Wheelabrator South Broward Inc.
A Waste Management Company

4400 South State Road 7
Ft. Lauderdale, FL 33314
(954) 581-6606
(954) 581-6705 Fax

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DIVISION OF AIR
RESOURCE MANAGEMENT

May 3, 2012

UPS# 1Z2ZW7390199472953

Mr. Lennon Anderson
Air Program Administrator
Florida Department of Environmental Protection
Southeast District
400 North Congress Ave., Suite 200
West Palm Beach, FL 33401

Re: Wheelabrator South Broward
2012 Annual Compliance Stack Test and RATA Reports

Dear Mr. Anderson:

Please find enclosed a copy of the final compliance stack test report and the continuous emissions monitoring system certification RATA report for testing conducted on March 20-22 of this year by Clean Air Engineering, Inc.

I, the undersigned, am a responsible official, as defined in Rule 62-210.200, F.A.C., of the Title V source addressed in this submittal. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements and information in this document are true, accurate and complete.

If there are any questions, please contact this office at (954) 581-6606.

Sincerely,

Scott McIvaine

Scott McIvaine
Plant Manager

cc: USEPA, Region IV, Pesticides and Toxics Management Division, Air & EPCRA Enforcement Branch, Air Enforcement Section (with) UPS# 1Z2AW7390198112361

FDEP, Tallahassee, Bureau of Air Regulation, New Source Review Section, (with) UPS# 1Z2AW7390198467372

Broward County Department of Planning and Environmental Protection, Air Quality Division (with) UPS# 1Z2AW7390195633983

Chuck Faller (with)
Ram Tewari – BCWRS (without)
Tim Porter (without)
Rob French – MPI (with) UPS# 1Z2AW7390196068191

WASTE MANAGEMENT

CleanAir.

CleanAir Engineering
500 W. Wood Street
Palatine, IL 60067-4975
www.cleanair.com

Wheelabrator South Broward, Inc.
4400 South State Road 7
Ft. Lauderdale, FL 33314

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RESOURCE MANAGEMENT

REPORT ON COMPLIANCE TESTING

Performed for:

WHEELABRATOR SOUTH BROWARD, INC.
UNITS 1, 2 AND 3 SDA INLETS, FF OUTLETS, ASH HANDLING SYSTEM AND LIME SILO VENT
FT. LAUDERDALE, FL
VOLUME I OF II

Client Reference No: Service Agreement
CleanAir Project No: 11414-1
Revision 0: May 2, 2012

To the best of our knowledge, the data presented in this report are accurate, complete, error free, legible and representative of the actual emissions during the test program. Clean Air Engineering operates in conformance with the requirements of ASTM D7036-04 Standard Practice for Competence of Air Emission Testing Bodies.

Submitted by,

Scott Brown
Project Manager
sbrown@cleanair.com
(800) 627-0033 ext. 4544

Reviewed by,

Mark Roach, P.E.
Engineering Group Technical Leader
mroach@cleanair.com
(800) 627-0033 ext. 4599

REVISION HISTORY

REPORT ON COMPLIANCE TESTING

DRAFT REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
D0a	04/20/12	All	Draft version of original document.

FINAL REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
0	05/02/12	All	Final version of original document.

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INTRODUCTION

Wheelabrator South Broward, Inc. operates a Refuse-to-Energy facility, located in Ft. Lauderdale, Florida. The facility's emission levels are regulated by the Florida Department of Environmental Protection (DEP). Wheelabrator South Broward, Inc. contracted Clean Air Engineering (CleanAir) to perform a compliance test program.

The Lime Silo Fabric Filter (FF) Vent was observed for visual emissions (VEs) and the Ash Handling System was observed for fugitive emissions. The VEs were determined by the facility's continuous opacity monitor system (COMS) data, as allowed under 40 CFR 60.11(e)(5). Testing was conducted in accordance with the Wheelabrator North and South Broward Protocol on Compliance, dated February 3, 2012, 40 CFR 60, Subpart Cb, and applicable sections of the facility's Title V Permit No. 0112119-015-AV.

All testing was conducted in accordance with the regulations set-forth by the United States Environmental Protection Agency (EPA) and the DEP.

Key Project Participants

Individuals responsible for coordinating and conducting the test program were:

C. Faller – Wheelabrator
S. Brown – CleanAir

Lee Hoeffert of the DEP was present for portions of the test program.

The CleanAir test crew consisted of the following individuals:

R. Vicere
D. Luckhard
P. Bihun
N. Hitchins
K. Sullivan
B. Arnold

The names of the laboratory employees that performed each specific analysis are presented in Appendix I of this report, along with the respective laboratory reports.

Test Program Parameters

The sampling was conducted at the Units 1, 2 and 3 Spray Dryer Absorption (SDA) Inlet, FF Outlets, Ash Handling System and Lime Silo Vent from March 20 through 22, 2012, and included the following emissions measurements:

- filterable particulate matter (FPM)
- polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF); Unit 1 only
- hydrogen chloride (HCl)
- mercury (Hg)
- cadmium (Cd)
- lead (Pb)
- flue gas composition (e.g., O_2, CO_2, H_2O)
- flue gas flow rate
- flue gas temperature
- fugitive emissions
- visible emissions (VEs)

TEST PROGRAM SYNOPSIS

Test Schedule

The on-site schedule followed during the test program is outlined in Table 1-1.

Table 1-1:
Schedule of Activities

Run Number	Location	Method	Analyte	Date	Start Time	End Time
1	Unit 1 FF Outlet	USEPA Methods 5/29	Particulate/Metals	03/20/12	07:52	10:05
1	Unit 3 FF Outlet	USEPA Methods 5/29	Particulate/Metals	03/20/12	07:54	10:11
1	Unit 2 SDA Inlet/FF Outlet	USEPA Method 26A	HCl	03/20/12	08:08	09:08
2	Unit 2 SDA Inlet/FF Outlet	USEPA Method 26A	HCl	03/20/12	09:49	10:49
2	Unit 1 FF Outlet	USEPA Methods 5/29	Particulate/Metals	03/20/12	10:29	12:44
1	Unit 1 FF Outlet	USEPA Method 23	PCDD/PCDF	03/20/12	11:15	15:43
3	Unit 2 SDA Inlet/FF Outlet	USEPA Method 26A	HCl	03/20/12	12:22	13:22
3	Unit 1 FF Outlet	USEPA Methods 5/29	Particulate/Metals	03/20/12	13:04	15:20
2	Unit 1 FF Outlet	USEPA Method 23	PCDD/PCDF	03/21/12	07:32	12:08
1	Unit 3 SDA Inlet/FF Outlet	USEPA Method 26A	HCl	03/21/12	07:54	09:40
1	Unit 2 FF Outlet	USEPA Methods 5/29	Particulate/Metals	03/21/12	08:16	10:28
NA	Lime Silo	USEPA Method 9	Opacity	03/21/12	08:28	11:27
2	Unit 3 SDA Inlet/FF Outlet	USEPA Method 26A	HCl	03/21/12	10:04	11:04
2	Unit 2 FF Outlet	USEPA Methods 5/29	Particulate/Metals	03/21/12	10:52	13:07
3	Unit 3 SDA Inlet/FF Outlet	USEPA Method 26A	HCl	03/21/12	11:30	12:30
3	Unit 1 FF Outlet	USEPA Method 23	PCDD/PCDF	03/21/12	12:31	16:54
4	Unit 1 FF Outlet	USEPA Method 29	Mercury	03/21/12	13:18	15:38
3	Unit 2 FF Outlet	USEPA Methods 5/29	Particulate/Metals	03/21/12	13:29	15:41
2	Unit 3 FF Outlet	USEPA Methods 5/29	Particulate/Metals	03/22/12	07:37	09:50
4	Unit 2 FF Outlet	USEPA Method 29	Mercury	03/22/12	07:43	09:56
1	Unit 1 SDA Inlet/FF Outlet	USEPA Method 26A	HCl	03/22/12	07:44	08:44
2	Unit 1 SDA Inlet/FF Outlet	USEPA Method 26A	HCl	03/22/12	09:07	10:07
3	Unit 3 FF Outlet	USEPA Methods 5/29	Particulate/Metals	03/22/12	10:11	12:23
3	Unit 1 SDA Inlet/FF Outlet	USEPA Method 26A	HCl	03/22/12	10:32	11:32
NA	Ash Handling System	USEPA Method 22	Fugitive Emissions	03/22/12	10:53	15:53
4	Unit 3 FF Outlet	USEPA Method 29	Mercury	03/22/12	12:50	15:01

Results Summary

Table 1-2 summarizes the results of the test program. A more detailed presentation of the test conditions and results of analysis are shown in Tables 2-1 through 2-19 on pages 2-1 through 2-18. Subpart Cb-required operating data is summarized in Table 1-3 and opacity and fugitive emission results are presented in Table 1-4, both on page 1-5.

Table 1-2:
Summary of Test Results

Source	Average Unit 1	Average Unit 2	Average Unit 3	Permit Limit[1]
Constituent				
Particulate (mg/dscm @7% O_2)	3.1	4.5	3.8	25 (27)
Visual Emissions (%, by COMS)[2]	1	0	0	10
Total PCCD/PCDF (ng/dscm @ 7% O_2)	13	NA	NA	30
Hydrogen Chloride (ppmdv @ 7% O_2) or	10	5.3	16	29
Hydrogen Chloride Removal (%)[3]	98%	99%	97%	>95
Cadmium (mg/dscm @ 7% O_2)	0.00026	0.0012	0.0010	0.035 (0.040)
Lead (mg/dscm @ 7% O_2)	0.0010	0.011	0.0099	0.40 (0.44)
Mercury (µg/dscm @ 7% O_2)	1.9	1.2	2.0	50 (70)
Carbon Feed Rate (lbs/hr)[4]	6	6	6	NA
Average Steam Flow (Klbs/hr)[4]	187.7	188.0	187.3	192
Average FF Inlet Temperature (^{O}F)[4]	320	315	315	NA

[1] Limits obtained from facilities Title V Permit 0112119-015-AV. If a second limit is shown that limit is being implemented by the EPA as of April 28, 2009. Respective PSD limits are presented in parenthesis.
[2] Visual Emissions (opacity) was obtained from the facilities COMS data as allowed under 40CFR60.11(e)(5).
[3] Removal for hydrogen chloride calculated in the unit of its standard. The hydrogen chloride limit is 29 ppmdv @ 7% O2 or 85% removal, whichever is less stringent.
[4] From all compliance test runs.

Table 1-3:
Subpart Cb- Required Operating Data

Process Condition	
Unit 1 Maximum Demonstrated Combustor Load (Klbs/hr)[1]	188.4
Unit 2 Maximum Demonstrated Combustor Load (Klbs/hr)[1]	183.9 [2]
Unit 3 Maximum Demonstrated Combustor Load (Klbs/hr)[1]	183.6 [3]
Unit 1 Maximum Particulate Control Device Inlet Temperature (°F)[4]	321
Unit 2 Maximum Particulate Control Device Inlet Temperature (°F)[4]	315 [2]
Unit 3 Maximum Particulate Control Device Inlet Temperature (°F)[4]	315 [3]
Unit 1 Carbon Feed Rate (lbs/hr)[5]	6
Unit 2 Carbon Feed Rate (lbs/hr)[5]	6
Unit 3 Carbon Feed rate (lbs/hr)[5]	6

[1] From 40CFR60.58b (i) (8) the maximum demonstrated load during PCDD/PCDF testing, four hour average.
[2] From CleanAir Cb test report dated May 5, 2010.
[3] From CleanAir Cb test report dated May 11, 2011.
[4] From 40CFR60.58b (i) (9) the highest four hour average during PCDD/PCDF testing.
[5] From 40CFR60.58b (m)(1)(i) an average mass carbon rate during mercury or dioxin testing. The minimum carbon feed rate is established as the lower of the average carbon feed rates measured during the mercury or dioxin testing.

Table 1-4:
Opacity and Fugitive Emission Test Results

Source	Constituent	Sampling Method	Results	Permit Limit[1]
Ash Handling System[2]				
	Fugitive Emissions (%)	EPA M22	0	5% of observation time
	Fugitive Emissions (minutes)		0	9 minutes
Lime Silo[3]				
	Visual Emisssions (%)	EPA M9	0	5%

[1] Limits obtained from 40 Code of Federal Register part 60 Subpart Cb - Emission Guidelines and Compliance Times for Large Municipal Waste Combustors That Are Constructed on or Before September 20, 1994 published in Federal Register as 62 FR 45123 on December 19, 1995 as modifed on August 25, 1997, Florida's Rule 62-296.416, F.A.C. and PSD-FL-105.
[2] The Ash Handling System was observed at various locations for a total of 3 hours.
[3] The Lime Silo was observed for one complete truck unloading.

Discussion of Test Program

All test methods were done in triplicate with the exception of mercury which had a fourth run performed on each unit. All data that is reported in the units of lb/MMBTU utilized the Fd of 9,570, as per EPA Method 19.

All equipment utilized for compliance testing was manufactured by CleanAir, except for the Servomex O_2/CO_2 analyzer utilized for all of the integrated gas sample (IGS) bag analyses.

During compliance testing, all three (3) boilers were operated within 10% of the 192,000 lb/hr maximum steam flow rating. The boilers and air pollution control equipment are in a well-maintained operating condition. Normal operating parameters for the fabric filters are a pressure drop of 2 to 7 inches of water and scrubber dilution water flow varies from 0 to 40 gallons per minute (gpm). The equipment operated within these ranges during compliance testing. The results tables present each boiler's steam output for every test run.

Dan Luckhard performed the fugitive emission readings, per EPA Method 22, on the Ash Handling System and the VE readings, per EPA Method 9, on the Lime Silo during one (1) entire truck unloading. Mr. Luckhard's VE evaluation certificate is presented in Appendix J of this report.

Any fractions of the mercury analysis that were reported as not detected were summed as zero if there was at least one (1) fraction detected in that run. The cadmium and lead front- and back-half fractions were combined proportionately for analysis, per EPA Method 29, Section 5.4.

Field blanks were collected for the Methods 23 and 29 testing by assembling a used set of glassware, taking the complete train to the outlet location and performing a leak-check. These samples were treated exactly as the other samples. The results for the method and field blanks are presented in Table 2-18 on page 2-17, as well as Appendix I of this report. The results of the Method 29 reagent blank analysis were used to correct any data, as outlined in Method 29.

All Method 23 samples were analyzed with the DB-5S column with modified calibration and additional quality assurance procedures as a direct substitute for the DB-5 and DB-225 columns. Confirmation of the 2,3,7,8 TCDF and TCDD 2,3,7,8 isomers was performed on the DB-5S column. The DB-5S column and modified calibration procedures meets the column separation requirement and can be used as a direct substitute for the DB-5 and DB-225 columns, in accordance with Method 23 as approved by the EPA. All QA/QC data (spikes and recoveries) for Method 23 are presented in Section 2 of this report, as well as in Appendix I.

