APPENDIX A

Inlet Field Data

A1 – THC Measurements and Calibration Data

EMISSION RATE CALCULATION SHEET
TOTAL HYDROCARBON EMISSIONS

Client/Site:	**Global**	**Run #:**	**Run 1**
Source:	**RTO**	**Date:**	**4-Feb-10**

START TIME :	6:45	END TIME :	7:45

AVERAGE CONCENTRATION	**827.7** PPM
AVERAGE FLOW RATE (FROM OUTLET)	6,665 WSCFM
MOLECULAR WEIGHT (Propane)	44.09 g/mole

mg/m3 =	(MW * PPM) / (24.055 l/mol. PPM	=	**1517.04**	mg/m3
mg/SCF =	(mg/m3) (m3/35.31 SCF)	=	**42.96**	mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**9.472E-05**	lb/SCF
lb/hr =	(lb/SCF * WSCFM * 60 min/hr)	=	**37.88**	lb/hr

EMISSION RATE CALCULATION SHEET
TOTAL HYDROCARBON EMISSIONS

Client/Site:	**Global**	**Run #:**	**Run 2**
Source:	**RTO**	**Date:**	**4-Feb-10**

START TIME :	8:05	END TIME :	9:05

AVERAGE CONCENTRATION	**865.7** PPM
AVERAGE FLOW RATE (FROM OUTLET)	6,896 WSCFM
MOLECULAR WEIGHT (Propane)	44.09 g/mole

mg/m3 =	(MW * PPM) / (24.055 l/mol. PPM	=	**1586.67**	mg/m3
mg/SCF =	(mg/m3) (m3/35.31 SCF)	=	**44.94**	mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**9.906E-05**	lb/SCF
lb/hr =	(lb/SCF * WSCFM * 60 min/hr)	=	**40.99**	lb/hr

EMISSION RATE CALCULATION SHEET
TOTAL HYDROCARBON EMISSIONS

Client/Site:	**Global**	**Run #:**	**Run 3**
Source:	**RTO**	**Date:**	**4-Feb-10**

START TIME :	9:25	END TIME :	10:25

AVERAGE CONCENTRATION	**861.5** PPM
AVERAGE FLOW RATE (FROM OUTLET)	6,634 WSCFM
MOLECULAR WEIGHT (Propane)	44.09 g/mole

mg/m3 =	(MW * PPM) / (24.055 l/mol. PPM	=	**1579.05** mg/m3
mg/SCF =	(mg/m3) (m3/35.31 SCF)	=	**44.72** mg/SCF
lb/SCF =	(1 lb/ 4.536E+5 mg) * (mg/SCF)	=	**9.859E-05** lb/SCF
lb/hr =	(lb/SCF * WSCFM * 60 min/hr)	=	**39.24** lb/hr

Eastmount Environmental Services, LLC
UNCORRECTED CEM MONITORING RESULTS
INSTRUMENTAL REFERENCE METHODS - 25A/18

CLIENT: / SITE: Global
SOURCE: RTO

CONDITION: Normal
RUN ID: RTO - Run 1

Date	Time	O2 %	CO2 %	Inlet THC ppm	Outlet THC ppm
04-Feb-2010	06:45	19.73	0.49	768.00	2.94
04-Feb-2010	06:46	19.69	0.52	769.82	1.60
04-Feb-2010	06:47	19.68	0.52	769.42	1.15
04-Feb-2010	06:48	19.66	0.51	770.77	0.33
04-Feb-2010	06:49	19.40	0.77	780.57	0.11
04-Feb-2010	06:50	18.83	1.12	775.84	0.03
04-Feb-2010	06:51	18.84	1.09	778.53	0.10
04-Feb-2010	06:52	19.61	0.52	787.98	36.50
04-Feb-2010	06:53	19.67	0.51	772.29	3.56
04-Feb-2010	06:54	19.70	0.52	772.30	1.87
04-Feb-2010	06:55	19.71	0.52	772.76	1.09
04-Feb-2010	06:56	19.69	0.51	779.09	0.78
04-Feb-2010	06:57	19.70	0.54	778.79	0.13
04-Feb-2010	06:58	19.05	1.02	782.79	0.12
04-Feb-2010	06:59	18.82	1.12	799.92	0.18
04-Feb-2010	07:00	19.55	0.56	805.33	37.04
04-Feb-2010	07:01	19.64	0.54	819.91	3.60
04-Feb-2010	07:02	19.61	0.55	820.28	1.83
04-Feb-2010	07:03	19.59	0.57	847.97	1.14
04-Feb-2010	07:04	19.57	0.58	883.20	0.29
04-Feb-2010	07:05	19.44	0.73	893.21	0.06
04-Feb-2010	07:06	18.69	1.23	905.53	0.15
04-Feb-2010	07:07	18.67	1.24	961.97	0.11
04-Feb-2010	07:08	19.32	0.72	1032.47	38.45
04-Feb-2010	07:09	19.52	0.64	1056.61	4.02
04-Feb-2010	07:10	19.52	0.62	1028.95	2.19
04-Feb-2010	07:11	19.50	0.65	1024.56	1.41
04-Feb-2010	07:12	19.52	0.63	1030.04	1.12
04-Feb-2010	07:13	19.51	0.62	1000.71	0.05
04-Feb-2010	07:14	19.22	0.90	991.05	0.11
04-Feb-2010	07:15	18.70	1.19	989.85	0.05
04-Feb-2010	07:16	19.37	0.70	912.18	34.68
04-Feb-2010	07:17	19.63	0.58	809.19	3.93
04-Feb-2010	07:18	19.67	0.54	785.35	1.85
04-Feb-2010	07:19	19.65	0.55	771.53	1.04
04-Feb-2010	07:20	19.67	0.54	750.36	0.67
04-Feb-2010	07:21	19.65	0.57	748.82	0.06
04-Feb-2010	07:22	18.90	1.16	762.47	0.09
04-Feb-2010	07:23	18.81	1.19	762.57	0.37
04-Feb-2010	07:24	19.39	0.71	768.62	32.71
04-Feb-2010	07:25	19.63	0.57	783.74	4.15
04-Feb-2010	07:26	19.59	0.58	806.61	2.21
04-Feb-2010	07:27	19.60	0.59	805.32	1.25
04-Feb-2010	07:28	19.56	0.58	804.11	1.17
04-Feb-2010	07:29	19.51	0.60	802.66	0.11
04-Feb-2010	07:30	19.38	0.72	829.60	0.24
04-Feb-2010	07:31	18.65	1.20	818.73	0.27
04-Feb-2010	07:32	19.13	0.77	815.59	30.97
04-Feb-2010	07:33	19.43	0.59	817.34	4.59
04-Feb-2010	07:34	19.41	0.58	819.48	2.13
04-Feb-2010	07:35	19.37	0.59	802.01	1.04
04-Feb-2010	07:36	19.37	0.58	806.68	0.88
04-Feb-2010	07:37	19.36	0.56	788.68	0.24
04-Feb-2010	07:38	18.73	1.06	763.61	0.18
04-Feb-2010	07:39	18.49	1.20	758.17	0.29
04-Feb-2010	07:40	18.90	0.80	766.40	35.46
04-Feb-2010	07:41	19.29	0.59	761.94	4.62
04-Feb-2010	07:42	19.30	0.57	761.62	2.36
04-Feb-2010	07:43	19.31	0.59	765.82	1.50
04-Feb-2010	07:44	19.27	0.57	760.90	1.13
AVERAGES:		19.36	0.71	827.68	5.21

