63	86.84	1132.10	
26-May-11 18:39:00	78.48	43.21	20.59	120	249.44	86.69	1129.10	
26-May-11 18:40:00	78.47	43.22	20.52	119	248.49	86.73	1142.53	
26-May-11 18:41:00	78.37	43.11	20.39	119	246.98	87.51	1137.60	
26-May-11 18:42:00	78.23	43.19	20.45	119	247.01	87.25	1137.52	
26-May-11 18:43:00	78.38	43.23	20.44	119	245.94	86.87	1138.46	
26-May-11 18:44:00	78.48	43.18	20.47	118	246.47	87.05	1138.58	
26-May-11 18:45:00	78.50	43.24	20.18	118	247.40	86.30	1137.70	
26-May-11 18:46:00	78.46	43.24	20.24	118	246.31	86.66	1137.19	
26-May-11 18:47:00	78.39	43.19	20.62	118	248.09	87.09	1137.12	
26-May-11 18:48:00	78.30	43.27	20.39	118	248.16	86.97	1140.02	
26-May-11 18:49:00	78.13	43.22	20.65	118	249.30	86.59	1142.04	
26-May-11 18:50:00	78.14	43.17	20.80	118	250.22	86.12	1130.56	
26-May-11 18:51:00	78.20	43.17	20.89	117	249.67	86.17	1128.14	
26-May-11 18:52:00	78.26	43.25	20.84	117	249.43	86.38	1144.68	
26-May-11 18:53:00	78.49	43.17	20.69	117	250.14	87.00	1137.33	

Run 1	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
26-May-11 18:00:00	1167.11	266.23	223.46	93.78	15.50	81.24	17.30	73.99
26-May-11 18:01:00	1165.45	266.26	223.38	93.70	15.51	80.44	17.28	64.01
26-May-11 18:02:00	1152.60	266.25	223.41	93.70	15.54	79.40	17.29	69.82
26-May-11 18:03:00	1151.29	266.37	223.38	93.63	15.57	79.07	17.31	86.73
26-May-11 18:04:00	1168.41	266.36	223.34	93.53	15.53	79.92	17.41	231.77
26-May-11 18:05:00	1163.88	266.27	223.02	93.48	15.51	80.90	17.48	351.43
26-May-11 18:06:00	1163.35	266.38	222.78	93.39	15.52	80.97	17.38	162.85
26-May-11 18:07:00	1162.82	266.24	222.75	93.35	15.58	80.92	17.29	78.19
26-May-11 18:08:00	1163.17	266.10	222.70	93.32	15.54	80.99	17.27	74.41
26-May-11 18:09:00	1164.97	266.10	222.65	93.33	15.50	81.24	17.30	85.20
26-May-11 18:10:00	1165.59	266.10	222.52	93.32	15.55	81.32	17.31	79.34
26-May-11 18:11:00	1164.83	266.10	222.57	93.33	15.55	81.22	17.28	71.00
26-May-11 18:12:00	1165.29	266.13	222.56	93.37	15.54	80.91	17.28	67.79
26-May-11 18:13:00	1166.19	266.20	222.26	93.40	15.54	80.29	17.29	74.13
26-May-11 18:14:00	1157.97	266.19	222.29	93.38	15.52	79.67	17.27	63.98
26-May-11 18:15:00	1154.72	266.20	222.28	93.30	15.50	79.35	17.30	78.96
26-May-11 18:16:00	1168.44	266.33	222.20	93.23	15.48	80.00	17.39	244.05
26-May-11 18:17:00	1162.34	266.26	222.03	93.13	15.49	80.63	17.45	369.36
26-May-11 18:18:00	1163.49	266.21	221.89	93.10	15.46	80.80	17.35	129.71
26-May-11 18:19:00	1166.21	266.19	222.01	93.08	15.47	81.10	17.31	90.40
26-May-11 18:20:00	1167.20	266.16	221.83	93.00	15.51	81.25	17.29	77.24
26-May-11 18:21:00	1166.40	266.38	221.89	92.98	15.50	81.21	17.26	67.21
26-May-11 18:22:00	1165.48	266.77	221.95	92.90	15.52	81.10	17.27	67.79
26-May-11 18:23:00	1165.88	266.62	222.11	92.90	15.48	81.08	17.29	68.61
26-May-11 18:24:00	1168.68	266.63	222.00	92.90	15.45	81.10	17.27	63.21
26-May-11 18:25:00	1168.00	266.73	221.77	92.90	15.47	80.47	17.26	63.88
26-May-11 18:26:00	1153.91	266.75	221.79	92.90	15.51	79.46	17.24	59.07
26-May-11 18:27:00	1152.76	266.54	221.50	92.90	15.51	79.14	17.26	71.87
26-May-11 18:28:00	1169.72	266.53	221.37	92.90	15.50	79.84	17.39	241.45
26-May-11 18:29:00	1166.15	266.17	221.37	92.90	15.49	80.82	17.47	377.59
26-May-11 18:30:00	1167.17	266.20	221.48	92.90	15.49	81.12	17.36	161.12
26-May-11 18:31:00	1166.36	266.30	221.39	92.88	15.48	81.13	17.30	97.50
26-May-11 18:32:00	1165.99	266.53	221.24	92.80	15.49	81.05	17.28	86.11
26-May-11 18:33:00	1166.39	266.45	220.92	92.73	15.47	81.06	17.28	76.46
26-May-11 18:34:00	1167.48	266.26	220.95	92.70	15.51	81.24	17.28	71.92
26-May-11 18:35:00	1167.27	266.28	220.86	92.63	15.52	81.25	17.25	60.31
26-May-11 18:36:00	1165.87	266.09	220.78	92.60	15.49	80.85	17.23	51.68
26-May-11 18:37:00	1165.44	265.92	220.90	92.60	15.49	80.11	17.25	56.16
26-May-11 18:38:00	1156.73	265.61	220.90	92.60	15.50	79.34	17.25	56.05
26-May-11 18:39:00	1155.21	265.55	220.90	92.58	15.51	79.18	17.28	63.59
26-May-11 18:40:00	1171.10	265.70	220.95	92.55	15.58	80.25	17.37	129.21
26-May-11 18:41:00	1165.32	266.08	220.84	92.49	15.56	80.79	17.40	175.46
26-May-11 18:42:00	1165.16	266.10	220.72	92.39	15.53	80.83	17.33	92.45
26-May-11 18:43:00	1165.64	266.10	220.67	92.30	15.60	80.90	17.30	77.82
26-May-11 18:44:00	1166.45	266.10	220.20	92.30	15.56	81.01	17.27	60.53
26-May-11 18:45:00	1166.13	266.08	220.23	92.30	15.62	81.05	17.28	58.98
26-May-11 18:46:00	1164.91	266.08	220.30	92.37	15.64	80.94	17.29	62.65
26-May-11 18:47:00	1164.29	266.17	220.03	92.40	15.52	80.83	17.26	54.59
26-May-11 18:48:00	1165.68	266.08	219.94	92.40	15.55	80.58	17.26	53.21
26-May-11 18:49:00	1166.23	265.99	219.99	92.40	15.48	80.08	17.26	52.55
26-May-11 18:50:00	1154.99	265.94	220.01	92.40	15.49	79.46	17.25	49.98
26-May-11 18:51:00	1148.40	266.09	220.09	92.40	15.50	78.97	17.22	48.71
26-May-11 18:52:00	1160.02	266.01	220.16	92.34	15.48	79.41	17.30	120.15
26-May-11 18:53:00	1164.86	265.78	220.01	92.23	15.43	80.62	17.41	196.88

Run 1	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsd/m) - Oa 317C_dryair	Vol Reg FG (dsd/m) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
26-May-11 18:00:00	0.57	350.35	76679.45	73671.66	25605.37	51988.20	184.94
26-May-11 18:01:00	0.60	349.53	76778.97	73763.70	25514.60	51932.87	184.90
26-May-11 18:02:00	0.59	348.82	76599.86	73868.42	25480.15	52002.18	184.28
26-May-11 18:03:00	0.55	348.06	76444.60	73694.98	25459.29	52095.91	185.02
26-May-11 18:04:00	0.50	349.18	76276.54	73533.90	25677.93	52071.18	185.12
26-May-11 18:05:00	0.39	349.92	76522.20	73425.90	25857.57	51999.88	185.80
26-May-11 18:06:00	0.39	350.18	76684.91	73627.41	25743.50	52020.59	185.32
26-May-11 18:07:00	0.54	349.51	76742.30	73690.81	25542.66	52055.36	185.57
26-May-11 18:08:00	0.59	349.75	76594.78	73789.95	25526.48	52074.45	185.28
26-May-11 18:09:00	0.49	349.33	76648.29	73669.66	25557.16	52096.41	185.40
26-May-11 18:10:00	0.51	349.30	76556.97	73657.43	25554.75	52094.00	185.47
26-May-11 18:11:00	0.63	349.81	76549.96	73603.98	25529.47	52073.46	185.52
26-May-11 18:12:00	0.68	348.60	76660.14	73676.13	25427.42	52054.06	185.86
26-May-11 18:13:00	0.64	349.45	76395.89	73825.82	25515.00	52079.95	185.36
26-May-11 18:14:00	0.63	350.67	76581.34	73545.30	25580.65	51750.82	186.15
26-May-11 18:15:00	0.62	350.81	76850.02	73706.11	25631.13	51669.17	185.73
26-May-11 18:16:00	0.45	350.49	76880.99	73972.60	25768.46	51920.18	184.65
26-May-11 18:17:00	0.36	350.39	76809.31	73962.55	25871.29	52028.54	184.73
26-May-11 18:18:00	0.39	350.36	76787.80	73855.40	25720.86	52087.12	184.63
26-May-11 18:19:00	0.52	350.74	76781.39	73788.11	25663.84	52033.31	184.78
26-May-11 18:20:00	0.61	351.07	76865.51	73837.70	25636.14	51976.66	184.58
26-May-11 18:21:00	0.63	351.44	76936.51	73963.54	25620.34	51897.52	183.96
26-May-11 18:22:00	0.63	351.52	77018.44	74028.36	25635.91	51823.91	184.34
26-May-11 18:23:00	0.57	351.80	77035.90	74112.29	25698.01	51744.44	184.01
26-May-11 18:24:00	0.59	351.12	77098.28	74099.43	25628.85	51754.76	184.13
26-May-11 18:25:00	0.62	351.34	76948.51	74156.47	25615.69	51922.79	183.92
26-May-11 18:26:00	0.66	350.78	76997.29	74029.27	25542.19	51988.44	184.21
26-May-11 18:27:00	0.64	350.48	76874.41	74096.08	25547.71	51864.99	184.35
26-May-11 18:28:00	0.50	350.52	76807.64	73980.09	25763.23	51771.98	184.41
26-May-11 18:29:00	0.36	351.11	76817.20	73918.55	25943.90	51699.52	184.45
26-May-11 18:30:00	0.42	351.17	76945.63	73876.63	25786.73	51680.94	184.52
26-May-11 18:31:00	0.51	350.61	76958.80	73943.23	25641.43	51763.97	184.41
26-May-11 18:32:00	0.58	350.88	76835.95	73983.15	25621.85	51807.73	184.28
26-May-11 18:33:00	0.57	350.86	76896.26	73901.41	25621.98	51758.70	184.43
26-May-11 18:34:00	0.54	351.52	76890.95	73949.65	25683.14	51745.41	184.33
26-May-11 18:35:00	0.56	352.72	77035.88	73919.86	25727.08	51740.67	184.03
26-May-11 18:36:00	0.64	351.40	77299.18	74055.99	25582.90	51734.34	184.35
26-May-11 18:37:00	0.63	350.33	77010.06	74358.79	25528.58	51770.72	183.23
26-May-11 18:38:00	0.60	350.08	76779.22	74053.93	25522.93	51779.64	184.57
26-May-11 18:39:00	0.55	350.67	76721.16	73768.77	25613.81	51808.21	185.12
26-May-11 18:40:00	0.57	351.42	76861.28	73785.01	25764.53	51919.75	185.17
26-May-11 18:41:00	0.43	350.88	77013.94	74001.01	25806.95	51973.35	185.23
26-May-11 18:42:00	0.43	350.02	76896.25	74046.07	25654.37	51917.11	184.82
26-May-11 18:43:00	0.56	349.54	76706.33	73881.09	25548.24	51831.18	184.85
26-May-11 18:44:00	0.67	348.51	76601.03	73783.30	25412.35	51823.61	185.32
26-May-11 18:45:00	0.68	349.14	76376.57	73757.59	25468.58	51780.75	185.10
26-May-11 18:46:00	0.56	349.46	76514.63	73546.04	25528.50	51721.37	185.53
26-May-11 18:47:00	0.57	349.02	76585.02	73582.63	25462.48	51750.07	186.06
26-May-11 18:48:00	0.62	350.57	76488.02	73634.99	25560.51	51709.61	185.27
26-May-11 18:49:00	0.71	350.60	76828.48	73596.32	25542.80	51637.14	186.06
26-May-11 18:50:00	0.70	351.04	76834.04	74004.51	25564.36	51637.86	185.02
26-May-11 18:51:00	0.69	351.44	76930.85	73977.74	25558.23	51620.08	184.97
26-May-11 18:52:00	0.67	350.95	77017.80	74042.29	25629.23	51668.55	184.55
26-May-11 18:53:00	0.50	351.00	76909.83	74186.69	25807.04	51765.16	184.25

Run 1	Scrubbing Liquid Upper Circulation (psig) 317P1105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FI113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FI105
26-May-11 18:54:00	78.47	43.13	20.71	117	251.15	86.79	1139.41
26-May-11 18:55:00	78.44	43.16	20.97	117	251.75	86.55	1139.43
26-May-11 18:56:00	78.35	43.11	20.94	117	251.98	86.20	1136.81
26-May-11 18:57:00	78.21	43.03	20.93	117	251.20	86.27	1133.29
26-May-11 18:58:00	78.32	43.03	20.79	117	250.82	86.43	1131.82
26-May-11 18:59:00	78.42	43.03	20.73	117	251.03	86.32	1132.32
26-May-11 19:00:00	78.33	43.08	20.69	117	252.24	85.61	1135.35
26-May-11 19:01:00	78.20	43.09	20.74	116	250.59	86.19	1137.58
26-May-11 19:02:00	78.26	42.95	20.67	116	249.54	86.68	1128.40
26-May-11 19:03:00	78.07	42.74	20.46	116	250.56	86.14	1124.73
26-May-11 19:04:00	77.79	42.84	20.46	116	250.64	85.92	1143.05
26-May-11 19:05:00	77.67	42.81	20.38	116	249.68	86.33	1135.64
26-May-11 19:06:00	77.79	42.74	20.47	116	250.53	86.11	1136.77
26-May-11 19:07:00	77.70	42.78	20.61	117	251.91	85.91	1136.89
26-May-11 19:08:00	77.93	42.86	20.61	116	250.55	86.28	1137.57
26-May-11 19:09:00	78.13	42.89	20.57	116	249.59	86.41	1139.89
26-May-11 19:10:00	77.92	42.84	20.63	116	250.50	86.02	1139.31
26-May-11 19:11:00	77.97	42.76	20.43	116	248.81	86.69	1137.30
26-May-11 19:12:00	77.67	42.65	20.29	116	247.92	87.22	1138.23
26-May-11 19:13:00	77.91	42.64	20.53	116	250.17	86.33	1140.19
26-May-11 19:14:00	78.15	42.69	20.71	116	251.04	85.80	1132.16
26-May-11 19:15:00	77.65	42.77	20.71	116	249.67	86.32	1127.67
26-May-11 19:16:00	77.56	42.80	20.44	116	250.52	86.10	1140.82
26-May-11 19:17:00	77.63	42.74	20.41	117	250.31	86.24	1132.85
26-May-11 19:18:00	77.79	42.66	20.53	117	250.71	85.97	1132.25
26-May-11 19:19:00	77.90	42.71	20.65	117	250.76	86.17	1132.86
26-May-11 19:20:00	77.71	42.75	20.62	117	250.32	86.42	1133.01
26-May-11 19:21:00	77.62	42.64	20.48	117	249.88	86.41	1131.87
26-May-11 19:22:00	77.62	42.60	20.64	117	250.97	86.12	1131.97
26-May-11 19:23:00	77.65	42.59	20.65	117	251.66	85.99	1132.22
26-May-11 19:24:00	77.71	42.68	20.52	116	250.99	86.54	1137.43
26-May-11 19:25:00	77.76	42.60	20.49	117	250.96	86.35	1138.50
26-May-11 19:26:00	77.50	42.61	20.40	117	251.20	86.19	1122.24
26-May-11 19:27:00	77.72	42.61	20.67	117	252.16	85.98	1118.66
26-May-11 19:28:00	77.74	42.67	20.90	116	250.70	86.58	1135.22
26-May-11 19:29:00	77.61	42.52	20.66	116	249.32	86.90	1134.67
	78.28	43.24	20.47	119.35	248.61	86.63	1135.79

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 1								
26-May-11 18:54:00	1166.96	265.77	219.70	92.18	15.46	81.08	17.33	109.51
26-May-11 18:55:00	1167.03	265.71	219.69	92.04	15.45	81.25	17.27	69.74
26-May-11 18:56:00	1164.22	265.51	219.57	91.94	15.47	81.01	17.21	55.55
26-May-11 18:57:00	1159.94	265.39	219.54	91.88	15.48	80.47	17.20	51.72
26-May-11 18:58:00	1159.11	265.44	219.60	91.80	15.47	80.12	17.20	49.58
26-May-11 18:59:00	1159.98	265.49	219.61	91.80	15.44	80.13	17.21	50.61
26-May-11 19:00:00	1161.65	265.56	219.58	91.80	15.41	80.04	17.22	50.69
26-May-11 19:01:00	1160.70	265.37	219.74	91.73	15.44	79.32	17.21	49.64
26-May-11 19:02:00	1150.15	265.13	219.52	91.70	15.46	78.59	17.17	43.92
26-May-11 19:03:00	1144.76	264.97	219.53	91.70	15.51	78.31	17.20	48.88
26-May-11 19:04:00	1157.40	264.96	219.56	91.68	15.50	79.00	17.33	137.71
26-May-11 19:05:00	1161.95	264.93	219.52	91.65	15.52	80.31	17.41	208.69
26-May-11 19:06:00	1163.44	264.89	219.51	91.60	15.49	80.62	17.28	81.96
26-May-11 19:07:00	1163.90	264.96	219.50	91.58	15.51	80.72	17.24	59.90
26-May-11 19:08:00	1165.25	264.96	219.53	91.50	15.53	80.82	17.24	57.67
26-May-11 19:09:00	1167.41	264.96	219.65	91.44	15.51	81.09	17.21	47.29
26-May-11 19:10:00	1167.81	264.96	219.61	91.34	15.49	81.18	17.21	47.47
26-May-11 19:11:00	1165.40	265.09	219.51	91.23	15.52	80.97	17.23	48.99
26-May-11 19:12:00	1164.93	265.42	219.49	91.18	15.52	80.52	17.20	45.79
26-May-11 19:13:00	1164.83	265.49	219.18	91.10	15.47	79.78	17.20	47.34
26-May-11 19:14:00	1156.35	265.61	219.00	91.03	15.50	79.16	17.21	47.15
26-May-11 19:15:00	1153.35	265.57	219.08	91.00	15.55	78.83	17.19	45.20
26-May-11 19:16:00	1166.71	265.35	218.97	91.00	15.51	79.51	17.27	100.55
26-May-11 19:17:00	1159.64	265.08	219.09	90.94	15.52	79.91	17.35	149.07
26-May-11 19:18:00	1158.86	264.95	219.12	90.88	15.49	79.95	17.25	67.74
26-May-11 19:19:00	1159.32	264.88	219.02	90.80	15.50	80.06	17.21	53.32
26-May-11 19:20:00	1159.31	264.94	218.84	90.73	15.53	80.11	17.18	47.31
26-May-11 19:21:00	1158.10	265.08	218.77	90.63	15.53	79.93	17.15	41.82
26-May-11 19:22:00	1157.99	264.86	218.78	90.60	15.50	79.81	17.13	40.31
26-May-11 19:23:00	1158.20	264.86	218.89	90.53	15.46	79.88	15.30	37.93
26-May-11 19:24:00	1160.62	264.97	218.96	90.44	15.50	79.72	8.30	23.73
26-May-11 19:25:00	1157.37	265.11	218.86	90.38	15.49	79.02	1.59	4.28
26-May-11 19:26:00	1145.09	264.94	218.87	90.30	15.49	78.44	1.42	3.82
26-May-11 19:27:00	1140.68	264.86	218.89	90.30	15.49	78.03	1.17	4.01
26-May-11 19:28:00	1153.02	264.94	218.83	90.23	15.51	78.44	1.36	5.37
26-May-11 19:29:00	1160.79	265.11	218.83	90.20	15.47	79.94	5.00	6.88
	1162.77	266.38	222.42	93.29	15.51	80.46	16.87	132.40

	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dsdcm) - Oa 317C_dryair	Vol Reg FG (dsdcm) - Or 317C_fuegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 1							
26-May-11 18:54:00	0.53	352.17	76920.85	74024.55	25787.03	51702.03	184.78
26-May-11 18:55:00	0.62	353.10	77179.13	73991.47	25755.57	51791.77	184.95
26-May-11 18:56:00	0.58	353.43	77381.44	74247.49	25729.00	51885.30	184.55
26-May-11 18:57:00	0.64	353.35	77453.57	74388.86	25689.83	51725.62	184.61
26-May-11 18:58:00	0.70	352.73	77436.91	74479.44	25626.45	51698.94	184.33
26-May-11 18:59:00	0.66	352.41	77301.51	74514.28	25632.81	51732.65	184.01
26-May-11 19:00:00	0.60	352.31	77230.74	74353.48	25646.04	51751.31	184.29
26-May-11 19:01:00	0.61	352.66	77208.94	74246.09	25666.09	51727.80	184.51
26-May-11 19:02:00	0.70	351.76	77285.71	74223.07	25528.43	51665.87	186.21
26-May-11 19:03:00	0.81	351.41	77089.33	74360.37	25505.57	51677.54	189.40
26-May-11 19:04:00	0.65	352.10	77011.34	74280.63	25753.63	51702.40	189.28
26-May-11 19:05:00	0.44	352.02	77163.05	74182.67	25897.70	51623.38	189.99
26-May-11 19:06:00	0.47	351.54	77145.78	74208.96	25699.75	51520.60	190.04
26-May-11 19:07:00	0.65	352.17	77039.33	74117.78	25654.04	51568.44	190.26
26-May-11 19:08:00	0.67	353.41	77178.44	74127.99	25731.47	51678.16	189.69
26-May-11 19:09:00	0.70	352.38	77450.67	74275.59	25615.58	51687.02	189.15
26-May-11 19:10:00	0.71	351.51	77224.88	74534.95	25548.79	51665.26	188.78
26-May-11 19:11:00	0.69	351.90	77033.73	74335.91	25601.42	51693.75	189.43
26-May-11 19:12:00	0.70	351.06	77120.09	74140.20	25511.40	51733.31	190.95
26-May-11 19:13:00	0.77	350.61	76935.89	74211.54	25459.12	51767.40	190.59
26-May-11 19:14:00	0.75	351.75	76836.86	74106.63	25553.13	51729.12	190.37
26-May-11 19:15:00	0.67	352.16	77085.24	73984.76	25588.99	51667.71	190.76
26-May-11 19:16:00	0.67	351.60	77175.72	74149.53	25644.37	51623.97	190.50
26-May-11 19:17:00	0.58	352.15	77053.31	74316.08	25807.00	51594.68	190.04
26-May-11 19:18:00	0.63	352.05	77174.24	74177.38	25653.30	51634.56	190.74
26-May-11 19:19:00	0.71	352.10	77151.15	74246.97	25593.07	51627.13	190.27
26-May-11 19:20:00	0.68	352.53	77162.26	74256.31	25598.55	51553.92	190.17
26-May-11 19:21:00	0.67	352.38	77257.18	74212.86	25553.96	51542.93	190.90
26-May-11 19:22:00	0.71	351.97	77224.21	74261.99	25494.01	51554.10	190.93
26-May-11 19:23:00	0.83	352.59	77134.34	74271.37	23517.32	51676.78	190.98
26-May-11 19:24:00	0.86	353.00	77289.28	72485.43	16649.96	51780.96	193.80
26-May-11 19:25:00	0.61	353.02	77360.26	69957.26	11082.18	51773.64	208.71
26-May-11 19:26:00	0.54	352.73	77364.97	62417.04	10962.81	51700.29	226.36
26-May-11 19:27:00	4.33	352.74	77300.42	62374.31	9280.45	51644.22	227.61
26-May-11 19:28:00	9.35	353.66	77304.07	65027.86	7281.23	51634.71	220.52
26-May-11 19:29:00	6.62	352.65	77504.99	68480.80	11525.45	51628.65	208.39
	0.65	350.29	76765.98	73595.59	25167.52	52014.12	186.22