The Method 23 results for Runs 1 and 2 contained at least one (1) estimated maximum possible concentration (EMPC) value. EMPC results do not meet all the identification criteria required by Method 23 to be positively identified as a dioxin or furan. Specifically, the integrated ion abundance ratios were not within 15% of the theoretical value limits specified in Method 23, Section 5.3.2.5, Table 4. The laboratory reports EMPC results as zero and, for this reason, all EMPC results are enclosed in brackets and are considered zero when calculating total dioxin/furans.

For analytical results that are below the detection limit, values are reported as ND, with the detection limit in parenthesis and are considered zero for calculating total catch weights, per Method 23, Section 9.9.

Chuck Faller of Wheelabrator provided the process (operating) data. This data is presented in its entirety in Appendix C of this report. All process data and CleanAir run times are based on facility DCS (Bailey System) time. The carbon feed rate and opacity run times are CEM-based and one (1) hour behind the DCS time.

IGS's were collected in a vinyl sample bag from every sample train. The contents of the bag were then analyzed for oxygen (O_2) and carbon dioxide (CO_2) concentrations, using an O_2/CO_2 continuous monitoring analyzer calibrated with EPA Protocol gases. A linearity and bias check was performed on the analyzers before each set of bags was analyzed, and then a post bias check was performed after each set of bags was analyzed. All data was recorded using CleanAir's data acquisition system. The results of the IGS bag analyses are presented in Appendix H of this report.

One (1) eight-hour greenhouse gas (GHG) sample was collected in accordance with ASTM Method D7459-08 and analyzed by Beta Analytic, Inc. in Miami, Florida, in accordance with ASTM D6866-08. The ASTM D6866-08 sample bag was obtained from the Method 23 Unit 1, Runs 1 and 2 (four hours per run). The results of analysis are presented in Appendix E in this report.

The eight-hour samples were collected within 10% of the initial sample rate from the isokinetic sample train's IGS. The IGS bags were leak-checked prior to use and all collected within 10% of the initial sample rate, using the orifice off of the dry gas meter in conjunction with a rotometer. The IGS bag contents were then combined proportionally into a 3L Tedlar® bag. Both four-hour samples met the two (2) times relative standard deviation (2RSD) criteria by stack flow rate (<30%).

The Ash Handling System fugitive emission readings were made for 90 minutes at two (2) locations rather than for 60 minutes at three (3) locations as in the past. This was done due to a new plant policy of keeping the rolling door next to the Unit 1 FF Baghouse closed at all times.

Problems Encountered

The dry gas meter being used during Run 1, Method 26A, at the SDA Inlet stopped working 15 minutes into the test run. A new meter was substituted and utilized for the final 45 minutes of the test run. The data from the first 15 minutes was interpolated with the data from the last 45 minutes of HCl concentration calculations.

Test Method Modifications

Metals and particulate matter sampling were combined during this test program, per the Method 29, Section 1.2 principle, "This method may be used to determine particulate emissions in addition to the metals emissions if the prescribed procedures and precautions are followed." This modification was included in the Test Protocol.

Sixty-minute Method 26A sample trains at the SDA Inlets and FF Outlets were utilized to exhibit compliance with each unit's HCl limit(s). The Method 26A was modified to a single-point constant sampling rate at all test locations. This modification was also included in the Test Protocol.

End of Section 1 – Project Overview

RESULTS

Table 2-1:
Unit 1 FF Outlet – Particulate and Metals

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		07:52	10:29	13:04	
Stop Time (approx.)		10:05	12:44	15:20	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	188.0	187.6	188.6	**188.1**
P_1	Fabric Filter Inlet Temperature - (°F)	320	320	320	**320**
P_2	Carbon Injection Rate - (lbs/hr)	6	6	6	**6**
Gas Conditions					
O_2	Oxygen (dry volume %)	8.1	8.6	8.9	**8.6**
CO_2	Carbon dioxide (dry volume %)	11.0	10.6	10.5	**10.7**
T_s	Sample temperature (°F)	302	303	305	**303**
B_w	Actual water vapor in gas (% by volume)	24.0	22.7	22.5	**23.1**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	169,000	176,000	177,000	**174,000**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	87,300	92,300	92,500	**90,700**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	72.24	74.64	75.33	**74.07**
%I	Isokinetic sampling (%)	102.0	99.8	100.4	**100.7**
Laboratory Data					
m_{filter}	Matter collected on filter(s) (g)	0.00010	<0.00010	0.00030	
m_s	Matter collected in solvent rinse(s) (g)	0.00400	0.00670	0.00630	
m_n	Total FPM (g)	0.00410	0.00670	0.00660	
FPM Results					
C_{sd}	Particulate Concentration (mg/dscm)	2.0	3.2	3.1	**2.8**
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	2.2	3.6	3.6	**3.1**
$E_{lb/hr}$	Particulate Rate (lb/hr)	0.66	1.1	1.1	**0.94**
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.0020	0.0032	0.0032	**0.0028**
Cadmium Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	0.2268	0.9492	0.2913	
Cadmium Results - Total					
C_{sd}	Concentration (mg/dscm)	0.00011	0.00045	0.00014	**0.00023**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	0.00012	0.00051	0.00016	**0.00026**
$E_{lb/hr}$	Rate (lb/hr)	3.6E-05	1.6E-04	4.7E-05	**8.0E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.1E-07	4.6E-07	1.4E-07	**2.4E-07**
Lead Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	1.9777	1.3753	2.2826	
Lead Results - Total					
C_{sd}	Concentration (mg/dscm)	0.00097	0.00065	0.00107	**0.00090**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	0.0011	0.00074	0.0012	**0.0010**
$E_{lb/hr}$	Rate (lb/hr)	3.2E-04	2.2E-04	3.7E-04	**3.0E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	9.4E-07	6.6E-07	1.1E-06	**9.1E-07**

RESULTS

Table 2-2:
Unit 1 FF Outlet – Mercury

Run No.		1	2	3	4	Average
Date (2012)		Mar 20	Mar 20	Mar 20	Mar 21	
Start Time (approx.)		07:52	10:29	13:04	13:18	
Stop Time (approx.)		10:05	12:44	15:20	15:38	
Process Conditions						
R_P	Steam Production Rate - (Klbs/hour)	188.0	187.6	188.6	187.5	**187.9**
P_1	Fabric Filter Inlet Temperature - (°F)	320	320	320	320	**320**
P_2	Carbon Injection Rate - (lbs/hr)	6	6	6	6	**6**
Gas Conditions						
O_2	Oxygen (dry volume %)	8.1	8.6	8.9	8.9	**8.7**
CO_2	Carbon dioxide (dry volume %)	11.0	10.6	10.5	10.4	**10.6**
T_s	Sample temperature (°F)	302	303	305	304	**304**
B_w	Actual water vapor in gas (% by volume)	24.0	22.7	22.5	22.6	**23.0**
Gas Flow Rate						
Q_a	Volumetric flow rate, actual (acfm)	169,000	176,000	177,000	179,000	**175,000**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	87,300	92,300	92,500	93,800	**91,500**
Sampling Data						
V_{mstd}	Volume metered, standard (dscf)	72.24	74.64	75.33	77.09	**74.82**
%I	Isokinetic sampling (%)	102.0	99.8	100.4	101.4	**100.9**
Laboratory Data						
m_{n-1b}	Fraction 1B (µg)	<0.1000	<0.1000	<0.1000	<0.1000	
m_{n-2b}	Fraction 2B (µg)	3.4141	3.3755	3.3764	3.7572	
m_{n-3a}	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000	<0.2000	
m_{n-3b}	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000	<0.5000	
m_{n-3c}	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000	<0.4000	
m_n	Total matter corrected for allowable blanks (µg)	3.4141	3.3755	3.3764	3.7572	
Mercury Results - Total						
C_{sd}	Concentration (µg/dscm)	1.7	1.6	1.6	1.7	**1.6**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.8	1.8	1.8	2.0	**1.9**
$E_{lb/hr}$	Rate (lb/hr)	5.5E-04	5.5E-04	5.5E-04	6.0E-04	**5.6E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.6E-06	1.6E-06	1.7E-06	1.8E-06	**1.7E-06**

Table 2-3:
Unit 1 FF Outlet – PCDD/PCDF

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 21	Mar 21	
Start Time (approx.)		11:15	07:32	12:31	
Stop Time (approx.)		15:43	12:08	16:54	
Process Conditions					
R_P	Steam Production Rate - (klbs/hour)	188.4	188.2	187.9	**188.2**
P_1	Fabric Filter Inlet Temperature - (°F)	320	321	320	**320**
P_2	Carbon Feed Rate - (lbs/hr)	6	6	6	**6**
Gas Conditions					
O_2	Oxygen (dry volume %)	8.8	9.5	9.0	**9.1**
CO_2	Carbon dioxide (dry volume %)	10.6	9.8	10.5	**10.3**
T_s	Sample temperature (°F)	303	304	304	**304**
B_w	Actual water vapor in gas (% by volume)	22.2	21.2	22.3	**21.9**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	172,255	169,253	170,289	**170,599**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	90,796	90,477	89,759	**90,344**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	145.17	145.28	147.87	**146.11**
%I	Isokinetic sampling (%)	100.0	100.4	103.1	**101.2**
Results (ND and EMPC = 0)					
Laboratory Data from USEPA Method 23 (PCDD/PCDF)					
m_n	Total PCDDs & PCDFs (ng)	46.6000	43.1000	48.1000	
m_{n_TEQ}	Total TEQ PCDDs & PCDFs (ng)	0.3270	0.2810	0.3370	
Total PCDD/F Results (TEF=1)					
C_{sd}	PCDD/F Concentration (ng/dscm)	11.3	10.5	11.5	**11.1**
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/dscm)	13.0	12.7	13.4	**13.0**
$E_{lb/hr}$	PCDD/F Rate (lb/hr)	3.9E-06	3.6E-06	3.9E-06	**3.8E-06**
E_{Fd}	PCDD/F Rate - F_d-based (lb/MMBtu)	1.2E-08	1.1E-08	1.2E-08	**1.2E-08**
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)					
C_{sdTEQ}	TEQ Concentration (ng/dscm)	0.080	0.068	0.080	**0.076**
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/dscm)	0.091	0.083	0.094	**0.089**
$E_{lb/hrTEQ}$	TEQ Rate (lb/hr)	2.7E-08	2.3E-08	2.7E-08	**2.6E-08**
E_{FdTEQ}	TEQ Rate - F_d-based (lb/MMBtu)	8.2E-11	7.5E-11	8.4E-11	**8.0E-11**
Results (ND and EMPC = actual value)					
Laboratory Data from USEPA Method 23 (PCDD/PCDF), including NDs and EMPCs					
m_n	Total PCDDs & PCDFs (ng)	46.7000	43.2000	48.1000	
m_{n_TEQ}	Total TEQ PCDDs & PCDFs (ng)	0.3270	0.3000	0.3370	
Total PCDD/F Results (TEF=1)					
C_{sd}	PCDD/F Concentration (ng/dscm)	11.4	10.5	11.5	**11.1**
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/dscm)	13.0	12.8	13.4	**13.1**
$E_{lb/hr}$	PCDD/F Rate (lb/hr)	3.9E-06	3.6E-06	3.9E-06	**3.8E-06**
E_{Fd}	PCDD/F Rate - F_d-based (lb/MMBtu)	1.2E-08	1.1E-08	1.2E-08	**1.2E-08**
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)					
C_{sdTEQ}	TEQ Concentration (ng/dscm)	0.080	0.073	0.080	**0.078**
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/dscm)	0.091	0.089	0.094	**0.091**
$E_{lb/hrTEQ}$	TEQ Rate (lb/hr)	2.7E-08	2.5E-08	2.7E-08	**2.6E-08**
E_{FdTEQ}	TEQ Rate - F_d-based (lb/MMBtu)	8.2E-11	8.0E-11	8.4E-11	**8.2E-11**

**Table 2-4:
Unit 1 FF Outlet and SDA Inlet – Hydrogen Chloride**

Run No.		1	2	3	Average
Date (2012)		Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:44	09:07	10:32	
Stop Time (approx.)		08:44	10:07	11:32	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	186.6	186.0	188.3	**187.0**
P_1	Fabric Filter Inlet Temperature (°F)	320	320	320	**320**
SDA Inlet Gas Conditions					
O_2	Oxygen (dry volume %)	7.0	7.1	7.9	**7.3**
CO_2	Carbon dioxide (dry volume %)	11.8	11.8	11.1	**11.6**
T_s	Sample temperature (°F)	471	477	482	**477**
B_w	Actual water vapor in gas (% by volume)	21.1	22.4	20.9	**21.5**
SDA Inlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	34.59	34.61	34.95	**34.72**
SDA Inlet Laboratory Data					
m_n	Total HCl collected (mg)	815.19372	892.84370	867.35444	
SDA Inlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	549	601	579	**576**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	549	606	616	**590**
C_{sd}	HCl Concentration (mg/dscm)	832	911	876	**873**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	831	918	933	**894**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.76	0.84	0.85	**0.82**
FF Outlet Gas Conditions					
O_2	Oxygen (dry volume %)	9.2	8.7	9.2	**9.0**
CO_2	Carbon dioxide (dry volume %)	10.0	10.3	9.8	**10.0**
T_s	Sample temperature (°F)	301	302	303	**302**
B_w	Actual water vapor in gas (% by volume)	22.7	23.4	22.3	**22.8**
FF Outlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	40.15	40.18	40.37	**40.23**
FF Outlet Laboratory Data					
m_n	Total HCl collected (mg)	16.13035	15.28800	13.51351	
FF Outlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	9.4	8.9	7.8	**8.7**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	11	10	9.3	**10**
C_{sd}	HCl Concentration (mg/dscm)	14	13	12	**13**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	17	15	14	**15**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.015	0.014	0.013	**0.014**
RE	Reduction Efficiency (% Removal)	98.0%	98.3%	98.5%	**98.3%**