Eastmount Environmental Services, LLC
UNCORRECTED CEM MONITORING RESULTS
INSTRUMENTAL REFERENCE METHODS - 25A/18

CLIENT: / SITE: Global
SOURCE: RTO

CONDITION: Normal
RUN ID: RTO - Run 2

Date	Time	O2 %	CO2 %	Inlet THC ppm	Outlet THC ppm
04-Feb-2010	08:05	19.72	0.64	789.55	5.83
04-Feb-2010	08:06	19.72	0.64	813.26	2.37
04-Feb-2010	08:07	19.92	0.64	826.89	1.23
04-Feb-2010	08:08	20.10	0.64	850.37	0.97
04-Feb-2010	08:09	20.14	0.64	876.72	0.16
04-Feb-2010	08:10	19.66	1.02	886.23	0.00
04-Feb-2010	08:11	19.30	1.27	882.76	0.15
04-Feb-2010	08:12	19.57	0.99	891.60	35.19
04-Feb-2010	08:13	20.16	0.64	888.41	6.13
04-Feb-2010	08:14	20.15	0.66	891.33	2.88
04-Feb-2010	08:15	20.11	0.64	892.18	1.65
04-Feb-2010	08:16	20.13	0.70	882.54	0.95
04-Feb-2010	08:17	20.12	0.61	860.39	0.16
04-Feb-2010	08:18	19.71	0.93	830.28	0.10
04-Feb-2010	08:19	19.19	1.25	818.82	0.16
04-Feb-2010	08:20	19.92	0.67	830.63	36.79
04-Feb-2010	08:21	20.03	0.61	834.72	3.51
04-Feb-2010	08:22	20.10	0.62	837.35	1.68
04-Feb-2010	08:23	20.05	0.60	838.28	1.13
04-Feb-2010	08:24	20.03	0.63	831.76	0.54
04-Feb-2010	08:25	19.96	0.65	836.08	0.15
04-Feb-2010	08:26	19.14	1.24	853.50	0.03
04-Feb-2010	08:27	19.10	1.22	839.37	0.19
04-Feb-2010	08:28	19.76	0.69	836.76	34.40
04-Feb-2010	08:29	19.88	0.64	822.41	3.95
04-Feb-2010	08:30	19.86	0.63	843.41	2.20
04-Feb-2010	08:31	19.85	0.61	862.66	1.30
04-Feb-2010	08:32	19.89	0.62	833.36	1.04
04-Feb-2010	08:33	19.90	0.61	833.91	0.21
04-Feb-2010	08:34	19.59	0.89	846.52	0.05
04-Feb-2010	08:35	19.03	1.22	839.58	0.16
04-Feb-2010	08:36	19.70	0.73	839.31	36.24
04-Feb-2010	08:37	19.95	0.64	836.32	4.02
04-Feb-2010	08:38	20.01	0.65	840.26	1.93
04-Feb-2010	08:39	20.04	0.63	833.65	1.20
04-Feb-2010	08:40	20.07	0.63	821.12	0.89
04-Feb-2010	08:41	20.09	0.62	811.16	0.18
04-Feb-2010	08:42	19.31	1.21	847.33	0.14
04-Feb-2010	08:43	19.16	1.28	845.82	0.13
04-Feb-2010	08:44	19.78	0.81	902.61	36.15
04-Feb-2010	08:45	20.07	0.66	941.10	4.36
04-Feb-2010	08:46	20.07	0.69	934.73	2.25
04-Feb-2010	08:47	20.12	0.68	940.08	1.55
04-Feb-2010	08:48	20.15	0.65	954.37	1.13
04-Feb-2010	08:49	20.17	0.68	944.11	0.24
04-Feb-2010	08:50	20.17	0.74	936.27	0.06
04-Feb-2010	08:51	19.36	1.29	936.17	0.20
04-Feb-2010	08:52	19.85	0.86	916.52	38.26
04-Feb-2010	08:53	20.23	0.67	926.27	4.81
04-Feb-2010	08:54	20.21	0.67	910.11	2.24
04-Feb-2010	08:55	20.24	0.67	888.16	1.24
04-Feb-2010	08:56	20.20	0.64	875.11	1.00
04-Feb-2010	08:57	20.15	0.66	868.91	0.13
04-Feb-2010	08:58	19.64	1.05	864.16	0.18
04-Feb-2010	08:59	19.25	1.28	861.32	0.15
04-Feb-2010	09:00	19.66	0.85	883.11	42.85
04-Feb-2010	09:01	20.09	0.64	875.22	4.67
04-Feb-2010	09:02	20.03	0.64	872.09	2.42
04-Feb-2010	09:03	20.00	0.65	854.46	1.43
04-Feb-2010	09:04	20.06	0.55	862.48	1.00
AVERAGES:		19.85	0.78	865.67	5.81