PM/PM2.5/Ammonia

5/27/2011 10:42
5/27/2011 13:49

1m

Run 2	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P117A	Shipped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FI113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FE105
27-May-11 10:42:00	78.06	43.42	22.02	120	258.61	90.28	1145.32
27-May-11 10:43:00	77.87	43.39	22.29	121	260.27	89.63	1146.19
27-May-11 10:44:00	78.00	43.33	21.95	121	259.19	90.11	1146.55
27-May-11 10:45:00	77.86	43.36	21.95	121	258.03	90.78	1143.94
27-May-11 10:46:00	78.03	43.41	22.09	122	257.34	90.68	1142.62
27-May-11 10:47:00	78.06	43.39	21.96	121	259.78	89.63	1147.27
27-May-11 10:48:00	77.96	43.50	22.10	122	260.56	89.46	1152.20
27-May-11 10:49:00	78.19	43.46	22.20	122	258.82	89.98	1139.19
27-May-11 10:50:00	78.13	43.46	22.27	123	257.32	90.06	1132.62
27-May-11 10:51:00	78.06	43.43	21.98	123	257.30	90.45	1136.64
27-May-11 10:52:00	78.14	43.51	21.81	122	257.82	90.30	1146.79
27-May-11 10:53:00	78.28	43.51	21.93	122	258.68	90.05	1148.54
27-May-11 10:54:00	78.09	43.42	21.99	121	258.65	89.93	1150.27
27-May-11 10:55:00	77.90	43.49	22.17	121	259.04	89.71	1148.32
27-May-11 10:56:00	77.98	43.46	22.08	121	259.67	89.90	1146.84
27-May-11 10:57:00	77.96	43.50	21.68	121	258.45	90.32	1145.34
27-May-11 10:58:00	78.06	43.60	21.91	122	257.66	90.33	1146.27
27-May-11 10:59:00	78.20	43.60	22.08	121	257.35	90.27	1154.01
27-May-11 11:00:00	78.26	43.62	22.25	121	256.80	90.24	1156.16
27-May-11 11:01:00	78.05	43.61	22.28	121	259.17	89.33	1141.43
27-May-11 11:02:00	78.13	43.66	22.24	121	258.66	89.41	1141.70
27-May-11 11:03:00	78.16	43.63	22.12	121	259.25	89.70	1156.61
27-May-11 11:04:00	78.04	43.58	22.03	120	257.79	90.14	1149.80
27-May-11 11:05:00	78.24	43.66	21.81	120	258.91	89.42	1145.37
27-May-11 11:06:00	78.26	43.78	21.74	120	258.62	89.53	1144.53
27-May-11 11:07:00	78.31	43.74	21.86	120	258.61	89.53	1146.30
27-May-11 11:08:00	78.32	43.76	21.97	120	259.36	89.34	1147.52
27-May-11 11:09:00	78.22	43.81	22.07	120	260.98	88.78	1147.69
27-May-11 11:10:00	78.15	43.69	22.03	120	260.77	88.83	1145.53
27-May-11 11:11:00	78.28	43.69	22.12	120	259.28	89.34	1147.22
27-May-11 11:12:00	78.13	43.76	21.90	120	259.88	89.06	1149.34
27-May-11 11:13:00	77.97	43.80	21.95	120	260.60	88.67	1136.36
27-May-11 11:14:00	78.01	43.79	21.91	119	258.13	89.62	1139.37
27-May-11 11:15:00	77.90	43.81	22.05	120	258.24	89.96	1152.35
27-May-11 11:16:00	78.07	43.98	22.12	120	259.15	89.19	1144.15
27-May-11 11:17:00	78.12	43.96	22.06	120	259.45	88.95	1143.49
27-May-11 11:18:00	78.00	43.86	21.93	120	260.13	89.23	1145.07
27-May-11 11:19:00	77.96	43.91	21.88	119	259.34	89.39	1147.27
27-May-11 11:20:00	77.83	43.83	22.00	119	260.31	88.75	1144.94
27-May-11 11:21:00	77.75	43.86	22.09	119	260.68	88.61	1142.42
27-May-11 11:22:00	77.92	43.93	22.03	119	260.12	89.01	1142.93
27-May-11 11:23:00	78.02	43.87	22.07	119	262.18	88.42	1147.94
27-May-11 11:24:00	78.11	43.88	22.19	119	261.44	88.71	1152.83
27-May-11 11:25:00	77.99	43.96	22.10	119	258.83	89.20	1137.83
27-May-11 11:26:00	78.00	43.91	22.24	119	259.68	88.86	1128.05
27-May-11 11:27:00	78.21	43.94	22.21	120	261.36	88.66	1132.12
27-May-11 11:28:00	78.37	43.93	22.17	119	262.83	88.01	1144.69
27-May-11 11:29:00	78.37	44.05	22.12	119	261.34	88.60	1146.56
27-May-11 11:30:00	78.26	44.08	21.96	119	260.80	88.96	1146.27
27-May-11 11:31:00	77.94	44.05	21.94	119	261.68	89.05	1145.63

PM/PM2.5/Ammonia

Run 2	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
27-May-11 10:42:00	1167.83	246.45	208.09	84.40	15.48	80.32	17.41	116.03
27-May-11 10:43:00	1169.39	246.57	208.24	84.40	15.44	80.43	17.39	84.76
27-May-11 10:44:00	1170.25	246.72	208.34	84.47	15.48	80.61	17.37	82.19
27-May-11 10:45:00	1166.89	247.02	208.25	84.52	15.53	80.39	17.29	58.20
27-May-11 10:46:00	1165.49	246.87	208.20	84.68	15.47	80.13	17.29	60.61
27-May-11 10:47:00	1166.38	246.79	208.40	84.88	15.41	79.75	17.34	71.35
27-May-11 10:48:00	1166.75	246.89	208.90	85.01	15.44	79.20	17.35	74.04
27-May-11 10:49:00	1159.56	247.10	208.93	85.18	15.49	79.09	17.31	62.79
27-May-11 10:50:00	1154.23	247.18	209.00	85.38	15.44	78.94	17.30	63.75
27-May-11 10:51:00	1159.41	247.02	209.25	85.58	15.47	78.78	17.43	175.32
27-May-11 10:52:00	1168.47	246.91	209.38	85.84	15.44	79.90	17.54	283.39
27-May-11 10:53:00	1170.61	246.98	209.38	86.08	15.44	80.25	17.44	146.01
27-May-11 10:54:00	1172.83	247.13	209.63	86.34	15.42	80.59	17.36	82.59
27-May-11 10:55:00	1171.21	247.25	209.64	86.58	15.41	80.59	17.33	71.38
27-May-11 10:56:00	1169.04	247.62	209.88	86.78	15.46	80.36	17.34	73.75
27-May-11 10:57:00	1167.31	247.62	210.18	86.96	15.47	80.10	17.30	65.06
27-May-11 10:58:00	1168.25	247.77	210.25	87.05	15.46	80.17	17.28	64.07
27-May-11 10:59:00	1171.51	248.32	210.34	86.99	15.47	80.19	17.31	72.29
27-May-11 11:00:00	1169.57	248.38	210.72	86.90	15.43	79.59	17.33	79.68
27-May-11 11:01:00	1159.61	248.16	211.07	86.85	15.44	79.07	17.37	88.34
27-May-11 11:02:00	1157.23	248.17	211.01	86.92	15.45	78.77	17.38	92.16
27-May-11 11:03:00	1165.71	248.24	211.08	87.01	15.50	78.96	17.44	303.48
27-May-11 11:04:00	1171.07	248.39	211.15	87.18	15.48	80.28	17.53	484.38
27-May-11 11:05:00	1168.74	248.53	211.14	87.32	15.43	80.50	17.43	147.56
27-May-11 11:06:00	1168.35	248.31	211.30	87.40	15.43	80.44	17.41	132.99
27-May-11 11:07:00	1169.31	248.56	211.70	87.42	15.40	80.52	17.38	83.46
27-May-11 11:08:00	1169.97	249.11	212.02	87.56	15.42	80.63	17.36	84.91
27-May-11 11:09:00	1170.17	249.00	212.40	87.66	15.41	80.78	17.37	94.07
27-May-11 11:10:00	1168.54	249.08	212.70	87.83	15.45	80.70	17.35	84.03
27-May-11 11:11:00	1167.38	249.12	213.07	87.97	15.43	80.19	17.30	67.08
27-May-11 11:12:00	1163.55	249.11	213.07	88.06	15.41	79.30	17.30	65.90
27-May-11 11:13:00	1155.84	249.21	213.19	88.12	15.43	78.89	17.31	66.21
27-May-11 11:14:00	1155.69	249.21	213.21	88.13	15.48	79.04	17.29	63.01
27-May-11 11:15:00	1162.82	249.24	213.11	88.16	15.48	79.02	17.34	129.09
27-May-11 11:16:00	1166.01	249.29	213.14	88.13	15.42	80.02	17.47	205.35
27-May-11 11:17:00	1166.08	249.24	213.30	88.08	15.42	80.19	17.38	107.23
27-May-11 11:18:00	1168.08	249.26	213.27	87.94	15.46	80.38	17.30	71.78
27-May-11 11:19:00	1169.99	249.24	212.87	87.88	15.47	80.71	17.27	62.88
27-May-11 11:20:00	1168.02	249.22	212.85	87.74	15.40	80.65	17.28	62.55
27-May-11 11:21:00	1165.81	248.96	212.79	87.70	15.43	80.39	17.30	63.25
27-May-11 11:22:00	1165.21	248.81	212.66	87.70	15.45	80.29	17.25	55.54
27-May-11 11:23:00	1165.06	249.02	212.66	87.70	15.42	80.04	17.24	56.23
27-May-11 11:24:00	1162.40	249.19	212.66	87.63	15.47	79.52	17.25	56.77
27-May-11 11:25:00	1155.02	249.09	212.89	87.60	15.43	79.14	17.21	50.95
27-May-11 11:26:00	1148.33	248.94	212.81	87.53	15.41	78.59	17.25	56.79
27-May-11 11:27:00	1153.34	248.93	212.73	87.50	15.39	78.53	17.38	117.53
27-May-11 11:28:00	1166.17	248.94	212.79	87.56	15.33	79.81	17.46	173.27
27-May-11 11:29:00	1169.89	248.74	212.73	87.58	15.37	80.44	17.33	94.81
27-May-11 11:30:00	1169.88	248.57	212.48	87.42	15.39	80.63	17.25	65.58
27-May-11 11:31:00	1168.21	248.22	212.52	87.22	15.42	80.57	17.24	60.21

PM/PM2.5/Ammonia

5/27/2011 10:42
5/27/2011 13:49

1m

O ₂ (WGS CEMS) (% by vol, dry) 317AI07	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dflair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2						
27-May-11 10:42:00	0.50	369.41	80943.94	77916.26	27159.69	52699.75
27-May-11 10:43:00	0.62	369.02	80955.66	77912.17	27065.90	52714.63
27-May-11 10:44:00	0.69	369.70	80871.17	78022.07	27069.10	52701.84
27-May-11 10:45:00	0.75	369.50	81020.78	77971.30	26936.70	52754.68
27-May-11 10:46:00	0.76	368.99	80975.14	78098.04	26902.35	52907.57
27-May-11 10:47:00	0.66	367.93	80864.64	78064.47	26911.84	53000.37
27-May-11 10:48:00	0.66	369.04	80831.30	77917.44	27009.46	52976.72
27-May-11 10:49:00	0.73	369.85	80876.28	77704.82	26992.48	52945.46
27-May-11 10:50:00	0.75	368.48	81053.48	77956.80	26874.16	52903.95
27-May-11 10:51:00	0.63	366.98	80753.38	78140.91	26965.75	52892.64
27-May-11 10:52:00	0.43	367.53	80423.30	77872.69	27211.71	52957.51
27-May-11 10:53:00	0.48	367.85	80544.16	77468.42	27079.95	52948.99
27-May-11 10:54:00	0.67	368.40	80613.82	77540.09	26964.35	52854.90
27-May-11 10:55:00	0.68	368.03	80735.76	77702.71	26897.81	52826.76
27-May-11 10:56:00	0.60	368.25	80653.60	77788.89	26949.69	52858.15
27-May-11 10:57:00	0.66	369.30	80701.41	77655.75	26966.43	52858.66
27-May-11 10:58:00	0.71	368.33	80931.50	77721.35	26856.68	52767.31
27-May-11 10:59:00	0.65	367.47	80755.76	77941.64	26850.06	52733.01
27-May-11 11:00:00	0.64	367.20	80536.39	77753.89	26856.95	52775.79
27-May-11 11:01:00	0.62	366.35	80404.28	77589.45	26846.36	52807.96
27-May-11 11:02:00	0.56	367.58	80286.07	77452.14	26961.87	52990.42
27-May-11 11:03:00	0.54	367.53	80554.67	77309.02	27066.67	53106.60
27-May-11 11:04:00	0.43	368.54	80545.41	77624.13	27297.71	53025.76
27-May-11 11:05:00	0.49	367.36	80765.83	77597.74	27028.50	53005.21
27-May-11 11:06:00	0.49	367.49	80506.52	77742.00	27022.08	53054.43
27-May-11 11:07:00	0.62	367.27	80535.45	77483.59	26924.04	52957.22
27-May-11 11:08:00	0.63	367.09	80486.78	77597.33	26886.45	52824.43
27-May-11 11:09:00	0.58	367.67	80448.49	77540.46	26956.86	52872.17
27-May-11 11:10:00	0.62	368.67	80574.64	77467.38	26995.07	52913.46
27-May-11 11:11:00	0.66	368.65	80794.23	77603.69	26917.04	52974.54
27-May-11 11:12:00	0.69	367.47	80789.19	77811.44	26819.03	53041.81
27-May-11 11:13:00	0.68	367.71	80530.20	77828.86	26851.63	53058.14
27-May-11 11:14:00	0.67	368.03	80584.92	77576.25	26857.46	52958.41
27-May-11 11:15:00	0.69	366.96	80654.88	77605.39	26847.02	52859.54
27-May-11 11:16:00	0.57	367.33	80420.11	77751.20	27066.58	52878.72
27-May-11 11:17:00	0.56	367.00	80501.21	77534.25	26920.30	52866.39
27-May-11 11:18:00	0.64	367.32	80427.88	77506.56	26826.49	52891.77
27-May-11 11:19:00	0.71	368.48	80499.00	77438.19	26852.48	52906.19
27-May-11 11:20:00	0.68	367.74	80753.27	77536.70	26821.91	52921.99
27-May-11 11:21:00	0.66	367.79	80591.17	77762.42	26852.76	52971.18
27-May-11 11:22:00	0.73	368.27	80802.41	77604.42	26810.64	52898.11
27-May-11 11:23:00	0.80	368.23	80706.76	77650.22	26770.92	52941.20
27-May-11 11:24:00	0.71	369.64	80698.35	77790.42	26910.14	53089.77
27-May-11 11:25:00	0.76	369.18	81005.91	77708.22	26825.22	53104.58
27-May-11 11:26:00	0.80	366.81	80906.52	78031.45	26688.28	53071.56
27-May-11 11:27:00	0.64	367.36	80385.84	78000.27	26924.97	53018.49
27-May-11 11:28:00	0.59	368.67	80507.17	77483.83	27135.27	52967.19
27-May-11 11:29:00	0.63	369.24	80795.26	77618.62	27008.27	52979.92
27-May-11 11:30:00	0.76	368.55	80919.62	77808.80	26828.08	53021.81
27-May-11 11:31:00	0.82	368.78	80767.71	77982.26	26813.16	52997.41
27-May-11 11:32:00						174.62
27-May-11 11:33:00						175.13
27-May-11 11:34:00						174.86
27-May-11 11:35:00						175.14
27-May-11 11:36:00						174.39
27-May-11 11:37:00						174.62
27-May-11 11:38:00						174.34
27-May-11 11:39:00						175.05
27-May-11 11:40:00						174.54
27-May-11 11:41:00						174.23
27-May-11 11:42:00						174.20
27-May-11 11:43:00						175.15
27-May-11 11:44:00						175.61
27-May-11 11:45:00						175.14
27-May-11 11:46:00						174.92
27-May-11 11:47:00						175.00
27-May-11 11:48:00						175.00
27-May-11 11:49:00						174.52
27-May-11 11:50:00						173.85
27-May-11 11:51:00						173.99
27-May-11 11:52:00						174.78
27-May-11 11:53:00						174.39
27-May-11 11:54:00						175.34
27-May-11 11:55:00						174.63
27-May-11 11:56:00						174.45
27-May-11 11:57:00						173.28
27-May-11 11:58:00						174.12
27-May-11 11:59:00						173.84
27-May-11 12:00:00						173.68
27-May-11 12:01:00						174.42
27-May-11 12:02:00						174.10
27-May-11 12:03:00						173.50
27-May-11 12:04:00						173.30
27-May-11 12:05:00						173.79
27-May-11 12:06:00						173.98
27-May-11 12:07:00						172.55
27-May-11 12:08:00						173.10
27-May-11 12:09:00						173.74
27-May-11 12:10:00						173.69
27-May-11 12:11:00						174.06
27-May-11 12:12:00						173.43
27-May-11 12:13:00						173.28
27-May-11 12:14:00						173.50
27-May-11 12:15:00						173.02
27-May-11 12:16:00						172.94
27-May-11 12:17:00						172.64
27-May-11 12:18:00						171.96
27-May-11 12:19:00						173.30
27-May-11 12:20:00						172.56
27-May-11 12:21:00						172.06
27-May-11 12:22:00						172.07

Run 2	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B	317P1108	317P1177A	317FC202	317FC115	317FI113	317FI105
27-May-11 11:32:00	77.96		44.00	21.98	118	261.24	88.98	1144.82
27-May-11 11:33:00	78.05		44.03	22.13	118	263.35	88.17	1145.34
27-May-11 11:34:00	78.01		44.05	22.40	118	263.74	88.02	1145.97
27-May-11 11:35:00	78.23		44.03	22.20	118	262.09	88.48	1147.16
27-May-11 11:36:00	78.14		43.97	22.16	119	260.87	88.89	1150.70
27-May-11 11:37:00	77.92		44.04	22.16	119	262.45	88.32	1139.88
27-May-11 11:38:00	78.06		44.04	22.06	118	263.29	88.01	1139.56
27-May-11 11:39:00	78.32		43.99	22.17	119	261.41	88.79	1154.14
27-May-11 11:40:00	78.26		44.05	22.24	119	262.79	88.09	1145.93
27-May-11 11:41:00	78.23		44.06	22.26	119	262.15	88.50	1144.55
27-May-11 11:42:00	78.29		44.09	21.95	119	262.09	88.53	1144.49
27-May-11 11:43:00	78.15		44.10	22.12	119	260.34	89.14	1145.32
27-May-11 11:44:00	78.15		44.05	22.26	120	260.86	89.08	1145.76
27-May-11 11:45:00	78.20		43.98	22.03	120	262.61	88.56	1142.36
27-May-11 11:46:00	78.10		44.05	22.27	120	264.19	87.97	1140.19
27-May-11 11:47:00	77.92		44.11	22.17	120	262.42	88.59	1142.79
27-May-11 11:48:00	78.28		44.10	22.16	119	263.56	88.10	1145.91
27-May-11 11:49:00	78.28		44.06	22.21	119	263.28	88.14	1137.68
27-May-11 11:50:00	78.24		44.10	22.22	118	262.58	87.86	1128.45
27-May-11 11:51:00	78.41		44.07	22.07	119	261.44	88.27	1131.20
27-May-11 11:52:00	78.30		44.03	22.21	119	261.49	88.29	1141.49
27-May-11 11:53:00	78.28		43.99	22.31	119	263.52	87.72	1143.64
27-May-11 11:54:00	78.24		44.07	22.16	119	262.87	88.43	1143.84
27-May-11 11:55:00	78.11		44.03	22.01	119	262.56	88.40	1141.30
27-May-11 11:56:00	78.31		44.02	22.08	120	262.52	87.96	1140.06
27-May-11 11:57:00	78.13		43.99	22.21	120	262.53	88.20	1138.49
27-May-11 11:58:00	78.03		44.05	22.24	120	261.16	88.60	1139.31
27-May-11 11:59:00	78.26		44.03	22.30	120	261.70	88.47	1142.91
27-May-11 12:00:00	78.17		44.06	22.23	120	261.70	88.28	1142.05
27-May-11 12:01:00	78.24		43.97	22.21	121	260.91	88.17	1131.42
27-May-11 12:02:00	78.34		43.92	22.11	121	261.47	87.98	1125.47
27-May-11 12:03:00	78.31		43.86	21.93	120	261.26	88.35	1131.50
27-May-11 12:04:00	78.19		43.90	21.82	120	259.25	89.18	1143.26
27-May-11 12:05:00	78.18		43.85	21.96	120	258.31	89.39	1142.22
27-May-11 12:06:00	77.98		43.81	22.05	120	259.44	88.95	1141.82
27-May-11 12:07:00	78.06		43.84	21.71	120	258.57	89.43	1141.59
27-May-11 12:08:00	78.04		43.90	21.80	120	258.54	89.53	1142.18
27-May-11 12:09:00	78.05		43.79	21.86	120	259.14	89.18	1142.78
27-May-11 12:10:00	78.03		43.71	21.97	120	259.97	88.38	1141.40
27-May-11 12:11:00	78.12		43.85	21.83	121	258.50	88.90	1137.61
27-May-11 12:12:00	78.28		43.85	21.94	121	260.99	87.53	1132.55
27-May-11 12:13:00	78.17		43.79	21.92	121	261.39	87.23	1134.72
27-May-11 12:14:00	77.98		43.71	21.91	121	258.90	88.26	1130.92
27-May-11 12:15:00	77.89		43.77	21.73	121	258.42	88.36	1132.66
27-May-11 12:16:00	78.03		43.76	21.82	120	257.57	88.78	1139.11
27-May-11 12:17:00	78.31		43.67	22.16	120	259.90	88.19	1137.09
27-May-11 12:18:00	78.28		43.70	22.23	120	261.30	87.67	1138.44
27-May-11 12:19:00	78.16		43.75	21.86	120	260.09	88.23	1140.99
27-May-11 12:20:00	77.98		43.70	21.64	120	259.95	88.45	1139.42
27-May-11 12:21:00	78.11		43.59	21.85	121	259.13	88.43	1138.24

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FE1106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317A1109	CO (WGS CEMS) (ppmv, dry) 317A111
Run 2							
27-May-11 11:32:00	248.17	212.24	87.02	15.41	80.45	17.21	56.85
27-May-11 11:33:00	248.22	211.59	86.80	15.37	80.39	17.18	50.04
27-May-11 11:34:00	248.18	211.80	86.52	15.38	80.56	17.21	52.34
27-May-11 11:35:00	248.12	212.23	86.32	15.41	80.16	17.13	46.21
27-May-11 11:36:00	248.18	212.30	86.14	15.41	79.34	17.09	45.30
27-May-11 11:37:00	248.07	212.28	86.10	15.35	78.92	17.15	48.54
27-May-11 11:38:00	248.04	212.25	86.18	15.39	78.57	17.21	53.18
27-May-11 11:39:00	248.05	212.30	86.45	15.37	78.99	17.28	71.40
27-May-11 11:40:00	248.12	212.27	86.75	15.33	80.10	17.32	90.18
27-May-11 11:41:00	248.24	212.17	87.00	15.37	80.29	17.25	68.36
27-May-11 11:42:00	248.22	212.21	87.28	15.37	80.31	17.19	54.34
27-May-11 11:43:00	248.08	212.41	87.48	15.38	80.43	17.19	53.08
27-May-11 11:44:00	248.21	212.51	87.61	15.35	80.60	17.19	49.75
27-May-11 11:45:00	248.42	212.81	87.70	15.37	80.36	17.21	50.35
27-May-11 11:46:00	248.55	212.82	87.63	15.37	80.15	17.20	51.15
27-May-11 11:47:00	248.58	213.04	87.53	15.39	79.64	17.20	49.32
27-May-11 11:48:00	248.65	213.42	87.50	15.36	78.99	17.19	48.57
27-May-11 11:49:00	248.70	213.61	87.58	15.40	79.04	17.23	52.52
27-May-11 11:50:00	248.73	213.79	87.76	15.35	78.78	17.21	51.44
27-May-11 11:51:00	248.83	214.18	87.88	15.35	78.72	17.28	74.17
27-May-11 11:52:00	249.01	214.06	88.06	15.30	79.86	17.36	98.07
27-May-11 11:53:00	249.23	214.16	88.18	15.29	80.28	17.26	70.10
27-May-11 11:54:00	249.07	214.66	88.30	15.36	80.54	17.20	60.07
27-May-11 11:55:00	249.09	214.65	88.22	15.35	80.29	17.15	48.50
27-May-11 11:56:00	248.96	214.57	88.02	15.29	79.91	17.17	49.58
27-May-11 11:57:00	248.96	214.60	87.75	15.32	79.67	17.20	50.12
27-May-11 11:58:00	248.96	214.53	87.37	15.34	79.73	17.14	46.81
27-May-11 11:59:00	248.96	214.18	86.96	15.37	79.66	17.11	44.97
27-May-11 12:00:00	248.92	214.11	86.79	15.36	78.96	17.13	46.40
27-May-11 12:01:00	248.91	213.94	86.64	15.35	78.65	17.14	46.02
27-May-11 12:02:00	249.08	213.82	86.60	15.36	78.44	17.12	44.62
27-May-11 12:03:00	248.92	213.42	86.68	15.38	78.42	17.22	67.82
27-May-11 12:04:00	248.84	212.93	86.80	15.40	79.78	17.32	93.80
27-May-11 12:05:00	248.83	212.65	86.93	15.37	80.07	17.24	67.82
27-May-11 12:06:00	248.78	212.31	87.02	15.36	80.01	17.17	54.65
27-May-11 12:07:00	248.93	212.18	87.10	15.40	79.94	17.16	52.02
27-May-11 12:08:00	248.89	211.83	87.18	15.43	79.99	17.18	51.55
27-May-11 12:09:00	248.99	211.57	87.36	15.40	80.17	17.21	51.88
27-May-11 12:10:00	249.21	211.11	87.48	15.39	80.08	17.21	52.54
27-May-11 12:11:00	249.07	210.98	87.61	15.43	79.61	17.22	53.45
27-May-11 12:12:00	248.95	211.12	87.70	15.32	79.00	17.21	52.76
27-May-11 12:13:00	248.84	211.13	87.63	15.36	79.06	17.24	57.49
27-May-11 12:14:00	249.06	210.98	87.56	15.45	79.25	17.18	51.28
27-May-11 12:15:00	249.07	210.53	87.61	15.40	78.81	17.22	113.70
27-May-11 12:16:00	249.06	210.35	87.70	15.40	79.53	17.41	195.24
27-May-11 12:17:00	249.01	210.39	87.63	15.37	79.41	17.35	113.97
27-May-11 12:18:00	248.94	210.24	87.60	15.38	79.39	17.29	74.96
27-May-11 12:19:00	248.75	209.81	87.66	15.39	79.63	17.21	59.92
27-May-11 12:20:00	248.46	209.70	87.77	15.42	79.64	17.19	52.44
27-May-11 12:21:00	248.66	209.81	87.87	15.38	79.58	17.20	53.25