Table 2-5:
Unit 2 FF Outlet – Particulate and Metals

Run No.		1	2	3	Average
Date (2012)		Mar 21	Mar 21	Mar 21	
Start Time (approx.)		08:16	10:52	13:29	
Stop Time (approx.)		10:28	13:07	15:41	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	187.7	187.5	188.6	**187.9**
P_1	Fabric Filter Inlet Temperature - (°F)	317	315	314	**315**
P_2	Carbon Injection Rate - (lbs/hr)	7	6	6	**6**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.1	9.5	9.7	**9.4**
CO_2	Carbon dioxide (dry volume %)	10.0	9.8	9.8	**9.9**
T_s	Sample temperature (°F)	299	296	294	**296**
B_w	Actual water vapor in gas (% by volume)	21.1	21.4	21.0	**21.2**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	167,000	172,000	170,000	**169,000**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	88,700	91,700	91,600	**90,700**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	72.34	74.16	73.58	**73.36**
%I	Isokinetic sampling (%)	99.8	99.0	98.3	**99.1**
Laboratory Data					
m_{filter}	Matter collected on filter(s) (g)	0.00220	0.00380	0.00260	
m_s	Matter collected in solvent rinse(s) (g)	0.00670	0.00520	0.00290	
m_n	Total FPM (g)	0.00890	0.00900	0.00550	
FPM Results					
C_{sd}	Particulate Concentration (mg/dscm)	4.3	4.3	2.6	**3.8**
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	5.1	5.2	3.3	**4.5**
$E_{lb/hr}$	Particulate Rate (lb/hr)	1.4	1.5	0.91	**1.3**
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.0046	0.0047	0.0029	**0.0041**
Cadmium Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	2.5502	2.0332	1.4806	
Cadmium Results - Total					
C_{sd}	Concentration (mg/dscm)	0.00124	0.00097	0.00071	**0.00097**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	0.0015	0.0012	0.00088	**0.0012**
$E_{lb/hr}$	Rate (lb/hr)	4.1E-04	3.3E-04	2.4E-04	**3.3E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.3E-06	1.1E-06	7.9E-07	**1.1E-06**
Lead Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	23.7408	22.6439	10.9037	
Lead Results - Total					
C_{sd}	Concentration (mg/dscm)	0.012	0.011	0.0052	**0.0092**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	0.014	0.013	0.0065	**0.011**
$E_{lb/hr}$	Rate (lb/hr)	3.9E-03	3.7E-03	1.8E-03	**3.1E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.2E-05	1.2E-05	5.8E-06	**1.0E-05**

Table 2-6:
Unit 2 FF Outlet – Mercury

Run No.		1	2	3	4	Average
Date (2012)		Mar 21	Mar 21	Mar 21	Mar 22	
Start Time (approx.)		08:16	10:52	13:29	07:43	
Stop Time (approx.)		10:28	13:07	15:41	09:56	
Process Conditions						
R_P	Steam Production Rate - (Klbs/hour)	187.7	187.5	188.6	187.5	**187.8**
P_1	Fabric Filter Inlet Temperature - (°F)	317	315	314	315	**315**
P_2	Carbon Feed Rate - (lbs/hr)	7	6	6	6	**6**
Gas Conditions						
O_2	Oxygen (dry volume %)	9.1	9.5	9.7	9.2	**9.4**
CO_2	Carbon dioxide (dry volume %)	10.0	9.8	9.8	10.0	**9.9**
T_s	Sample temperature (°F)	299	296	294	293	**295**
B_w	Actual water vapor in gas (% by volume)	21.1	21.4	21.0	21.0	**21.1**
Gas Flow Rate						
Q_a	Volumetric flow rate, actual (acfm)	167,000	172,000	170,000	160,000	**167,000**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	88,700	91,700	91,600	86,400	**89,600**
Sampling Data						
V_{mstd}	Volume metered, standard (dscf)	72.34	74.16	73.58	68.07	**72.04**
%I	Isokinetic sampling (%)	99.8	99.0	98.3	97.2	**98.6**
Laboratory Data						
$m_{n\text{-}1b}$	Fraction 1B (µg)	<0.1000	<0.1000	<0.1000	<0.1000	
$m_{n\text{-}2b}$	Fraction 2B (µg)	2.4063	2.0337	1.6400	2.1908	
$m_{n\text{-}3a}$	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000	<0.2000	
$m_{n\text{-}3b}$	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000	<0.5000	
$m_{n\text{-}3c}$	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000	<0.4000	
m_n	Total matter corrected for allowable blanks (µg)	2.4063	2.0337	1.6400	2.1908	
Mercury Results - Total						
C_{sd}	Concentration (µg/dscm)	1.2	0.97	0.79	1.1	**1.0**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.4	1.2	1.0	1.3	**1.2**
$E_{lb/hr}$	Rate (lb/hr)	3.9E-04	3.3E-04	2.7E-04	3.7E-04	**3.4E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.2E-06	1.1E-06	8.7E-07	1.2E-06	**1.1E-06**

Table 2-7:
Unit 2 FF Outlet and SDA Inlet – Hydrogen Chloride

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		08:08	09:49	12:22	
Stop Time (approx.)		09:08	10:49	13:22	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	188.0	189.1	187.4	**188.2**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
SDA Inlet Gas Conditions					
O_2	Oxygen (dry volume %)	8.5	8.2	8.5	**8.4**
CO_2	Carbon dioxide (dry volume %)	10.7	11.0	10.8	**10.9**
T_s	Sample temperature (°F)	478	478	476	**477**
B_w	Actual water vapor in gas (% by volume)	18.2	18.0	17.3	**17.8**
SDA Inlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	36.30	36.21	36.21	**36.24**
SDA Inlet Laboratory Data					
m_n	Total HCl collected (mg)	743.55343	753.97221	678.61158	
SDA Inlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	478	485	437	**467**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	534	530	491	**518**
C_{sd}	HCl Concentration (mg/dscm)	723	735	662	**707**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	808	803	743	**785**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.74	0.73	0.68	**0.72**
FF Outlet Gas Conditions					
O_2	Oxygen (dry volume %)	9.6	9.7	9.6	**9.6**
CO_2	Carbon dioxide (dry volume %)	9.5	9.7	9.8	**9.7**
T_s	Sample temperature (°F)	292	295	293	**293**
B_w	Actual water vapor in gas (% by volume)	21.2	21.0	20.9	**21.0**
FF Outlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	39.77	39.39	39.72	**39.63**
FF Outlet Laboratory Data					
m_n	Total HCl collected (mg)	7.22164	7.78316	6.81058	
FF Outlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	4.2	4.6	4.0	**4.3**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	5.2	5.7	4.9	**5.3**
C_{sd}	HCl Concentration (mg/dscm)	6.4	7.0	6.1	**6.5**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	7.9	8.7	7.4	**8.0**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.0072	0.0079	0.0068	**0.0073**
RE	Reduction Efficiency (% Removal)	99.0%	98.9%	99.0%	**99.0%**

Table 2-8:
Unit 3 FF Outlet – Particulate and Metals

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	
Stop Time (approx.)		10:11	09:50	12:23	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	188.0	187.9	187.9	**187.9**
P_1	Fabric Filter Inlet Temperature - (°F)	315	315	315	**315**
P_2	Carbon Injection Rate - (lbs/hr)	6	6	6	**6**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.5	8.9	9.2	**9.2**
CO_2	Carbon dioxide (dry volume %)	9.8	10.2	10.1	**10.0**
T_s	Sample temperature (°F)	294	297	296	**296**
B_w	Actual water vapor in gas (% by volume)	22.8	22.8	22.5	**22.7**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	175,000	180,000	179,000	**178,000**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	92,000	95,300	94,600	**93,900**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	74.99	78.56	77.72	**77.09**
%I	Isokinetic sampling (%)	99.8	101.0	100.6	**100.4**
Laboratory Data					
m_{filter}	Matter collected on filter(s) (g)	0.00190	0.00200	0.00270	
m_s	Matter collected in solvent rinse(s) (g)	0.00540	0.00490	0.00410	
m_n	Total FPM (g)	0.00730	0.00690	0.00680	
FPM Results					
C_{sd}	Particulate Concentration (mg/dscm)	3.4	3.1	3.1	**3.2**
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	4.2	3.6	3.7	**3.8**
$E_{lb/hr}$	Particulate Rate (lb/hr)	1.2	1.1	1.1	**1.1**
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.0038	0.0032	0.0033	**0.0034**
Cadmium Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	1.6744	2.2224	1.7914	
Cadmium Results - Total					
C_{sd}	Concentration (mg/dscm)	0.00079	0.0010	0.00081	**0.00087**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	0.00096	0.0012	0.00097	**0.0010**
$E_{lb/hr}$	Rate (lb/hr)	2.7E-04	3.6E-04	2.9E-04	**3.1E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	8.6E-07	1.0E-06	8.7E-07	**9.2E-07**
Lead Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	23.1840	15.2666	15.5427	
Lead Results - Total					
C_{sd}	Concentration (mg/dscm)	0.011	0.0069	0.0071	**0.0083**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	0.013	0.0079	0.0084	**0.0099**
$E_{lb/hr}$	Rate (lb/hr)	3.8E-03	2.4E-03	2.5E-03	**2.9E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.2E-05	7.1E-06	7.6E-06	**8.9E-06**

Table 2-9: Unit 3 FF Outlet – Mercury

Run No.		1	2	3	4	Average
Date (2012)		Mar 20	Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	12:50	
Stop Time (approx.)		10:11	09:50	12:23	15:01	
Process Conditions						
R_P	Steam Production Rate - (Klbs/hour)	188.0	187.9	187.9	186.7	**187.6**
P_1	Fabric Filter Inlet Temperature - (°F)	315	315	315	315	**315**
P_2	Carbon Feed Rate - (lbs/hr)	6	6	6	6	**6**
Gas Conditions						
O_2	Oxygen (dry volume %)	9.5	8.9	9.2	9.2	**9.2**
CO_2	Carbon dioxide (dry volume %)	9.8	10.2	10.1	10.0	**10.0**
T_s	Sample temperature (°F)	294	297	296	296	**296**
B_w	Actual water vapor in gas (% by volume)	22.8	22.8	22.5	22.5	**22.6**
Gas Flow Rate						
Q_a	Volumetric flow rate, actual (acfm)	175,000	180,000	179,000	190,000	**181,000**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	92,000	95,300	94,600	101,000	**95,600**
Sampling Data						
V_{mstd}	Volume metered, standard (dscf)	74.99	78.56	77.72	82.86	**78.53**
%I	Isokinetic sampling (%)	99.8	101.0	100.6	100.8	**100.5**
Laboratory Data						
$m_{n\text{-}1b}$	Fraction 1B (μg)	<0.1000	<0.1000	0.1378	<0.1000	
$m_{n\text{-}2b}$	Fraction 2B (μg)	3.0947	3.0276	3.2500	5.2098	
$m_{n\text{-}3a}$	Fraction 3A (μg)	<0.2000	<0.2000	<0.2000	<0.2000	
$m_{n\text{-}3b}$	Fraction 3B (μg)	<0.5000	<0.5000	<0.5000	<0.5000	
$m_{n\text{-}3c}$	Fraction 3C (μg)	<0.4000	<0.4000	<0.4000	<0.4000	
m_n	Total matter corrected for allowable blanks (μg)	3.0947	3.0276	3.3878	5.2098	
Mercury Results - Total						
C_{sd}	Concentration (μg/dscm)	1.5	1.4	1.5	2.2	**1.6**
C_{sd7}	Concentration @7% O_2 (μg/dscm)	1.8	1.6	1.8	2.6	**2.0**
$E_{lb/hr}$	Rate (lb/hr)	5.0E-04	4.9E-04	5.5E-04	8.4E-04	**5.9E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.6E-06	1.4E-06	1.6E-06	2.4E-06	**1.8E-06**

Table 2-10:
Unit 3 FF Outlet and SDA Inlet – Hydrogen Chloride

Run No.		1	2	3	Average
Date (2012)		Mar 21	Mar 21	Mar 21	
Start Time (approx.)		07:54	10:04	11:30	
Stop Time (approx.)		09:40	11:04	12:30	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	188.0	188.7	183.9	**186.9**
P_1	Fabric Filter Inlet Temperature (°F)	316	316	315	**316**
SDA Inlet Gas Conditions					
O_2	Oxygen (dry volume %)	9.0	9.0	8.4	**8.8**
CO_2	Carbon dioxide (dry volume %)	10.4	10.4	10.8	**10.5**
T_s	Sample temperature (°F)	490	490	488	**489**
B_w	Actual water vapor in gas (% by volume)	17.8	17.8	18.3	**18.0**
SDA Inlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	35.41	34.92	34.74	**35.02**
SDA Inlet Laboratory Data					
m_n	Total HCl collected (mg)	812.94240	760.01171	733.01334	
SDA Inlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	535	507	492	**511**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	625	593	548	**589**
C_{sd}	HCl Concentration (mg/dscm)	811	768	745	**775**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	947	898	830	**892**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.87	0.82	0.76	**0.82**
FF Outlet Gas Conditions					
O_2	Oxygen (dry volume %)	9.5	9.2	9.3	**9.3**
CO_2	Carbon dioxide (dry volume %)	9.8	10.0	10.1	**10.0**
T_s	Sample temperature (°F)	295	296	295	**296**
B_w	Actual water vapor in gas (% by volume)	21.7	22.0	22.1	**21.9**
FF Outlet Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	40.61	40.64	40.46	**40.57**
FF Outlet Laboratory Data					
m_n	Total HCl collected (mg)	22.69125	24.71172	20.30793	
FF Outlet Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (ppmdv)	13	14	12	**13**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	16	17	14	**16**
C_{sd}	HCl Concentration (mg/dscm)	20	21	18	**20**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	24	26	21	**24**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.022	0.023	0.019	**0.022**
RE	Reduction Efficiency (% Removal)	97.5%	97.2%	97.5%	**97.4%**

Table 2-11:
Units 1, 2 and 3 FF Outlets – Opacity by COMS

Run No.	1	2	3	Average
Unit 1				
Date (2012)	Mar 20	Mar 20	Mar 20	
Start Time (approx.)	07:52	10:29	13:04	
Stop Time (approx.)	10:05	12:44	15:20	
Visible Emissions (%)[1]				
Average Opacity	0	1	1	**1**
Maximum Reading	1	1	1	**1**
Minimum Reading	0	0	1	**0**
Unit 2				
Date (2012)	Mar 21	Mar 21	Mar 21	
Start Time (approx.)	08:16	10:52	13:29	
Stop Time (approx.)	10:28	13:07	15:41	
Visible Emissions (%)[1]				
Average Opacity	0	0	0	**0**
Maximum Reading	0	0	0	**0**
Minimum Reading	0	0	0	**0**
Unit 3				
Date (2012)	Mar 20	Mar 22	Mar 22	
Start Time (approx.)	07:54	07:37	10:11	
Stop Time (approx.)	10:11	09:50	12:23	
Visible Emissions (%)[1]				
Average Opacity	0	0	0	**0**
Maximum Reading	0	0	0	**0**
Minimum Reading	0	0	0	**0**

[1] Reading obtained from facility's continuous opacity monitoring system (COMS) as provided under 40 CFR 60.11(e)(5) and coincide with Method 5/29 test runs.