Eastmount Environmental Services, LLC
UNCORRECTED CEM MONITORING RESULTS
INSTRUMENTAL REFERENCE METHODS - 25A/18

CLIENT: / SITE: Global
SOURCE: RTO

CONDITION: Normal
RUN ID: RTO - Run 3

Date	Time	O2 %	CO2 %	Inlet THC ppm	Outlet THC ppm
04-Feb-2010	09:25	19.85	0.68	832.13	36.52
04-Feb-2010	09:26	19.95	0.66	836.49	2.86
04-Feb-2010	09:27	20.00	0.68	830.87	1.40
04-Feb-2010	09:28	20.00	0.65	835.20	1.20
04-Feb-2010	09:29	19.97	0.67	808.15	0.45
04-Feb-2010	09:30	19.96	0.72	853.70	0.23
04-Feb-2010	09:31	19.14	1.27	838.35	0.19
04-Feb-2010	09:32	19.05	1.25	819.31	0.11
04-Feb-2010	09:33	19.89	0.65	845.08	38.07
04-Feb-2010	09:34	19.87	0.65	828.44	3.54
04-Feb-2010	09:35	19.88	0.66	835.44	1.89
04-Feb-2010	09:36	19.82	0.63	840.85	1.17
04-Feb-2010	09:37	19.83	0.67	839.96	0.84
04-Feb-2010	09:38	19.83	0.67	845.63	0.11
04-Feb-2010	09:39	19.59	0.92	847.91	0.21
04-Feb-2010	09:40	18.95	1.27	854.75	0.09
04-Feb-2010	09:41	19.68	0.68	859.75	35.74
04-Feb-2010	09:42	19.80	0.70	859.36	3.34
04-Feb-2010	09:43	19.82	0.68	874.52	1.62
04-Feb-2010	09:44	19.83	0.66	856.31	1.14
04-Feb-2010	09:45	19.85	0.65	866.79	0.89
04-Feb-2010	09:46	19.85	0.69	839.09	0.09
04-Feb-2010	09:47	19.28	1.15	849.47	0.07
04-Feb-2010	09:48	18.97	1.29	856.10	0.23
04-Feb-2010	09:49	19.68	0.74	856.56	79.57
04-Feb-2010	09:50	19.90	0.66	852.95	3.81
04-Feb-2010	09:51	19.92	0.66	844.12	2.14
04-Feb-2010	09:52	19.91	0.65	850.97	1.12
04-Feb-2010	09:53	19.94	0.65	841.01	1.16
04-Feb-2010	09:54	19.90	0.66	855.00	0.25
04-Feb-2010	09:55	19.86	0.75	851.07	0.11
04-Feb-2010	09:56	18.97	1.32	854.99	0.18
04-Feb-2010	09:57	19.61	0.78	877.22	36.78
04-Feb-2010	09:58	19.87	0.66	869.19	3.92
04-Feb-2010	09:59	19.86	0.66	837.22	1.84
04-Feb-2010	10:00	19.84	0.66	847.74	1.14
04-Feb-2010	10:01	19.84	0.66	866.38	0.94
04-Feb-2010	10:02	19.80	0.64	854.62	0.13
04-Feb-2010	10:03	19.36	1.06	877.21	0.14
04-Feb-2010	10:04	18.86	1.31	883.13	0.19
04-Feb-2010	10:05	19.49	0.77	867.67	34.14
04-Feb-2010	10:06	19.77	0.66	858.81	4.06
04-Feb-2010	10:07	19.72	0.65	882.02	2.15
04-Feb-2010	10:08	19.73	0.68	877.91	1.26
04-Feb-2010	10:09	19.73	0.67	893.97	1.22
04-Feb-2010	10:10	19.73	0.66	893.65	0.42
04-Feb-2010	10:11	19.68	0.67	891.66	0.24
04-Feb-2010	10:12	18.95	1.28	898.60	0.09
04-Feb-2010	10:13	19.37	0.85	891.42	34.83
04-Feb-2010	10:14	19.73	0.69	888.55	4.10
04-Feb-2010	10:15	19.75	0.67	897.95	1.79
04-Feb-2010	10:16	19.78	0.68	896.33	1.22
04-Feb-2010	10:17	19.82	0.68	891.41	1.10
04-Feb-2010	10:18	19.88	0.68	902.52	0.06
04-Feb-2010	10:19	19.56	1.00	886.94	0.11
04-Feb-2010	10:20	19.07	1.30	885.77	0.01
04-Feb-2010	10:21	19.60	0.87	880.29	47.43
04-Feb-2010	10:22	19.96	0.67	901.02	4.43
04-Feb-2010	10:23	20.04	0.67	869.53	2.32
04-Feb-2010	10:24	20.05	0.65	861.45	1.33
AVERAGES:		19.69	0.79	861.51	6.80