	O2 (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dvair	Vol Reg FG (dscfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2							
27-May-11 11:32:00	0.79	369.76	80818.27	77868.30	26852.26	52937.09	172.32
27-May-11 11:33:00	0.90	369.24	81033.33	77871.34	26744.15	52943.09	172.50
27-May-11 11:34:00	0.86	370.42	80919.97	78153.58	26881.86	53005.72	171.55
27-May-11 11:35:00	0.85	370.67	81177.52	78018.25	26802.66	52995.06	171.84
27-May-11 11:36:00	0.96	369.64	81232.37	78193.02	26654.22	52932.84	171.84
27-May-11 11:37:00	0.97	368.69	81007.72	78319.87	26657.77	52874.03	171.37
27-May-11 11:38:00	0.77	369.56	80798.28	78156.97	26850.49	52868.39	171.50
27-May-11 11:39:00	0.68	370.17	80989.24	77813.21	27005.51	52916.01	172.22
27-May-11 11:40:00	0.76	369.02	81122.84	78016.57	26945.21	52930.23	172.01
27-May-11 11:41:00	0.68	369.45	80870.00	78231.37	26909.52	52894.55	171.06
27-May-11 11:42:00	0.81	369.49	80965.67	77849.11	26810.16	52850.10	171.92
27-May-11 11:43:00	0.86	369.38	80974.91	78016.54	26786.54	52876.20	171.54
27-May-11 11:44:00	0.80	368.36	80950.36	78063.71	26723.53	52892.04	171.71
27-May-11 11:45:00	0.75	368.62	80726.53	77985.99	26780.02	52781.78	172.00
27-May-11 11:46:00	0.74	370.01	80783.83	77731.77	26877.26	52744.90	172.35
27-May-11 11:47:00	0.82	370.86	81087.71	77786.14	26910.72	52792.31	172.26
27-May-11 11:48:00	0.79	369.74	81275.07	78136.46	26829.19	52858.89	171.35
27-May-11 11:49:00	0.74	370.29	81028.17	78289.33	26926.03	52894.19	170.95
27-May-11 11:50:00	0.70	370.03	81148.67	78025.04	26895.27	52963.34	171.45
27-May-11 11:51:00	0.66	368.79	81092.45	78092.27	26905.76	53055.56	171.40
27-May-11 11:52:00	0.58	367.92	80820.33	78077.68	26960.97	53023.61	171.47
27-May-11 11:53:00	0.63	367.86	80630.94	77809.77	26817.02	53022.18	172.35
27-May-11 11:54:00	0.76	369.31	80617.44	77583.65	26819.53	52989.41	172.43
27-May-11 11:55:00	0.95	369.79	80934.60	77644.96	26741.85	52910.43	172.90
27-May-11 11:56:00	0.95	369.12	81039.55	78078.40	26721.88	52894.95	171.69
27-May-11 11:57:00	0.84	368.53	80893.14	78192.13	26734.37	52903.17	171.68
27-May-11 11:58:00	0.79	368.82	80764.54	77960.53	26704.25	52885.94	171.77
27-May-11 11:59:00	0.85	368.10	80826.96	77752.62	26599.64	52895.30	172.43
27-May-11 12:00:00	0.86	368.70	80668.29	77837.97	26665.69	52918.27	172.02
27-May-11 12:01:00	0.91	368.26	80801.48	77724.01	26627.50	52950.01	172.75
27-May-11 12:02:00	0.88	367.33	80703.62	77901.05	26545.91	53074.23	172.46
27-May-11 12:03:00	0.75	367.80	80500.88	77742.25	26735.96	53184.95	172.89
27-May-11 12:04:00	0.64	368.21	80604.51	77537.98	26922.22	53211.01	173.41
27-May-11 12:05:00	0.58	367.10	80693.44	77619.08	26752.91	53162.71	173.39
27-May-11 12:06:00	0.71	366.33	80451.19	77578.37	26581.41	53073.67	173.90
27-May-11 12:07:00	0.79	366.94	80280.73	77395.07	26590.22	53007.45	173.93
27-May-11 12:08:00	0.87	366.85	80414.11	77318.52	26584.79	53004.08	174.17
27-May-11 12:09:00	0.77	367.07	80395.34	77524.73	26661.70	53012.74	173.95
27-May-11 12:10:00	0.72	367.07	80443.98	77436.38	26681.45	53013.43	174.61
27-May-11 12:11:00	0.64	367.09	80444.60	77443.04	26719.60	53036.51	173.84
27-May-11 12:12:00	0.72	366.21	80448.64	77371.35	26613.35	53082.78	173.92
27-May-11 12:13:00	0.74	366.80	80255.60	77460.92	26686.61	53058.60	174.11
27-May-11 12:14:00	0.66	367.22	80384.09	77288.39	26671.50	52970.17	174.83
27-May-11 12:15:00	0.83	366.13	80477.33	77312.82	26603.09	52943.90	174.93
27-May-11 12:16:00	0.56	365.52	80237.17	77604.65	26868.58	52835.59	173.89
27-May-11 12:17:00	0.49	365.17	80103.57	77275.64	26775.24	52774.12	174.80
27-May-11 12:18:00	0.61	366.83	80028.23	77044.56	26785.15	52813.61	175.30
27-May-11 12:19:00	0.61	367.63	80391.18	77001.67	26757.24	52793.05	175.28
27-May-11 12:20:00	0.70	367.37	80567.28	77295.67	26683.00	52822.67	175.16
27-May-11 12:21:00	0.67	367.38	80509.19	77517.54	26704.70	52961.02	174.76

Run 2	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air		Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B	317P1108	317P1177A	317FC202	Air to Regen (M lbs/hr)	317FC115	317F1113	317F1105
27-May-11 12:22:00	78.19		43.62	21.92	121	260.21		88.26	1140.61
27-May-11 12:23:00	78.21		43.59	21.80	121	259.13		88.97	1140.43
27-May-11 12:24:00	78.09		43.66	21.90	120	259.08		88.50	1134.24
27-May-11 12:25:00	78.16		43.67	21.86	120	258.14		88.87	1129.48
27-May-11 12:26:00	78.20		43.58	21.80	120	257.48		89.17	1124.94
27-May-11 12:27:00	78.23		43.56	21.92	120	259.67		88.38	1130.69
27-May-11 12:28:00	78.17		43.55	22.10	120	261.66		87.56	1139.93
27-May-11 12:29:00	78.06		43.57	22.12	120	260.79		88.03	1141.27
27-May-11 12:30:00	78.42		43.62	22.15	121	260.62		88.26	1141.45
27-May-11 12:31:00	78.26		43.62	22.07	121	259.78		88.84	1141.56
27-May-11 12:32:00	78.08		43.63	22.07	120	259.40		88.51	1141.09
27-May-11 12:33:00	78.08		43.55	22.16	120	259.02		88.55	1141.46
27-May-11 12:34:00	78.05		43.49	22.00	120	259.94		88.54	1143.34
27-May-11 12:35:00	78.02		43.53	21.84	121	259.27		88.72	1139.26
27-May-11 12:36:00	78.10		43.58	21.88	121	259.03		88.96	1132.44
27-May-11 12:37:00	78.05		43.64	21.95	120	259.29		88.80	1131.95
27-May-11 12:38:00	78.10		43.64	21.87	121	258.85		88.95	1128.56
27-May-11 12:39:00	78.22		43.49	21.81	120	259.28		88.90	1135.05
27-May-11 12:40:00	78.22		43.51	21.74	120	257.79		89.32	1142.97
27-May-11 12:41:00	78.20		43.52	21.94	121	260.43		88.59	1140.89
27-May-11 12:42:00	78.18		43.55	21.87	121	259.56		88.98	1139.60
27-May-11 12:43:00	78.04		43.51	22.06	121	258.95		89.00	1140.87
27-May-11 12:44:00	78.10		43.55	22.00	121	259.51		88.86	1142.09
27-May-11 12:45:00	78.07		43.60	21.99	121	260.31		88.88	1139.61
27-May-11 12:46:00	78.08		43.51	22.01	121	260.64		88.42	1138.74
27-May-11 12:47:00	77.86		43.51	22.01	122	262.46		87.68	1135.23
27-May-11 12:48:00	78.16		43.45	22.09	121	262.41		87.84	1128.62
27-May-11 12:49:00	78.12		43.45	21.94	120	260.68		88.06	1129.69
27-May-11 12:50:00	77.91		43.49	21.91	120	259.05		88.61	1124.65
27-May-11 12:51:00	78.17		43.54	22.00	121	259.31		88.45	1127.75
27-May-11 12:52:00	78.17		43.45	21.91	121	259.72		88.76	1136.51
27-May-11 12:53:00	78.21		43.44	21.95	121	258.86		89.41	1137.72
27-May-11 12:54:00	78.15		43.50	22.12	121	261.08		88.42	1139.16
27-May-11 12:55:00	78.11		43.50	22.21	120	259.94		88.48	1137.86
27-May-11 12:56:00	77.93		43.45	22.03	120	258.88		88.91	1135.73
27-May-11 12:57:00	78.11		43.43	21.95	121	258.87		88.71	1133.71
27-May-11 12:58:00	78.06		43.47	21.85	121	257.26		89.33	1135.08
27-May-11 12:59:00	78.03		43.46	21.86	121	259.26		88.39	1134.15
27-May-11 13:00:00	78.22		43.47	21.77	121	258.14		88.92	1125.80
27-May-11 13:01:00	78.18		43.43	21.75	120	257.62		89.16	1123.89
27-May-11 13:02:00	77.93		43.35	21.53	121	256.43		89.23	1119.77
27-May-11 13:03:00	78.03		43.36	21.65	121	256.75		89.33	1125.08
27-May-11 13:04:00	78.25		43.41	21.91	121	258.04		88.91	1137.04
27-May-11 13:05:00	78.27		43.42	21.84	121	259.42		88.34	1136.17
27-May-11 13:06:00	78.18		43.43	21.90	121	258.71		88.56	1133.81
27-May-11 13:07:00	78.16		43.46	21.99	121	257.33		88.72	1133.67
27-May-11 13:08:00	78.29		43.32	21.87	121	258.10		88.88	1135.90
27-May-11 13:09:00	78.40		43.37	21.94	120	259.26		88.34	1137.14
27-May-11 13:10:00	78.42		43.43	21.95	121	259.05		88.34	1136.03
27-May-11 13:11:00	78.40		43.41	21.88	121	258.84		88.30	1131.16

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 2							
27-May-11 12:22:00	1163.59	248.94	87.92	15.39	79.67	17.18	51.56
27-May-11 12:23:00	1163.13	249.03	88.01	15.46	79.66	17.19	52.87
27-May-11 12:24:00	1154.07	249.09	88.05	15.38	79.17	17.20	53.72
27-May-11 12:25:00	1150.12	248.85	88.02	15.43	78.78	17.24	58.20
27-May-11 12:26:00	1146.65	248.83	87.82	15.46	78.44	17.25	57.27
27-May-11 12:27:00	1152.01	248.58	87.65	15.40	78.05	17.33	110.80
27-May-11 12:28:00	1163.83	248.28	87.71	15.32	79.05	17.43	172.46
27-May-11 12:29:00	1165.24	248.37	87.90	15.34	79.71	17.32	94.89
27-May-11 12:30:00	1164.55	248.28	88.18	15.38	79.95	17.22	60.17
27-May-11 12:31:00	1164.30	248.10	88.36	15.41	80.01	17.20	57.89
27-May-11 12:32:00	1163.78	248.24	88.38	15.33	79.86	17.20	57.65
27-May-11 12:33:00	1163.28	248.32	88.29	15.35	79.79	17.24	61.99
27-May-11 12:34:00	1164.89	248.38	88.14	15.38	79.98	17.23	59.70
27-May-11 12:35:00	1160.73	248.43	88.08	15.38	79.71	17.25	60.39
27-May-11 12:36:00	1151.64	248.45	87.99	15.40	78.95	17.24	56.02
27-May-11 12:37:00	1151.01	248.38	87.84	15.40	78.75	17.24	59.23
27-May-11 12:38:00	1150.31	248.37	87.72	15.42	78.75	17.28	65.62
27-May-11 12:39:00	1157.01	248.40	87.54	15.42	78.79	17.36	127.14
27-May-11 12:40:00	1166.14	248.54	87.48	15.36	79.88	17.45	188.36
27-May-11 12:41:00	1164.42	248.63	87.40	15.37	79.84	17.33	98.37
27-May-11 12:42:00	1163.46	248.46	87.40	15.39	79.69	17.29	82.06
27-May-11 12:43:00	1164.19	248.46	87.47	15.37	79.70	17.23	63.55
27-May-11 12:44:00	1165.21	248.67	87.56	15.37	79.85	17.22	60.41
27-May-11 12:45:00	1162.89	248.61	87.58	15.41	79.82	17.20	55.32
27-May-11 12:46:00	1162.44	248.58	87.50	15.36	79.76	17.16	51.80
27-May-11 12:47:00	1157.60	248.59	87.44	15.34	79.28	17.15	51.21
27-May-11 12:48:00	1148.37	248.49	87.34	15.37	78.47	17.14	50.87
27-May-11 12:49:00	1149.29	248.50	87.30	15.35	78.33	17.11	47.87
27-May-11 12:50:00	1146.72	248.55	87.38	15.39	78.20	17.09	46.10
27-May-11 12:51:00	1150.03	248.66	87.51	15.33	77.94	17.19	84.71
27-May-11 12:52:00	1159.75	248.96	87.60	15.38	78.84	17.32	126.47
27-May-11 12:53:00	1160.77	249.04	87.60	15.40	79.22	17.21	77.45
27-May-11 12:54:00	1162.18	249.09	87.68	15.33	79.50	17.16	60.52
27-May-11 12:55:00	1160.91	249.12	87.86	15.35	79.44	17.17	59.08
27-May-11 12:56:00	1159.18	249.09	87.90	15.40	79.19	17.11	50.00
27-May-11 12:57:00	1157.99	249.12	87.98	15.40	78.89	17.12	50.35
27-May-11 12:58:00	1158.73	249.04	88.18	15.41	78.94	17.15	51.79
27-May-11 12:59:00	1156.47	248.99	88.32	15.36	78.92	17.17	55.11
27-May-11 13:00:00	1146.31	249.08	88.33	15.40	78.32	17.19	58.58
27-May-11 13:01:00	1144.67	249.18	88.15	15.41	77.94	17.16	53.65
27-May-11 13:02:00	1142.40	249.24	87.94	15.39	77.59	17.17	61.80
27-May-11 13:03:00	1147.74	249.32	87.88	15.39	77.57	16.68	121.74
27-May-11 13:04:00	1160.30	249.76	87.79	15.40	78.89	16.44	201.45
27-May-11 13:05:00	1159.18	249.62	87.68	15.41	79.08	17.33	142.93
27-May-11 13:06:00	1157.43	249.40	87.62	15.41	78.94	17.29	91.70
27-May-11 13:07:00	1157.00	249.59	87.68	15.37	78.75	17.24	69.85
27-May-11 13:08:00	1158.82	249.67	87.67	15.41	78.79	17.24	67.63
27-May-11 13:09:00	1160.53	249.66	87.77	15.37	79.14	17.23	65.68
27-May-11 13:10:00	1159.10	249.87	87.88	15.39	79.18	17.20	61.75
27-May-11 13:11:00	1153.72	249.70	88.00	15.42	78.72	17.18	59.80

	O2 (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dvair	Vol Reg FG (dscfm) - Or 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2							
27-May-11 12:22:00	0.70	366.34	80511.55	77438.55	26596.78	53078.40	174.90
27-May-11 12:23:00	0.70	367.50	80284.17	77468.39	26690.87	53086.49	174.79
27-May-11 12:24:00	0.61	367.19	80536.94	77234.40	26710.38	52971.59	175.17
27-May-11 12:25:00	0.75	366.30	80471.00	77440.69	26652.61	52865.39	174.78
27-May-11 12:26:00	0.66	366.05	80273.83	77517.11	26672.47	52842.53	174.73
27-May-11 12:27:00	0.61	365.86	80220.09	77257.62	26773.08	52922.29	175.48
27-May-11 12:28:00	0.50	367.00	80178.14	77252.68	27008.23	52996.65	175.56
27-May-11 12:29:00	0.46	367.79	80427.22	77176.73	26934.86	52894.54	175.72
27-May-11 12:30:00	0.63	367.59	80601.67	77277.92	26753.98	52769.18	175.17
27-May-11 12:31:00	0.74	367.99	80557.20	77519.40	26729.46	52712.71	174.59
27-May-11 12:32:00	0.75	367.71	80645.85	77563.83	26706.98	52767.96	174.62
27-May-11 12:33:00	0.68	366.50	80583.51	77650.34	26685.38	52854.79	174.76
27-May-11 12:34:00	0.65	366.47	80318.24	77564.48	26685.14	52984.48	175.21
27-May-11 12:35:00	0.61	367.48	80311.30	77270.37	26786.16	53017.37	175.62
27-May-11 12:36:00	0.69	366.94	80532.44	77252.37	26712.05	52977.60	175.64
27-May-11 12:37:00	0.69	367.11	80415.04	77519.17	26730.80	52946.07	174.68
27-May-11 12:38:00	0.65	367.11	80452.59	77420.21	26789.19	52865.46	174.80
27-May-11 12:39:00	0.51	367.19	80452.37	77448.42	26928.38	52817.56	175.45
27-May-11 12:40:00	0.37	367.25	80469.02	77397.33	27082.99	52802.35	175.26
27-May-11 12:41:00	0.47	366.10	80483.05	77365.73	26830.94	52809.34	175.63
27-May-11 12:42:00	0.54	368.01	80232.03	77362.21	26900.21	52838.03	175.06
27-May-11 12:43:00	0.59	367.60	80648.58	77144.46	26784.33	52844.16	176.26
27-May-11 12:44:00	0.64	366.83	80560.27	77539.97	26699.35	52862.19	175.08
27-May-11 12:45:00	0.72	367.44	80391.74	77496.74	26690.94	52917.92	174.85
27-May-11 12:46:00	0.77	368.30	80524.18	77374.56	26691.43	53087.15	175.53
27-May-11 12:47:00	0.78	367.85	80713.25	77521.55	26649.96	53205.55	175.56
27-May-11 12:48:00	0.73	368.97	80614.35	77692.69	26731.75	53092.20	174.96
27-May-11 12:49:00	0.77	369.00	80860.03	77541.93	26683.56	52995.09	175.43
27-May-11 12:50:00	0.79	367.49	80866.32	77788.42	26546.97	52979.02	174.98
27-May-11 12:51:00	0.73	366.36	80534.71	77800.67	26606.37	53001.77	174.25
27-May-11 12:52:00	0.57	366.39	80288.27	77532.07	26805.34	53022.27	175.37
27-May-11 12:53:00	0.52	367.36	80293.93	77235.50	26760.01	53023.26	175.84
27-May-11 12:54:00	0.71	367.22	80507.27	77122.47	26640.65	52986.03	176.27
27-May-11 12:55:00	0.66	367.98	80477.37	77452.72	26719.00	52906.46	175.33
27-May-11 12:56:00	0.71	367.01	80643.89	77372.76	26563.06	52846.44	175.98
27-May-11 12:57:00	0.87	366.71	80430.79	77541.25	26506.51	52907.33	175.61
27-May-11 12:58:00	0.79	366.42	80364.63	77478.74	26545.19	52981.51	175.40
27-May-11 12:59:00	0.71	365.58	80301.00	77366.58	26527.40	52982.63	175.89
27-May-11 13:00:00	0.69	366.30	80117.32	77257.79	26612.04	52936.84	175.69
27-May-11 13:01:00	0.70	365.97	80274.75	77088.76	26550.17	53054.23	176.59
27-May-11 13:02:00	0.56	365.53	80202.85	77211.45	26571.06	53189.13	176.69
27-May-11 13:03:00	2.49	364.39	80106.79	77012.21	25367.11	53178.12	177.08
27-May-11 13:04:00	3.89	364.86	79856.22	78595.37	24707.91	53154.52	174.38
27-May-11 13:05:00	0.48	365.72	79959.27	79052.69	26793.31	53091.22	171.22
27-May-11 13:06:00	0.54	366.68	80147.40	76842.46	26796.30	53059.71	176.84
27-May-11 13:07:00	0.62	365.96	80357.45	77062.52	26661.76	53013.20	176.50
27-May-11 13:08:00	0.65	364.71	80200.99	77291.24	26560.73	53016.39	176.45
27-May-11 13:09:00	0.69	365.82	79925.87	77176.93	26621.28	53005.81	176.29
27-May-11 13:10:00	0.61	366.10	80168.75	76925.58	26625.05	52979.81	176.68
27-May-11 13:11:00	0.63	366.13	80231.62	77057.71	26598.31	52969.74	176.58

Run 2	Scrubbing Liquid		Pump Pressure Lower Circulation (psig)	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O)	Stripped Sour Water Makeup (gpm)	Carrying Air Air to Regen (M lbs/hr)	Air to Rings Air to Regen (M lbs/hr)	#1 Stand Pipe Aeration Air to Regen (lbs/min)
	Upper Circulation (psig)	317P1105B	317P1108	317P1177A	317FC202	317FC115	317FI113	317FI105
27-May-11 13:12:00	78.25		43.44	21.77	120	257.32	89.07	1121.84
27-May-11 13:13:00	78.23		43.41	21.78	120	258.07	88.60	1120.91
27-May-11 13:14:00	78.03		43.29	21.65	120	255.32	89.30	1118.29
27-May-11 13:15:00	77.82		43.33	21.89	120	258.05	88.46	1121.70
27-May-11 13:16:00	78.10		43.33	21.65	121	257.80	89.11	1131.59
27-May-11 13:17:00	78.22		43.33	21.67	121	256.43	89.51	1130.29
27-May-11 13:18:00	78.12		43.36	21.74	121	257.01	89.45	1130.16
27-May-11 13:19:00	78.03		43.35	21.87	121	257.59	88.75	1130.98
27-May-11 13:20:00	78.12		43.31	21.92	121	258.20	88.26	1129.79
27-May-11 13:21:00	78.01		43.28	22.05	121	258.34	88.73	1128.67
27-May-11 13:22:00	78.20		43.30	21.92	121	258.11	89.00	1129.00
27-May-11 13:23:00	78.00		43.17	21.59	120	258.42	88.86	1126.46
27-May-11 13:24:00	78.11		43.18	21.64	120	258.15	88.81	1118.18
27-May-11 13:25:00	78.20		43.10	21.77	121	256.15	89.65	1116.35
27-May-11 13:26:00	78.20		43.12	21.90	120	255.85	89.60	1114.72
27-May-11 13:27:00	78.19		43.06	21.82	121	256.12	89.01	1115.78
27-May-11 13:28:00	78.35		43.09	21.63	121	258.27	88.53	1127.69
27-May-11 13:29:00	78.15		43.13	21.62	121	257.35	88.78	1132.06
27-May-11 13:30:00	78.00		43.06	21.62	120	255.64	89.64	1136.78
27-May-11 13:31:00	78.10		43.03	21.57	120	255.92	89.57	1146.21
27-May-11 13:32:00	78.22		43.06	21.74	121	255.21	89.62	1147.31
27-May-11 13:33:00	78.22		43.08	21.87	121	256.81	89.11	1146.59
27-May-11 13:34:00	78.15		42.95	21.67	122	255.24	89.58	1145.20
27-May-11 13:35:00	78.14		42.97	21.71	121	257.05	88.96	1135.39
27-May-11 13:36:00	78.22		43.04	21.66	121	257.98	88.51	1126.28
27-May-11 13:37:00	78.16		42.99	21.60	121	256.16	89.34	1126.05
27-May-11 13:38:00	78.14		42.89	21.77	121	255.39	89.14	1126.13
27-May-11 13:39:00	78.09		42.92	21.85	121	257.44	88.35	1134.21
27-May-11 13:40:00	78.16		42.90	21.98	121	257.60	88.47	1143.57
27-May-11 13:41:00	78.21		42.83	21.82	121	257.45	88.71	1141.56
27-May-11 13:42:00	77.90		42.85	21.73	121	259.16	88.00	1139.34
27-May-11 13:43:00	77.96		42.91	21.73	121	258.35	88.49	1141.08
27-May-11 13:44:00	78.12		42.89	21.80	121	258.38	88.59	1141.62
27-May-11 13:45:00	78.00		42.87	21.87	121	259.16	88.35	1137.96
27-May-11 13:46:00	78.07		42.79	21.93	121	258.39	88.74	1137.65
27-May-11 13:47:00	78.20		42.82	21.98	120	257.13	89.05	1132.10
27-May-11 13:48:00	78.23		42.82	21.94	120	257.98	88.67	1126.53
78.13			43.59	21.97	120.29	259.42	88.87	1138.44

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317E1106	Air to Regen Temp B-1 Outlet (oF) 317T11112	Tempered Air Temp (oF) 317T11120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317A1109	CO (WGS CEMS) (ppmv, dry) 317A111
Run 2							
27-May-11 13:12:00	1142.63	249.62	88.00	15.40	77.88	17.19	63.49
27-May-11 13:13:00	1141.26	249.60	88.08	15.39	77.59	17.22	74.42
27-May-11 13:14:00	1140.89	249.55	88.18	15.42	77.33	17.29	89.85
27-May-11 13:15:00	1143.01	249.56	88.08	15.37	76.94	17.35	372.15
27-May-11 13:16:00	1153.08	249.66	88.00	15.44	77.79	17.49	672.56
27-May-11 13:17:00	1151.70	249.72	87.94	15.40	77.97	17.37	212.94
27-May-11 13:18:00	1152.79	249.66	87.97	15.43	77.97	17.30	96.06
27-May-11 13:19:00	1153.86	249.91	88.00	15.38	78.00	17.32	105.30
27-May-11 13:20:00	1151.70	249.90	88.00	15.37	77.97	17.33	102.99
27-May-11 13:21:00	1150.25	249.95	88.02	15.41	77.85	17.30	85.70
27-May-11 13:22:00	1151.29	249.97	88.18	15.42	77.87	17.27	75.60
27-May-11 13:23:00	1148.00	249.93	88.32	15.40	77.73	17.31	87.44
27-May-11 13:24:00	1138.06	249.84	88.46	15.41	77.33	17.32	88.96
27-May-11 13:25:00	1136.50	249.73	88.56	15.46	76.93	17.32	96.94
27-May-11 13:26:00	1138.08	249.57	88.60	15.50	76.46	17.33	113.09
27-May-11 13:27:00	1136.75	249.20	88.62	15.40	75.82	17.42	412.14
27-May-11 13:28:00	1150.21	249.28	88.70	15.40	77.07	17.50	844.58
27-May-11 13:29:00	1154.00	249.25	88.70	15.39	77.85	17.48	539.54
27-May-11 13:30:00	1159.22	249.15	88.65	15.44	78.58	17.40	170.19
27-May-11 13:31:00	1169.88	249.27	88.71	15.43	79.73	17.39	176.52
27-May-11 13:32:00	1173.19	249.63	88.80	15.40	80.46	17.42	214.62
27-May-11 13:33:00	1171.78	249.72	88.78	15.40	80.79	17.40	191.23
27-May-11 13:34:00	1170.28	249.73	88.62	15.42	80.83	17.40	222.43
27-May-11 13:35:00	1160.50	249.80	88.34	15.41	79.95	17.34	106.79
27-May-11 13:36:00	1149.55	249.96	87.96	15.38	78.75	17.37	137.99
27-May-11 13:37:00	1147.83	249.83	87.74	15.43	78.44	17.37	132.12
27-May-11 13:38:00	1149.56	249.67	87.65	15.42	78.45	17.31	81.46
27-May-11 13:39:00	1158.39	249.85	87.70	15.35	78.74	17.36	251.48
27-May-11 13:40:00	1167.75	249.74	87.72	15.38	79.80	17.45	403.91
27-May-11 13:41:00	1165.22	249.94	87.80	15.40	79.92	17.34	134.76
27-May-11 13:42:00	1162.46	249.89	87.80	15.35	79.74	17.28	84.52
27-May-11 13:43:00	1163.78	249.70	87.72	15.39	79.77	17.27	82.23
27-May-11 13:44:00	1165.13	249.67	87.54	15.39	79.91	17.22	67.01
27-May-11 13:45:00	1161.37	249.72	87.50	15.40	79.54	17.22	69.75
27-May-11 13:46:00	1161.02	249.58	87.58	15.44	79.37	17.22	65.23
27-May-11 13:47:00	1155.92	249.67	87.73	15.42	79.14	17.20	60.89
27-May-11 13:48:00	1147.50	249.56	87.98	15.40	78.67	17.20	64.34
Run 2							
27-May-11 13:49:00	1159.94	248.81	87.49	15.40	79.34	17.27	100.88