Table 2-12:
Ash Handling System – Fugitive Emissions

Source / Constituent	Date (2012)	Start Time (approx.)	Stop Time (approx.)	Observation Duration (minutes)	Accumulated Emission Duration (seconds)
Ash Unloading / Conveyor					
Visual Opacity (%)	March 22	10:53	12:43	90	0
Ash Unloading / Conveyor					
Visual Opacity (%)	March 22	13:03	15:53	90	0

Total (% of observation time) = 0

Total (minutes) = 0

Table 2-13:
Lime Silo Fabric Filter Outlet – Visible Emissions

Run No.	1
Date (2012)	Mar 21
Start Time (approx.)	08:28
Stop Time (approx.)	11:27
Process Conditions	
Total lime unloaded (tons)	25.78
Rate of unloading (tons/hr)	8.6
Visible Emissions	
Average (percent opacity)	0
Maximum reading (percent opacity)	0

Table 2-14:
Air Flow Summary

Run Number	Run Date	Run Time	Steam Flow Klbs/hour	Flue Gas Temp Deg F	Air Flow ACFM	O_2 %	CO_2 %	Air Flow, DSCFM	Air Flow, DSCFM@ 7%O_2
1-O-M5/29-1	3/20/2012	07:52-10:05	188.0	302	169,000	8.1	11.0	87,300	80,280
1-O-M5/29-2	3/20/2012	10:29-12:44	187.6	303	176,000	8.6	10.6	92,300	81,384
1-O-M5/29-3	3/20/2012	13:04-15:20	188.6	305	177,000	8.9	10.5	92,500	79,766
1-O-M29-4	3/21/2012	13:18-15:38	187.5	304	179,000	8.9	10.4	93,800	80,688
1-O-M23-1	3/20/2012	11:15-15:43	188.4	303	172,255	8.8	10.6	90,796	79,234
1-O-M23-2	3/21/2012	07:32-12:08	188.2	304	169,253	9.5	9.8	90,477	74,400
1-O-M23-3	3/21/2012	12:31-16:54	187.9	304	170,289	9.0	10.5	89,759	77,037
		Average	**188.0**	**304**	**173,257**	**8.8**	**10.5**	**90,990**	**78,970**
2-O-M5/29-1	3/21/2012	08:16-10:28	187.7	299	167,000	9.1	10.0	88,700	75,327
2-O-M5/29-2	3/21/2012	10:52-13:07	187.5	296	172,000	9.5	9.8	91,700	74,931
2-O-M5/29-3	3/21/2012	13:29-15:41	188.6	294	170,000	9.7	9.8	91,600	74,064
2-O-M29-4	3/22/2012	07:43-09:56	187.5	293	160,000	9.2	10.0	86,400	72,900
		Average	**187.8**	**295**	**167,250**	**9.4**	**9.9**	**89,600**	**74,306**
3-O-M5/29-1	3/20/2012	07:54-10:11	188.0	294	175,000	9.5	9.8	92,000	75,592
3-O-M5/29-2	3/22/2012	07:37-09:50	187.9	297	180,000	8.9	10.2	95,300	82,573
3-O-M5/29-3	3/22/2012	10:11-12:23	187.9	296	179,000	9.2	10.1	94,600	79,403
3-O-M29-4	3/22/2012	12:50-15:01	186.7	296	190,000	9.2	10.0	101,000	84,439
		Average	**187.6**	**296**	**181,000**	**9.2**	**10.0**	**95,725**	**80,502**
	Facility Average		**187.8**	**298**	**173,836**	**9.1**	**10.1**	**92,105**	**77,926**

Table 2-15:
Quality Control and Quality Assurance
PCDD/PCDF – Extraction Standard Percent Recoveries

Sample Number	Extraction Standard Percent Recoveries, %						
	^{13}C-TCDD	^{13}C-PeCDD	^{13}C-HxCDD	^{13}C-HxCDD	^{13}C-HxCDD	^{13}C-HpCDD	^{13}C-OCDD
Method Blank	83.6	82.4	80.1	78.3	79.2	82	77.9
UI FF OUTLET-FIELD B	91.4	90.4	87.6	82.7	83.6	83.2	78.5
U1 FF OUTLET- RUN 1	90.4	86.7	87.6	84	85	87.2	82.6
U1 FF OUTLET- RUN 2	84.6	81.3	83.6	81.6	82.6	84.1	80.7
U1 FF OUTLET- RUN 3	83.6	79.7	81.1	78.9	79.2	79.6	75.3
Average	87	84	84	81	82	83	79
SD	4	4	4	2	3	3	3
Min	83.6	79.7	80.1	78.3	79.2	79.6	75.3
Max	91.4	90.4	87.6	84	85	87.2	82.6
Within M23 QC	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

Sample Number	Extraction Standard Percent Recoveries, %									
	^{13}C-TCDF	^{13}C-PeCDF	^{13}C-PeCDF	^{13}C-HxCDF	^{13}C-HxCDF	^{13}C-HxCDF	^{13}C-HxCDF	^{13}C-HpCDF	^{13}C-HpCDF	^{13}C-OCDF
Method Blank	87.2	84.6	84.6	76.6	76.3	80.1	77.4	76.8	80.2	79.3
UI FF OUTLET-FIELD B	91.9	90.6	89.6	81.5	79.7	83.1	82.6	79.7	80.4	77.9
U1 FF OUTLET- RUN 1	93.8	87.9	89.1	83.9	80.6	85.7	82.9	81.6	84.7	78.7
U1 FF OUTLET- RUN 2	87.9	82.9	82.8	84	78	82	80.5	80.4	81.3	79.3
U1 FF OUTLET- RUN 3	90.3	84.2	83.4	79.1	75.3	80.2	77.7	76.7	79.6	74
Average	90	86	86	81	78	82	80	79	81	78
SD	3	3	3	3	2	2	3	2	2	2
Min	87.2	82.9	82.8	76.6	75.3	80.1	77.4	76.7	79.6	74
Max	93.8	90.6	89.6	84	80.6	85.7	82.9	81.6	84.7	79.3
Within M23 QC	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

Table 2-16:
Quality Control and Quality Assurance
PCDD/PCDF – CS/SS Percent Recoveries

Sample Number	CS/SS Percent Recoveries, %				
	^{37}Cl-TCDD	^{13}C-PeCDD	^{13}C-PeCDF	^{13}C-HxCDF	^{13}C-HpCDF
Method Blank	106	106	105	110	109
UI FF OUTLET-FIELD B	95.8	100	96.1	102	102
U1 FF OUTLET- RUN 1	97.5	100	98	103	98.7
U1 FF OUTLET- RUN 2	98	102	96.8	102	98.6
U1 FF OUTLET- RUN 3	100	102	101	105	99.5
Average	99	102	99	104	102
SD	4	2	4	3	4
Min	95.8	100	96.1	102	98.6
Max	106	106	105	110	109
Min within M23 QC	TRUE	TRUE	TRUE	TRUE	TRUE

Table 2-17:
Quality Control and Quality Assurance – Metals

RPD RESULTS

Run Number	FH Front Half	BH H_2O_2/HNO_4	A Empty Impinger	B $KMnO_4$	C HCl
U1 FF Outlet R1	NA	0.6%	NA	NA	NA
U1 FF Outlet R2	NA	0.7%	NA	NA	NA
U1 FF Outlet R3	NA	0.7%	NA	NA	NA
U1 FF Outlet R4	NA	0.1%	NA	NA	NA
U2 FF Outlet R1	NA	0.2%	NA	NA	NA
U2 FF Outlet R2	NA	1.5%	NA	NA	NA
U2 FF Outlet R3	NA	0.8%	NA	NA	NA
U2 FF Outlet R4	NA	0.9%	NA	NA	NA
U3 FF Outlet R1	NA	0.1%	NA	NA	NA
U3 FF Outlet R2	NA	0.1%	NA	NA	NA
U3 FF Outlet R3	1.9%	0.2%	NA	NA	NA
U3 FF Outlet R4	NA	0.3%	NA	NA	NA
Field Blank	NA	NA	NA	NA	NA
Reagent Blank	NA	NA	NA	NA	NA

Element	U1-R2 RPD	U2-R2 RPD	U3-R2 RPD
	18417-2	18417-6	18417-10
Cadmium	3.8%	1.1%	7.7%
Lead	2.2%	0.6%	9.8%

RESULTS

Table 2-17 (Continued):
Quality Control and Quality Assurance – Metals

Sample Spike and Recovery

Run Number		FH Front Half	BH H_2O_2/HNO_4	A Empty Impinger	B $KMnO_4$	C HCl
U1 FF Outlet R3	#1	115%	111%	98%	108%	86%
	#2	114%	112%	95%	107%	86%
U2 FF Outlet R3	#1	109%	102%	94%	102%	91%
	#2	108%	102%	97%	101%	91%
U3 FF Outlet R3	#1	102%	99%	87%	109%	94%
	#2	101%	100%	84%	109%	93%

Element	U1-R3 Recovery	U2-R3 Recovery	U3-R3 Recovery
	18417-3	18417-7	18417-11
Cadmium	79%	104%	79%
Lead	91%	98%	96%

Second Source Calibration Verification

Element	1 ppb QC Std 2	50 ppb QC Std 5	100 ppb QC Std 4	250 ppb QC Std 3
Cadmium	99%	100%	103%	100%
Lead	97%	101%	102%	99%

Table 2-18:
Quality Control and Quality Assurance – Method and Field Blanks

Method 29			FH Front Half	BH H_2O_2/HNO_4	A Empty Impinger	B $KMnO_4$	C HCl
Field Blank	#1	< 0.5	< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
Reagent Blank	#1	< 0.5	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.2	< 0.2	< 0.5	< 0.4

Element	Field Blank Total µg	Reagent Blank Total µg
Cadmium	< 0.2	< 0.2
Lead	0.577	0.622

Method 23	Method Blank pg	UI FF Outlet-Field Blank pg
2,3,7,8-TCDD	(2.29)	1.8
1,2,3,7,8-PeCDD	(1.98)	(1.88)
1,2,3,4,7,8-HxCDD	(2.2)	(1.33)
1,2,3,6,7,8-HxCDD	(2.38)	(1.39)
1,2,3,7,8,9-HxCDD	(2.66)	(1.46)
1,2,3,4,6,7,8-HpCDD	(3.19)	(1.93)
OCDD	(4.11)	[5.07]
2,3,7,8-TCDF	(1.64)	(1.43)
1,2,3,7,8-PeCDF	(2)	(1.39)
2,3,4,7,8-PeCDF	(1.83)	(1.37)
1,2,3,4,7,8-HxCDF	(1.37)	(1.15)
1,2,3,6,7,8-HxCDF	(1.29)	(1.09)
2,3,4,6,7,8-HxCDF	(1.21)	(1.06)
1,2,3,7,8,9-HxCDF	(1.69)	(1.39)
1,2,3,4,6,7,8-HpCDF	(1.89)	(1.26)
1,2,3,4,7,8,9-HpCDF	(2.61)	(1.91)
OCDF	(5.7)	(4.84)
ITEF TEQ (ND=0; EMPC=0)	0.00	1.80
ITEF TEQ (ND=0; EMPC=EMPC)	0.00	1.81
ITEF TEQ (ND=DL/2; EMPC=0)	2.91	3.2
ITEF TEQ (ND=DL/2; EMPC=EMPC)	2.91	3.2
ITEF TEQ (ND=DL; EMPC=EMPC)	5.82	4.59

Table 2-19:
Metals Reagent Blank Correction Summary

Sample Number and Analytical Parameter	Catch Weight, ug	Reagent Blank Catch, ug	Maximum Allowable,	Corrected Catch Weight, ug
1-FFO-M29-1				
Cadmuim	0.227	<0.2	12.46	0.227
Lead	2.60	0.622	12.46	1.98
1-FFO-M29-2				
Cadmuim	0.949	<0.2	12.46	0.949
Lead	2.00	0.622	12.46	1.38
1-FFO-M29-3				
Cadmuim	0.291	<0.2	12.46	0.291
Lead	2.90	0.622	12.46	2.28
2-FFO-M29-1				
Cadmuim	2.55	<0.2	12.46	2.55
Lead	24.4	0.622	12.46	23.7
2-FFO-M29-2				
Cadmuim	2.03	<0.2	12.46	2.03
Lead	23.3	0.622	12.46	22.6
2-FFO-M29-3				
Cadmuim	1.48	<0.2	12.46	1.48
Lead	11.5	0.622	12.46	10.9
3-FFO-M29-1				
Cadmuim	1.67	<0.2	12.46	1.67
Lead	23.8	0.622	12.46	23.2
3-FFO-M29-2				
Cadmuim	2.22	<0.2	12.46	2.22
Lead	15.9	0.622	12.46	15.3
3-FFO-M29-3				
Cadmuim	1.79	<0.2	12.46	1.79
Lead	16.2	0.622	12.46	15.5

Table 2-20:
Quality Control and Quality Assurance – Miscellaneous

Blanks	Result	
Acetone (g)	<0.0001	
HCl DI H_2O (mg/l)	<0.101	
HCl 0.1 N H_2SO_4 (mg/l)	<0.101	
Meters - Post Cal	**Result**	**Limit**
61-5	-1.9%	≤ ± 5%
66-4	0.0%	≤ ± 5%
66-7	-0.8%	≤ ± 5%
66-11	-0.9%	≤ ± 5%
66-20*	2.0%	≤ ± 5%
85-3	-0.5%	≤ ± 5%

* Post Cal result based on average of ALT-009 from SDA Inlet Method 26A on Units 1 and 3.

End of Section 2 – Results

DESCRIPTION OF INSTALLATION

PROCESS DESCRIPTION

The South Broward Resource Recovery facility operates three (3) 750 tons-per-day municipal refuse-fired, water-wall boiler trains. The trains were manufactured by Babcock and Wilcox to produce electricity for sale to a local utility company. The boilers are rated at a maximum steam flow of 192,000 lbs/hr.

Each boiler is equipped with the following air pollution controls (APCs): a Selective Non-Catalytic Reduction (SNCR) for nitrogen oxides (NO_X) control, Spray Dry Absorber (SDA) for acid gas removal, powdered activated carbon injection for enhanced control of mercury and dioxin and a Fabric Filter (FF) for the control of particulate emissions.

Each FF is followed by an induced draft (ID) fan that directs the flue gas to a dedicated flue in a common stack. The APC equipment is manufactured by Wheelabrator Air Pollution Control, Inc. All APC equipment is generally in excellent condition. Each boiler is also equipped with a continuous emission monitoring (CEM) system to demonstrate the compliance with sulfur dioxide (SO_2), nitrogen oxides (NO_X) and carbon monoxide (CO) limits.

Figure 3-1 shows a general schematic of the facility.