Method 25A Calibration Data Sheet - Inlet

Source Summary	
Client:/Site:	Global
Source:/Location:	RTO
Test Date:	4-Feb-10

THC Analyzer Data			
Manufacturer -	TECO		
Model/Serial Number -	51		
Fuel Pressure -	28		
Combustion Air Pressure -	31		
Sample Pressure -	9.0		
Range -	0	-	10,000
Calibrant (choose one, x in box)	Propane	x	
	Methane		
Program Molecular Weight:	44.09	g/mol	

Field Crew Summary	
Crew Member 1 -	A. Seaha
Crew Member 2 -	M. Bruni
Crew Member 3 -	
Crew Member 4 -	

Calibration Error Test Data		
Calibration Gas	Cylinder Concentration	Actual Response
Zero Gas	0	4
High Gas	8,310	8,330
Response Line	1.002	

Response Line = (Ha-Za)/(Hc-Zc)

Run Summary			
Run No.	1	2	3
Start Time	6:45	8:05	9:25
Stop Time	7:45	9:05	10:25

Calibration Gas	Cylinder Concentration	Predicted Response	Actual Response	Calibration Error	Acceptance Criteria
Low Gas	2,990	2,996	2,947	1.6	< 5% of cylinder concentration
Mid Gas	4,754	4,763	4,555	4.4	< 5% of cylinder concentration

Where:

Predicted Response = (Cylinder Concentration) x (Response Line)

Calibration Error = (Actual Response - Predicted Response) / Cylinder Concentration x 100

Calibration Drift Test Data

Calibration Gas	Cylinder Concentration	Initial Test Response	Final Test Response	Calibration Drift	Acceptance Criteria	
Test Run 1 Zero	0	4	31	0.3	< 3% of the measurement range	
Test Run 1 Mid	3,000	2,947	3,145	2.0	< 3% of the measurement range	
					Test Run 1 Avg. Conc.	827.7
Test Run 2 Zero	0	4	26	0.2	< 3% of the measurement range	
Test Run 2 Mid	3,000	2,947	3,132	1.9	< 3% of the measurement range	
					Test Run 2 Avg. Conc.	865.7
Test Run 3 Zero	0	4	26	0.2	< 3% of the measurement range	
Test Run 3 Mid	3,000	2,947	3,120	1.7	< 3% of the measurement range	
					Test Run 3 Avg. Conc.	861.5

Where:

$$\text{Calibration Drift} = \frac{(\text{Final Test Response} - \text{Initial Test Response})}{\text{Measurement Range}} * 100$$

Gas Cylinder Data

Calibration Gas	Required % of Span	Cylinder Concentration	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel	N/A		UHP H2			N/A
Combustion Air			UHP Air			
Zero Gas	0	0	UHP Air			0.0%
Low Gas	25-35					0.0%
Mid Gas	45-55					0.0%
High Gas	80-90					0.0%

CEMS System Response Time = 60 seconds

Method 25A Data Sheet

Client	CAA / Globe / Oil
Facility	Chelsea, MA
Source	RTO
Test Location	Inlet
Date	2/4/10

THC Analyzer Data

Manufacturer	TECO
Model/Serial Number	51 / 53403-296
Fuel Pressure	28
Combustion Air Pressure	31
Sample Pressure	9
Measurement Range	0 - 10,000 C_3H_8
Response Time	1 min

Test Data

Test Number	1	2	3
Start Time	645	805	925
Stop Time	745	905	1025
Testers	AS, MB		

Calibration Error Test Data

Calibration Gas	Cylinder Concentration	Actual Response
Zero Gas	0	4
High Gas	8310	8330
Response Line	1.002	

Response Line = (Ha/Za)/(Hc-Zc)

Calibration Gas	Cylinder Concentration	Predicted Response	Actual Response	Calibration Error	Criteria Acceptance
Low Gas	2990	2996	2947	1.6	< 5% of cylinder concentration
Mid Gas	4754	4763	4555	4.4	< 5% of cylinder concentration

Predicted Response = (Cylinder Concentration) x (Response Line)
Calibration Error = (Actual Response - Predicted Response) / Cylinder Concentration x 100