	O2 (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dvair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 2							
27-May-11 13:12:00	0.68	365.85	80236.91	77123.64	26579.43	52890.46	176.22
27-May-11 13:13:00	0.64	365.12	80176.82	77182.80	26574.86	52898.44	176.48
27-May-11 13:14:00	0.51	365.18	80015.86	77112.03	26701.49	52979.02	176.91
27-May-11 13:15:00	0.50	363.30	80029.61	76908.29	26667.75	53002.31	177.84
27-May-11 13:16:00	0.27	365.25	79618.45	76999.72	27079.55	52983.44	177.00
27-May-11 13:17:00	0.29	365.74	80045.34	76521.56	26909.74	52969.67	178.18
27-May-11 13:18:00	0.52	364.71	80151.63	76833.79	26674.41	52945.77	177.76
27-May-11 13:19:00	0.48	365.26	79926.77	77059.17	26752.18	52945.76	176.84
27-May-11 13:20:00	0.48	364.74	80046.61	76825.82	26726.26	52935.80	177.69
27-May-11 13:21:00	0.45	364.98	79933.02	76943.41	26709.41	52916.77	177.63
27-May-11 13:22:00	0.48	365.80	79986.22	76777.67	26726.18	52918.00	177.73
27-May-11 13:23:00	0.47	365.81	80166.35	76839.34	26774.17	52975.20	178.44
27-May-11 13:24:00	0.43	365.95	80167.37	77031.23	26809.37	53098.23	177.79
27-May-11 13:25:00	0.42	365.62	80198.45	77000.64	26791.86	53095.67	178.08
27-May-11 13:26:00	0.45	364.94	80126.71	77034.50	26750.73	52980.70	178.03
27-May-11 13:27:00	0.38	364.49	79976.53	77005.66	26873.99	52979.50	178.12
27-May-11 13:28:00	0.23	363.97	79877.15	76907.79	27037.74	52969.68	178.33
27-May-11 13:29:00	0.20	365.67	79763.85	76776.02	27102.56	52926.94	178.29
27-May-11 13:30:00	0.35	364.90	80136.16	76602.53	26860.84	52906.66	179.54
27-May-11 13:31:00	0.36	364.60	79968.20	76983.33	26825.91	52897.22	178.58
27-May-11 13:32:00	0.41	364.49	79902.50	76835.14	26839.51	52871.72	178.58
27-May-11 13:33:00	0.31	363.87	79878.47	76829.99	26796.18	52809.42	178.65
27-May-11 13:34:00	0.29	364.81	79742.85	76698.41	26879.78	52743.17	179.21
27-May-11 13:35:00	0.39	363.91	79948.37	76555.64	26696.98	52680.26	180.00
27-May-11 13:36:00	0.35	364.91	79752.18	76781.15	26826.12	52832.95	178.70
27-May-11 13:37:00	0.34	365.23	79969.50	76587.50	26851.13	52537.23	179.58
27-May-11 13:38:00	0.49	364.36	80040.67	76796.81	26662.32	52232.67	179.60
27-May-11 13:39:00	0.50	363.38	79849.97	76929.77	26667.55	52413.62	179.17
27-May-11 13:40:00	0.36	364.37	79634.32	76817.14	26913.01	52495.34	179.34
27-May-11 13:41:00	0.39	364.85	79851.44	76571.65	26767.06	52585.93	180.21
27-May-11 13:42:00	0.49	364.96	79956.08	76690.61	26670.97	52545.09	180.24
27-May-11 13:43:00	0.52	365.77	79980.69	76820.30	26715.37	52411.55	179.49
27-May-11 13:44:00	0.60	365.68	80159.28	76876.81	26621.32	52314.19	179.48
27-May-11 13:45:00	0.52	365.79	80139.34	77058.79	26656.50	52290.25	179.10
27-May-11 13:46:00	0.56	366.47	80162.68	76974.30	26693.95	52350.33	179.57
27-May-11 13:47:00	0.63	366.20	80311.18	77027.78	26626.40	52317.57	179.30
27-May-11 13:48:00	0.63	365.05	80253.17	77227.14	26542.21	52197.88	178.86
	0.66	367.21	80479.86	77484.81	26776.75	52905.06	174.95

PM/PM2.5/Ammonia

5/27/2011 14:58
5/27/2011 18:00

1m

Run 3	Scrubbing Liquid Upper Circulation (psig) 317P105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105
27-May-11 14:58:00	78.20	42.65	21.92	120	257.03	88.46	1142.09
27-May-11 14:59:00	78.17	42.64	21.85	121	258.50	88.27	1137.40
27-May-11 15:00:00	77.92	42.65	21.74	121	259.44	88.24	1121.12
27-May-11 15:01:00	77.96	42.66	21.88	121	258.55	88.39	1125.00
27-May-11 15:02:00	78.12	42.68	22.12	121	257.87	88.33	1133.09
27-May-11 15:03:00	78.28	42.64	21.91	121	257.62	88.45	1133.59
27-May-11 15:04:00	78.40	42.60	21.75	121	257.03	89.12	1145.56
27-May-11 15:05:00	78.22	42.63	21.90	120	257.46	88.84	1142.93
27-May-11 15:06:00	78.02	42.62	21.77	120	255.99	89.58	1142.29
27-May-11 15:07:00	78.14	42.66	21.75	120	257.05	89.34	1143.33
27-May-11 15:08:00	78.08	42.62	21.75	120	256.73	89.31	1143.54
27-May-11 15:09:00	78.07	42.65	21.80	120	255.64	89.52	1144.82
27-May-11 15:10:00	78.16	42.65	21.90	120	257.15	88.82	1144.74
27-May-11 15:11:00	78.16	42.67	21.95	120	257.12	89.06	1135.57
27-May-11 15:12:00	78.13	42.66	21.78	120	256.87	89.13	1121.80
27-May-11 15:13:00	78.09	42.60	21.70	119	255.34	89.59	1129.54
27-May-11 15:14:00	78.06	42.62	21.71	120	255.80	89.13	1134.73
27-May-11 15:15:00	78.11	42.61	21.69	120	257.64	88.39	1135.17
27-May-11 15:16:00	78.19	42.67	21.77	120	256.82	88.63	1147.21
27-May-11 15:17:00	78.31	42.68	21.76	120	255.51	89.33	1146.60
27-May-11 15:18:00	78.44	42.73	21.75	120	257.19	88.57	1147.72
27-May-11 15:19:00	78.24	42.73	21.76	120	256.51	88.72	1147.23
27-May-11 15:20:00	78.12	42.59	21.65	120	256.28	88.85	1142.16
27-May-11 15:21:00	78.20	42.62	21.74	119	258.19	88.42	1139.48
27-May-11 15:22:00	78.21	42.68	21.64	120	256.19	89.11	1139.68
27-May-11 15:23:00	78.23	42.73	21.84	120	256.87	88.69	1135.34
27-May-11 15:24:00	78.26	42.66	21.94	119	257.10	88.59	1125.56
27-May-11 15:25:00	78.15	42.64	21.95	119	256.22	88.76	1123.43
27-May-11 15:26:00	78.19	42.62	21.77	119	255.47	88.98	1122.33
27-May-11 15:27:00	78.32	42.67	21.68	120	255.06	89.42	1130.03
27-May-11 15:28:00	78.34	42.71	21.68	120	254.85	89.46	1143.73
27-May-11 15:29:00	78.24	42.66	21.76	120	256.21	88.86	1144.99
27-May-11 15:30:00	78.36	42.71	21.73	120	257.75	88.36	1143.53
27-May-11 15:31:00	78.38	42.69	21.60	120	257.09	88.57	1143.52
27-May-11 15:32:00	78.37	42.66	21.40	120	255.43	88.85	1143.37
27-May-11 15:33:00	78.37	42.75	21.58	120	255.08	88.73	1144.74
27-May-11 15:34:00	78.17	42.75	21.77	120	254.94	88.86	1147.95
27-May-11 15:35:00	78.19	42.71	21.72	120	255.60	88.85	1141.21
27-May-11 15:36:00	78.07	42.71	21.62	120	255.18	89.04	1127.45
27-May-11 15:37:00	77.98	42.74	21.68	120	254.84	88.96	1123.75
27-May-11 15:38:00	78.25	42.77	21.96	120	256.22	88.60	1132.05
27-May-11 15:39:00	78.24	42.75	21.74	120	256.17	88.75	1136.99
27-May-11 15:40:00	78.16	42.75	21.45	120	255.70	88.86	1144.70
27-May-11 15:41:00	78.39	42.82	21.78	120	257.64	88.11	1142.35
27-May-11 15:42:00	78.46	42.76	21.79	120	256.83	88.64	1143.96
27-May-11 15:43:00	78.27	42.64	21.80	120	256.18	88.93	1146.40
27-May-11 15:44:00	77.96	42.62	21.61	120	255.26	88.72	1147.15
27-May-11 15:45:00	77.94	42.64	21.75	120	256.27	88.17	1144.62
27-May-11 15:46:00	78.08	42.68	21.71	120	257.38	87.80	1144.67
27-May-11 15:47:00	77.97	42.72	21.74	120	258.55	87.42	1141.36

PM/PM2.5/Ammonia

Run 3	#2 Stand Pipe Aeration Air to Regen (lbs/min)	Air to Regen Temp B-1 Outlet (oF)	Tempered Air Temp (oF)	Ambient Air Temp (oF)	Air to Regen Pressure Blower Discharge (psig)	Plant Air to 45lb Air (psig)	CO2 (WGS CEMS) (% by vol. dry)	CO (WGS CEMS) (ppmv, dry)
Run 3								
27-May-11 14:58:00	1164.49	249.05	207.35	87.20	15.33	79.47	17.02	49.20
27-May-11 14:59:00	1162.18	249.28	207.48	87.18	15.35	79.50	17.05	53.29
27-May-11 15:00:00	1149.88	249.32	207.69	87.12	15.39	79.05	17.07	56.18
27-May-11 15:01:00	1145.47	249.39	207.60	87.20	15.36	78.70	17.06	52.18
27-May-11 15:02:00	1154.03	249.37	207.49	87.20	15.37	78.47	17.07	53.40
27-May-11 15:03:00	1153.80	249.29	207.47	87.12	15.35	78.00	17.15	91.66
27-May-11 15:04:00	1165.83	249.29	207.22	87.00	15.40	79.16	17.26	143.33
27-May-11 15:05:00	1165.78	249.29	206.98	86.95	15.36	79.61	17.18	102.26
27-May-11 15:06:00	1164.55	249.38	207.02	87.00	15.41	79.53	17.14	76.74
27-May-11 15:07:00	1165.24	249.51	207.04	87.00	15.40	79.49	17.13	68.93
27-May-11 15:08:00	1166.13	249.30	206.94	87.06	15.41	79.58	17.15	73.49
27-May-11 15:09:00	1167.31	249.29	206.72	87.20	15.41	79.78	17.17	70.20
27-May-11 15:10:00	1166.93	249.15	206.28	87.41	15.34	79.83	17.20	88.65
27-May-11 15:11:00	1161.31	248.80	205.75	87.51	15.40	79.37	17.25	107.79
27-May-11 15:12:00	1150.81	248.70	205.49	87.60	15.39	78.83	17.22	86.13
27-May-11 15:13:00	1148.70	248.70	204.94	87.60	15.41	78.56	17.20	75.80
27-May-11 15:14:00	1156.58	248.73	204.65	87.58	15.39	78.67	17.23	89.82
27-May-11 15:15:00	1156.05	248.81	204.60	87.50	15.36	78.27	17.33	235.74
27-May-11 15:16:00	1168.77	248.90	204.73	87.56	15.34	79.42	17.42	383.65
27-May-11 15:17:00	1169.76	249.17	204.70	87.62	15.38	79.97	17.33	217.50
27-May-11 15:18:00	1170.65	249.28	204.87	87.71	15.32	80.25	17.28	147.73
27-May-11 15:19:00	1170.15	249.32	205.20	87.86	15.35	80.34	17.33	188.09
27-May-11 15:20:00	1164.75	249.39	205.29	87.90	15.35	79.90	17.31	140.02
27-May-11 15:21:00	1162.55	249.37	205.33	87.88	15.38	79.58	17.29	140.46
27-May-11 15:22:00	1161.82	249.32	205.66	87.80	15.40	79.20	17.28	153.60
27-May-11 15:23:00	1161.15	249.39	205.71	87.87	15.36	79.18	17.25	122.20
27-May-11 15:24:00	1152.97	249.46	205.82	87.84	15.36	79.03	17.32	175.15
27-May-11 15:25:00	1141.88	249.53	205.87	87.82	15.38	78.28	17.31	137.14
27-May-11 15:26:00	1144.15	249.35	205.90	87.92	15.40	77.91	17.29	117.68
27-May-11 15:27:00	1150.91	249.40	205.85	88.00	15.43	77.70	17.36	362.81
27-May-11 15:28:00	1163.68	249.49	205.76	88.06	15.38	78.87	17.45	605.91
27-May-11 15:29:00	1167.16	249.76	205.67	88.16	15.35	79.72	17.39	315.83
27-May-11 15:30:00	1166.92	249.96	205.82	88.27	15.35	79.90	17.34	194.62
27-May-11 15:31:00	1166.19	250.03	205.89	88.37	15.35	79.87	17.29	151.61
27-May-11 15:32:00	1165.83	249.76	205.94	88.32	15.35	79.82	17.28	126.49
27-May-11 15:33:00	1167.50	250.06	205.82	88.12	15.35	79.95	17.31	156.37
27-May-11 15:34:00	1170.48	250.15	205.82	87.94	15.36	80.23	17.34	196.44
27-May-11 15:35:00	1166.61	250.16	205.80	87.84	15.39	80.06	17.33	171.61
27-May-11 15:36:00	1156.25	250.10	205.82	87.82	15.42	79.55	17.33	145.23
27-May-11 15:37:00	1145.90	250.14	205.94	87.92	15.40	78.96	17.33	160.48
27-May-11 15:38:00	1155.02	250.05	205.87	87.98	15.43	78.85	17.34	168.08
27-May-11 15:39:00	1156.95	250.13	205.90	87.82	15.45	78.66	17.38	394.88
27-May-11 15:40:00	1166.17	249.96	205.70	87.62	15.42	79.55	17.45	702.60
27-May-11 15:41:00	1166.23	249.86	205.76	87.50	15.40	79.83	17.43	434.14
27-May-11 15:42:00	1166.65	249.73	205.85	87.44	15.45	79.85	17.36	236.44
27-May-11 15:43:00	1169.04	249.55	205.89	87.40	15.46	80.06	17.28	120.99
27-May-11 15:44:00	1170.01	249.54	205.64	87.48	15.42	80.33	17.28	125.77
27-May-11 15:45:00	1167.39	249.54	205.25	87.66	15.38	80.15	17.32	159.82
27-May-11 15:46:00	1167.17	249.52	205.34	87.75	15.36	79.91	17.34	176.93
27-May-11 15:47:00	1165.14	249.52	205.43	87.70	15.33	79.66	17.29	124.55

PM/PM2.5/Ammonia
5/27/2011 14:58
5/27/2011 18:00

1m

O ₂ (WGS CEMS) (% by vol, dry) 317AI07	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dylair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3						
27-May-11 14:58:00	0.70	365.05	76794.37	26321.95	52372.96	180.47
27-May-11 14:59:00	0.63	364.07	76837.94	26302.44	52379.09	180.54
27-May-11 15:00:00	0.63	365.53	76787.84	26428.93	52359.71	180.62
27-May-11 15:01:00	0.67	366.46	76597.57	26469.26	52363.05	181.20
27-May-11 15:02:00	0.66	365.54	76938.04	26422.81	52382.80	180.34
27-May-11 15:03:00	0.60	364.83	80108.35	26483.57	52403.06	179.69
27-May-11 15:04:00	0.55	364.76	79953.01	26634.09	52442.40	180.19
27-May-11 15:05:00	0.54	365.15	79937.77	26567.41	52477.96	180.31
27-May-11 15:06:00	0.60	365.05	80023.41	26486.81	52468.00	180.92
27-May-11 15:07:00	0.54	364.63	79999.90	26851.82	52426.65	180.41
27-May-11 15:08:00	0.57	365.39	79908.58	26529.93	52396.62	180.80
27-May-11 15:09:00	0.54	365.08	80076.53	26536.52	52299.14	180.86
27-May-11 15:10:00	0.50	364.19	80007.93	26527.49	52248.00	180.50
27-May-11 15:11:00	0.41	364.80	79811.47	26655.18	52294.61	180.37
27-May-11 15:12:00	0.39	365.36	79947.02	26671.90	52311.58	181.02
27-May-11 15:13:00	0.51	365.11	80067.96	26586.38	52421.35	181.33
27-May-11 15:14:00	0.37	364.12	80015.18	26592.00	52436.51	180.67
27-May-11 15:15:00	0.41	364.09	79796.60	26727.05	52512.34	181.03
27-May-11 15:16:00	0.31	364.92	79791.55	26918.89	52671.11	180.79
27-May-11 15:17:00	0.32	364.35	79972.75	26756.76	52612.75	180.78
27-May-11 15:18:00	0.47	363.87	79848.22	26751.99	52524.04	180.21
27-May-11 15:19:00	0.35	364.50	79741.59	26704.67	52475.55	180.30
27-May-11 15:20:00	0.29	363.91	79881.49	26699.08	52453.33	181.48
27-May-11 15:21:00	0.38	364.06	79751.55	26604.85	52449.01	181.25
27-May-11 15:22:00	0.43	365.56	79783.17	26745.27	52467.13	180.91
27-May-11 15:23:00	0.46	364.27	80112.52	26608.99	52479.13	180.86
27-May-11 15:24:00	0.36	364.32	79830.61	26926.26	52671.51	180.11
27-May-11 15:25:00	0.32	364.42	79842.02	26725.02	52439.87	180.93
27-May-11 15:26:00	0.42	363.70	79863.68	26698.30	52342.17	181.25
27-May-11 15:27:00	0.25	363.44	79705.83	26759.82	52310.41	180.61
27-May-11 15:28:00	0.15	363.55	79649.10	26932.79	52379.82	180.85
27-May-11 15:29:00	0.18	363.14	79671.74	26782.57	52613.70	181.33
27-May-11 15:30:00	0.33	363.77	79581.70	26714.54	52666.41	181.05
27-May-11 15:31:00	0.41	364.76	79719.60	26707.77	52524.61	181.16
27-May-11 15:32:00	0.46	364.22	79937.04	26635.53	52563.04	181.10
27-May-11 15:33:00	0.29	362.87	79819.41	26624.86	52588.15	180.01
27-May-11 15:34:00	0.22	362.35	79524.20	26640.46	52516.42	180.47
27-May-11 15:35:00	0.27	362.46	79408.91	26621.61	52455.20	181.51
27-May-11 15:36:00	0.32	363.36	79433.78	26674.17	52426.13	181.79
27-May-11 15:37:00	0.36	363.07	79629.87	26643.27	52421.74	181.72
27-May-11 15:38:00	0.30	362.61	79566.75	26639.23	52455.29	180.80
27-May-11 15:39:00	0.29	363.93	79466.93	26815.39	52489.43	180.98
27-May-11 15:40:00	0.20	363.98	79756.05	26921.79	52483.60	181.40
27-May-11 15:41:00	0.17	363.66	79767.40	26888.51	52487.44	180.25
27-May-11 15:42:00	0.24	364.70	79695.27	26841.12	52449.26	180.32
27-May-11 15:43:00	0.35	364.82	79924.81	26710.23	52368.78	181.45
27-May-11 15:44:00	0.38	364.37	79951.21	26672.92	52367.13	181.15
27-May-11 15:45:00	0.30	363.02	79851.84	26645.56	52441.38	180.99
27-May-11 15:46:00	0.26	363.34	79555.87	26700.69	52457.97	180.81
27-May-11 15:47:00	0.32	364.00	79626.60	26667.97	52446.06	181.58

Run 3	Scrubbing Liquid		Pump Pressure	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317FI113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317FI105
	Upper Circulation (psig) 317P1105B	Lower Circulation (psig) 317P1108						
27-May-11 15:48:00	78.09	42.71	21.74	120	258.76	87.47	1131.31	
27-May-11 15:49:00	78.15	42.72	21.77	120	258.92	87.90	1125.27	
27-May-11 15:50:00	78.06	42.73	21.81	120	257.55	88.77	1134.41	
27-May-11 15:51:00	78.06	42.84	21.87	120	256.38	88.93	1132.99	
27-May-11 15:52:00	78.12	42.87	21.81	120	258.63	88.15	1141.56	
27-May-11 15:53:00	78.05	42.90	21.70	120	258.54	88.25	1147.42	
27-May-11 15:54:00	78.06	42.87	21.85	121	258.22	88.60	1149.09	
27-May-11 15:55:00	77.93	42.82	21.75	120	257.98	88.51	1147.08	
27-May-11 15:56:00	77.83	42.90	21.73	120	260.11	87.29	1144.08	
27-May-11 15:57:00	78.05	42.91	21.72	120	258.96	87.94	1142.26	
27-May-11 15:58:00	78.12	42.98	21.56	120	256.62	89.15	1145.23	
27-May-11 15:59:00	78.14	43.02	21.81	120	259.04	88.15	1146.78	
27-May-11 16:00:00	78.22	43.10	21.67	120	257.98	88.44	1136.25	
27-May-11 16:01:00	78.11	43.07	21.73	120	257.93	88.35	1123.81	
27-May-11 16:02:00	77.97	43.12	21.73	120	256.91	88.55	1133.94	
27-May-11 16:03:00	78.13	43.15	21.64	120	256.49	88.69	1133.86	
27-May-11 16:04:00	78.22	43.17	21.81	120	256.21	88.74	1144.91	
27-May-11 16:05:00	78.26	43.24	21.85	121	256.26	88.73	1141.91	
27-May-11 16:06:00	78.14	43.23	21.64	121	257.01	88.70	1140.90	
27-May-11 16:07:00	78.21	43.15	21.66	120	258.59	88.20	1140.87	
27-May-11 16:08:00	78.06	43.28	21.87	119	259.25	87.52	1141.87	
27-May-11 16:09:00	78.01	43.25	21.84	119	258.12	88.17	1142.80	
27-May-11 16:10:00	78.23	43.31	21.72	120	258.11	88.45	1144.65	
27-May-11 16:11:00	78.14	43.30	21.84	120	255.98	89.56	1142.53	
27-May-11 16:12:00	78.18	43.30	21.88	120	257.56	88.52	1129.55	
27-May-11 16:13:00	77.77	43.30	21.80	120	254.99	88.94	1115.91	
27-May-11 16:14:00	77.89	43.32	22.06	120	255.13	89.94	1134.52	
27-May-11 16:15:00	78.04	43.34	22.08	120	258.13	88.54	1133.42	
27-May-11 16:16:00	78.02	43.31	22.28	120	260.57	87.67	1141.98	
27-May-11 16:17:00	78.05	43.41	22.25	120	260.67	87.81	1141.91	
27-May-11 16:18:00	78.06	43.37	22.06	119	258.63	88.66	1143.25	
27-May-11 16:19:00	78.13	43.42	21.93	119	258.56	88.54	1145.15	
27-May-11 16:20:00	78.13	43.41	21.75	120	259.99	88.06	1143.82	
27-May-11 16:21:00	78.23	43.49	21.61	120	259.39	88.25	1142.44	
27-May-11 16:22:00	78.12	43.46	21.71	120	258.48	88.53	1142.28	
27-May-11 16:23:00	78.13	43.32	21.82	120	258.16	88.66	1141.81	
27-May-11 16:24:00	78.01	43.32	21.75	120	259.25	88.09	1131.57	
27-May-11 16:25:00	78.00	43.37	21.71	120	258.23	88.36	1114.50	
27-May-11 16:26:00	78.30	43.45	21.82	120	257.07	88.33	1130.03	
27-May-11 16:27:00	78.29	43.48	21.80	120	257.93	88.15	1129.99	
27-May-11 16:28:00	78.12	43.54	21.88	120	258.03	88.18	1138.78	
27-May-11 16:29:00	78.04	43.50	21.83	120	257.60	88.64	1143.27	
27-May-11 16:30:00	78.13	43.41	21.86	120	258.79	88.08	1143.58	
27-May-11 16:31:00	78.07	43.50	21.81	120	259.25	87.83	1142.89	
27-May-11 16:32:00	78.04	43.60	21.67	120	257.49	88.74	1141.99	
27-May-11 16:33:00	78.12	43.57	21.69	120	259.88	87.56	1143.43	
27-May-11 16:34:00	78.13	43.59	21.77	120	260.10	87.42	1145.04	
27-May-11 16:35:00	78.29	43.50	21.74	120	257.82	88.40	1142.78	
27-May-11 16:36:00	78.13	43.48	21.94	119	259.24	87.85	1132.77	
27-May-11 16:37:00	78.17	43.51	21.90	119	259.18	88.05	1116.04	