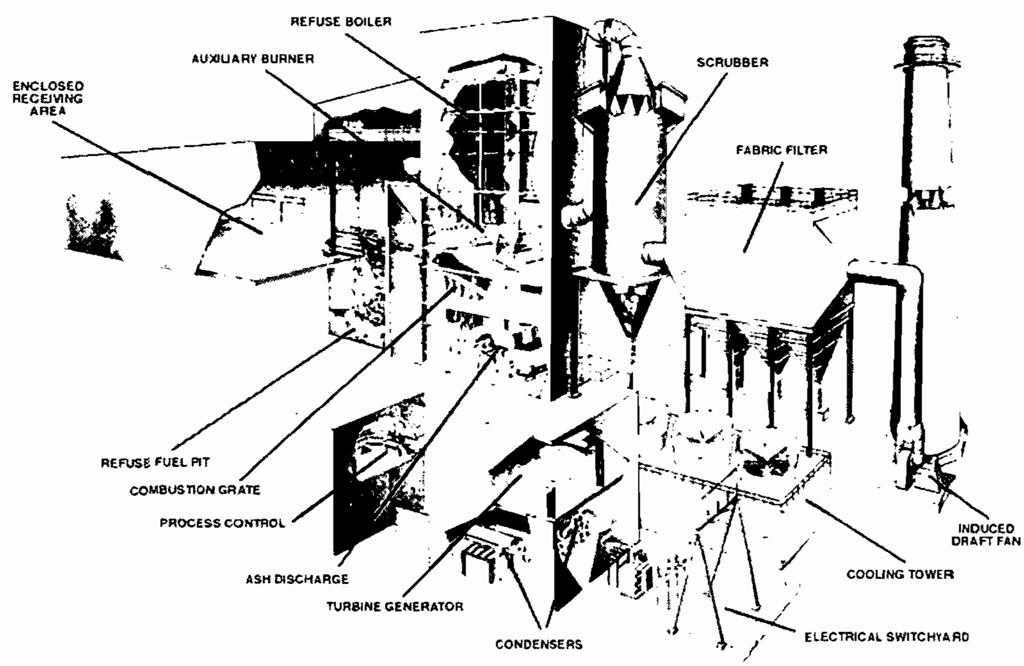


Figure 3-1: General Process Schematic

DESCRIPTION OF INSTALLATION

The general sampling locations for the Units 1, 2 and 3 SDA Inlets and FF Outlets are shown in Figure 3-2.

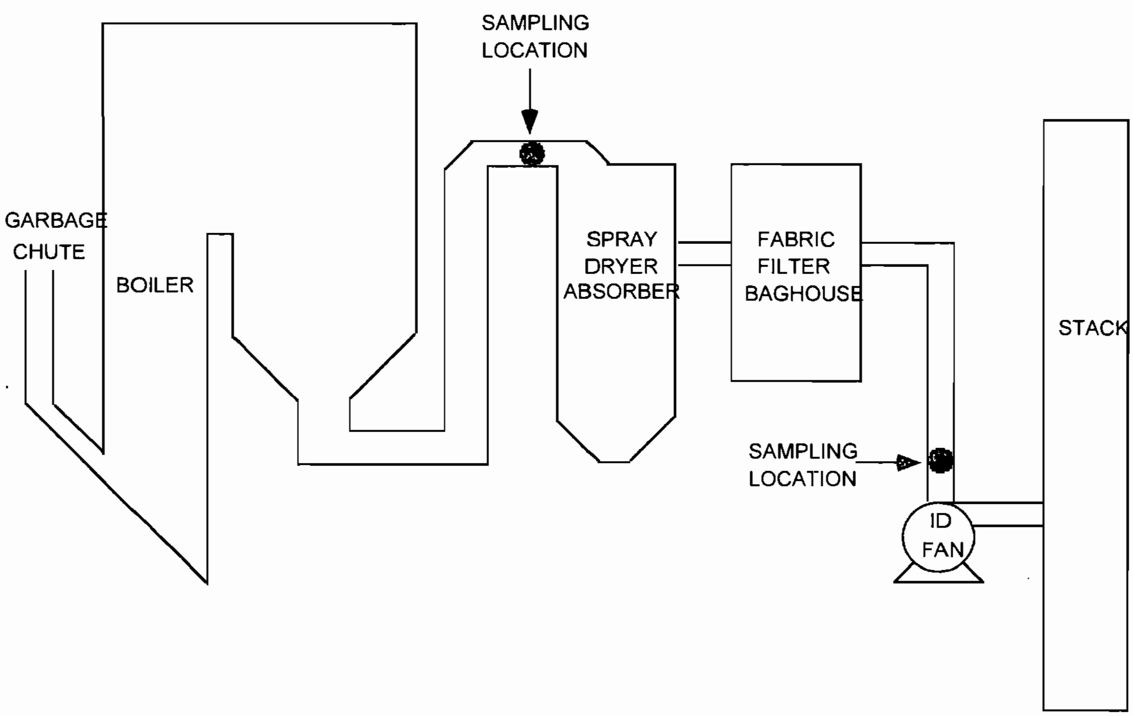


Figure 3-2: Sampling Locations

Table 3-1:
Unit 1 Compliance Test Process Data

PLANT NAME: SOUTH BROWARD 2012						Data from DCS Printouts						Calculated		Lime Feed Rate			Carbon Feed	
Test	Unit No.	Run No.	Date	Time Start	Time Stop	Steam Flow klbs/hr	FF Inlet Temp deg F	Fabric Filter Delta In. H2O	SDA Inlet Temp deg F	Total SDA Flow gpm	Diluton H2O flow gpm	Slurry Flow gpm	Slurry Conc. %	Slurry Specific Gravity	Slurry CaO Density lb/gal	CaO Flow lbs/hr	lb/hr	Test Run Comments
M-26A	1	1	3/22/2012	0744	0844	186.6	320.2	7.8	465.9	29.5	20.3	9.1	28.2	1.100	1.051	575.7	NA	All times based on DCS time
HCl		2	3/22/2012	0907	1007	186.0	320.1	8.2	473.3	32.0	24.9	7.1	22.1	1.117	1.231	522.9	NA	
		3	3/22/2012	1032	1132	188.3	320.1	8.1	473.2	31.8	25.1	6.7	21.3	1.123	1.296	522.5	NA	
					Avg	187.0	320.1	8.1	470.8	31.1	23.4	7.6	23.9	1.113	1.193	540.4	NA	
M-5/29	1	1	3/20/2012	0752	1005	188.0	320.0	7.3	463.7	28.7	21.6	7.1	24.6	1.117	1.234	525.7	6.0	All times based on DCS time
Metals		2	3/20/2012	1029	1244	187.6	320.1	7.7	472.2	31.1	23.0	8.1	26.3	1.099	1.044	508.0	6.0	
PM		3	3/20/2012	1304	1520	188.6	320.0	7.5	471.0	30.2	19.6	10.7	35.3	1.084	0.877	561.5	6.0	
		4 (Hg)	3/21/2012	1318	1538	187.5	319.7	7.7	474.4	31.4	24.5	6.9	21.9	1.121	1.277	531.7	6.0	
					Avg Part/Metals	188.1	320.0	7.5	469.0	30.0	21.4	8.6	28.7	1.1	1.1	531.7	6.0	
					Avg Hg	187.9	320.0	7.6	470.3	30.4	22.2	8.2	27.0	1.105	1.108	531.7	6.0	
M-23	1	1	3/20/2012	1115	1543	188.4	320.0	7.6	471.5	30.6	20.7	9.9	32.5	1.088	0.923	548.8	6.0	All times based on DCS time
dioxins		2	3/21/2012	0732	1208	188.2	320.9	7.6	470.4	30.0	19.5	10.5	32.0	1.093	0.969	611.6	6.0	
		3	3/21/2012	1231	1654	187.9	320.4	7.7	474.3	31.2	25.1	6.1	22.0	1.121	1.284	469.9	6.0	
					Avg	188.2	320.4	7.6	472.1	30.6	21.8	8.8	28.8	1.101	1.059	543.5	6.0	

Table 3-2:
Unit 2 Compliance Test Process Data

PLANT NAME: SOUTH BROWARD 2012						Data From DCS Printouts						Calculated		Lime Feed Rate			Carbon Feed	
Test	Unit No.	Run No.	Date	Time Start	Time Stop	Steam Flow klbs/hr	FF Inlet Temp deg F	Fabric Filter Delta In. H2O	SDA Inlet Temp deg F	Total SDA Flow gpm	Diluton H2O flow gpm	Slurry Flow gpm	Slurry Conc. %	Slurry Specific Gravity	Slurry CaO Density lb/gal	CaO Flow lbs/hr	lb/hr	Test Run Comments
M-26A	2	1	3/20/2012	0808	0908	188.0	315.0	7.5	474.4	30.8	23.8	7.0	22.8	1.118	1.249	522.3	NA	All times based on DCS time
HCl		2	3/20/2012	0949	1049	189.1	314.9	7.4	473.6	29.8	22.3	7.5	25.1	1.109	1.141	511.4	NA	
		3	3/20/2012	1222	1322	187.4	315.2	7.6	476.8	31.0	21.8	9.1	29.5	1.093	0.978	535.7	NA	
					Avg	188.2	315.0	7.5	475.0	30.5	22.7	7.9	25.8	1.107	1.123	523.2	NA	
M-5/29	2	1	3/21/2012	0816	1028	187.7	317.1	7.5	473.8	29.4	18.6	10.8	37.5	1.084	0.880	567.6	7.0	All times based on DCS time
		2	3/21/2012	1052	1307	187.5	315.0	7.9	481.8	33.1	25.2	8.0	22.6	1.111	1.167	558.1	6.0	
Metals		3	3/21/2012	1329	1541	188.6	314.1	7.5	475.7	30.7	23.6	7.1	22.5	1.121	1.279	544.1	6.0	
PM		4 (Hg)	3/22/2012	0743	0956	187.5	315.1	7.4	469.5	27.3	19.0	8.3	28.5	1.107	1.124	556.4	6.0	
					Avg Part/Metals	187.9	315.4	7.6	477.1	31.1	22.5	8.6	27.5	1.1	1.1	556.6	6.3	
					Avg Hg	187.8	315.3	7.6	475.2	30.1	21.6	8.5	27.8	1.106	1.113	556.5	6.3	

Table 3-3:
Unit 3 Compliance Test Process Data

PLANT NAME: SOUTH BROWARD 2012						Data From DCS Printouts						Calculated		Lime Feed Rate			Carbon Feed	
Test	Unit No.	Run No.	Date	Time Start	Time Stop	Steam Flow klbs/hr	FF Inlet Temp deg F	Fabric Filter Delta In. H2O	SDA Inlet Temp deg F	Total SDA Flow gpm	Diluton H2O flow gpm	Slurry Flow gpm	Slurry Conc. %	Slurry Specific Gravity	Slurry CaO Density lb/gal	CaO Flow lbs/hr	lb/hr	Test Run Comments
M-26A	3	1	3/21/2012	0754	0940	188.0	315.8	7.1	485.3	37.9	26.3	11.6	26.6	1.088	0.924	640.3	NA	All times based on DCS time
HCl		2	3/21/2012	1004	1104	188.7	315.8	7.1	491.0	40.6	30.4	10.2	24.3	1.088	0.924	564.9	NA	
		3	3/21/2012	1130	1230	183.9	315.3	7.2	493.0	42.8	32.0	10.8	17.1	1.114	1.195	770.8	NA	
					Avg	186.8	315.6	7.1	489.8	40.4	29.6	10.8	22.7	1.097	1.014	658.7	NA	
M-5/29	3	1	3/20/2012	0754	1011	188.0	315.0	7.1	492.1	40.3	33.9	6.4	17.6	1.117	1.229	471.2	6.0	All times based on DCS time
		2	3/22/2012	0737	0950	187.9	315.1	7.1	486.2	38.0	30.3	7.7	20.8	1.106	1.111	513.9	6.0	
Metals		3	3/22/2012	1011	1223	187.9	315.1	7.1	492.0	40.3	30.9	9.4	16.9	1.122	1.291	726.6	6.0	
PM		4 (Hg)	3/22/2012	1250	1501	186.7	314.9	7.2	499.2	45.2	31.7	13.5	14.8	1.126	1.328	1078.1	6.0	
					Avg Part/Metals	187.9	315.1	7.1	490.1	39.5	31.7	7.8	18.4	1.1	1.2	570.6	6.0	
					Avg Hg	187.6	315.0	7.1	492.4	41.0	31.7	9.3	17.5	1.118	1.240	697.4	6.0	

DESCRIPTION OF SAMPLING LOCATIONS

Sampling point locations were determined according to EPA Method 1.

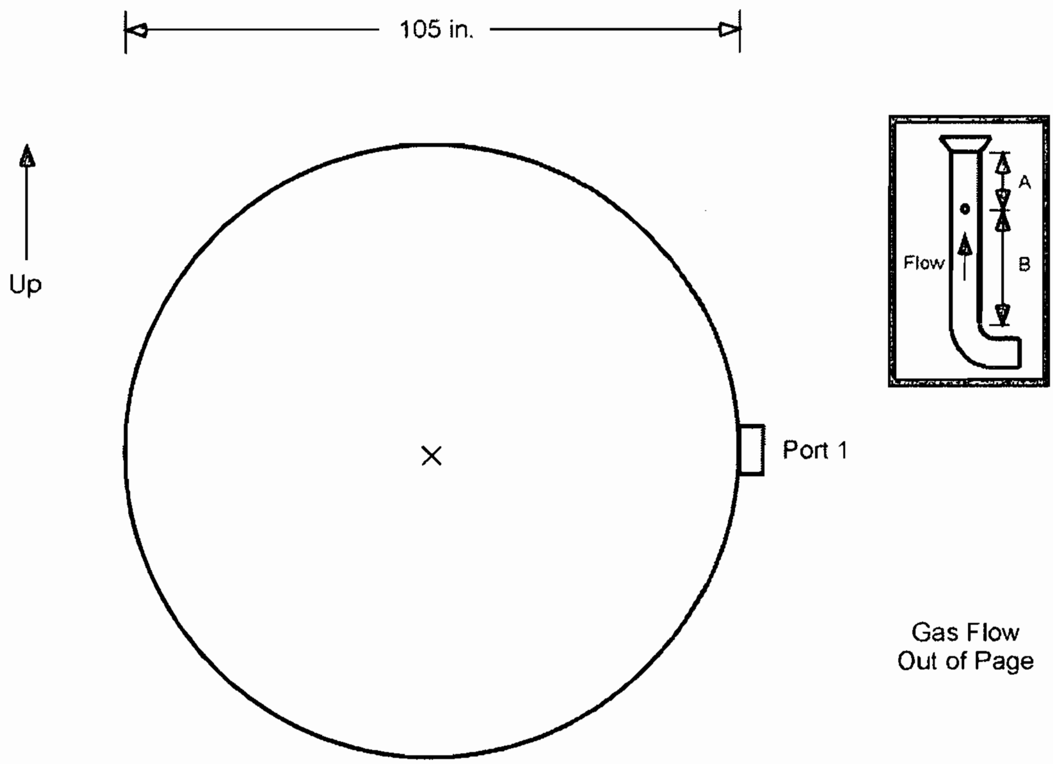
Table 3-4 outlines the sampling point configurations. Figures 3-3 through 3-5 (on pages 3-7 through 3-9) illustrate the sampling points and orientation of sampling ports for each of the sources that were tested in the program.

**Table 3-4:
Sampling Points**

Location	Constituent	Method	Run No.	Ports	Points per Port	Minutes per Point	Total Minutes	Figure
Units 1, 2 and 3 SDA Inlets								
	Hydrogen Chloride	26A[1]	1-3	1	1	60	60	3-3
Units 1, 2 and 3 FF Outlets								
	Particulate, Cd, Pb and Hg	5/29[2]	1-3/4[3]	5	5	5	125	3-4
	PCDDs/PCDFs (Unit 1 only)	23	1-3	5	5	10	250	3-4
	Hydrogen Chloride	26A[1]	1-3	1	1	60	60	3-5

[1] Hydrogen chloride inlet testing utilized a modification of EPA Method 26A (single point constant sampling rate).
[2] Metals testing was done in conjunction with EPA Method 5 particulate sampling.
[3] A fourth run for mercury only was performed on all three (3) units.