Calibration Drift Test Data

Calibration Gas	Cylinder Concentration	CE Test Response	Actual Response	Calibration Drift	Criteria Acceptance	
Test Run 1 Zero	0	4	31	0.3	< 3% of the measurement range	
Test Run 1 Mid	2990	2947	3145	2.0	< 3% of the measurement range	
					Test Run 1 Avg. Conc.	827.68
Test Run 2 Zero	0	4	26	0.2	< 3% of the measurement range	
Test Run 2 Mid	2990	2947	3132	1.9	< 3% of the measurement range	
					Test Run 2 Avg. Conc.	865.67
Test Run 3 Zero	0	4	26	0.2	< 3% of the measurement range	
Test Run 3 Mid	2990	2947	3120	1.7	< 3% of the measurement range	
Calibration Drift = (Actual Response - CE Test Response) / Measurement Range * 100					Test Run 3 Avg. Conc.	861.51

Gas Cylinder Data

Calibration Gas	Required % of Span	Cylinder Concentration	Cylinder Composition	Cylinder Number	Expiration Date	Actual % of Span
Fuel			UHP H2			
Combustion Air			UHP Air			
Low Gas	25 - 35	2990	C_3H_8/Air	CC32038		29.9
Mid Gas	45 - 55	4754		CC118012		47.5
High Gas	80 - 90	8310		CC2339		83.1

A2 – Flow Measurement Data

A3 – Sulfur Results

Columbia Analytical Services™ 2655 Park Center Drive, Suite A | Simi Valley, CA 93065 | 805.526.7161 | 805.526.7270 fax | www.caslab.com

LABORATORY REPORT

February 19, 2010

Paul Murphy
CA Associates
16 Revolutionary Road
Acton, MA 01720

RE: Global Oil / 09-017

Dear Paul:

Enclosed are the results of the samples submitted to our laboratory on February 5, 2010. For your reference, these analyses have been assigned our service request number P1000433.

All analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein. Your report contains 12 pages.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; Department of the Navy (NFESC); Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-09-TX; Minnesota Department of Health, Certificate No. 11495AA. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Kate Aguilera

Kate Aguilera
Project Manager

100% Recycled Paper

Client: CA Associates
Project: Global Oil / 09-017

CAS Project No: P1000433

CASE NARRATIVE

The samples were received intact under chain of custody on February 5, 2010 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Sulfur Analysis

The samples were analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

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Client: CA Associates
Project: Global Oil/09-017

Service Request: P1000433

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
P1000433-001	Inlet Run 1	2/4/10	15:00
P1000433-002	Inlet Run 2	2/4/10	15:10
P1000433-003	Inlet Run 3	2/4/10	15:20
P1000433-004	Outlet Run 1	2/4/10	15:40
P1000433-005	Outlet Run 2	2/4/10	15:45
P1000433-006	Outlet Run 3	2/4/10	15:50

3

Air - Chain of Custody Record & Analytical Service Request

Columbia Analytical Services INC.
An Employee - Owned Company

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day - Standard

CAS Project No. P1000433

CAS Contact

Company Name & Address (Reporting Information)
CA ASSOCIATES
16 REVOLUTIONARY RD
ACTON, MA 01720

Project Name: GLOBAL O/L

Project Number: 09-017

Project Manager: PAUL MURPHY

P.O. # / Billing Information: 09-017

Phone: (978) 263-4895 Fax: (978) 263-2191

Email Address for Result Reporting: CAassociates@comcast.net

Sampler (Print & Sign): PAUL MURPHY

Analysis Method and/or Analytes: SULFUR COMPOUNDS

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Sample Type (Air/Tube/Solid)	Canister ID (Bar Code # - AC, SC, etc.)	Flow Controller (Bar Code - FC #)	Sample Volume	Comments e.g. Actual Preservative or specific instructions
INLET RUN 1	1	2/4/10	3:00	AIR	N/A	N/A	1L	
" " 2	2		3:10					
" " 3	3		3:20					
OUTLET RUN 1	4		3:40					
" " 2	5		3:45					
" " 3	6		3:50				3L	

Report Tier Levels - please select
Tier I - (Results/Default if not specified) ____
Tier II - (Results + QC) ____
Tier III - (Data Validation Package) 10% Surcharge ____
Tier V - (client specified) ____

EDD required Yes / No
Type: _____
EDD Units: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature) Paul Murphy	Date: 2/4/10	Time: 17:00	Received by: (Signature) [illegible]	Date: 2/5/10	Time: 0755
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank
Temperature _____ °C

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: CA Associates Work order: P1000433

Project: Global Oil / 09-017

Sample(s) received on: 02/05/10 Date opened: 02/05/10 by: MZAMORA

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by** CAS?	☐	☒	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Was a **chain-of-custody** provided?	☒	☐	☐
5	Was the **chain-of-custody** properly completed?	☒	☐	☐
6	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
7	Was **sample volume** received adequate for analysis?	☒	☐	☐
8	Are samples within specified holding times?	☒	☐	☐
9	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature _____ °C Blank Temperature _____ °C			
10	Was a **trip blank** received?	☐	☐	☒
	Trip blank supplied by CAS: _____			
11	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
12	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
13	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
14	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1000433-001.01	1.0 L Tedlar Bag					Received Flat
P1000433-002.01	1.0 L Tedlar Bag					
P1000433-003.01	1.0 L Tedlar Bag					
P1000433-004.01	1.0 L Tedlar Bag					
P1000433-005.01	1.0 L Tedlar Bag					
P1000433-006.01	3.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers): _____