	#2 Stand Pipe Aeration Air to Regen (lbs/min) 317FI106	Air to Regen Temp B-1 Outlet (oF) 317TI1112	Tempered Air Temp (oF) 317TI1120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317AI109	CO (WGS CEMS) (ppmv, dry) 317AI111
Run 3	Run 3							
27-May-11 15:48:00	1157.68	249.62	205.73	87.70	15.30	79.46	17.25	91.27
27-May-11 15:49:00	1149.88	249.60	205.98	87.70	15.35	79.40	17.21	80.30
27-May-11 15:50:00	1157.90	249.74	206.08	87.72	15.42	79.23	17.18	74.59
27-May-11 15:51:00	1154.75	249.91	205.91	87.88	15.37	78.56	17.23	170.75
27-May-11 15:52:00	1163.19	250.21	206.06	88.08	15.35	79.27	17.36	341.81
27-May-11 15:53:00	1168.31	250.19	206.56	88.20	15.35	79.90	17.31	257.33
27-May-11 15:54:00	1171.92	250.01	206.61	88.20	15.39	80.25	17.23	101.74
27-May-11 15:55:00	1170.64	249.96	206.68	88.05	15.37	80.17	17.21	96.21
27-May-11 15:56:00	1167.27	249.66	206.71	87.80	15.31	80.00	17.22	91.73
27-May-11 15:57:00	1166.46	249.46	206.63	87.59	15.38	79.82	17.21	87.11
27-May-11 15:58:00	1167.95	249.38	206.58	87.44	15.39	79.87	17.15	67.71
27-May-11 15:59:00	1168.82	249.41	206.60	87.34	15.37	80.03	17.17	85.04
27-May-11 16:00:00	1158.90	249.51	206.53	87.22	15.40	79.62	17.23	101.59
27-May-11 16:01:00	1147.06	249.35	206.47	87.08	15.38	79.02	17.19	75.61
27-May-11 16:02:00	1155.22	249.44	206.02	87.00	15.37	78.69	17.21	84.00
27-May-11 16:03:00	1154.62	249.40	206.00	86.94	15.35	78.21	17.26	160.44
27-May-11 16:04:00	1166.68	249.42	206.06	86.85	15.34	79.36	17.37	315.17
27-May-11 16:05:00	1164.53	249.58	206.29	86.92	15.34	79.67	17.34	265.38
27-May-11 16:06:00	1163.36	249.84	206.56	87.10	15.37	79.55	17.29	128.90
27-May-11 16:07:00	1163.27	249.90	206.77	87.38	15.33	79.50	17.27	108.47
27-May-11 16:08:00	1164.62	250.19	206.96	87.48	15.30	79.61	17.25	92.07
27-May-11 16:09:00	1166.45	250.31	207.53	87.39	15.35	79.92	17.22	86.58
27-May-11 16:10:00	1166.36	250.16	207.55	87.25	15.39	79.94	17.21	86.17
27-May-11 16:11:00	1164.60	250.20	207.46	87.36	15.37	79.76	17.23	93.03
27-May-11 16:12:00	1158.12	250.16	207.54	87.40	15.34	79.50	17.20	78.63
27-May-11 16:13:00	1151.86	250.01	207.42	87.40	15.48	79.36	17.22	93.19
27-May-11 16:14:00	1158.78	249.81	207.41	87.42	15.37	79.10	17.18	65.48
27-May-11 16:15:00	1154.29	249.62	207.13	87.50	15.30	78.37	17.24	154.37
27-May-11 16:16:00	1161.78	249.62	206.86	87.50	15.29	79.01	17.36	322.13
27-May-11 16:17:00	1164.35	249.62	207.07	87.42	15.30	79.42	17.30	240.78
27-May-11 16:18:00	1165.83	249.52	206.92	87.29	15.32	79.61	17.16	81.54
27-May-11 16:19:00	1167.79	249.39	206.77	87.20	15.30	79.94	17.09	62.93
27-May-11 16:20:00	1166.37	249.62	206.75	87.13	15.32	79.96	17.13	72.65
27-May-11 16:21:00	1164.99	249.67	207.02	87.16	15.35	79.81	17.14	75.00
27-May-11 16:22:00	1165.04	249.79	207.22	87.28	15.36	79.65	17.11	59.10
27-May-11 16:23:00	1164.65	249.88	207.28	87.42	15.36	79.59	17.11	57.80
27-May-11 16:24:00	1160.14	249.70	207.37	87.50	15.35	79.65	17.12	58.91
27-May-11 16:25:00	1151.60	249.65	207.51	87.48	15.38	79.39	17.12	60.07
27-May-11 16:26:00	1154.35	249.72	207.34	87.32	15.34	78.74	17.13	59.51
27-May-11 16:27:00	1150.74	249.71	207.41	87.10	15.35	77.95	17.20	97.69
27-May-11 16:28:00	1160.28	249.65	207.41	86.81	15.35	78.80	17.28	151.96
27-May-11 16:29:00	1165.88	249.60	207.73	86.54	15.36	79.62	17.21	114.07
27-May-11 16:30:00	1165.53	249.62	207.81	86.50	15.31	79.76	17.14	76.71
27-May-11 16:31:00	1164.91	249.77	207.89	86.56	15.31	79.69	17.13	67.26
27-May-11 16:32:00	1164.44	249.70	207.92	86.60	15.37	79.62	17.11	60.76
27-May-11 16:33:00	1165.19	249.63	207.83	86.68	15.32	79.72	17.09	56.41
27-May-11 16:34:00	1167.84	249.64	207.82	86.78	15.34	79.94	17.12	59.32
27-May-11 16:35:00	1165.43	249.62	207.99	86.62	15.36	79.81	17.06	51.45
27-May-11 16:36:00	1158.39	249.67	207.83	86.50	15.34	79.59	17.03	48.90
27-May-11 16:37:00	1146.92	249.72	207.70	86.56	15.39	79.17	17.06	52.33

Run 3	O ₂ (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dvair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
27-May-11 15:48:00	0.42	364.50	79771.56	76356.60	26625.93	52423.93	181.43
27-May-11 15:49:00	0.58	364.61	79880.85	76560.97	26544.66	52395.30	180.96
27-May-11 15:50:00	0.57	365.68	79905.52	76769.46	26585.50	52459.87	180.36
27-May-11 15:51:00	0.54	365.21	80138.17	76744.83	26637.44	52549.25	179.90
27-May-11 15:52:00	0.41	364.08	80035.59	77021.53	26756.23	52524.04	179.36
27-May-11 15:53:00	0.28	365.35	79788.31	76906.86	26825.56	52383.03	178.98
27-May-11 15:54:00	0.40	365.47	80065.99	76515.44	26677.99	52349.76	180.45
27-May-11 15:55:00	0.41	365.72	80092.05	76801.79	26672.39	52298.36	180.00
27-May-11 15:56:00	0.39	365.12	80147.47	76814.22	26653.02	52253.61	179.73
27-May-11 15:57:00	0.49	365.89	80016.87	76861.74	26667.47	52226.54	179.32
27-May-11 15:58:00	0.60	365.69	80185.52	76826.33	26547.99	52141.20	179.10
27-May-11 15:59:00	0.54	364.83	80141.70	77025.56	26525.98	52194.14	178.55
27-May-11 16:00:00	0.48	366.02	79953.65	76940.73	26694.28	52248.73	177.99
27-May-11 16:01:00	0.56	365.34	80212.49	76766.55	26577.44	52276.43	179.00
27-May-11 16:02:00	0.53	365.05	80065.27	77053.32	26588.10	52237.51	178.01
27-May-11 16:03:00	0.42	364.21	80000.37	76885.89	26628.68	52155.22	178.18
27-May-11 16:04:00	0.31	363.84	79817.93	76797.40	26783.33	52205.57	178.19
27-May-11 16:05:00	0.29	363.55	79736.60	76623.05	26723.02	52275.39	178.19
27-May-11 16:06:00	0.42	363.66	79671.75	76512.13	26617.37	52264.70	178.65
27-May-11 16:07:00	0.38	364.46	79696.72	76489.01	26661.77	52261.87	179.03
27-May-11 16:08:00	0.48	365.19	79870.79	76471.90	26660.55	52266.18	178.73
27-May-11 16:09:00	0.51	364.86	80031.86	76708.60	26595.28	52321.74	178.37
27-May-11 16:10:00	0.56	364.88	79960.03	76860.64	26567.10	52411.29	177.55
27-May-11 16:11:00	0.56	365.25	79962.82	76828.23	26624.25	52435.27	177.63
27-May-11 16:12:00	0.48	364.19	80044.73	76842.74	26530.55	52399.06	177.84
27-May-11 16:13:00	0.38	364.36	79811.77	76815.69	26600.37	52335.40	177.84
27-May-11 16:14:00	0.53	363.17	79850.50	76531.50	26415.24	52356.02	178.67
27-May-11 16:15:00	0.59	363.72	79588.14	76679.59	26526.10	52412.92	177.94
27-May-11 16:16:00	0.32	365.01	79709.07	76528.24	26857.10	52389.71	178.48
27-May-11 16:17:00	0.23	366.55	79992.78	76510.56	26908.19	52329.18	178.05
27-May-11 16:18:00	0.38	366.84	80329.59	76840.32	26699.01	52269.48	178.02
27-May-11 16:19:00	0.54	365.75	80393.85	76967.54	26502.17	52232.59	176.98
27-May-11 16:20:00	0.56	365.60	80155.25	77121.56	26526.25	52145.74	176.58
27-May-11 16:21:00	0.49	366.59	80122.28	76929.41	26634.22	52120.16	176.44
27-May-11 16:22:00	0.55	366.30	80339.41	76846.46	26553.91	51982.25	176.98
27-May-11 16:23:00	0.62	365.69	80274.76	77086.84	26493.38	51832.14	176.98
27-May-11 16:24:00	0.65	365.43	80140.70	77094.45	26472.52	51949.55	176.99
27-May-11 16:25:00	0.66	365.98	80083.32	77001.98	26510.63	52140.88	177.03
27-May-11 16:26:00	0.62	365.14	80204.88	76947.90	26469.64	52218.68	176.59
27-May-11 16:27:00	0.59	363.87	80021.04	77040.86	26476.23	52078.01	176.30
27-May-11 16:28:00	0.47	364.55	79743.19	76902.13	26661.84	51998.88	176.21
27-May-11 16:29:00	0.44	364.83	79890.33	76596.85	26609.08	52051.17	177.28
27-May-11 16:30:00	0.49	364.88	79952.65	76649.75	26510.96	52019.13	177.56
27-May-11 16:31:00	0.54	365.18	79963.82	76694.59	26502.97	51916.75	177.19
27-May-11 16:32:00	0.61	365.40	80030.49	76737.16	26468.30	51799.65	176.58
27-May-11 16:33:00	0.65	364.88	80077.73	76844.15	26399.33	51773.54	176.45
27-May-11 16:34:00	0.62	365.87	79962.86	76911.71	26512.27	51811.81	176.10
27-May-11 16:35:00	0.67	365.99	80180.81	76792.87	26442.68	51873.66	176.66
27-May-11 16:36:00	0.77	364.83	80206.32	77006.60	26290.05	51916.51	176.60
27-May-11 16:37:00	0.67	365.65	79953.03	77076.46	26420.86	51977.05	175.97

Run 3	Scrubbing Liquid		Pump Pressure	Agglo-Filtering Module (AFM)	Stripped Sour Water	Carrying Air	Air to Rings	#1 Stand Pipe Aeration
	Upper Circulation (psig)	Lower Circulation (psig)	and Cyclolabs Pressure (psig)	and Cyclolabs Pressure (in. H2O)	Makeup (gpm)	Air to Regen (M lbs/hr)	Air to Regen (M lbs/hr)	Air to Regen (lbs/min)
	317P1105B	317P1108	317P1177A	317FC202	317FC115	317F1113	317F1105	
27-May-11 16:38:00	78.29	43.53	21.96	119	258.67	87.87	1127.38	
27-May-11 16:39:00	78.23	43.49	21.94	119	260.08	87.32	1136.08	
27-May-11 16:40:00	78.26	43.52	21.93	118	260.51	87.35	1145.12	
27-May-11 16:41:00	78.34	43.53	21.93	118	259.58	87.53	1145.66	
27-May-11 16:42:00	78.22	43.50	21.94	119	260.18	87.64	1145.67	
27-May-11 16:43:00	78.12	43.50	21.86	118	260.30	87.63	1146.39	
27-May-11 16:44:00	78.00	43.47	22.02	118	259.87	87.58	1145.58	
27-May-11 16:45:00	78.17	43.52	22.04	118	259.28	87.78	1142.91	
27-May-11 16:46:00	78.28	43.45	21.94	118	260.13	87.71	1143.23	
27-May-11 16:47:00	78.35	43.43	22.06	118	260.74	87.94	1141.37	
27-May-11 16:48:00	78.17	43.44	22.21	118	261.69	87.32	1129.46	
27-May-11 16:49:00	77.91	43.46	22.13	118	261.74	87.30	1117.30	
27-May-11 16:50:00	78.08	43.47	21.98	119	261.48	87.41	1133.00	
27-May-11 16:51:00	78.31	43.51	21.96	118	260.15	87.86	1129.63	
27-May-11 16:52:00	78.35	43.49	22.02	118	260.49	87.92	1137.90	
27-May-11 16:53:00	78.19	43.43	22.08	118	261.26	87.38	1142.96	
27-May-11 16:54:00	77.98	43.42	22.12	118	261.22	87.30	1144.33	
27-May-11 16:55:00	77.92	43.43	22.00	118	260.44	87.84	1143.09	
27-May-11 16:56:00	78.11	43.48	21.93	118	261.22	87.83	1141.37	
27-May-11 16:57:00	78.18	43.42	21.99	118	260.60	87.89	1139.91	
27-May-11 16:58:00	78.16	43.53	22.11	118	261.22	87.63	1142.50	
27-May-11 16:59:00	78.10	43.52	22.07	118	263.06	86.95	1141.95	
27-May-11 17:00:00	78.20	43.43	22.02	118	263.04	86.94	1129.84	
27-May-11 17:01:00	78.38	43.45	21.94	119	261.20	87.80	1115.39	
27-May-11 17:02:00	78.22	43.44	22.00	119	259.97	88.07	1127.33	
27-May-11 17:03:00	78.11	43.48	22.16	118	259.98	87.91	1129.14	
27-May-11 17:04:00	78.15	43.52	22.07	118	260.68	87.88	1140.22	
27-May-11 17:05:00	78.12	43.56	22.11	118	261.31	87.60	1141.50	
27-May-11 17:06:00	78.21	43.49	21.93	119	258.98	88.58	1140.20	
27-May-11 17:07:00	78.35	43.46	22.02	119	260.23	87.72	1138.59	
27-May-11 17:08:00	78.30	43.39	22.17	119	261.89	87.49	1138.44	
27-May-11 17:09:00	78.18	43.41	22.10	118	261.47	87.99	1140.38	
27-May-11 17:10:00	78.20	43.38	21.85	118	260.81	88.08	1139.69	
27-May-11 17:11:00	78.15	43.33	21.89	118	259.98	88.40	1137.33	
27-May-11 17:12:00	78.02	43.39	21.98	118	259.53	88.50	1138.01	
27-May-11 17:13:00	78.07	43.41	21.87	118	259.64	88.10	1138.11	
27-May-11 17:14:00	78.13	43.34	22.11	119	260.23	88.03	1130.78	
27-May-11 17:15:00	78.20	43.37	22.09	119	259.57	88.17	1126.34	
27-May-11 17:16:00	78.19	43.41	21.94	119	259.98	88.42	1133.33	
27-May-11 17:17:00	78.22	43.29	22.01	119	260.50	88.21	1135.27	
27-May-11 17:18:00	78.14	43.29	22.16	119	260.80	87.99	1137.29	
27-May-11 17:19:00	77.95	43.30	22.01	119	260.09	88.28	1139.07	
27-May-11 17:20:00	78.14	43.22	22.05	119	260.64	87.86	1138.17	
27-May-11 17:21:00	78.11	43.17	22.23	118	260.65	87.76	1136.40	
27-May-11 17:22:00	77.98	43.18	22.24	119	260.30	87.92	1137.29	
27-May-11 17:23:00	78.02	43.12	22.00	119	259.39	88.42	1137.32	
27-May-11 17:24:00	78.13	43.05	22.02	119	260.04	88.46	1137.75	
27-May-11 17:25:00	78.00	43.06	22.08	118	258.51	88.81	1135.59	
27-May-11 17:26:00	77.98	42.94	22.11	118	258.43	88.21	1128.59	
27-May-11 17:27:00	77.97	42.97	21.97	118	256.58	88.88	1122.80	

#2 Stand Pipe Aeration Air to Regen (lbs/min) 317E1106	Air to Regen Temp B-1 Outlet (oF) 317T11112	Tempered Air Temp (oF) 317T11120	Ambient Air Temp (oF) DWS AT	Air to Regen Pressure Blower Discharge (psig) 317PC039	Plant Air to 45lb Air (psig) 317PC088	CO2 (WGS CEMS) (% by vol. dry) 317A109	CO (WGS CEMS) (ppmv, dry) 317A111
Run 3							
27-May-11 16:38:00	1153.10	207.67	86.66	15.38	78.99	17.04	49.43
27-May-11 16:39:00	1157.48	207.80	86.75	15.37	78.74	17.08	71.13
27-May-11 16:40:00	1165.79	207.94	86.62	15.35	79.57	17.18	102.27
27-May-11 16:41:00	1168.19	207.76	86.49	15.35	80.00	17.10	75.94
27-May-11 16:42:00	1168.49	207.58	86.40	15.38	80.06	17.05	57.13
27-May-11 16:43:00	1169.65	207.37	86.42	15.39	80.18	17.03	51.78
27-May-11 16:44:00	1169.18	207.22	86.51	15.35	80.35	17.01	47.56
27-May-11 16:45:00	1166.28	207.04	86.68	15.36	80.10	16.99	46.50
27-May-11 16:46:00	1165.81	207.03	86.82	15.35	79.79	16.97	44.73
27-May-11 16:47:00	1163.22	207.13	86.85	15.37	79.45	17.00	46.04
27-May-11 16:48:00	1159.23	206.96	86.90	15.31	79.27	16.97	43.57
27-May-11 16:49:00	1155.96	206.87	86.92	15.34	79.33	16.96	42.87
27-May-11 16:50:00	1157.40	206.60	86.92	15.35	78.88	16.94	41.67
27-May-11 16:51:00	1151.50	206.43	86.72	15.33	78.08	17.01	56.11
27-May-11 16:52:00	1159.00	206.40	86.52	15.33	78.74	17.13	82.08
27-May-11 16:53:00	1164.53	206.17	86.34	15.27	79.33	17.06	72.48
27-May-11 16:54:00	1167.24	205.91	86.23	15.29	79.72	16.97	51.43
27-May-11 16:55:00	1166.11	205.64	86.20	15.34	79.72	16.93	45.83
27-May-11 16:56:00	1164.11	205.40	86.20	15.37	79.54	16.93	43.79
27-May-11 16:57:00	1162.90	205.12	86.20	15.35	79.32	16.91	42.72
27-May-11 16:58:00	1164.16	205.17	86.13	15.33	79.25	16.89	41.79
27-May-11 16:59:00	1164.54	205.05	86.03	15.31	79.36	16.92	42.18
27-May-11 17:00:00	1160.15	204.72	86.02	15.31	79.20	16.93	42.22
27-May-11 17:01:00	1155.43	204.69	86.11	15.36	78.88	16.90	42.11
27-May-11 17:02:00	1153.36	204.51	86.26	15.37	78.29	16.83	40.79
27-May-11 17:03:00	1149.88	204.47	86.30	15.33	77.66	16.36	57.17
27-May-11 17:04:00	1160.35	204.50	86.22	15.33	78.70	16.13	79.77
27-May-11 17:05:00	1163.43	204.65	86.08	15.32	79.29	17.00	66.33
27-May-11 17:06:00	1162.52	204.63	85.92	15.38	79.29	16.95	52.23
27-May-11 17:07:00	1161.13	204.70	85.79	15.27	79.19	16.90	46.49
27-May-11 17:08:00	1161.81	204.88	85.70	15.31	79.22	16.96	48.71
27-May-11 17:09:00	1162.29	205.17	85.72	15.36	79.39	16.97	46.76
27-May-11 17:10:00	1161.67	205.19	85.86	15.33	79.27	16.93	43.42
27-May-11 17:11:00	1159.75	205.26	85.97	15.36	78.99	16.94	44.17
27-May-11 17:12:00	1159.14	205.31	85.94	15.38	78.79	16.96	45.56
27-May-11 17:13:00	1159.61	205.32	85.84	15.33	78.84	16.99	47.47
27-May-11 17:14:00	1155.25	204.91	85.72	15.35	78.44	17.00	48.51
27-May-11 17:15:00	1147.35	204.52	85.58	15.33	77.61	17.06	78.07
27-May-11 17:16:00	1154.59	204.67	85.42	15.36	78.12	17.21	142.62
27-May-11 17:17:00	1157.40	204.61	85.24	15.33	78.48	17.21	131.93
27-May-11 17:18:00	1158.82	204.43	85.13	15.34	78.63	17.12	75.49
27-May-11 17:19:00	1161.69	204.33	85.03	15.36	78.96	17.09	66.34
27-May-11 17:20:00	1160.02	204.00	85.00	15.37	78.95	17.09	61.82
27-May-11 17:21:00	1158.64	203.74	84.98	15.33	78.84	17.08	59.99
27-May-11 17:22:00	1158.51	203.77	84.97	15.34	78.71	17.08	58.10
27-May-11 17:23:00	1158.77	203.85	85.00	15.35	78.67	17.09	57.50
27-May-11 17:24:00	1159.55	203.77	85.00	15.36	78.80	17.09	59.85
27-May-11 17:25:00	1156.96	203.68	85.00	15.36	78.62	17.12	65.31
27-May-11 17:26:00	1151.26	203.67	85.00	15.32	77.88	17.10	68.42
27-May-11 17:27:00	1143.97	203.77	85.00	15.35	77.05	17.20	109.67

O ₂ (WGS CEMS) (% by vol, dry) 317A1107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Q _a 317C_dvair	Vol Reg FG (dscfm) - Q _r 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3						
27-May-11 16:38:00	365.88	80133.25	76791.60	26383.86	52042.35	176.59
27-May-11 16:39:00	365.19	80182.99	77002.03	26401.05	51998.19	176.49
27-May-11 16:40:00	366.13	80030.89	77071.32	26612.45	51875.88	176.00
27-May-11 16:41:00	366.36	80238.00	76919.45	26522.87	51787.08	176.23
27-May-11 16:42:00	365.82	80287.45	77072.50	26397.83	51778.03	176.37
27-May-11 16:43:00	366.83	80170.72	77141.21	26469.43	51792.16	176.00
27-May-11 16:44:00	366.93	80391.53	76957.40	26433.89	51801.28	176.83
27-May-11 16:45:00	366.18	80411.85	77197.69	26336.39	51815.45	175.99
27-May-11 16:46:00	365.84	80248.98	77281.41	26284.16	51822.54	175.90
27-May-11 16:47:00	366.74	80174.54	77120.10	26365.84	51939.45	176.30
27-May-11 16:48:00	367.56	80372.12	77115.61	26404.47	52090.12	176.46
27-May-11 16:49:00	367.51	80550.52	77247.36	26411.21	52015.53	176.33
27-May-11 16:50:00	367.81	80539.21	77312.09	26407.33	51964.85	175.96
27-May-11 16:51:00	367.62	80606.15	77320.59	26448.60	52002.53	175.67
27-May-11 16:52:00	366.83	80564.39	77536.01	26572.10	51920.75	175.24
27-May-11 16:53:00	367.14	80391.27	77449.12	26558.08	51867.15	175.53
27-May-11 16:54:00	367.16	80458.60	77122.44	26412.12	52025.18	176.66
27-May-11 16:55:00	367.19	80463.32	77212.83	26329.60	52130.87	176.47
27-May-11 16:56:00	367.51	80470.34	77336.82	26309.37	52122.00	175.95
27-May-11 16:57:00	368.36	80539.56	77462.49	26364.84	52113.63	175.72
27-May-11 16:58:00	367.65	80725.59	77434.55	26310.36	52120.83	175.47
27-May-11 16:59:00	367.97	80571.75	77536.53	26349.55	52134.97	175.21
27-May-11 17:00:00	369.00	80640.78	77473.39	26433.60	52144.69	175.71
27-May-11 17:01:00	368.98	80866.81	77544.91	26421.87	52276.72	175.37
27-May-11 17:02:00	368.18	80862.98	77649.24	26288.84	52361.36	175.22
27-May-11 17:03:00	367.21	80887.41	77593.26	25108.52	52345.43	175.28
27-May-11 17:04:00	366.96	80474.21	79060.21	24441.44	52214.38	173.06
27-May-11 17:05:00	367.63	80419.61	79435.59	26506.36	52129.35	169.96
27-May-11 17:06:00	368.04	80567.31	77111.61	26467.74	52279.95	176.02
27-May-11 17:07:00	366.79	80656.53	77273.76	26263.51	52400.09	176.03
27-May-11 17:08:00	366.76	80381.85	77490.11	26343.51	52467.39	175.76
27-May-11 17:09:00	368.48	80375.10	77194.75	26515.23	52547.60	176.22
27-May-11 17:10:00	368.68	80751.72	77092.65	26431.64	52586.04	176.90
27-May-11 17:11:00	367.91	80796.79	77621.44	26371.39	52513.99	175.96
27-May-11 17:12:00	367.67	80627.32	77693.18	26413.47	52444.11	175.39
27-May-11 17:13:00	367.18	80574.50	77450.61	26426.34	52456.79	175.77
27-May-11 17:14:00	366.84	80467.99	77356.62	26453.73	52483.43	176.36
27-May-11 17:15:00	367.30	80392.84	77168.07	26544.96	52493.53	176.51
27-May-11 17:16:00	366.85	80493.14	77230.38	26702.11	52506.76	176.46
27-May-11 17:17:00	367.61	80395.86	77368.23	26822.05	52554.63	176.24
27-May-11 17:18:00	367.80	80561.99	77087.18	26687.66	52616.09	177.23
27-May-11 17:19:00	367.93	80603.78	77308.44	26635.39	52619.26	176.76
27-May-11 17:20:00	367.82	80631.06	77389.47	26639.90	52627.82	176.79
27-May-11 17:21:00	367.90	80608.56	77346.29	26648.32	52620.33	176.98
27-May-11 17:22:00	367.70	80625.36	77311.94	26590.56	52535.25	177.32
27-May-11 17:23:00	367.45	80582.62	77441.27	26577.14	52566.78	177.03
27-May-11 17:24:00	367.29	80527.76	77420.97	26560.65	52757.98	177.46
27-May-11 17:25:00	367.95	80492.46	77385.07	26679.89	52812.28	177.30
27-May-11 17:26:00	366.70	80635.72	77248.64	26574.87	52800.65	178.43
27-May-11 17:27:00	365.61	80363.27	77376.42	26587.75	52791.35	177.88