DESCRIPTION OF INSTALLATION

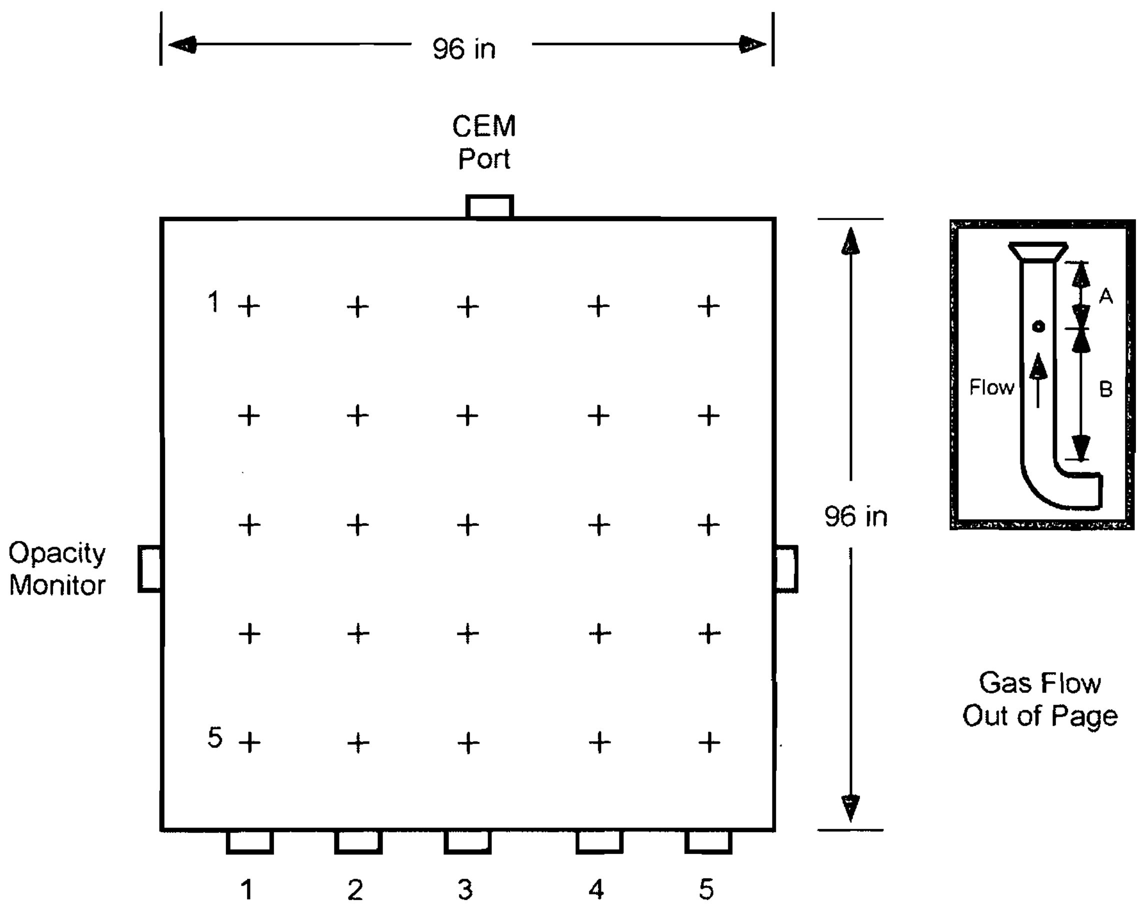


Sampling Point	Port to Point Distance (in.)
1	approximate center

Diameters upstream from flow disturbance (A):	>0.5	Limit: 0.5
Diameters downstream from flow disturbance (B):	>2.0	Limit: 2.0

Figure 3-3: SDA Inlets – Sampling Point Determination – HCl Sampling (Units 1, 2 and 3 are identical)

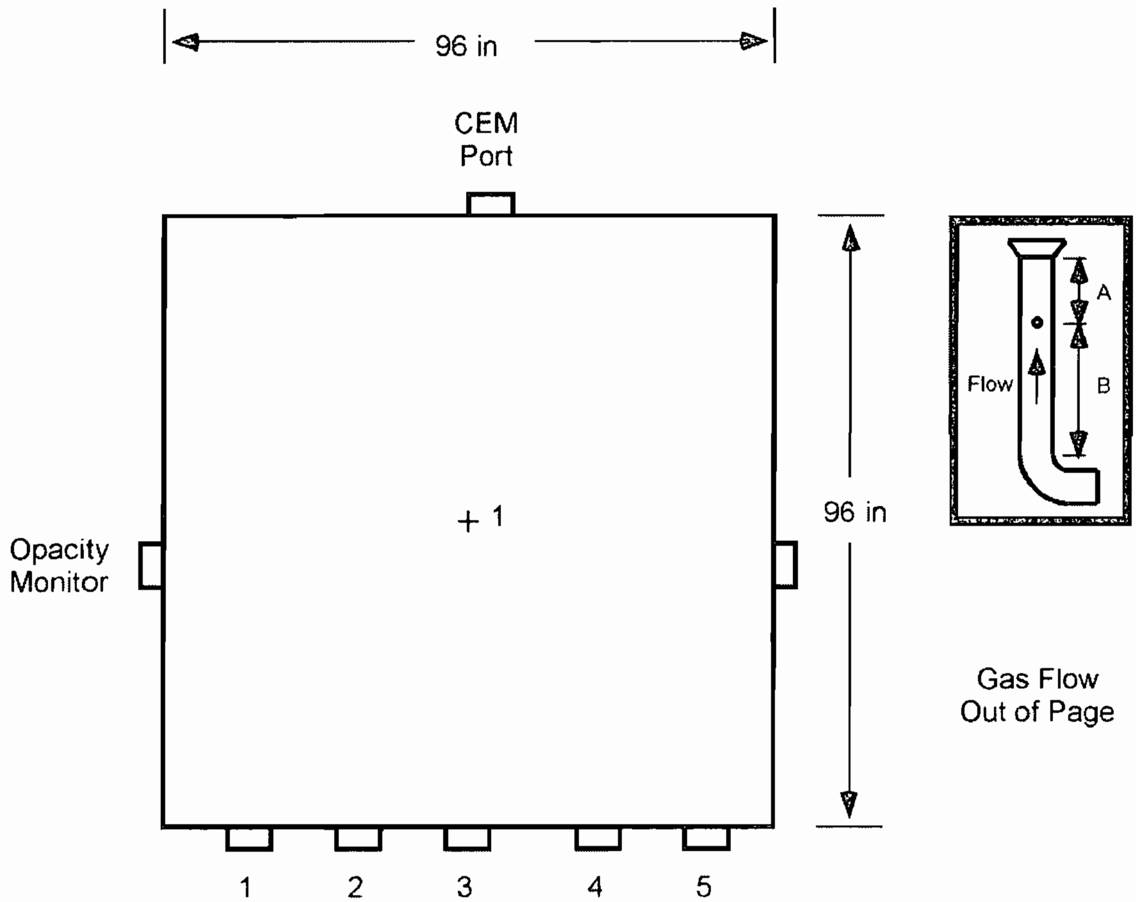
DESCRIPTION OF INSTALLATION



Traverse Point	Port to Point Distance (in.)
1	86.4
2	67.2
3	48.0
4	28.8
5	9.6

Equivalent Duct diameters upstream from flow disturbance (A):	>0.5	Limit: 0.5
Equivalent Duct diameters downstream from flow disturbance (B):	>2.0	Limit: 2.0

Figure 3-4: FF Outlet Isokinetic Sampling Point Determination (EPA Method 1)
(Units 1, 2 and 3 are identical)



Sampling Point	Port to Point Distance (in.)
1	Approximate center

Equivalent Duct diameters upstream from flow disturbance (A):	>0.5	Limit: 0.5
Equivalent Duct diameters downstream from flow disturbance (B):	>2.0	Limit: 2.0

Figure 3-5: FF Outlet HCl Sampling Point Determination (EPA Method 1)
(Units 1, 2 and 3 are identical)

End of Section 3 – Description of Installation

METHODOLOGY

Clean Air Engineering followed procedures as detailed in EPA Methods 1, 2, 3, 3A, 3B, 4, 5, 9, 22, 23, modified 26A and 29. The following table summarizes the methods and their respective sources.

Table 4-1:
Summary of Sampling Procedures

Title 40 CFR Part 60 Appendix A

Method 1	"Sample and Velocity Traverses for Stationary Sources"
Method 2	"Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)"
Method 3	"Gas Analysis for the Determination of Dry Molecular Weight"
Method 3A	"Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)"
Method 3B	"Gas Analysis for the Determination of Emission Rate Correction Factor or Excess Air"
Method 5	"Determination of Particulate Matter Emissions from Stationary Sources"
Method 9	"Visual Determination of the Opacity of Emissions from Stationary Sources"
Method 23	"Determination of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans from Municipal Waste Conductors"
Method 22	"Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares"
Mod.Method 26A[1]	"Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources Isokinetic Method"
Method 29	"Determination of Metals Emissions from Stationary Sources"

[1] Hydrogen chloride testing utilized a modification of EPA Method 26A (single point constant sampling rate) at the inlet and outlet sampling locations.

These methods appear in detail in Title 40 of the Code of Federal Regulations (CFR) and are located on the internet at http://ecfr.gpoaccess.gov.

Diagrams of the sampling apparatus and major specifications of the sampling, recovery and analytical procedures are summarized for each method in Appendix A of this report.

CleanAir followed specific quality assurance and quality control (QA/QC) procedures as outlined in the individual methods and as prescribed in CleanAir's internal Quality Manual. Results of all QA/QC activities performed by CleanAir are summarized in Appendix F of this report.

End of Section 4 – Methodology

APPENDIX

5-1

TEST METHOD SPECIFICATIONS

A

I herby certify that all pages contained within this Appendix have been reviewed and, to the best of my ability, verified as accurate.

QA/QC Initials: MK

Date: 4/27/12

CleanAir

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Specification Sheet for EPA Method 5/29

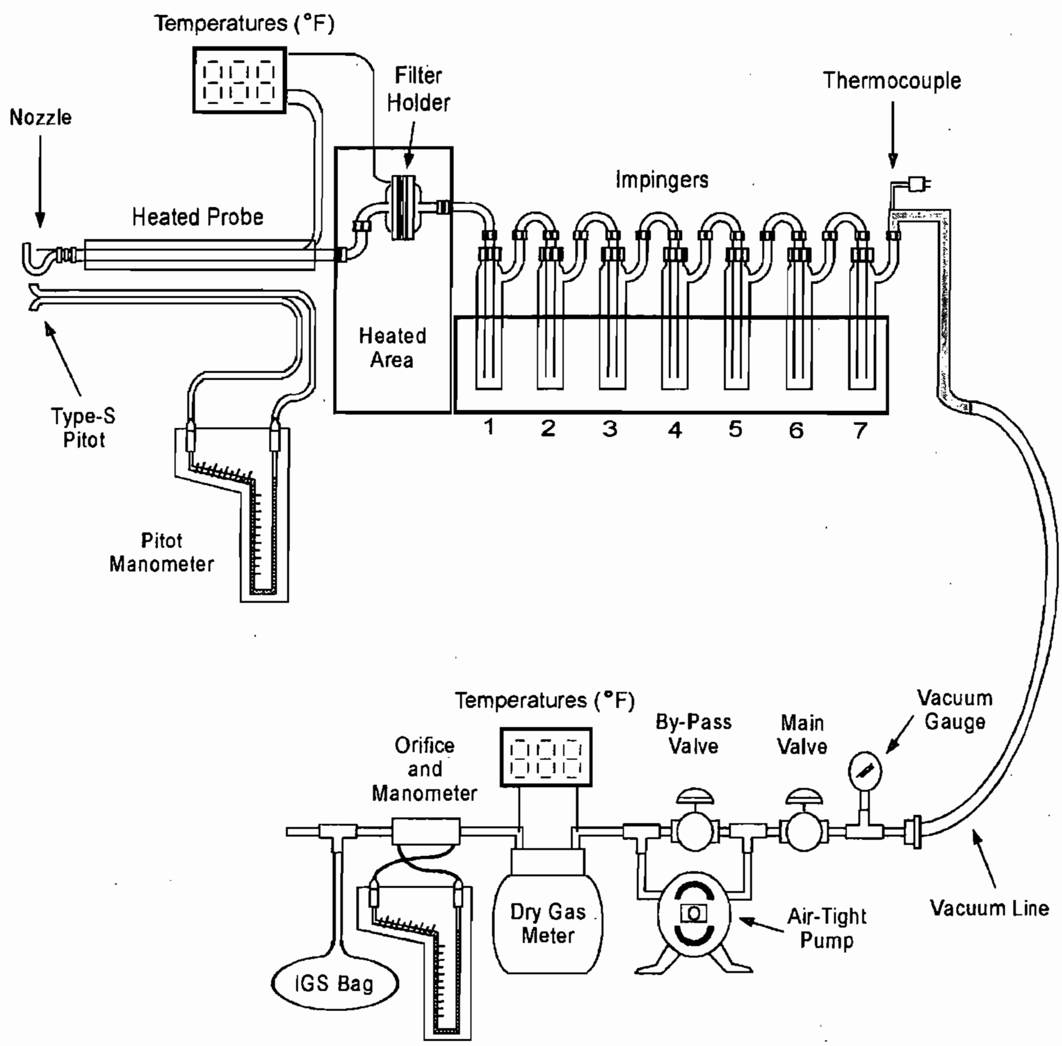
Source Location Name(s)	Units 1, 2 and 3 FF Outlets
Pollutant(s) to be Determined	Particulate Matter (PM) and Trace Metals (including Mercury)
Other Parameters to be Determined from Train	Gas Density, Moisture, Flow Rate