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*Required pH: Phenols/COD/NH3/TOC/TOX/NO3+NO2/TKN/T.PHOS, H2SO4 (pH<2); Metals, HNO3 (pH<2); CN (NaOH or NaOH/Asc Acid) (pH>12);
Diss. Sulfide, NaOH (pH>12); T. Sulfide, NaOH/ZnAc (pH>12) RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: CA Associates
Client Project ID: Global Oil / 09-017

CAS Project ID: P1000433

Total Reduced Sulfur as Hydrogen Sulfide

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Tedlar Bag(s)
Test Notes:

Date(s) Collected: 2/4/10
Date Received: 2/5/10
Date Analyzed: 2/5/10

Client Sample ID	CAS Sample ID	Injection Volume ml(s)	Time Analyzed	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
Inlet Run 2	P1000433-002	1.0	08:49	**15**	7.0	**10**	5.0	
Inlet Run 3	P1000433-003	1.0	09:08	**9.9**	7.0	**7.1**	5.0	
Outlet Run 1	P1000433-004	1.0	09:37	**14**	7.0	**10**	5.0	
Outlet Run 2	P1000433-005	1.0	09:56	**14**	7.0	**10**	5.0	
Outlet Run 3	P1000433-006	1.0	10:15	ND	7.0	ND	5.0	
Method Blank	P100205-MB	1.0	07:51	ND	7.0	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 2/18/10

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **CA Associates**
Client Sample ID: **Inlet Run 2**
Client Project ID: **Global Oil / 09-017**

CAS Project ID: P1000433
CAS Sample ID: P1000433-002

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 2/4/10
Time Collected: 15:10
Date Received: 2/5/10
Date Analyzed: 2/5/10
Time Analyzed: 08:49
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	**Carbonyl Sulfide**	**15**	12	**6.0**	5.0	+
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
+ = Possible Tedlar bag artifact.

Verified By: _____ Date: 2/18/10

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: CA Associates
Client Sample ID: Inlet Run 3
Client Project ID: Global Oil / 09-017

CAS Project ID: P1000433
CAS Sample ID: P1000433-003

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 2/4/10
Time Collected: 15:20
Date Received: 2/5/10
Date Analyzed: 2/5/10
Time Analyzed: 09:08
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 2/8/10

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: CA Associates
Client Sample ID: Outlet Run 1
Client Project ID: Global Oil / 09-017

CAS Project ID: P1000433
CAS Sample ID: P1000433-004

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 2/4/10
Time Collected: 15:40
Date Received: 2/5/10
Date Analyzed: 2/5/10
Time Analyzed: 09:37
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	**Carbonyl Sulfide**	12	12	5.1	5.0	+
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
+ = Possible Tedlar bag artifact.

Verified By: _____ Date: 2/18/10

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **CA Associates**
Client Sample ID: **Outlet Run 2**
Client Project ID: **Global Oil / 09-017**

CAS Project ID: P1000433
CAS Sample ID: P1000433-005

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Zheng Wang
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 2/4/10
Time Collected: 15:45
Date Received: 2/5/10
Date Analyzed: 2/5/10
Time Analyzed: 09:56
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	**Carbonyl Sulfide**	**17**	12	**6.8**	5.0	+
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
+ = Possible Tedlar bag artifact.

Verified By: _____ Date: 2/18/1

A4 – Tank/Rack Capture Flow Rate Data

Table 2-2, Summary of Results - Tank Capture

Tank	Flow Rate (DSCFM)	Hood VOC	Intake VOC
203	513	1300	0
204	599	2200	0
102	496	350	0
103	507	1000	0
104	474	350	0
106	486	350	0

Summary of Results - Rack Capture

Rack	Flow Rate (DSCFM)
G	333
H	343
J	371
K	305
L	346
M	288
N	329
O	372
P	406
R	405

Flow Rate Summaries

Rack	Delta P	SQ Root	T	Ps	Diam	Area	Flow Rate
R	1.100	1.05	55.0	-9.9	0.33	0.087	**358**
P	1.300	1.14	55.0	-9.4	0.33	0.087	**389**
O	1.000	1.00	55.0	-9.5	0.33	0.087	**341**
N	1.300	1.14	55.0	-9.3	0.33	0.087	**389**
M	1.200	1.10	55.0	-8.8	0.33	0.087	**374**
L	1.400	1.18	55.0	-9.2	0.33	0.087	**404**
K	0.8	0.89	55.0	-8.6	0.33	0.087	**306**
J	1	1.00	55.0	-8.6	0.33	0.087	**342**
H	0.7	0.84	55.0	-8.8	0.33	0.087	**286**
G	0.78	0.88	55.0	-8.8	0.33	0.087	**302**
Tanks							
202	0.49	0.70	55.0	-8.8	0.50	0.196	**538**
203	0.52	0.72	55.0	-1.1	0.50	0.196	**560**
204	0.27	0.52	55.0	-1.4	0.50	0.196	**403**
104	0.45	0.67	55.0	-1.4	0.42	0.136	**362**
103	0.32	0.57	55.0	-2.1	0.42	0.136	**305**
102	0.38	0.62	55.0	-2.1	0.42	0.136	**332**
106	0.43	0.66	55.0	-1.8	0.42	0.136	**353**

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Tank 203	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.35	0.59	74
2	0.36	0.60	74
3	0.36	0.60	74
4	0.34	0.58	74
5	0.57	0.75	75
6	0.55	0.74	75
7	0.58	0.76	75
B1	0.58	0.76	75
2			
3			
4			
5			
6			
Average	0.461	0.67	75