Run 3								
Scrubbing Liquid Upper Circulation (psig) 317P1105B	Pump Pressure Lower Circulation (psig) 317P1108	Agglo-Filtering Module (AFM) and Cyclolabs Pressure (in. H2O) 317P1177A	Stripped Sour Water Makeup (gpm) 317FC202	Carrying Air Air to Regen (M lbs/hr) 317FC115	Air to Rings Air to Regen (M lbs/hr) 317F1113	#1 Stand Pipe Aeration Air to Regen (lbs/min) 317F1105		
27-May-11 17:28:00	78.16	42.99	22.06	118	260.04	88.22	1131.22	
27-May-11 17:29:00	77.99	43.01	21.92	119	261.27	88.03	1136.33	
27-May-11 17:30:00	77.68	42.98	22.15	119	260.79	88.03	1136.12	
27-May-11 17:31:00	77.95	42.94	21.93	119	260.53	88.25	1135.71	
27-May-11 17:32:00	78.03	42.88	21.84	118	258.31	88.84	1137.71	
27-May-11 17:33:00	78.03	42.83	21.90	118	257.12	89.05	1145.09	
27-May-11 17:34:00	78.32	42.85	22.21	118	260.43	87.84	1151.49	
27-May-11 17:35:00	78.24	42.88	22.08	119	259.36	88.24	1153.10	
27-May-11 17:36:00	78.13	42.80	22.03	118	259.73	87.93	1149.32	
27-May-11 17:37:00	78.06	42.83	22.07	118	259.31	87.78	1139.83	
27-May-11 17:38:00	78.10	42.89	21.89	118	257.23	88.61	1134.30	
27-May-11 17:39:00	78.12	42.87	22.04	119	258.72	88.01	1136.91	
27-May-11 17:40:00	78.07	42.83	22.06	119	258.94	88.05	1142.71	
27-May-11 17:41:00	78.21	42.81	21.91	118	257.16	88.84	1146.22	
27-May-11 17:42:00	78.11	42.74	21.81	118	259.00	88.18	1146.78	
27-May-11 17:43:00	78.16	42.87	21.98	118	259.99	88.01	1146.43	
27-May-11 17:44:00	78.27	42.87	21.75	118	257.95	88.87	1145.37	
27-May-11 17:45:00	78.26	42.79	21.72	118	257.63	88.92	1142.39	
27-May-11 17:46:00	78.10	42.79	21.80	119	258.31	88.61	1141.61	
27-May-11 17:47:00	78.10	42.72	21.73	119	258.27	88.57	1140.92	
27-May-11 17:48:00	78.01	42.73	21.94	119	259.04	88.01	1143.55	
27-May-11 17:49:00	77.93	42.77	22.03	118	261.44	87.26	1147.72	
27-May-11 17:50:00	77.99	42.84	22.16	118	260.60	87.41	1142.96	
27-May-11 17:51:00	78.03	42.76	22.18	119	259.50	87.69	1135.55	
27-May-11 17:52:00	78.12	42.76	22.04	119	259.93	87.51	1144.35	
27-May-11 17:53:00	78.09	42.77	21.95	119	260.29	87.45	1148.69	
27-May-11 17:54:00	78.18	42.70	22.18	119	259.07	87.78	1147.52	
27-May-11 17:55:00	78.03	42.67	22.10	119	258.65	88.28	1144.21	
27-May-11 17:56:00	78.08	42.66	22.01	119	259.61	88.31	1143.35	
27-May-11 17:57:00	78.03	42.69	22.03	118	259.83	88.17	1143.99	
27-May-11 17:58:00	78.25	42.69	22.07	118	260.90	87.87	1146.04	
27-May-11 17:59:00	77.99	42.64	22.07	118	260.64	88.06	1147.38	

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	O2 (WGS CEMS) (% by vol, dry) 317AI107	Total Corrected Air (M lb/hr) 317C_Tot_Corr_Air	Volume Air to Reg (dscfm) - Qa 317C_dryair	Vol Reg FG (dscfm) - Qr 317C_fluegas	EPA Coke Make (lbs/hr) Rc	Cat Feed Rate (BPD) 317C_B Cat_Feed	L/G Ratio (gal/MSCF) 317C_WGS_L_G_RATIO
Run 3							
27-May-11 17:28:00	0.47	364.76	80124.55	77286.58	26697.95	52793.53	177.99
27-May-11 17:29:00	0.22	367.55	79937.08	76979.11	26994.23	52772.70	178.31
27-May-11 17:30:00	0.32	368.58	80549.54	76581.08	26897.96	52634.88	180.05
27-May-11 17:31:00	0.42	367.87	80774.58	77165.02	26775.68	52568.01	178.83
27-May-11 17:32:00	0.49	367.81	80619.91	77435.98	26746.90	52543.37	177.86
27-May-11 17:33:00	0.63	366.15	80605.65	77370.80	26566.47	52569.39	178.11
27-May-11 17:34:00	0.51	365.51	80242.59	77449.10	26585.97	52605.81	177.99
27-May-11 17:35:00	0.46	367.41	80102.39	77008.95	26770.52	52592.68	178.71
27-May-11 17:36:00	0.47	367.05	80518.64	76858.35	26686.40	52639.71	179.99
27-May-11 17:37:00	0.48	366.99	80439.30	77224.77	26711.31	52669.24	178.87
27-May-11 17:38:00	0.55	366.40	80425.66	77194.43	26662.57	52764.95	178.68
27-May-11 17:39:00	0.48	365.40	80296.66	77238.34	26681.04	52850.07	178.56
27-May-11 17:40:00	0.39	366.01	80078.45	77128.48	26928.77	52816.40	178.99
27-May-11 17:41:00	0.33	366.41	80210.28	76951.19	26858.64	52735.89	179.31
27-May-11 17:42:00	0.44	365.53	80298.88	76941.72	26668.15	52663.02	179.97
27-May-11 17:43:00	0.43	366.65	80105.43	77063.01	26779.47	52602.08	179.01
27-May-11 17:44:00	0.45	367.61	80352.33	76879.19	26794.95	52520.76	179.30
27-May-11 17:45:00	0.56	366.55	80561.08	77108.14	26658.71	52558.23	179.39
27-May-11 17:46:00	0.45	366.10	80328.87	77383.06	26728.46	52474.74	178.59
27-May-11 17:47:00	0.36	366.49	80232.02	77104.89	26777.54	52443.19	179.50
27-May-11 17:48:00	0.42	366.34	80316.95	76926.26	26725.22	52568.28	180.00
27-May-11 17:49:00	0.46	366.49	80282.78	77051.40	26734.69	52598.36	179.80
27-May-11 17:50:00	0.41	368.26	80316.77	77046.61	26860.64	52613.50	179.15
27-May-11 17:51:00	0.52	367.71	80703.98	77032.70	26807.65	52639.76	179.91
27-May-11 17:52:00	0.36	366.71	80583.46	77525.42	26942.96	52641.29	178.64
27-May-11 17:53:00	0.23	366.92	80365.80	77370.60	26976.53	52639.90	178.65
27-May-11 17:54:00	0.43	367.36	80411.36	77041.97	26797.16	52641.30	179.79
27-May-11 17:55:00	0.46	366.38	80506.12	77146.65	26678.84	52460.89	179.85
27-May-11 17:56:00	0.48	366.67	80292.25	77238.00	26677.19	52336.47	179.59
27-May-11 17:57:00	0.58	367.60	80355.20	77039.32	26723.42	52421.96	179.90
27-May-11 17:58:00	0.66	367.66	80560.57	77208.13	26706.21	52497.94	179.71
27-May-11 17:59:00	0.58	368.47	80572.56	77460.40	26752.74	52550.22	179.17
	0.56	365.78	80156.04	76969.80	26585.07	52355.72	178.46

Appendix F

Test Equipment Calibrations

**APEX INSTRUMENTS METHOD 5 CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
5-POINT ENGLISH UNITS**

Factors/Conversions	
Std Temp	528 °R
Std Press	29.92 in Hg
K ₁	17.647 oR/in Hg

¹For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

²The Critical Orifice Coefficient, K' , must be entered in English units, $(t^{3.0} R^{1/2})/(\text{in. Hg}^{\circ}\text{min})$.

Calibration Data											
Run Time		Metering Console					Critical Orifice				
Elapsed		DGM Orifice ΔH	Volume Initial (V_{mi})	Volume Final (V_{mf})	Outlet Temp Initial (t_{mi})	Outlet Temp Final (t_{mf})	Serial Number	Coefficient	Amb Temp Initial (t_{amb})	Amb Temp Final (t_{amb})	Actual Vacuum
(e)		(P_m)	(V_{mi})	(V_{mf})	(t_{mi})	(t_{mf})		K'	(t_{amb})	(t_{amb})	
min		in H ₂ O	cubic feet	cubic feet	$^{\circ}\text{F}$	$^{\circ}\text{F}$		see above2	$^{\circ}\text{F}$	$^{\circ}\text{F}$	in Hg
10.0		0.31	953.924	956.888	66	68	TE-40	0.2280	67.0	68.0	23.8
10.0		0.63	956.888	961.179	68	69	TE-48	0.3294	68.0	70.0	22.5
10.0		1.10	961.179	966.716	69	70	TE-55	0.4253	70.0	71.0	21.5
10.0		2.00	966.716	974.372	70	71	TE-63	0.5955	71.0	71.0	19.8
10.0		3.40	974.372	984.451	71	73	TE-73	0.7718	71.0	72.0	17.5

Results									
Standardized Data					Dry Gas Meter				
Dry Gas Meter		Critical Orifice		Calibration Factor		Flowrate		ΔH @	
$(V_{m(isd)})$	$(Q_{m(isd)})$	$(V_{or(isd)})$	$(Q_{cr(isd)})$	Value	Variation	Std & Corr	0.75 SCFM	ΔH @	Variation
cubic feet	cfm	cubic feet	cfm	(Y)	(ΔY)	$(Q_{m(std,corr)})$	in H2O	(ΔH@)	(ΔΔH@)
2.984	0.298	2.982	0.298	0.999	0.003	0.298	1.977	0.017	
4.311	0.431	4.302	0.430	0.998	0.002	0.430	1.928	-0.032	
5.558	0.556	5.547	0.555	0.998	0.002	0.555	2.026	0.066	
7.688	0.769	7.633	0.763	0.993	-0.003	0.763	1.950	-0.009	
10.127	1.013	10.057	1.006	0.993	-0.003	1.006	1.917	-0.042	
				0.996	Y Average			1.960	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ± 0.02 .

certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature _____ Share Vincent
Date: 02/23/2011

Meter Console Information	
Console Model Number	XC-522
Console Serial Number	809033
DGM Model Number	S-110
DGM Serial Number	SN320508

²The Critical Orifice Coefficient, K' , must be entered in English units, $(ft^{3,0}R^{1/2})/(in.Hg^*min)$.

Results									
Standardized Data				Dry Gas Meter					
Dry Gas Meter		Critical Orifice		Calibration Factor		Flowrate		ΔH @	
(V_{mist})	(Q_{mist})	$(V_{c'_{(gas)}}$	$(Q_{c'_{(std)}}$	Value (Y)	Variation (ΔY)	Std & Corr ($Q_{mist}/corr$)	0.75 SCFM ($\Delta H@$)	0.75 SCFM ($\Delta H@$)	Variation ($\Delta \Delta H@$)
cubic feet	cfm	cubic feet	cfm			cfm	in H2O		
2.920	0.292	2.900	0.290	0.993	0.000	0.290	2.099		0.068
4.224	0.422	4.192	0.419	0.992	-0.001	0.419	2.010		-0.022
5.449	0.545	5.424	0.542	0.995	0.002	0.542	2.024		-0.007
7.609	0.761	7.461	0.746	0.981	-0.012	0.746	2.047		0.016
9.785	0.978	9.821	0.982	1.004	0.011	0.982	1.977		-0.054
				0.993	Y Average		2.032		$\Delta H@$ Average

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Date: 06/07/2011

Thermocouple Verification Form

Using Electronic Temperature Source

Source I.D.: LA-SI01

Date: 11/17/2010

Box I.D.: LA-A02 Pass

Technician: Henry Walton

32 Degrees			
TC1	30	31	31
TC2	30	31	31
TC3	30	31	31
TC4	30	31	31
TC5	30	31	31

Average
30.6667
30.6667
30.6667
30.6667
30.6667

Percent Error	
0.27118	Pass
0.27118	Pass
0.27118	Pass
0.27118	Pass
0.27118	Pass

400 Degrees			
TC1	397	398	398
TC2	397	398	398
TC3	397	398	398
TC4	397	398	398
TC5	397	398	398

Average
397.667
397.667
397.667
397.667
397.667

Percent Error	
0.27142	Pass
0.27142	Pass
0.27142	Pass
0.27142	Pass
0.27142	Pass

800 Degrees			
TC1	799	799	799
TC2	799	799	799
TC3	799	799	799
TC4	798	799	799
TC5	798	799	799

Average
799
799
799
798.667
798.667

Percent Error	
0.07939	Pass
0.07939	Pass
0.07939	Pass
0.10585	Pass
0.10585	Pass

1600 Degrees			
TC1	1599	1598	1599
TC2	1599	1599	1599
TC3	1598	1599	1599
TC4	1598	1598	1598
TC5	1599	1599	1599

Average
1598.67
1599
1598.67
1598
1599

Percent Error	
0.06474	Pass
0.04855	Pass
0.06474	Pass
0.0971	Pass
0.04855	Pass

Tolerance must be within 1.5%

Technician Signature:

**APEX INSTRUMENTS METHOD 5 CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
5-POINT ENGLISH UNITS**

Factors/Conversions	
Std Temp	528 °R
Std Press	29.92 in Hg
K ₁	17.647 oR/in Hg

¹For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

²The Critical Orifice Coefficient, K' , must be entered in English units, $(ft^{3.0}R^{1/2})/(in.Hg^*min)$.

Run Time		Calibration Data								
		Metering Console			Critical Orifice					
Elapsed (e)	DGM Orifice ΔH (P _m)	Volume Initial (V _{mi})	Volume Final (V _{mf})	Outlet Temp Initial (t _{mi})	Outlet Temp Final (t _{mf})	Serial Number	Coefficient	Amb Temp Initial (t _{amb})	Amb Temp Final (t _{amb})	Actual Vacuum
min	in H ₂ O	cubic feet	cubic feet	°F	°F		K'		°F	in Hg
10.0	0.34	198.837	201.762	60	60	TE-40	0.2280	60.0	60.0	23.5
10.0	0.70	201.762	205.987	61	61	TE-48	0.3294	60.0	61.0	22.5
10.0	1.10	205.987	211.458	61	62	TE-55	0.4253	61.0	61.0	21.5
10.0	2.10	211.458	219.018	62	63	TE-63	0.5855	61.0	61.0	19.5
10.0	3.50	219.018	229.013	63	65	TE-73	0.7718	61.0	61.0	17.3

Results									
Standardized Data					Dry Gas Meter				
Dry Gas Meter			Critical Orifice		Calibration Factor		Flowrate		ΔH @
$(V_{m(gas)})$	$(Q_{m(gas)})$		$(V_{Cf(gas)})$	$(Q_{Cf(gas)})$	Value (Y)	Variation (ΔY)	Std & Corr ($Q_{m(std)corr}$)	0.75 SCFM (ΔH @)	
cubic feet	cfm		cubic feet	cfm			cfm	in H ₂ O	ΔH @ (ΔΔH @)
2.980	0.298		3.000	0.300	1.006	0.004	0.300	2.169	0.100
4.301	0.430		4.331	0.433	1.007	0.005	0.433	2.142	0.073
5.569	0.557		5.590	0.559	1.004	0.001	0.559	2.023	-0.046
7.699	0.770		7.695	0.770	0.999	-0.003	0.770	2.044	-0.025
10.185	1.018		10.144	1.014	0.996	-0.007	1.014	1.968	-0.101
					1.003	Y Average		2.069	ΔH @ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ± 0.02 .

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature _____ Shane Vincent

Date: 02/23/2011

**APEX INSTRUMENTS METHOD 5 CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
5-POINT ENGLISH UNITS**

Factors/Conversions	
Std Temp	528 °R
Std Press	29.92 in Hg
K ₁	17.647 oR/in Hg

¹For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

²The Critical Orifice Coefficient, K' , must be entered in English units, $(ft^{3.0}R^{1/2})/(in.Hg^*min)$.

Calibration Data										
Run Time	Metering Console					Critical Orifice				
Elapsed (e) min	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial (t_{amb})	Amb Temp Final (t_{amb}) °F	Actual Vacuum in Hg
	(P _m)	(V _{mi})	(V _{mf})	(t _{mi})	(t _{mf})					
	in H ₂ O	cubic feet	cubic feet	°F	°F					
10.0	0.33	835.033	838.104	93	91	TE-40	0.2280	91.2	88.2	22.5
10.0	0.66	838.104	842.528	91	90	TE-48	0.3294	88.2	86.2	20.5
10.0	1.10	842.528	848.214	90	88	TE-55	0.4253	86.2	85.1	19.5
10.0	2.10	848.214	856.154	88	87	TE-63	0.5855	85.1	85.3	17.0
10.0	3.40	856.154	866.334	87	88	TE-73	0.7718	85.3	86.2	14.5

Results									
Standardized Data					Dry Gas Meter				
Dry Gas Meter		Critical Orifice		Calibration Factor	Flowrate	ΔH @		Variation	ΔH@
(V _{measured})	(Q _{measured})	(V _{critical})	(Q _{critical})			Value	Std & Corr		
cubic feet	cfm	cubic feet	cfm	(Y)	(Q _{measured}) cfm	(ΔH@) in H2O	(ΔΔH@)		
2.930	0.293	2.900	0.290	0.990	0.290	2.109	0.082		
4.236	0.424	4.199	0.420	0.991	0.420	2.021	-0.006		
5.465	0.547	5.429	0.543	0.993	0.543	2.025	-0.003		
7.671	0.767	7.478	0.748	0.975	0.748	2.053	0.026		
9.867	0.987	9.852	0.985	0.998	0.985	1.927	-0.100		
				0.990	Y Average	2.027	ΔH@ Average		

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is ± 0.02 .

certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Date: 02/23/2011

Thermocouple Verification Form

Using Electronic Temperature Source

Source I.D.: LA-SI01

Date: 11/17/2010

Box I.D.: LA-A03 Pass

Technician: Henry Walton

32 Degrees			
TC1	29	29	29
TC2	29	29	29
TC3	29	29	29
TC4	29	29	29
TC5	29	29	29
TC6	29	29	29

Average
29
29
29
29
29
29

Percent Error	
0.61017	Pass
0.61017	Pass
0.61017	Pass
0.61017	Pass
0.61017	Pass
0.61017	Pass

400 Degrees			
TC1	396	396	396
TC2	396	396	396
TC3	397	395	396
TC4	395	396	396
TC5	396	396	395
TC6	395	396	395

Average
396
396
396
395.667
395.667
395.333

Percent Error	
0.46529	Pass
0.46529	Pass
0.46529	Pass
0.50407	Pass
0.50407	Pass
0.54284	Pass

800 Degrees			
TC1	797	797	797
TC2	797	797	797
TC3	797	798	798
TC4	797	797	798
TC5	797	797	797
TC6	797	797	797

Average
797
797
797.667
797.333
797
797

Percent Error	
0.23816	Pass
0.23816	Pass
0.18523	Pass
0.2117	Pass
0.23816	Pass
0.23816	Pass

1600 Degrees			
TC1	1597	1597	1597
TC2	1597	1597	1597
TC3	1598	1599	1598
TC4	1596	1599	1596
TC5	1597	1598	1597
TC6	1597	1597	1596

Average
1597
1597
1598.33
1597
1597.33
1596.67

Percent Error	
0.14565	Pass
0.14565	Pass
0.08092	Pass
0.14565	Pass
0.12947	Pass
0.16184	Pass

Tolerance must be within 1.5%

Date: 11/03+A1/2010
USING CALIBRATED CRITICAL ORIFICES
5-POINT ENGLISH UNITS

Meter Console Information			Calibration Conditions			Factors/Conversions	
Console Model Number	XC-522		Date	Time	03/14/11	11:00	
Console Serial Number	904018		Barometric Pressure	29.83		in Hg	°R
DGM Model Number	S-110		Theoretical Critical Vacuum ¹	14.1		in Hg	in Hg
DGM Serial Number	SN953379		Calibration Technician	KC		LA-A04	K ₁

¹For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

²The Critical Orifice Coefficient, K', must be entered in English units, (ft³•°R^{1/2})/(in.Hg•min).

Calibration Data									
Metering Console					Critical Orifice				
Run Time	Elapsed (θ)	DGM Orifice ΔH (P _m)	Volume Initial (V _{mi})	Volume Final (V _{mf})	Outlet Temp Initial (t _{mi})	Outlet Temp Final (t _{mf})	Serial Number	Coefficient	Amb Temp Initial (t _{amb})
	min	in H ₂ O	cubic feet	cubic feet	°F	°F		K'	°F
	10.0	0.33	942.695	945.594	70	71	TE-40	see above ²	69.0
	10.0	0.66	945.594	949.862	71	72	TE-48	0.2323	69.0
	10.0	1.10	949.862	955.398	72	74	TE-55	0.3349	70.0
	10.0	2.05	955.398	963.023	71	71	TE-63	0.4316	69.0
	10.0	3.45	963.023	973.024	71	73	TE-73	0.5938	70.0
								0.7821	69.0
									70.0
									12.0

Results									
Standardized Data					Dry Gas Meter				
Dry Gas Meter		Critical Orifice			Calibration Factor		Flowrate		
(V _{mi})	(Q _{mi})	(V _{cf})	(Q _{cf})	(Q _{scf})	Value (Y)	Variation (ΔY)	Std & Corr (Q _{scf/corr})	0.75 SCFM (ΔH@)	Variation (ΔΔH@)
cubic feet	cfm	cubic feet	cfm	cfm			cfm	in H ₂ O	
2.879	0.288	3.013	0.301	0.301	1.046	0.022	0.301	2.034	0.072
4.234	0.423	4.341	0.434	0.434	1.025	0.001	0.434	1.959	-0.003
5.482	0.548	5.595	0.560	0.560	1.021	-0.004	0.560	1.964	0.003
7.597	0.760	7.698	0.770	0.770	1.013	-0.011	0.770	1.950	-0.011
9.980	0.998	10.139	1.014	1.014	1.016	-0.008	1.014	1.901	-0.060
					1.024	Y Average		1.962	ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature _____ Kelly Campbell

Date: 03/14/2011

Date: 11/03+A1/2010
USING CALIBRATED CRITICAL ORIFICES
5-POINT ENGLISH UNITS

Meter Console Information			Calibration Conditions		Factors/Conversions	
Console Model Number	XC-522		Date	Time	Std Temp	°R
Console Serial Number	904018		Barometric Pressure	29.85	Std Press	in Hg
DGM Model Number	S-110		Theoretical Critical Vacuum ¹	14.1	K ₁	oR/in Hg
DGM Serial Number	SN953379		Calibration Technician	SV		

Metering Console			Calibration Data		Critical Orifice	
Run Time	DGM Orifice	Volume	Outlet Temp	Serial Number	Coefficient	Amb Temp
Elapsed	ΔH	Initial	Initial			Final
(θ)	(P _m)	(V _m)	(t _m)		K ¹	(t _{amb})
min	in H ₂ O	cubic feet	°F		see above ²	°F
10.0	0.33	668.298	73	TE-40	0.2280	73.0
10.0	0.66	671.274	74	TE-48	0.3294	74.0
10.0	1.10	675.569	75	TE-55	0.4253	74.0
10.0	2.10	681.112	76	TE-63	0.5855	75.0
10.0	3.45	688.774	78	TE-73	0.7718	76.0
		698.844	81			77.0
						15.3

¹For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

²The Critical Orifice Coefficient, K¹, must be entered in English units, (ft³·oR^{1/2})/(in·Hg^{1/2}·min).