	Standard Method Specification	Actual Specification Used
Pollutant Sampling Information		
Duration of Run	N/A	125 minutes
No. of Sample Traverse Points	N/A	25
Sample Time per Point	N/A	5 minutes
Sampling Rate	Isokinetic (90-110%)	Isokinetic (90-110%)
Sampling Probe		
Nozzle Material	Borosilicate or Quartz Glass	Borosilicate Glass
Nozzle Design	Button-Hook or Elbow	Button-Hook
Probe Liner Material	Borosilicate or Quartz Glass	Borosilicate Glass
Effective Probe Length	N/A	8 feet
Probe Temperature Set-Point	248°F±25°F	248°F±25°F
Velocity Measuring Equipment		
Pitot Tube Design	Type S	Type S
Pitot Tube Coefficient	N/A	varied
Pitot Tube Calibration by	Geometric or Wind Tunnel	Wind-Tunnel
Pitot Tube Attachment	Attached to Probe	Attached to Probe
Metering System Console		
Meter Type	Dry Gas Meter	Dry Gas Meter
Meter Accuracy	±2%	±1%
Meter Resolution	N/A	0.01 cubic feet
Meter Size	N/A	0.1 dcf/revolution
Meter Calibrated Against	Wet Test Meter or Standard DGM	Wet Test Meter
Pump Type	N/A	Rotary Vane
Temperature Measurements	N/A	Type K Thermocouple/Pyrometer
Temperature Resolution	5.4°F	1.0°F
ΔP Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
ΔH Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
Barometer	Mercury or Aneroid	Digital Barometer calibrated w/Mercury Aneroid
Filter Description		
Filter Location	After Probe	Exit of Probe
Filter Holder Material	Borosilicate Glass	Borosilicate Glass
Filter Support Material	Teflon (or other non-metallic material)	Teflon
Cyclone Material	N/A	None
Filter Heater Set-Point	248°F±25°F	248°F±25°F
Filter Material	Quartz or Fiberglass Fiber	Quartz Fiber
Other Components		
Description	N/A	N/A
Location	N/A	N/A
Operating Temperature	N/A	N/A

Specification Sheet for EPA Method 5/29

	Standard Method Specification	Actual Specification Used
Impinger Train Description		
Type of Glassware Connections	Ground Glass or Equivalent	Screw Joint with Silicone Gasket
Connection to Probe or Filter by	Direct Glass Connection	Direct Glass Connection
Number of Impingers	7	7
Impinger Stem Types		
Impinger 1	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 2	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 3	Greenburg-Smith	Greenburg-Smith
Impinger 4	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 5	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 6	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 7	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 8		
Gas Density Determination		
Sample Collection	Multi-point integrated	Multi-Point Integrated
Sample Collection Medium	Flexible Gas Bag	Vinyl Bag
Sample Analysis	Orsat or Fyrite Analyzer	CEM
Sample Recovery Information		
Probe Brush Material	Non-metallic swab or bristle	Teflon Mat
Probe Rinse Reagent	Acetone/0.1N Nitric Acid	Acetone/0.1N. Nitric Acid
Probe Rinse Wash Bottle Material	Glass or Teflon	Teflon
Probe Rinse Storage Container	See Method 29 Recovery Flow Chart	See Recovery Flow Chart
Filter Recovered?	Yes	Yes
Filter Storage Container	Petri Dish - Glass or Polystyrene	Glass
Impinger Contents Recovered?	Yes	Yes
Impinger Rinse Reagent	See Method 29 Recovery Flow Chart	See Recovery Flow Chart
Impinger Wash Bottle	Glass or Teflon	Teflon
Impinger Storage Container	See Recovery Flow Chart	See Recovery Flow Chart
Analytical Information		
Method 4 H_2O Determination by	Volumetric or Gravimetric	Gravimetric and Volumetric
Filter Preparation Conditions	See Method 29 Analytical Flow Chart	For Metals Analysis
Front-Half Rinse Preparation	See Method 29 Analytical Flow Chart	See Analytical Flow Chart
Back-Half Analysis	See Method 29 Analytical Flow Chart	See Analytical Flow Chart
Additional Analysis	Gravimetric (EPA Method 5)	Gravimetric (EPA Method 5)

EPA Method 5/29
Sampling Train Configuration



Impinger Contents

Impinger 1	Empty
Impinger 2	100 ml 5% HNO_3 / 10% H_2O_2
Impinger 3	100 ml 5% HNO_3 / 10% H_2O_2
Impinger 4	Empty
Impinger 5	100 ml 4% $KMnO_4$ / 10% H_2SO_4
Impinger 6	100 ml 4% $KMnO_4$ / 10% H_2SO_4
Impinger 7	Silica Gel

EPA Method 29
Glassware Preparation Procedures

Wash with soap and hot tap water

↓

Rinse 3X with hot tap water

↓

Rinse 3X with D.I. water

↓

Soak in 10% nitric acid bath for 4 hours

↓

Rinse 3X with D.I. water

↓

Rinse 3X with metals grade acetone

↓

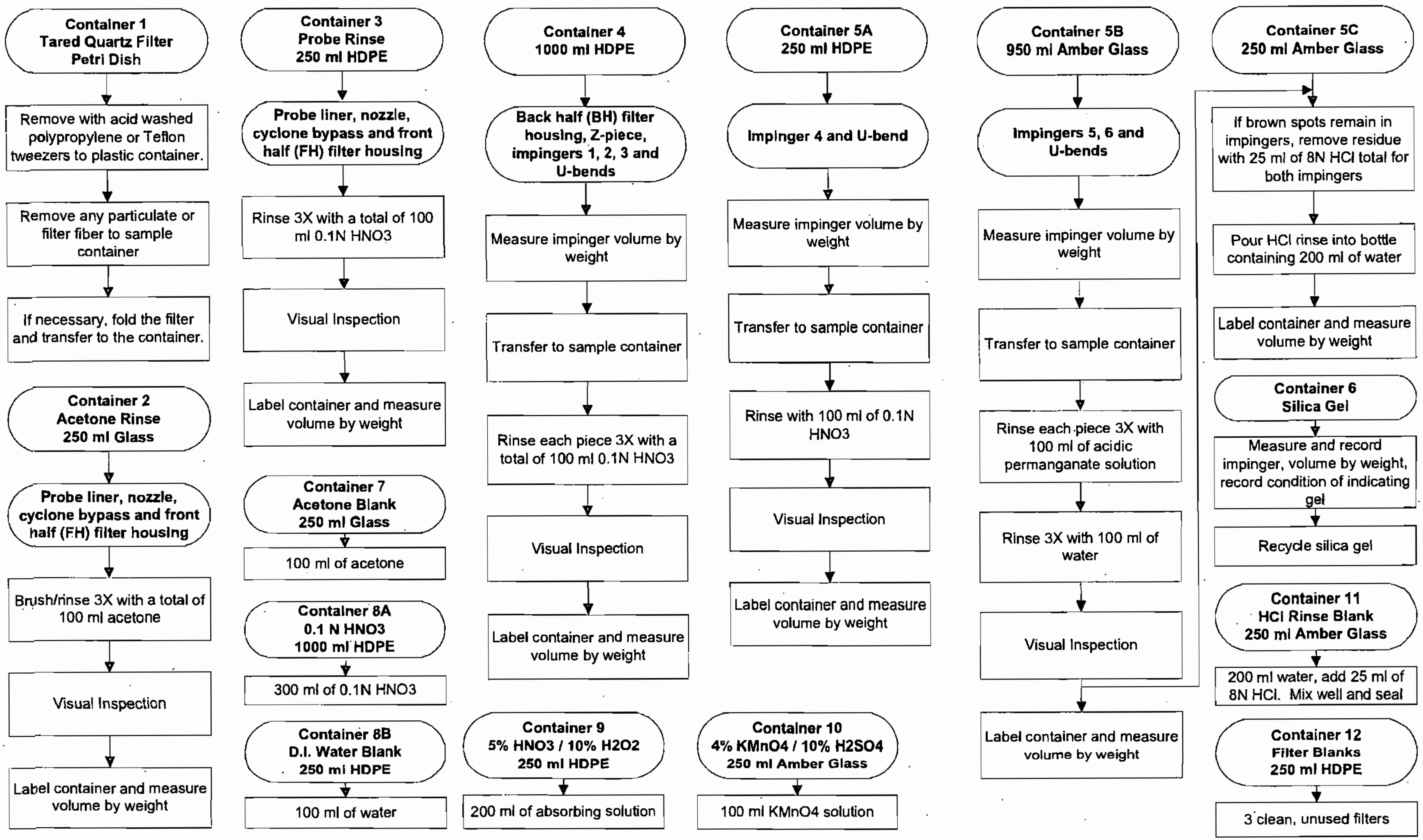
Allow to air dry

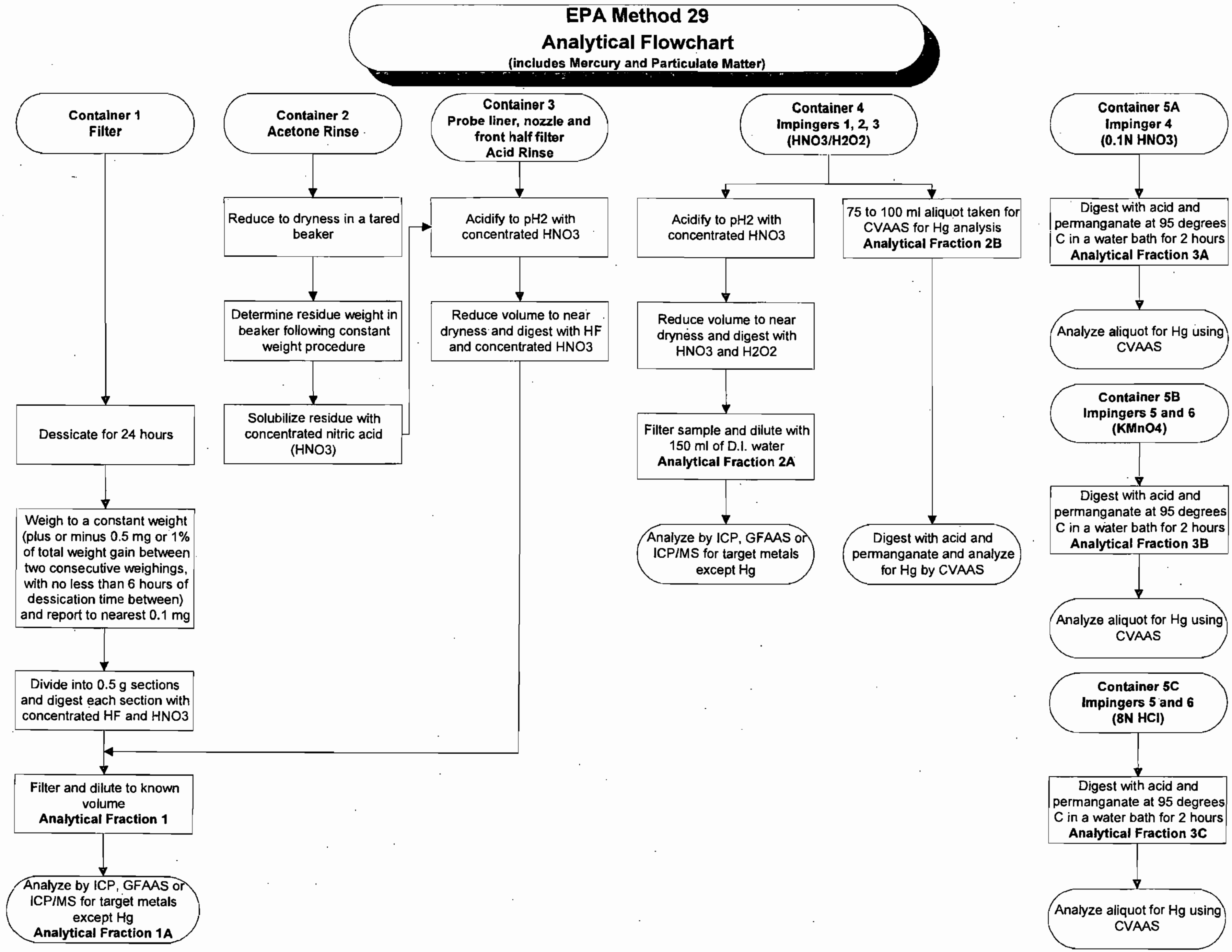
↓

Cover all openings with parafilm

EPA Method 29
Sample Recovery Flowchart
(includes Mercury and Particulate Matter)

- Tare all sample containers before sample collection
- Mark all liquid levels and final weights on the outside of each sample container
- Seal all sample containers with Teflon tape
- If recycling, bake silica gel for two hours at 350 degrees F (175 degrees C)
- Collect one complete blank set per field test




EPA Method 29
Analytical Flowchart
(includes Mercury and Particulate Matter)
Container 1
Filter
Dessicate for 24 hours
Weigh to a constant weight (plus or minus 0.5 mg or 1% of total weight gain between two consecutive weighings, with no less than 6 hours of dessication time between) and report to nearest 0.1 mg
Divide into 0.5 g sections and digest each section with concentrated HF and HNO3
Filter and dilute to known volume
Analytical Fraction 1
Analyze by ICP, GFAAS or ICP/MS for target metals except Hg
Analytical Fraction 1A
Container 2
Acetone Rinse
Reduce to dryness in a tared beaker
Determine residue weight in beaker following constant weight procedure
Solubilize residue with concentrated nitric acid (HNO3)
Container 3
Probe liner, nozzle and front half filter
Acid Rinse
Acidify to pH2 with concentrated HNO3
Reduce volume to near dryness and digest with HF and concentrated HNO3
Container 4
Impingers 1, 2, 3
(HNO3/H2O2)
Acidify to pH2 with concentrated HNO3
Reduce volume to near dryness and digest with HNO3 and H2O2
Filter sample and dilute with 150 ml of D.I. water
Analytical Fraction 2A
Analyze by ICP, GFAAS or ICP/MS for target metals except Hg
75 to 100 ml aliquot taken for CVAAS for Hg analysis
Analytical Fraction 2B
Digest with acid and permanganate and analyze for Hg by CVAAS
Container 5A
Impinger 4
(0.1N HNO3)
Digest with acid and permanganate at 95 degrees C in a water bath for 2 hours
Analytical Fraction 3A
Analyze aliquot for Hg using CVAAS
Container 5B
Impingers 5 and 6
(KMnO4)
Digest with acid and permanganate at 95 degrees C in a water bath for 2 hours
Analytical Fraction 3B
Analyze aliquot for Hg using CVAAS
Container 5C
Impingers 5 and 6
(8N HCl)
Digest with acid and permanganate at 95 degrees C in a water bath for 2 hours
Analytical Fraction 3C
Analyze aliquot for Hg using CVAAS