Avg. Delta P ("H_2O)	0.461
Avg. Stack Temp (°F)	74.5
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-2.3
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.500
L (ft)	
W (ft)	
Stack Area (ft^2)	0.196
Cp	0.99
Md	28.84
Ms	28.62

G	0.79	
VS	45.17	FPS
Qs	30786	DSCFH
	31414	WSCFH
	524	WSCFM
	513	DSCFM
	532	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Tank 204	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.58	0.76	64
2	0.88	0.94	64
3	0.76	0.87	64
4	0.65	0.81	64
5	0.35	0.59	65
6	0.47	0.69	65
7	0.60	0.77	65
B1	0.64	0.80	56
2			
3			
4			
5			
6			
Average	0.616	0.78	63

Avg. Delta P ("H_2O)	0.616
Avg. Stack Temp (°F)	63.4
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-2
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.500
L (ft)	
W (ft)	
Stack Area (ft^2)	0.196
Cp	0.99
Md	28.84
Ms	28.62

G	0.78	
VS	51.60	FPS
Qs	35940	DSCFH
	36674	WSCFH
	611	WSCFM
	599	DSCFM
	608	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Tank 102	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	1.10	1.05	57
2	1.10	1.05	57
3	1.10	1.05	57
4	1.10	1.05	57
5	0.58	0.76	57
6	0.64	0.80	57
7	0.67	0.82	57
B1	0.68	0.82	57
2			
3			
4			
5			
6			
Average	0.871	0.92	57

Avg. Delta P ("H_2O)	0.871
Avg. Stack Temp (°F)	57.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-3.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.417
L (ft)	
W (ft)	
Stack Area (ft^2)	0.136
Cp	0.99
Md	28.84
Ms	28.62

G	0.78	
VS	61.03	FPS
Qs	29775	DSCFH
	30383	WSCFH
	506	WSCFM
	496	DSCFM
	499	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 + .32 O2 + .28 CO + .28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Tank 103	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.88	0.94	44
2	1.00	1.00	44
3	1.20	1.10	44
4	0.93	0.96	44
5	0.63	0.79	43
6	0.76	0.87	43
7	0.80	0.89	43
B1	0.81	0.90	43
2			
3			
4			
5			
6			
Average	0.876	0.93	44

Avg. Delta P ("H_2O)	0.876
Avg. Stack Temp (°F)	43.5
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static ("H_2O)	-3.4
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.417
L (ft)	
W (ft)	
Stack Area (ft^2)	0.136
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	60.69	FPS
Qs	30411	DSCFH
	31032	WSCFH
	517	WSCFM
	507	DSCFM
	497	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Tank 104	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.88	0.94	54
2	1.00	1.00	54
3	1.10	1.05	54
4	1.10	1.05	54
5	0.47	0.69	50
6	0.56	0.75	50
7	0.60	0.77	50
B1	0.60	0.77	50
2			
3			
4			
5			
6			
Average	0.789	0.88	52

Avg. Delta P ("H_2O)	0.789
Avg. Stack Temp (°F)	52.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-2.4
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.417
L (ft)	
W (ft)	
Stack Area (ft^2)	0.136
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	57.53	FPS
Qs	28418	DSCFH
	28998	WSCFH
	483	WSCFM
	474	DSCFM
	471	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Tank 106	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.75	0.87	49
2	0.88	0.94	49
3	0.84	0.92	49
4	0.80	0.89	49
5	0.70	0.84	48
6	0.85	0.92	48
7	0.84	0.92	48
B1	0.80	0.89	48
2			
3			
4			
5			
6			
Average	0.808	0.90	49

Avg. Delta P ("H_2O)	0.808
Avg. Stack Temp (°F)	48.5
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-3.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.417
L (ft)	
W (ft)	
Stack Area (ft^2)	0.136
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	58.77	FPS
Qs	29149	DSCFH
	29744	WSCFH
	496	WSCFM
	486	DSCFM
	481	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Rack "G"	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.82	0.91	30
2	0.95	0.97	30
3	0.96	0.98	30
4	0.92	0.96	30
5			
6			
7			
B1			
2			
3			
4			
5			
6			
Average	0.913	0.95	30

Avg. Delta P ("H_2O)	0.913
Avg. Stack Temp (°F)	30.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static ("H_2O)	-12.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.333
L (ft)	
W (ft)	
Stack Area (ft^2)	0.087
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	62.03	FPS
Qs	19978	DSCFH
	20386	WSCFH
	340	WSCFM
	333	DSCFM
	325	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Rack "H"	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.99	0.99	30
2	0.96	0.98	30
3	0.95	0.97	30
4	0.96	0.98	30
5			
6			
7			
B1			
2			
3			
4			
5			
6			
Average	0.965	0.98	30

Avg. Delta P ("H_2O)	0.965
Avg. Stack Temp (°F)	30.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-12.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.333
L (ft)	
W (ft)	
Stack Area (ft^2)	0.087
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	63.81	FPS
Qs	20554	DSCFH
	20974	WSCFH
	350	WSCFM
	343	DSCFM
	334	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Rack "J"	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.95	0.97	30
2	1.10	1.05	30
3	1.30	1.14	30
4	1.20	1.10	30
5			
6			
7			
B1			
2			
3			
4			
5			
6			
Average	1.138	1.06	30