Standardized Data				Results			
Dry Gas Meter		Critical Orifice		Calibration Factor		Dry Gas Meter	
(V _{meas})	(Q _{meas})	(V _{cor})	(Q _{cor})	Value	Variation	Flowrate	ΔH @
cubic feet	cfm	cubic feet	cfm	(Y)	(ΔY)	Std & Corr	Variation
						(Q _{meas/corr})	(ΔH@)
						cfm	in H ₂ O
2.941	0.294	2.948	0.295	1.002	0.000	0.295	2.114
4.240	0.424	4.255	0.425	1.004	0.001	0.425	2.029
5.467	0.547	5.491	0.549	1.004	0.002	0.549	2.031
7.555	0.755	7.553	0.755	1.000	-0.003	0.755	2.054
9.916	0.992	9.946	0.995	1.003	0.000	0.995	1.950
				1.003	Y Average		2.036
							ΔH@ Average

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature _____ Shane K. Vincent

Date: 06/07/2011

Thermocouple Verification Form

Using Electronic Temperature Source

Source I.D.: LA-SI01

Date: 3/14/2011

Box I.D.: LA-A04 Pass

Technician: Kelly Campbell

32 Degrees			
TC1	31	31	30
TC2	31	30	30
TC3	31	30	30
TC4	31	30	31
TC5	30	30	30
TC6	30	30	30

Average
30.6667
30.3333
30.3333
30.6667
30
30

Percent Error	
0.2712	Pass
0.339	Pass
0.339	Pass
0.2712	Pass
0.4068	Pass
0.4068	Pass

400 Degrees			
TC1	398	398	398
TC2	398	398	398
TC3	398	398	398
TC4	398	398	398
TC5	398	398	398
TC6	398	398	398

Average
398
398
398
398
398
398

Percent Error	
0.2326	Pass
0.2326	Pass
0.2326	Pass
0.2326	Pass
0.2326	Pass
0.2326	Pass

800 Degrees			
TC1	800	800	800
TC2	800	800	799
TC3	800	799	800
TC4	799	799	800
TC5	799	800	799
TC6	799	799	800

Average
800
799.667
799.667
799.333
799.333
799.333

Percent Error	
0	Pass
0.0265	Pass
0.0265	Pass
0.0529	Pass
0.0529	Pass
0.0529	Pass

1600 Degrees			
TC1	1600	1601	1600
TC2	1600	1600	1601
TC3	1601	1601	1601
TC4	1601	1600	1601
TC5	1600	1601	1600
TC6	1601	1601	1601

Average
1600.33
1600.33
1601
1600.67
1600.33
1601

Percent Error	
0.0162	Pass
0.0162	Pass
0.0486	Pass
0.0324	Pass
0.0162	Pass
0.0486	Pass

Tolerance must be within 1.5%



Calibration of Liter Meter using Wet Test Meter

Console I.D.:	LA-LM01
Console Serial #:	40520
Wet Test Meter I.D.:	LA-AL17
Wet Test Meter Serial #:	14AN1

Date:	1/7/2011
Technician:	KC
Barometric Pressure:	30.26
Temperature:	73

Data Input									
Pressure (H ₂ O)	Wet Test Meter				Dry Gas Meter				
	WTM Initial Volume	WTM Final Volume	Initial Temp	Final Temp	DGM Initial Volume	DGM Final Volume	Initial Temp	Final Temp	
127	0.000	6.351	76	76	0.000	6.167	76	76	
101.6	0.000	5.200	76	76	0.000	5.049	76	76	
76.2	0.000	5.510	76	76	0.000	5.380	76	77	
127	0.000	6.240	76	76	0.000	6.086	77	77	
101.6	0.000	6.800	76	76	0.000	6.587	77	78	
76.2	0.000	5.280	76	76	0.000	5.091	77	78	

Results									
Wet Test Meter				Dry Gas Meter				Y Values	
Temperatures To °C		Average Temp	Volume	Temperatures To °C		Average Temp	Volume	Values	Variation
Initial	Final			Initial	Final				
24.44	24.44	24.44	6.351	24.44	24.44	24.44	6.167	1.017	0.004
24.44	24.44	24.44	5.200	24.44	24.44	24.44	5.049	1.020	0.001
24.44	24.44	24.44	5.510	24.44	25.00	24.72	5.380	1.018	0.004
24.44	24.44	24.44	6.240	25.00	25.00	25.00	6.086	1.015	0.006
24.44	24.44	24.44	6.800	25.00	25.56	25.28	6.587	1.025	-0.004
24.44	24.44	24.44	5.280	25.00	25.56	25.28	5.091	1.033	-0.011
								Y Value Average	
								1.021	
Box Pass or Fail:				Pass					

Technician Signature: _____



Calibration of Liter Meter using Wet Test Meter

Console I.D.:	LA-LM01
Console Serial #:	40520
Wet Test Meter I.D.:	LA-AL17
Wet Test Meter Serial #:	14AN1

Date:	7/6/2011
Technician:	SKV
Barometric Pressure:	29.93
Temperature:	76.3

Data Input									
Pressure (H ₂ O)	Wet Test Meter				Dry Gas Meter				
	WTM Initial Volume	WTM Final Volume	Initial Temp	Final Temp	DGM Initial Volume	DGM Final Volume	Initial Temp	Final Temp	
127	1.645	8.024	75	75	0.000	6.225	80	80	
76.2	8.774	14.179	75	75	0.000	5.220	80	81	
50.8	14.569	20.442	75	75	0.000	5.602	81	82	
127	21.065	27.327	75	75	0.000	6.105	82	83	
76.2	28.248	33.602	75	75	0.000	5.203	83	84	
50.8	3.979	9.964	75	75	0.000	5.737	84	84	

Results									
Wet Test Meter				Dry Gas Meter				Y Values	
Temperatures To °C		Average Temp	Volume	Temperatures To °C		Average Temp	Volume	Values	Variation
Initial	Final			Initial	Final				
23.89	23.89	23.89	6.379	26.67	26.67	26.67	6.225	1.022	0.018
23.89	23.89	23.89	5.405	26.67	27.22	26.94	5.220	1.038	0.001
23.89	23.89	23.89	5.873	27.22	27.78	27.50	5.602	1.056	-0.016
23.89	23.89	23.89	6.262	27.78	28.33	28.06	6.105	1.027	0.012
23.89	23.89	23.89	5.354	28.33	28.89	28.61	5.203	1.038	0.002
23.89	23.89	23.89	5.985	28.89	28.89	28.89	5.737	1.056	-0.016
								Y Value Average	
								1.040	

Box Pass or Fail:	Pass
-------------------	------

Technician Signature: _____

Thermocouple Verification Form

Using Electronic Temperature Source

Source I.D.: LA-TCS01

Date: 1/21/2010

Box I.D.: LA-LM01 Pass

Technician: Kelly Campbell

32 Degrees			
TC1	32	32	32
TC2	35	34	34
TC3	32	34	32
TC4	32	32	32
TC5	32	34	31
TC6	32	31	32

Average
32
34.3333
32.6667
32
32.3333
31.6667

Percent Error	
	Pass
0.47457	Pass
0.13559	Pass
	Pass
0.0678	Pass
0.0678	Pass

400 Degrees			
TC1	402	402	402
TC2	402	401	403
TC3	400	402	402
TC4	402	401	402
TC5	402	402	403
TC6	401	400	400

Average
402
402
401.333
401.667
402.333
400.333

Percent Error	
0.23265	Pass
0.23265	Pass
0.1551	Pass
0.19387	Pass
0.27142	Pass
0.03877	Pass

800 Degrees			
TC1	801	802	801
TC2	802	801	802
TC3	801	801	801
TC4	800	803	801
TC5	801	801	802
TC6	800	802	800

Average
801.333
801.667
801
801.333
801.333
800.667

Percent Error	
0.10585	Pass
0.13231	Pass
0.07939	Pass
0.10585	Pass
0.10585	Pass
0.05292	Pass

1600 Degrees			
TC1	1599	1598	1599
TC2	1598	1599	1598
TC3	1600	1600	1601
TC4	1599	1600	1599
TC5	1599	1599	1599
TC6	1600	1600	1598

Average
1598.67
1598.33
1600.33
1599.33
1599
1599.33

Percent Error	
0.06474	Pass
0.08092	Pass
0.01618	Pass
0.03237	Pass
0.04855	Pass
0.03237	Pass

Tolerance must be within 1.5%

Technician Signature:



Calibration of Liter Meter using Wet Test Meter

Console I.D.:	LA-LM02
Console Serial #:	0901002
Wet Test Meter I.D.:	LA-AL17
Wet Test Meter Serial #:	14AN1

Date:	1/13/2010
Technician:	JR
Barometric Pressure:	30.12
Temperature:	75

Data Input									
Pressure(H ₂ O)	Wet Test Meter				Dry Gas Meter				
	WTM Initial Volume	WTM Final Volume	Initial Temp	Final Temp	DGM Initial Volume	DGM Final Volume	Initial Temp	Final Temp	
80	21.365	31.080	76	76	0.000	9.894	75	75	
50	2.395	9.585	76	76	0.000	7.381	75	75	
20	9.940	16.215	76	76	0.000	6.444	75	75	
80	23.270	33.065	76	76	0.000	9.876	77	77	
50	4.625	11.765	76	76	0.000	7.261	77	77	
20	12.725	19.050	76	76	0.000	6.444	77	77	

Results									
Wet Test Meter				Dry Gas Meter				Y Values	
Temperatures To °C		Average Temp	Volume	Temperatures To °C		Average Temp	Volume	Values	Variation
				Initial	Final				
24.44	24.44	24.44	9.715	23.89	23.89	23.89	9.894	0.973	0.004
24.44	24.44	24.44	7.190	23.89	23.89	23.89	7.381	0.968	0.009
24.44	24.44	24.44	6.275	23.89	23.89	23.89	6.444	0.970	0.006
24.44	24.44	24.44	9.795	25.00	25.00	25.00	9.876	0.986	-0.010
24.44	24.44	24.44	7.140	25.00	25.00	25.00	7.261	0.980	-0.004
24.44	24.44	24.44	6.325	25.00	25.00	25.00	6.444	0.981	-0.005
Box Pass or Fail:								Y Value Average	
								0.976	

Box Pass or Fail: Pass

Technician Signature: _____



Calibration of Liter Meter using Wet Test Meter

Console I.D.:	LA-LM02
Console Serial #:	0901002
Wet Test Meter I.D.:	LA-AL17
Wet Test Meter Serial #:	14AN1

Date:	7/6/2011
Technician:	SKV
Barometric Pressure:	29.95
Temperature:	74.1

Data Input									
Pressure (H ₂ O)	Wet Test Meter				Dry Gas Meter				
	WTM Initial Volume	WTM Final Volume	Initial Temp	Final Temp	DGM Initial Volume	DGM Final Volume	Initial Temp	Final Temp	
80	1.285	10.943	75	75	0.000	9.778	75	76	
50	12.011	18.963	75	75	0.000	7.079	76	76	
20	19.501	25.326	75	75	0.000	5.931	76	76	
80	26.569	36.135	75	75	0.000	9.707	76	76	
50	6.926	13.912	75	75	0.000	7.151	76	76	
20	14.294	20.240	75	75	0.000	6.078	76	76	

Results									
Wet Test Meter				Dry Gas Meter					Y Values
Temperatures To °C		Volume	Temperatures To °C		Average Temp	Volume		Values	Variation
Initial	Final		Initial	Final					
23.89	23.89	9.658	23.89	24.44	24.17	9.778		0.981	-0.002
23.89	23.89	6.952	24.44	24.44	24.44	7.079		0.979	0.000
23.89	23.89	5.825	24.44	24.44	24.44	5.931		0.982	-0.003
23.89	23.89	9.566	24.44	24.44	24.44	9.707		0.980	-0.001
23.89	23.89	6.986	24.44	24.44	24.44	7.151		0.974	0.005
23.89	23.89	5.946	24.44	24.44	24.44	6.078		0.978	0.001
Y Value Average								0.979	

Box Pass or Fail:	Pass
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Technician Signature: _____

Thermocouple Verification Form

Using Electronic Temperature Source

Source I.D.: LA-TCS01

Date: 1/21/2010

Box I.D.: LA-LM02 Pass

Technician: Kelly Campbell

	32 Degrees		
TC1	32	32	32
TC2	32	32	32
TC3	32	32	32
TC4	32	32	32
TC5	31	31	31

Average
32
32
32
32
31

Percent Error	
0	Pass
0	Pass
0	Pass
0	Pass
0.20339	Pass

	400 Degrees		
TC1	400	400	400
TC2	400	400	400
TC3	400	400	400
TC4	399	399	399
TC5	399	399	399

Average
400
400
400
399
399

Percent Error	
0	Pass
0	Pass
0	Pass
0.11632	Pass
0.11632	Pass

	800 Degrees		
TC1	800	800	800
TC2	800	800	800
TC3	799	799	799
TC4	799	799	799
TC5	799	799	799

Average
800
800
799
799
799

Percent Error	
0	Pass
0	Pass
0.07939	Pass
0.07939	Pass
0.07939	Pass

	1600 Degrees		
TC1	1600	1600	1600
TC2	1600	1600	1600
TC3	1600	1600	1600
TC4	1600	1600	1600
TC5	1600	1600	1600

Average
1600
1600
1600
1600
1600

Percent Error	
0	Pass
0	Pass
0	Pass
0	Pass
0	Pass

Tolerance must be within 1.5%

Technician Signature:



Post Test LFM Calibration Sheet

Date: 5/6/2011
 Meter Box Number: LFM-3
 Barometric Pressure (Pm): 749 mm Hg
 Wet Test Meter Number: small
 Job Name: New Energy
 Job Number: 141814
 Initial Y: 1.05

Wet test meter pressure drop <i>in, H₂O</i>	Rota-meter setting <i>(cc/pm)</i>	Wet test meter volume			Wet test meter temp. <i>Degrees f</i>	Dry test meter volume			Dry test meter			Time of run <i>min./sec.</i>	Ratio <i>(Y)</i>
		Initial	Final	Total		Initial	Final	Total	Initial Meter temp. <i>Degrees f</i>	Final Meter temp. <i>Degrees f</i>	Average temp. <i>Degrees c</i>		
0.4	1000	0.000	9.000	9.000	71.0	0.000	8.597	8.597	71	73	22.2	8:09	1.049
0.4	1000	0.000	9.000	9.000	71.0	0.000	8.641	8.641	73	75	23.3	8:09	1.048
0.4	1000	0.000	9.000	9.000	71.0	0.000	8.664	8.664	75	76	24.2	8:11	1.048
Average Y*												1.048	

Calibrated by: [Signature]

Checked By: RC Campbell Date: 5/6/11

* Must be within $\pm 5\%$ of initial Y



Initial LFM Calibration Sheet

Date: 4/20/2010

Meter Box Number: LFM-3

Barometric Pressure (Pm): 749 mm Hg

Wet Test Meter Number: small

Wet test meter pressure drop in, H ₂ O	Rota-meter setting (cc/min.)	Wet test meter volume			Wet test meter temp. Degrees f	Dry test meter volume			Dry test meter			Time of run min./sec.	Ratio (Y)
		Initial	Final	Total		Initial	Final	Total	Initial Meter temp. Degrees f	Final Meter temp. Degrees f	Average temp. Degrees c		
0.5	1000	0.000	6.000	6.000	73.0	0.000	5.819	5.819	79	79	26.1	5.21	1.043
0.5	1000	0.000	8.000	8.000	73.0	0.000	7.750	7.750	79	80	26.4	7.08	1.045
0.5	1000	0.000	6.000	6.000	73.0	0.000	5.801	5.801	80	80	26.7	5.21	1.048
Average Y* =													1.045

Calibrated by: James

Checked By: G. Darnell Date: 4/22/10

* Y at each flow rate must be within $\pm 2\%$ of the average Y



Dry Gas Thermocouple Calibration Data Sheet

Date: 4/20/2010
Calibrator: Neese

Thermocouple Number: LFM-3
Reference: ASTM 3-F

Reference Point Number	Source *	Reference Thermometer Temperature (Degrees F)	Thermocouple Temperature (Degrees F)	Difference ** (Degrees F)	Percent Difference
1	1	72	71	1	-0.19
2	2	39	40	-1	0.20
3	3	194	195	-1	0.15

*Source 1. Ambient
2. Ice Bath
3. Water Bath

** Difference must be less than 5 Degrees F at all points.

Checked by: G. Darnell

Date: 4/22/10



Date: 4/20/2010
Operator: Neese

Indicator: LFM-3

Digital Indicator Calibration Data Sheet

Test Point Number	Equivalent Temperature, (T _e) °F	Digital Indicator Temperature, (T _{di}) °F	Difference, *%
1	0	0	0.00
2	100	99	0.18
3	200	202	-0.30
4	300	300	0.00
5	400	399	0.12
6	500	500	0.00
7	1000	1001	-0.07
8	1300	1300	0.00
9	1600	1600	0.00
10	1900	1899	0.04

* Percent difference must be less than or equal to 0.5%

$$\% \text{ Difference} = \frac{(T_{e,}^{\circ}\text{F} - T_{di,}^{\circ}\text{F})}{(T_{e,}^{\circ}\text{F} + 460)} * 100$$

Checked by: G. Damell

Date: 4/22/10



Type S Pitot Tube Inspection Form

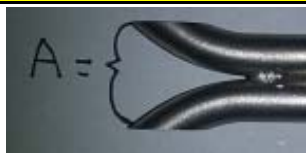
Pitot Tube: 1010078 (LA-8'M5-03) Passed

Micrometer: LA-CP02

Dt= Diameter of each Tube

Outside Diameter of Pitot?: 3/8"

A= Distance between Tubes



a1 and a2=
Angle of Openings



B1 and B2=
Angle of Openings



y= Angle of Top of Pitot Tubes



0= Angle of Side of Pitot Tubes



Parameter	Value	Tolerances	
Assembly Level?	Yes	Yes	Pass
Ports Damaged?	No	No	Pass
Dt	0.375	.188" to .375"	Pass
A	0.896	for 1/4" OD: .525" to .750" for 3/8" OD: .788" to 1.125"	Pass
a1	0.1	Greater than -10 Less than +10	Pass
a2	0.3	Greater than -10 Less than +10	Pass
B1	0.4	Greater than -5 Less than +5	Pass
B2	0.7	Greater than -5 Less than +5	Pass
y	1.3	No Tolerance	
0	0.8	No Tolerance	
Z=A tan y	0.05633	Z < or = .125 "	Pass
W= A tan 0	0.0161	W < or = .031"	Pass

Technician: Shane Vincent



Type S Pitot Tube Inspection Form

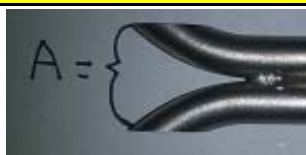
Pitot Tube: **LA-PT05** **Passed**

Micrometer: **LA-CP02**

Dt= Diameter of each Tube

Outside Diameter of Pitot?: **3/8"**

A= Distance between Tubes



a1 and a2=
Angle of Openings



B1 and B2=
Angle of Openings



y= Angle of Top of Pitot Tubes



0= Angle of Side of Pitot Tubes



Parameter	Value	Tolerances	
Assembly Level?	Yes	Yes	Pass
Ports Damaged?	No	No	Pass
Dt	0.375	.188" to .375"	Pass
A	0.905	for 1/4" OD: .525" to .750" for 3/8" OD: .788" to 1.125"	Pass
a1	3	Greater than -10 Less than +10	Pass
a2	2.3	Greater than -10 Less than +10	Pass
B1	0.3	Greater than -5 Less than +5	Pass
B2	0.2	Greater than -5 Less than +5	Pass
y	0.7	No Tolerance	
0	1	No Tolerance	
Z=A tan y	0.0133	Z < or = .125 "	Pass
W= A tan 0	0.0246	W < or = .031"	Pass

Technician: Kelly Campbell



Type S Pitot Tube Inspection Form

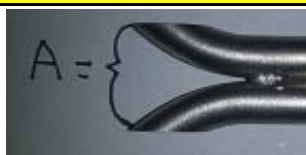
Pitot Tube: **LA-PT01** **Passed**

Micrometer: **LA-CP02**

Dt= Diameter of each Tube

Outside Diameter of Pitot?: **3/8"**

A= Distance between Tubes



a1 and a2=
Angle of Openings



B1 and B2=
Angle of Openings



y= Angle of Top of Pitot Tubes



0= Angle of Side of Pitot Tubes



Parameter	Value	Tolerances	
Assembly Level?	Yes	Yes	Pass
Ports Damaged?	No	No	Pass
Dt	0.371	.188" to .375"	Pass
A	0.91	for 1/4" OD: .525" to .750" for 3/8" OD: .788" to 1.125"	Pass
a1	3.6	Greater than -10 Less than +10	Pass
a2	0.7	Greater than -10 Less than +10	Pass
B1	0.4	Greater than -5 Less than +5	Pass
B2	0.2	Greater than -5 Less than +5	Pass
y	0.2	No Tolerance	
0	1.7	No Tolerance	
Z=A tan y	0.00322	Z < or = .125 "	Pass
W= A tan 0	-0.12224	W < or = .031"	Pass

Technician: Shane Vincent



Type S Pitot Tube Inspection Form

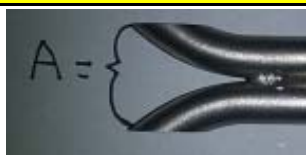
Pitot Tube: **LA-10'M5-02** **Passed**

Micrometer: **LA-CP02**

Dt= Diameter of each Tube

Outside Diameter of Pitot?: **3/8"**

A= Distance between Tubes



a1 and a2=
Angle of Openings



B1 and B2=
Angle of Openings



y= Angle of Top of Pitot Tubes



0= Angle of Side of Pitot Tubes



Parameter	Value	Tolerances	
Assembly Level?	Yes	Yes	Pass
Ports Damaged?	No	No	Pass
Dt	0.37	.188" to .375"	Pass
A	0.962	for 1/4" OD: .525" to .750" for 3/8" OD: .788" to 1.125"	Pass
a1	0.2	Greater than -10 Less than +10	Pass
a2	0.4	Greater than -10 Less than +10	Pass
B1	0.6	Greater than -5 Less than +5	Pass
B2	0.7	Greater than -5 Less than +5	Pass
y	1.1	No Tolerance	
0	0.9	No Tolerance	
Z=A tan y	0.03299	Z < or = .125 "	Pass
W= A tan 0	0.02116	W < or = .031"	Pass

Technician: Shane Vincent



Type S Pitot Tube Inspection Form

Pitot Tube: **1105270** **Passed**

Micrometer: **LA-CP02**

Dt= Diameter of each Tube

Outside Diameter of Pitot?: **3/8"**

A= Distance between Tubes



a1 and a2= Angle of Openings



B1 and B2= Angle of Openings



y= Angle of Top of Pitot Tubes



0= Angle of Side of Pitot Tubes



Parameter	Value	Tolerances	
Assembly Level?	Yes	Yes	Pass
Ports Damaged?	No	No	Pass
Dt	0.375	.188" to .375"	Pass
A	0.897	for 1/4" OD: .525" to .750" for 3/8" OD: .788" to 1.125"	Pass
a1	0.02	Greater than -10 Less than +10	Pass
a2	0.4	Greater than -10 Less than +10	Pass
B1	1.2	Greater than -5 Less than +5	Pass
B2	1.6	Greater than -5 Less than +5	Pass
y	0.6	No Tolerance	
0	1.8	No Tolerance	
Z=A tan y	0.01071	Z < or = .125 "	Pass
W= A tan 0	-0.0671	W < or = .031"	Pass

Technician: Shane Vincent



Type S Pitot Tube Inspection Form

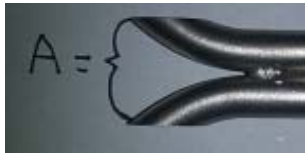
Pitot Tube: **1105269 (New)** **Passed**

Micrometer: **LA-CP02**

Dt= Diameter of each Tube

Outside Diameter of Pitot?: **3/8"**

A= Distance between Tubes



a1 and a2=
Angle of Openings



B1 and B2=
Angle of Openings



y= Angle of Top of Pitot Tubes



0= Angle of Side of Pitot Tubes



Parameter	Value	Tolerances	
Assembly Level?	Yes	Yes	Pass
Ports Damaged?	No	No	Pass
Dt	0.371	.188" to .375"	Pass
A	0.899	for 1/4" OD: .525" to .750" for 3/8" OD: .788" to 1.125"	Pass
a1	0.4	Greater than -10 Less than +10	Pass
a2	0.6	Greater than -10 Less than +10	Pass
B1	1.3	Greater than -5 Less than +5	Pass
B2	1.4	Greater than -5 Less than +5	Pass
y	0.5	No Tolerance	
0	1.9	No Tolerance	
Z=A tan y	0.00857	Z < or = .125 "	Pass
W= A tan 0	-0.04593	W < or = .031"	Pass

Technician: Shane Vincent



Type S Pitot Tube Inspection Form

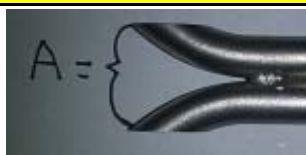
Pitot Tube: **LA-PT10** **Passed**

Micrometer: **LA-CP02**

Dt= Diameter of each Tube

Outside Diameter of Pitot?: **3/8"**

A= Distance between Tubes



a1 and a2=
Angle of Openings



B1 and B2=
Angle of Openings



y= Angle of Top of Pitot Tubes



0= Angle of Side of Pitot Tubes



Parameter	Value	Tolerances	
Assembly Level?	Yes	Yes	Pass
Ports Damaged?	No	No	Pass
Dt	0.372	.188" to .375"	Pass
A	0.93	for 1/4" OD: .525" to .750" for 3/8" OD: .788" to 1.125"	Pass
a1	3.4	Greater than -10 Less than +10	Pass
a2	0.9	Greater than -10 Less than +10	Pass
B1	0.6	Greater than -5 Less than +5	Pass
B2	0.4	Greater than -5 Less than +5	Pass
y	0.3	No Tolerance	
0	1.6	No Tolerance	
Z=A tan y	0.00502	Z < or = .125 "	Pass
W= A tan 0	-0.55565	W < or = .031"	Pass

Technician: Kelly Campbell



Calibration
Certificate No. 1750.01

Calibration complies with ISO 9001 ISO/IEC 17025 AND ANSI/NCSL Z540-1



Cert. No.: 4195-3031517

Traceable® Certificate of Calibration for Compact Digital Barometer

Instrument Identification:

Model: 4195 S/N: 101805286 Manufacturer : Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Digital Barometer	D4540001	12/11/10	1000270704
Chilled Mirror Hygrometer	31874/H2048MCR	9/18/10	7840
Digital Thermometer	90969500	6/10/11	4000-2319275

Certificate Information:

Technician: 57 Procedure: CAL-31 Cal Date: 7/12/10 Cal Due: 7/12/12
Test Conditions: 24.5°C 43.0 %RH 1013 mBar

Calibration Data: (New Instrument)

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
mbar		N.A.		805.95	802	Y	801	811	1.20	>4:1
mbar		N.A.		909.60	907	Y	905	915	1.20	>4:1
mbar		N.A.		1,014.60	1,013	Y	1,010	1,020	1.20	>4:1
°C		N.A.		26.389	25.5	Y	25.4	27.4	0.610	1.6:1
%RH		N.A.		44.99	46	Y	40	50	1.14	>4:1

This Instrument was calibrated using Instruments Traceable to National Institute of Standards and Technology.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ±U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min = Nominal(Rounded) - Tolerance; Max = Nominal(Rounded) + Tolerance; Date=MM/DD/YY

Nicol Rodriguez
Nicol Rodriguez, Quality Manager

Wallace Berry
Wallace Berry, Technical Manager

Maintaining Accuracy:

In our opinion once calibrated your Compact Digital Barometer should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Compact Digital Barometers change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

CONTROL COMPANY 4455 Rex Road Friendswood, TX 77546 USA
Phone 281 482-1714 Fax 281 482-9448 service@control3.com www.control3.com

Control Company is an ISO 17025:2005 Calibration Laboratory Accredited by (A2LA) American Association for Laboratory Accreditation, Certificate No. 1750.01.
Control Company is ISO 9001:2008 Quality Certified by (DNV) Det Norske Veritas, Certificate No. CERT-01805-2006-AQ-HOU-ANAB.
International Laboratory Accreditation Cooperation (ILAC) - Multilateral Recognition Arrangement (MRA).

Isokinetic Sampling Nozzle Calibration

Date	Calibrated by	Nozzle ID	Nozzle Diameter (inches)			ΔD	D_{avg}
			D1	D2	D3		
5/18/2011	Jason Pilgrim	.275	0.2750	0.2760	0.2750	0.0010	0.275
5/18/2011	Jason Pilgrim	.160	0.1600	0.1605	0.1600	0.0005	0.160
5/20/2011	Jason Pilgrim	.283	0.2835	0.2825	0.2830	0.0010	0.283
5/20/2011	Jason Pilgrim	.282	0.2825	0.2825	0.2815	0.0010	0.282
5/23/2011	Jason Pilgrim	.265	0.2650	0.2650	0.2655	0.0005	0.265
5/23/2011	Jason Pilgrim	.292	0.2925	0.2920	0.2920	0.0005	0.292
5/26/2011	Jason Pilgrim	.286	0.2860	0.2860	0.2865	0.0005	0.286
5/26/2011	Jason Pilgrim	.280	0.2800	0.2805	0.2800	0.0005	0.280

Where:

D1, D2, D3 = nozzle diameter measured on a different diameter, in.
measure to within 0.001 in.

ΔD = maximum difference between any two diameters, must be ≤ 0.004 in.
Tolerance = 0.004 in.

$D_{Avg.}$ = $(D1+D2+D3) / 3$

Instructions

- 1.) Inspect the nozzle for nicks, dents, and corrosion. If these are found, they should be corrected before calibration.
- 2.) Place a reference mark on the nozzle. Place the nozzle at the center of the figure, aligned with point P1. Measure and record D1.
- 3.) Rotate the nozzle so that the reference mark is aligned with point P2. Measure and record D2.
- 4.) Rotate the nozzle so that the reference mark is aligned with point P3. Measure and record D3.
- 5.) Calculate ΔD and $D_{Avg.}$

Caliper ID: LA-CP02
Checked by: Jason Pilgrim

Appendix G

Calibration Gas Certifications

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
1075 Cinclare Drive
Port Allen, LA 70767
225.388.0900
FAX: 225.388.0959
www.airgas.com

Part Number: E02NI99E15A0350 Reference Number: 83-124188124-1
Cylinder Number: CC216331 Cylinder Volume: 144 Cu.Ft.
Laboratory: ASG - Port Allen - LA Cylinder Pressure: 2015 PSIG
Analysis Date: Aug 27, 2009 Valve Outlet: 660

Expiration Date: Aug 27, 2011

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig i.e. 1 Mega Pascal

DO NOT USE THIS Cylinder below 150 psig i.e. 1 Mega Pascal

ANALYTICAL RESULTS				
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
SULFUR DIOXIDE	50.00 PPM	51.07 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	06061314	SG9123587BAL	173.0PPM SULFUR DIOXIDE/NITROGEN	Sep 01, 2010
NTRM	06061314	CC207604	45.91PPM SULFUR DIOXIDE/NITROGEN	Sep 01, 2010

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
AH2SGL	Photometric	Aug 05, 2009

Triad Data Available Upon Request

Notes:

Mei Blauok

QA Approval

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
1075 Cinclare Drive
Port Allen, LA 70767
225.388.0900
FAX : 225.388.0959
www.airgas.com

Part Number: E02NI99E15AC1P2 Reference Number: 83-124255148-3
Cylinder Number: SG9103323BAL Cylinder Volume: 144 Cu.Ft.
Laboratory: ASG - Port Allen - LA Cylinder Pressure: 2015 PSIG
Analysis Date: Mar 04, 2011 Valve Outlet: 350

Expiration Date: Mar 04, 2014

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig, i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
PROPANE	97.50 PPM	95.56 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

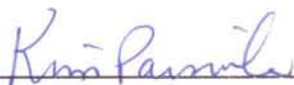
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	99060203	XC003516B	93.9PPM PROPANE/AIR	Oct 02, 2011

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801556 M1C3H8	FTIR	Feb 23, 2011

Triad Data Available Upon Request

Notes:



Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
1075 Cincinlare Drive
Port Allen, LA 70767
225.388.0900
FAX : 225.388.0959
www.airgas.com

Part Number: E02NI99E15A0931 Reference Number: 83-124255148-2
Cylinder Number: CC79433 Cylinder Volume: 144 Cu.Ft.
Laboratory: ASG - Port Allen - LA Cylinder Pressure: 2015 PSIG
Analysis Date: Mar 04, 2011 Valve Outlet: 350

Expiration Date: Mar 04, 2014

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS				
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
PROPANE	50.00 PPM	49.39 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	99060203	CC263030	49.62PPM PROPANE/NITROGEN	Jul 08, 2012

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801556 L2C3H8	FTIR	Feb 22, 2011

Triad Data Available Upon Request

Notes:

Kim Parnola

Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
1075 Cinclare Drive
Port Allen, LA 70767
225.388.0900
FAX : 225.388.0959
www.airgas.com

Part Number: E02NI99E15A0556 Reference Number: 83-124255148-1
Cylinder Number: CC19643 Cylinder Volume: 144 Cu.Ft.
Laboratory: ASG - Port Allen - LA Cylinder Pressure: 2015 PSIG
Analysis Date: Mar 04, 2011 Valve Outlet: 350

Expiration Date: Mar 04, 2014

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig, i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
PROPANE	25.00 PPM	25.03 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	080610	CC262361	49.62PPM PROPANE/AIR	Jul 15, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801556 L2C3H8	FTIR	Feb 22, 2011

Triad Data Available Upon Request

Notes:



Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
1075 Cinclare Drive
Port Allen, LA 70767
225.388.0900
FAX: 225.388.0959
www.airgas.com

Part Number: E02NI90E15A0228
Cylinder Number: XC025088B
Laboratory: ASG - Port Allen - LA
Analysis Date: Aug 23, 2010
Reference Number: 83-124230949-1
Cylinder Volume: 145 Cu.Ft.
Cylinder Pressure: 2015 PSIG
Valve Outlet: 590

Expiration Date: Aug 23, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
OXYGEN	10.00 %	9.956 %	G1	± 0.0044 (0.44%)
NITROGEN	Balance			± 0.0010 (0.10%)

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	00040210	CC108973	10.00% OXYGEN/NITROGEN	Oct 02, 2011

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
AH2SGL	Photometric	Aug 19, 2010

Triad Data Available Upon Request

Notes:

See Hardis
Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
1075 Cinclare Drive
Port Allen, LA 70767
225.388.0900
FAX: 225.388.0959
www.airgas.com

Part Number: E02NI99E15A0566 Reference Number: 83-124231025-2A
Cylinder Number: CC56129 Cylinder Volume: 144 Cu.Ft.
Laboratory: ASG - Port Allen - LA Cylinder Pressure: 2015 PSIG
Analysis Date: Sep 14, 2010 Valve Outlet: 350

Expiration Date: Sep 14, 2012

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig, i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
NITRIC OXIDE	95.00 PPM	95.71 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

Total oxides of nitrogen 95.76 PPM For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	09060921	cc269046	95.74PPM NITRIC OXIDE/NITROGEN	Mar 15, 2011

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR2MNO	FTIR	Aug 20, 2010

Triad Data Available Upon Request

Notes:

meblanong

Approved for Release

CERTIFICATE OF ANALYSIS Grade of Product: EPA Protocol

Airgas Specialty Gases
1075 Cindere Drive
Port Allen, LA 70767
225.388.0900
FAX: 225.388.0959
www.airgas.com

Part Number: E02NI99E15A0147
Cylinder Number: CC281221
Laboratory: ASG - Port Allen - LA
Analysis Date: Aug 26, 2010
Reference Number: 83-124231025-1
Cylinder Volume: 144 Cu.Ft.
Cylinder Pressure: 2015 PSIG
Valve Outlet: 660
Expiration Date: Aug 26, 2012

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig, i.e. 1 Mega Pascal

ANALYTICAL RESULTS				
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
NITRIC OXIDE	50.00 PPM	49.110 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

Total oxides of nitrogen 49.14 PPM For Reference Only

CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	06081021	CC206023	49.38PPM NITRIC OXIDE/NITROGEN	Oct 02, 2012

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR2LNO	FTIR	Aug 19, 2010

Triad Data Available Upon Request

Notes:

San Hurd
Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E02NI99E15A0101 Reference Number: 83-124164877-3
Cylinder Number: SG9134842 Cylinder Volume: 144 Cu.Ft.
Laboratory: ASG - Port Allen - LA Cylinder Pressure: 2015 PSIG
Analysis Date: Feb 03, 2009 Valve Outlet: 350

Expiration Date: Feb 03, 2012

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig, i.e. 1 Mega Pascal

ANALYTICAL RESULTS				
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON MONOXIDE	1000 PPM	998.8 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	080604	cc255365	1002.4PPM CARBON MONOXIDE/NITROGEN	Apr 15, 2012

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR2HCO	FTIR	Jan 22, 2009

Triad Data Available Upon Request

Notes:



QA Approval

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E02NI99E15A3168	Reference Number:	83-124181652-4
Cylinder Number:	CC22068	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Port Allen - LA	Cylinder Pressure:	2015 PSIG
Analysis Date:	Jun 30, 2009	Valve Outlet:	350

Expiration Date: Jun 30, 2012

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig, i.e. 1 Mega Pascal

ANALYTICAL RESULTS				
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON MONOXIDE	500.0 PPM	493.7 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	C80604	cc255365	1002.4PPM CARBON MONOXIDE/NITROGEN	Apr 15, 2012

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIR2HCO	FTIR	Jun 11, 2009

Triad Data Available Upon Request

Notes:

MLP/Blair

QA Approval



CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases

1075 Cincinere Drive
Port Allen, LA 70767
225.388.0900
FAX: 225.388.0959
www.airgas.com

Part Number: E02NI81E15A1861 Reference Number: 83-124233268-1
Cylinder Number: CC221405 Cylinder Volume: 156 Cu.Ft.
Laboratory: ASG - Port Allen - LA Cylinder Pressure: 2015 PSIG
Analysis Date: Sep 08, 2010 Valve Outlet: 580

Expiration Date: Sep 08, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig, i.e. 1 Mega Pascal

ANALYTICAL RESULTS				
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	19.00 %	18.93 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	08061338	CC255862	20.09% CARBON DIOXIDE/NITROGEN	Jul 15, 2012
ANALYTICAL EQUIPMENT				
Instrument/Make/Model		Analytical Principle		Last Multipoint Calibration
FTIRHCO2		FTIR		Aug 23, 2010

Triad Data Available Upon Request

Notes:



Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
1075 Cinclare Drive
Port Allen, LA 70767
225.388.0900
FAX: 225.388.0959
www.airgas.com

Part Number: E02NI90E15A0123 Reference Number: 83-124233268-2
Cylinder Number: CC171113 Cylinder Volume: 150 Cu.Ft.
Laboratory: ASG - Port Allen - LA Cylinder Pressure: 2015 PSIG
Analysis Date: Sep 08, 2010 Valve Outlet: 580

Expiration Date: Sep 08, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig, i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	10.00 %	9.991 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTM	09C60635	CC263040	9.921% CARBON DIOXIDE/NITROGEN	Apr 10, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
FTIRHCO2	FTIR	Aug 23, 2010

Triad Data Available Upon Request

Notes:

meBialov

Approved for Release

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number: E02NI99E15A0032 Reference Number: 83-124181646-1A
Cylinder Number: CC33499 Cylinder Volume: 144 Cu.Ft.
Laboratory: ASG - Port Allen - LA Cylinder Pressure: 2015 PSIG
Analysis Date: Jul 06, 2009 Valve Outlet: 660

Expiration Date: Jul 06, 2011

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS				
Component	requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
SULFUR DIOXIDE	100.0 PPM	101.5 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	06061116	CC206013	475.0PPM SULFUR DIOXIDE/NITROGEN	Sep 01, 2010
ANALYTICAL EQUIPMENT				
Instrument/Make/Model		Analytical Principle		Last Multipoint Calibration
FTIR2MSO2		FTIR		Jun 11, 2009

Triad Data Available Upon Request

Notes:



QA Approval

Appendix H

Agency Correspondence

From: [Bryan Tyler](#)
To: [Pilgrim, Jason D](#)
Subject: RE: EPA Method 18 Results
Date: Friday, July 29, 2011 10:16:07 AM

Emissions Testing Questions

Test-001

Q: What changes can I make from the ICR for sampling and analysis of the volatile organic compounds on Table 1.3 of Component 4?

A: EPA has determined that the following changes are acceptable. This list is not meant to be exhaustive. You may request other alternatives (e.g. NCASI CI/WP-98.01, ISS-FP-A105.01, etc.) following the process outlined in Component 4. For such requests, please submit as much detail in the request as possible including information on the associated QA/QC, spiking procedures and recovery standards.

- Because Method 18 sampling and analysis techniques are not suitable for measuring trimethylamine and there are no readily available validated method alternatives, we have removed trimethylamine from the target analyte list on Table 1.3.

From: Pilgrim, Jason D [mailto:jason.pilgrim@shawgrp.com]
Sent: Friday, July 29, 2011 10:34 AM
To: Bryan Tyler
Subject: RE: EPA Method 18 Results

Bryan,

You said that Triethylamine was removed from the target compound list by the EPA, can you show me where I can find documentation of this?

Thanks,

Jason Pilgrim

Scientist 1
National Air Measurements Group (NAMG)
Shaw Environmental & Infrastructure Group
4171 Essen Lane
Baton Rouge, LA 70809
225-987-7679 Direct
225-505-6736 Cell
225-213-1274 Fax

Shaw™ a world of Solutions™
www.shawgrp.com

From: Bryan Tyler [mailto:Bryan.Tyler@enthalpy.com]
Sent: Thursday, July 14, 2011 1:12 PM
To: Pilgrim, Jason D
Subject: RE: EPA Method 18 Results

Jason,
Triethylamine was removed from the target compound list by the EPA.
Bryan

From: Pilgrim, Jason D [mailto:jason.pilgrim@shawgrp.com]
Sent: Thursday, July 14, 2011 2:08 PM
To: Bryan Tyler
Subject: EPA Method 18 Results

Bryan,

I was looking over our EPA Method 18 results, and I didn't find an analysis for Triethylamine. Is there another name for Triethylamine that is in the results? Please let me know.

Thanks,

Jason Pilgrim

Scientist 1
National Air Measurements Group (NAMG)
Shaw Environmental & Infrastructure Group
4171 Essen Lane
Baton Rouge, LA 70809
225-987-7679 Direct
225-505-6736 Cell
225-213-1274 Fax

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Appendix I

Shaw Personnel Resumes

Richard H. Ishikawa

Professional Qualifications

Mr. Ishikawa has over 14 years of experience as an air quality professional managing large, multi-task programs. He is very knowledgeable about federal and state environmental laws and regulations.

Education

Bachelor of Science, Biology/Chemistry, Texas State University, San Marcos, Texas, 1985
Postgraduate Studies, Chemistry, University of Houston - Clear Lake, Houston, Texas

Additional Training/Continuing Education

Basic Plus Safety, Houston, TX, 2006
Respirator Training, Houston, TX, 2005
40-Hour Hazardous Waste Operations and Emergency Response Training (29CFR1910.120), Houston, TX, 1995

Experience and Background

06/2006 - Present

Project Manager, Shaw Environmental & Infrastructure, Inc., Baton Rouge, Louisiana

Responsibilities include providing support to client projects and office staff as a technical consultant. Also responsible for business development, preparing technical portions of major project proposals.

The following is a summary of key projects:

Air Permit Support, Little Gypsy 3 Repowering Project, 120581, Entergy Louisiana, LLC, Baton Rouge, LA, 07/2006 - 08/2006

Submit Title V air permit application.

11/1996 - 06/2006

Project Manager, Entech Engineering Inc., League City, Texas

Responsibilities included providing support to client projects and office staff as a technical consultant. Also responsible for business development, preparing technical portions of major project proposals.

The following is a summary of key projects:

Project Manager, Wet -Scrubber Removal Efficiency Test Program, , Lubrizol Corporation, Deer Park, Texas, \$50,000.00, 05/2006 - 06/2006

Quantify HRVOC/VOC and HCL/Cl2 emissions during worst-case operations at multiple wet scrubbers. Determine HCl/Cl2 removal efficiencies.

Project Manager, HRVOC Source Inventory, , Chevron Phillips Chemical Company, Pasadena, TX, \$1,000,000.00, 10/2005 - 06/2006

Identify and quantify all potential sources of HRVOC/VOC emissions during worst-case operations at multiple polymer plants within the Pasadena Plastics Plant. The project involved multiple crews working two twelve-hour shifts over several months.

Other Comments:

Project was long-term and was still continuing when I departed. The revenue for this one project was year-to-date.

Project Manager, Ambient H2S Monitoring, , MeadWestvaco Paper Plant, Vidor, Texas, \$30,000.00, 04/2006 - 04/2006

12-Hour fenceline monitoring of ambient H2S concentrations. The data was to support plant claim that TCEQ measurements were inconclusive.

Project Manager, Fuel Gas H2S Monitoring Project, , ExxonMobil Chemical Company, Beaumont, Texas, \$40,000.00, 12/2005 - 02/2006

Long-term project involving the continuous measurement of H2S content of fuel gas.

04/1992 - 11/1996

Principal Environmental Scientist, Tenerx Corporation, Friendswood, Texas

Responsibilities included providing support to client projects and office staff as a technical consultant. Also responsible for business development, preparing technical portions of major project proposals.

The following is a summary of key projects:

Principal Environmental Scientist, Burner Optimization Project, , Tennessee Valley Authority, Knoxville, TN, \$150,000.00, 10/1995 - 10/1995

Long-term project to facilitate the optimization of the burners for minimizing fuel usage.

Accomplishments:

Fuel saving over a year estimated between 0.8 to 1 million dollars.

Professional Affiliations

Air and Waste Management Association, 1992

Blake Fogleman

Professional Qualifications

Blake Fogleman has over a year of engineering consulting experience, providing technical assistance, engineering design, and project support. He has performed engineering calculations, report and presentation generation, as well as daily support in several civil and environmental engineering projects throughout the United States. He has been specifically involved in wetland and vegetation surveying, dredging design, roadway design, geotechnical design, and site development. Blake is most recently involved in providing technical assistance, in the field and office, on numerous air emission testing projects.

Education

Bachelor of Science, Civil and Environmental Engineering, Louisiana State University, Baton Rouge, Louisiana, 2007

Additional Training/Continuing Education

Basic Plus Safety, Baton Rouge Safety Council, 2008

Registrations/Certifications/Licenses

Engineering Intern, 2007, 0028729, Active, Louisiana, 03/2010

Security Clearance

Transportation Worker Identification Credential, Department of Homeland Security/FEMA, 2008, Active, 04/2013

Experience and Background

01/2008 - Present

Engineer 1, Shaw Environmental & Infrastructure, Inc., Engineering and National Air Measurement Group, Baton Rouge, Louisiana

Responsibilities include assistance with engineering calculations, graphing, and report generation. Daily activities include working alongside mid-level civil and environmental engineers and scientists, under direct supervision of the Program Manager.

05/2007 - 12/2007

Intern / Co-Op, Shaw Environmental & Infrastructure, Inc., Engineering, Baton Rouge, Louisiana

Assisted in engineering calculations, graphing, and project report preparations. Daily activities included working alongside mid-level civil and environmental engineers under the direct supervision of the Program Manager

06/2000 - 01/2007

General Assistant, BCI Louisiana, Mermentau, Louisiana

Assisted in development of process flows and piping for pilot plant expansion project. Participated in operations of Biomass to Ethanol R and D facility. Pipe fabricator's assistant. Ground keeper and maintenance in a fifty acre refinery. Handled all accounting functions for the plant: AR, payroll, GL, etc.

07/2001 - 07/2006

Louisiana Youth Seminar Counselor and Staff Assistant, Louisiana Seminars of America, Baton Rouge, Louisiana

One of four high school delegates chosen out of 200 to return and honor a four year commitment as a leader of LYS.

Staff (junior counselor and counselor) 4 years, Head Table (2 years)

Planned and organized 2005 and 2006's week long program. Assisted in executive duties during program. Political Party Coordinator. Responsible for daily leadership activities of 15-20 high school delegates. Mentor for Junior Counselor.

08/2001 - 06/2006

Louisiana Boys State Counselor and Staff member, Louisiana Boys State, Baton Rouge, Louisiana

Chosen out of 600 high school juniors to lead Louisiana Boys State as a counselor. Requested to serve every year from 2001 to 2006.

Logistics and Operations supervisor. Organization and supervision of daily activities of up to 600 Boys State citizens and 60 counselors. Development and organization of Louisiana Boys State 2006

Professional Affiliations

Air & Waste Management Association, fellow, 2008

Louisiana Engineering Society, fellow, 2008

Louisiana Water Environment Association, fellow, 2006

WEF, fellow, 2005

Louisiana Water Environment Association at LSU, fellow, 2003

James D. Rink

Professional Qualifications

Mr. Rink is an environmental technician with experience in air sampling, and the measuring of gaseous and particulate pollutants. He performs various test methods according to the Code of Federal Regulations(CFR), promulgated by the Environmental Protection Agency(EPA). Such methods include the determination of gas velocities, and volumetric flow rates, as well as the measurement of pollutant concentrations in gas streams. He has worked extensively on emission sources such as gas turbines, boilers, and engines. Mr. Rink also has experience maintaining and repairing different air sampling equipment.

Education

Bachelor of Science, Geography, Louisiana State University, Baton Rouge, Louisiana, 2006

Additional Training/Continuing Education

24-Hour Hazerdous Waste Operations and Emergency Response (29CFR1910.120) , Baton Rouge Safety Council, 2007

Experience and Background

09/2008 - Present

Engineering Technician I, Shaw Environmental & Infrastructure, Inc., Baton Rouge, Louisiana

Responsibilities include maintaining and calibration of equipment, as well as performing on site QA/QA, job safety analysis, and data reduction.

The following is a summary of key projects:

Sampling Technician, Compliance Tests of Gas Turbines, 590166, Astoria Power, Astoria, New York, 09/2008 - 10/2008

Setup sampling equipment in order to perform various EPA tests. However, testing could not be performed due to problems in the facility.

Sampling Technician, Compliance Testing of Hot Oil Heater and Regenerative Thermal Oxidizer, Enterprise Products Company, Meeker, Colorado, 09/2008 - 09/2008

Particulate matter was sampled isokinetically by using a vacuum pump to pull the effluants though a glass fiber filter.

09/2006 - 09/2008

Environmental Technician, Schwartz Environmental Testing Company, Baton Rouge, Louisiana

Responsibilities include maintaining and calibration of equipment as well as on site QA/QC, job

safety analysis and data reduction.

Henry W. Walton

Professional Qualifications

Henry Worth Walton
2469 South LeBlanc Rd.
Morse, Louisiana 70559
337-783-1867
Cell 337-224-2080

I am currently attending L.S.U. in Baton Rouge, Louisiana, as a full time second year student, majoring in Mechanical Engineering

Work Experience:

1998-2004 Robert Walton Farms
Crowley LA

- Operated rice-drying facilities, responsible for weighing trucks, keeping records of weights, moistures and temperatures. Also responsible for repairs of drying facility. This included welding, electrical troubleshooting, and general maintenance.
- Operated and maintained all heavy equipment utilized in land preparations.
- Operated equipment in harvesting of crops.

2005-2006 B.C.I

Mermentau LA

- Facilities maintenance operator
- Laboratory maintenance

Summer 2008 Write Enrichment

Crowley LA

- Warehouse hand
- Responsible for organizing and storing incoming freight in warehouse
- Operated forklifts to load and unload freight shipped and received in warehouse
- Sampled all vitamins and other raw materials received in warehouse

Education

- 2007 Graduate Notre Dame High School Crowley, LA. Overall GPA 3.76.
- Member of National Honors BETA club

Volunteer Service

- Muscular Dystrophy Camp Counselor, Camp Bethany, 2006
- Clean up work in New Orleans after Katrina and in Acadia Parish after hurricane Lilly and Rita

References:

- Mark Wayne Mahaffey, Production Foreman Energy XXI 337-207-3693
- Rudy Fogleman, VP of Operations, Bioenergy International, LLC 337-789-8080

- Scott Hodges, Warehouse Manager 337-250-1061

Education

High School Diploma, Mechanical Engineering, Louisiana State University, Baton Rouge, Louisiana

Experience and Background

02/2009 - present

Intern, Shaw Environmental & Infrastructure, Inc., NAMG, Baton Rouge, Louisiana

Basic OSHA training. Certified for TWIC.

05/2008 - 07/2008

Warehouse Hand, Write Enrichment, Shipping and Receiving, Crowley, Louisiana

- Responsible for organizing and storing incoming freight in warehouse
- Operated forklifts to load and unload freight shipped and received in warehouse
- Sampled all vitamins and other raw materials received in warehouse

05/2006 - 07/2006

Facilities Maintenance Operator, B. C. I., Mermantau, Louisiana

- Facilities maintenance operator
- Laboratory maintenance

01/1998 - 12/2004

Farm Manager, Robert Walton Farms, Morse, Louisiana

- Operated rice-drying facilities, responsible for weighing trucks, keeping records of weights, moistures and temperatures. Also responsible for repairs of drying facility. This included welding, electrical troubleshooting, and general maintenance.
- Operated and maintained all heavy equipment utilized in land preparations
- Operated equipment in harvesting of crops

Appendix J

Project Participants

Project Participants

The CITGO representatives are Mr. Mark Young (Procurement) and Ms. Michele Walker (Technical). The testing organization is Shaw Environmental & Infrastructure, Inc. and the Shaw representative is Mr. Richard Ishikawa. The names and addresses of these contacts are as follows:

Mr. Mark Young
Procurement Manager
CITGO Petroleum Corporation
Lake Charles Manufacturing Complex
4401 LA Highway 108
Sulphur, LA 70665
Bus: (337) 708-8035
Fax: (337) 708-6289
E-mail: myoung2@citgo.com

Mr. Richard Ishikawa
Gulf Coast Program Manager
Shaw Environmental & Infrastructure, Inc.
4171 Essen Lane
Baton Rouge, LA 70809
Bus: (225) 932-2745
Fax: (225) 213-1274
E-mail: richard.ishikawa@shawgrp.com

Ms. Michele Walker
Environmental Engineer
Citgo Petroleum Corporation
Lake Charles Manufacturing Complex
4401 LA Highway 108
Sulphur, LA 70665
Bus: (337) 708-8201
Fax: (337) 708-6010
E-mail: mwalke2@citgo.com