Avg. Delta P ("H_2O)	1.138
Avg. Stack Temp (°F)	30.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-12.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.333
L (ft)	
W (ft)	
Stack Area (ft^2)	0.087
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	69.17	FPS
Qs	22280	DSCFH
	22734	WSCFH
	379	WSCFM
	371	DSCFM
	362	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Rack "K"	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.60	0.77	30
2	0.60	0.77	30
3	0.95	0.97	30
4	0.95	0.97	30
5			
6			
7			
B1			
2			
3			
4			
5			
6			
Average	0.775	0.87	30

Avg. Delta P ("H_2O)	0.775
Avg. Stack Temp (°F)	30.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-12.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.333
L (ft)	
W (ft)	
Stack Area (ft^2)	0.087
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	56.82	FPS
Qs	18301	DSCFH
	18675	WSCFH
	311	WSCFM
	305	DSCFM
	298	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Rack "L"	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.70	0.84	30
2	0.66	0.81	30
3	1.50	1.22	30
4	1.20	1.10	30
5			
6			
7			
B1			
2			
3			
4			
5			
6			
Average	1.015	0.99	30

Avg. Delta P ("H_2O)	1.015
Avg. Stack Temp (°F)	30.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-12.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.333
L (ft)	
W (ft)	
Stack Area (ft^2)	0.087
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	64.46	FPS
Qs	20764	DSCFH
	21187	WSCFH
	353	WSCFM
	346	DSCFM
	338	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Rack "M"	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.69	0.83	30
2	0.70	0.84	30
3	0.65	0.81	30
4	0.68	0.82	30
5			
6			
7			
B1			
2			
3			
4			
5			
6			
Average	0.680	0.82	30

Avg. Delta P ("H_2O)	0.680
Avg. Stack Temp (°F)	30.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-12.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.333
L (ft)	
W (ft)	
Stack Area (ft^2)	0.087
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	53.56	FPS
Qs	17253	DSCFH
	17605	WSCFH
	293	WSCFM
	288	DSCFM
	280	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 + .32 O2 + .28 CO + .28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Rack "N"	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.80	0.89	30
2	0.95	0.97	30
3	0.92	0.96	30
4	0.90	0.95	30
5			
6			
7			
B1			
2			
3			
4			
5			
6			
Average	0.893	0.94	30

Avg. Delta P ("H_2O)	0.893
Avg. Stack Temp (°F)	30.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-12.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.333
L (ft)	
W (ft)	
Stack Area (ft^2)	0.087
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	61.34	FPS
Qs	19758	DSCFH
	20161	WSCFH
	336	WSCFM
	329	DSCFM
	321	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Rack "O"	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	0.88	0.94	30
2	1.20	1.10	30
3	1.30	1.14	30
4	1.20	1.10	30
5			
6			
7			
B1			
2			
3			
4			
5			
6			
Average	1.145	1.07	30

Avg. Delta P ("H_2O)	1.145
Avg. Stack Temp (°F)	30.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-12.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.333
L (ft)	
W (ft)	
Stack Area (ft^2)	0.087
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	69.33	FPS
Qs	22332	DSCFH
	22788	WSCFH
	380	WSCFM
	372	DSCFM
	363	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Rack "P"	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	1.10	1.05	30
2	1.60	1.26	30
3	1.40	1.18	30
4	1.35	1.16	30
5			
6			
7			
B1			
2			
3			
4			
5			
6			
Average	1.363	1.16	30

Avg. Delta P ("H_2O)	1.363
Avg. Stack Temp (°F)	30.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-12.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.333
L (ft)	
W (ft)	
Stack Area (ft^2)	0.087
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	75.66	FPS
Qs	24371	DSCFH
	24868	WSCFH
	414	WSCFM
	406	DSCFM
	396	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)

VOLUMETRIC FLOW CALCULATIONS

Plant:	Global	Run #:	Flow
Location:	Rack "R"	Date:	4-Feb-10

Trav. Point	Delta P	SQ Root	Stack Temp
A1	1.20	1.10	30
2	1.20	1.10	30
3	1.50	1.22	30
4	1.50	1.22	30
5			
6			
7			
B1			
2			
3			
4			
5			
6			
Average	1.350	1.16	30

Avg. Delta P ("H_2O)	1.350
Avg. Stack Temp (°F)	30.0
Bwo	0.020
Barometric Press ("Hg)	29.98
P Static (" H_2O)	-12.5
% CO_2	0
% O_2	20.9
% CO	0
% N_2	79.1
Stack Dia (ft)	0.333
L (ft)	
W (ft)	
Stack Area (ft^2)	0.087
Cp	0.99
Md	28.84
Ms	28.62

G	0.77	
VS	75.36	FPS
Qs	24274	DSCFH
	24770	WSCFH
	413	WSCFM
	405	DSCFM
	395	ACFM

Equations:

Ts = Temp Stack + 460
Ps = Pstatic/13.6 + Bp
Md = .44 CO2 +.32 O2 + .28 CO +.28 N2
Ms = Md(1-Bwo)+18(Bwo)
G = Sqrt(Ts/Ps/Ms)
Vs = 85.9(Cp)(G)(Ave Sqrt Delta P)
As = either D^2(PI)/4 or (L)(W)
Qs = 3600(1-Bwo)(Vs)(As)17.64(Ps)/(Ts)