Specification Sheet for EPA Method 23

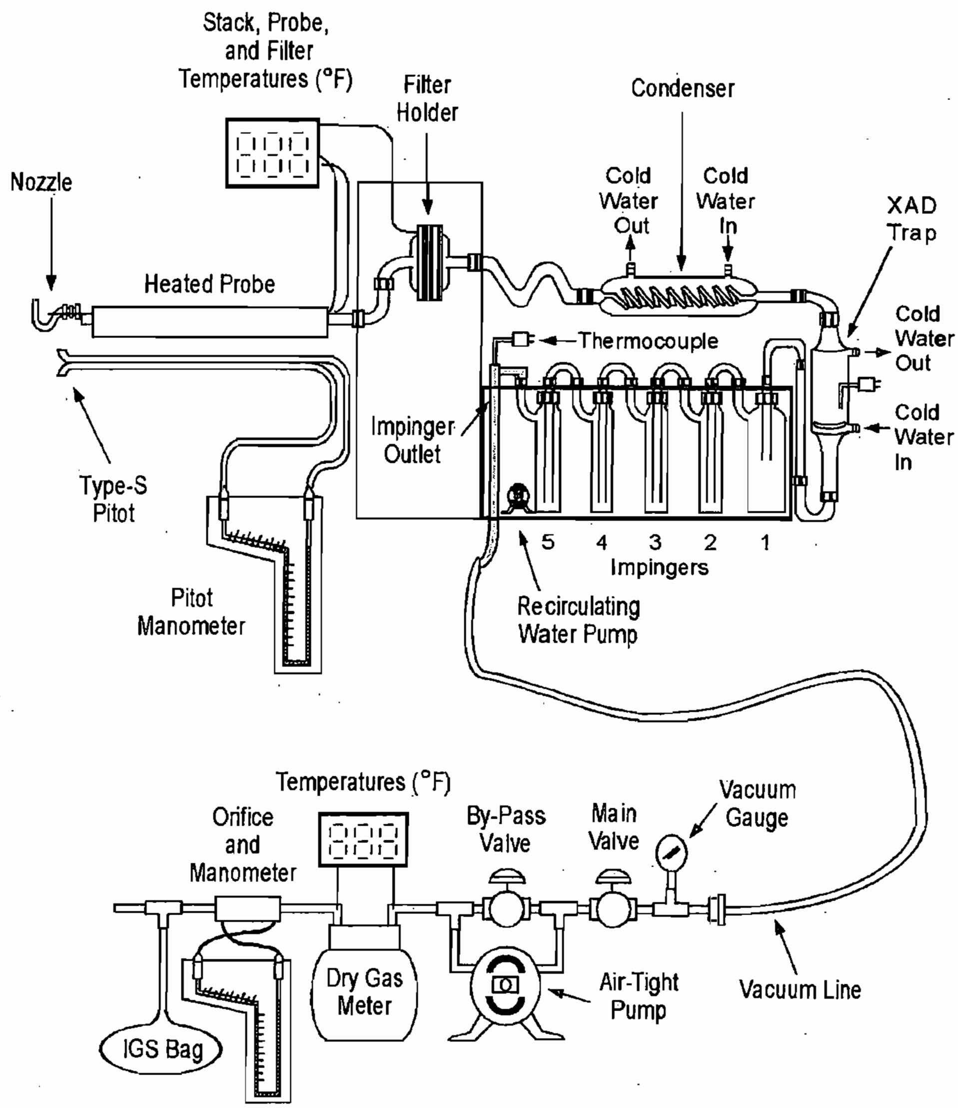
Source Location Name(s)	Unit 1 FF Outlet
Pollutant(s) to be Determined	Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans (PCDD/PCDF)
Other Parameters to be Determined from Train	Gas Density, Moisture, Flow Rate

	Standard Method Specification	Actual Specification Used
Pollutant Sampling Information		
Duration of Run	N/A	250 minutes
No. of Sample Traverse Points	N/A	25
Sample Time per Point	N/A	10 minutes
Sampling Rate	Isokinetic (90-110%)	Isokinetic (90-110%)
Sampling Probe		
Nozzle Material	Nickel, Quartz, Stainless Steel or Glass	Borosilicate Glass
Nozzle Design	Button-Hook or Elbow	Button-Hook
Probe Liner Material	Borosilicate or Quartz Glass	Borosilicate Glass
Effective Probe Length	N/A	8 feet
Probe Temperature Set-Point	248°F±25°F	248°F±25°F
Velocity Measuring Equipment		
Pitot Tube Design	Type S	Type S
Pitot Tube Coefficient	N/A	0.828
Pitot Tube Calibration by	Geometric or Wind Tunnel	Wind-Tunnel
Pitot Tube Attachment	Attached to Probe	Attached to Probe
Metering System Console		
Meter Type	Dry Gas Meter	Dry Gas Meter
Meter Accuracy	±2%	±1%
Meter Resolution	N/A	0.01 cubic feet
Meter Size	N/A	0.1 dcf/revolution
Meter Calibrated Against	Wet Test Meter or Standard DGM	Wet Test Meter
Pump Type	N/A	Rotary Vane
Temperature Measurements	N/A	Type K Thermocouple/Pyrometer
Temperature Resolution	5.4°F	1.0°F
ΔP Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
ΔH Differential Pressure Gauge	Inclined Manometer or Equivalent	Inclined Manometer
Barometer	Mercury or Aneroid	Digital Barometer calibrated w/Mercury Aneroid
Filter Description		
Filter Location	After Probe	Exit of Probe
Filter Holder Material	Borosilicate Glass	Borosilicate Glass
Filter Support Material	Glass Frit	Teflon
Cyclone Material	N/A	None
Filter Heater Set-Point	248°F±25°F	248°F±25°F
Filter Material	Glass Fiber - Toluene Extracted	Glass Fiber - Toluene Extracted
Other Components		
Adsorbent Module	XAD-2 Trap	XAD-II Adsorbent Trap
Location	After filter and condenser	After filter and condenser
Operating Temperature	< 68°F	<68°F

Specification Sheet for EPA Method 23

	Standard Method Specification	Actual Specification Used
Impinger Train Description		
Type of Glassware Connections	Ground Glass or Equivalent	Screw Joint with Silicone Gasket
Connection to Probe or Filter by	Direct Glass Connection	Direct Glass Connection
Number of Impingers	5	5
Impinger Stem Types		
Impinger 1	Modified Greenburg-Smith	Shortened Stem (open tip)
Impinger 2	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 3	Greenburg-Smith	Greenburg-Smith
Impinger 4	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 5	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 6		
Impinger 7		
Impinger 8		
Gas Density Determination		
Sample Collection	Multi-point integrated	Multi-Point Integrated
Sample Collection Medium	Flexible Gas Bag	Vinyl Bag
Sample Analysis	Orsat or Fyrite Analyzer	CEM
Sample Recovery Information		
Probe Brush Material	Inert Bristle	Teflon Mat
Probe Rinse Reagent	Acetone/Methylene Chloride/Toluene	Acetone/Toluene (see Appendix J)
Probe Rinse Wash Bottle Material	Glass or Teflon	Teflon
Probe Rinse Storage Container	Glass	Glass
Filter Recovered?	Yes	Yes
Filter Storage Container	Petri Dish - Glass or Polystyrene	Glass
Impinger Contents Recovered?	No	Archived
Impinger Rinse Reagent	N/A	HPLC Water
Impinger Wash Bottle	N/A	Teflon
Impinger Storage Container	N/A	Polyethylene
Analytical Information		
Method 4 H_2O Determination by	Volumetric or Gravimetric	Gravimetric
Filter Preparation Conditions	See Method 23 Analytical Flow Chart	For Organic Analysis
Front-Half Rinse Preparation	See Method 23 Analytical Flow Chart	Organic Analysis
Back-Half Analysis	N/A	Archive
Additional Analysis	None	None

EPA Method 23
Sampling Train Configuration

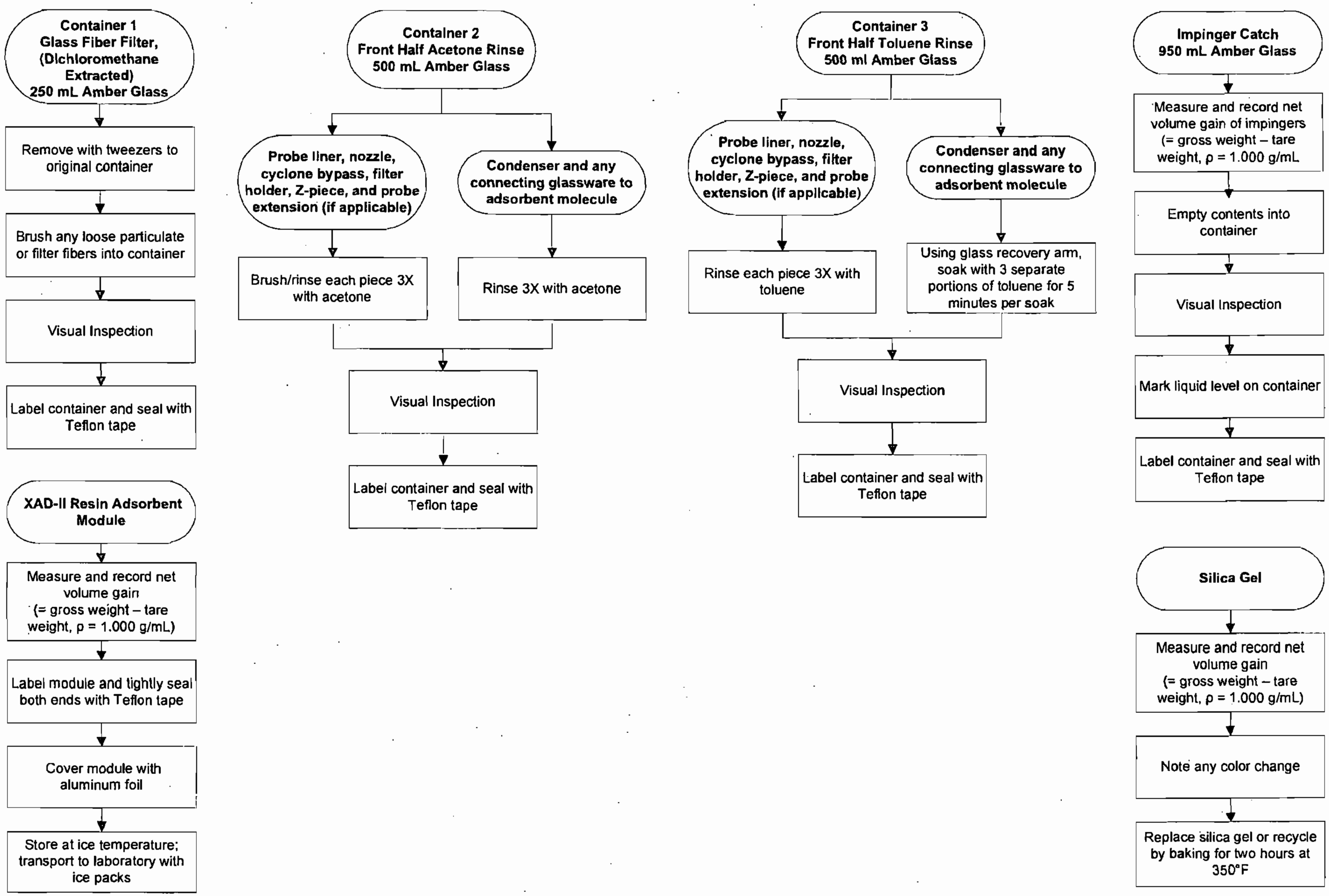


Impinger Contents	
Impinger 1	Empty
Impinger 2	100 ml HPLC H_2O
Impinger 3	100 ml HPLC H_2O
Impinger 4	Empty
Impinger 5	Silica Gel

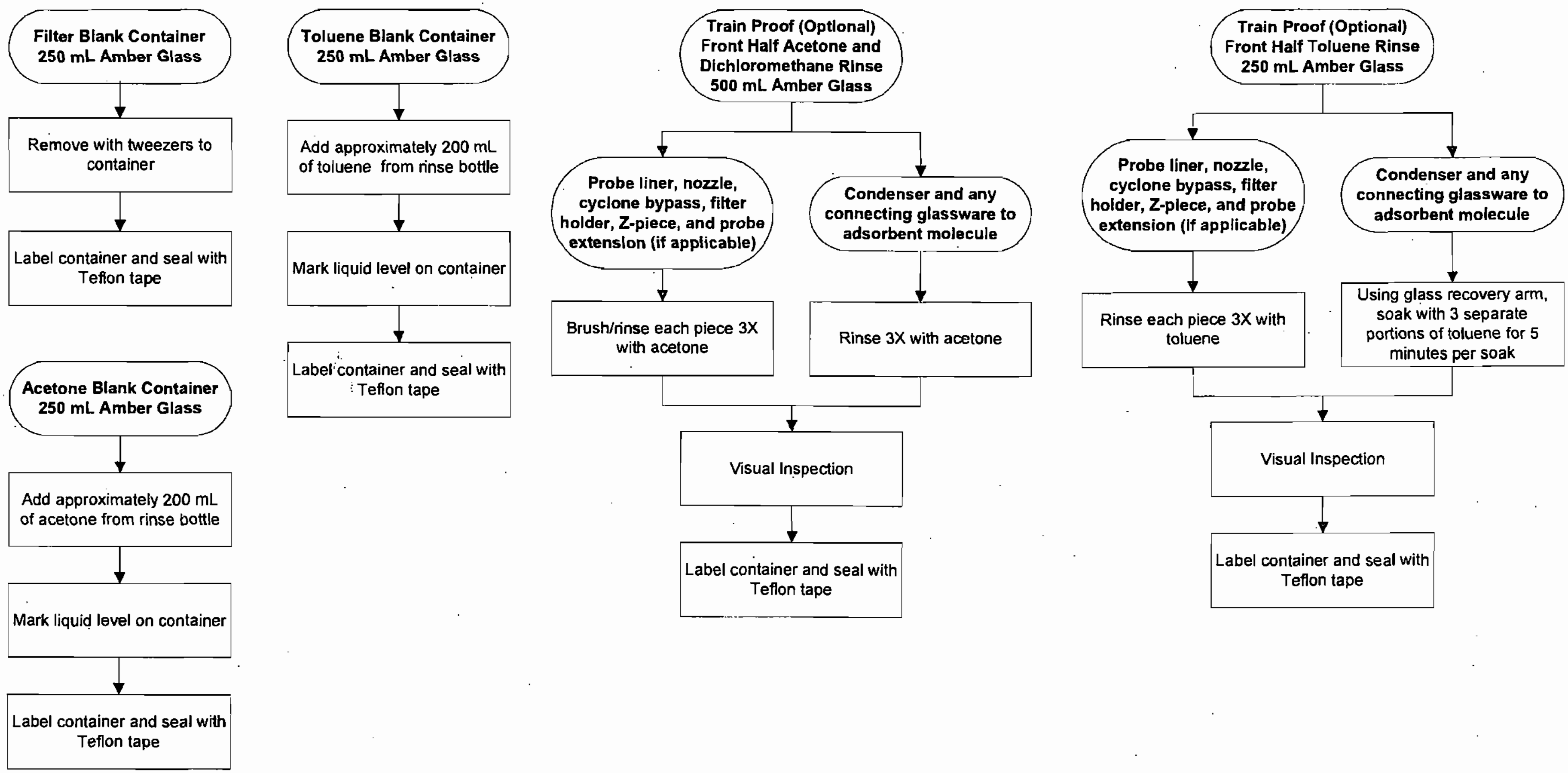
EPA Method 23
Glassware Preparation Procedures

1. Wash with soap and hot tap water
2. Rinse 3X with hot tap water
3. Rinse 3X with D.I. water
4. Oven dry at 450 degrees F for 2 hours
5. Rinse 3X with acetone
6. Rinse 3X with methylene chloride (MeCl2)
7. Allow to air dry
8. Cover all openings with MeCl2 cleaned aluminum foil

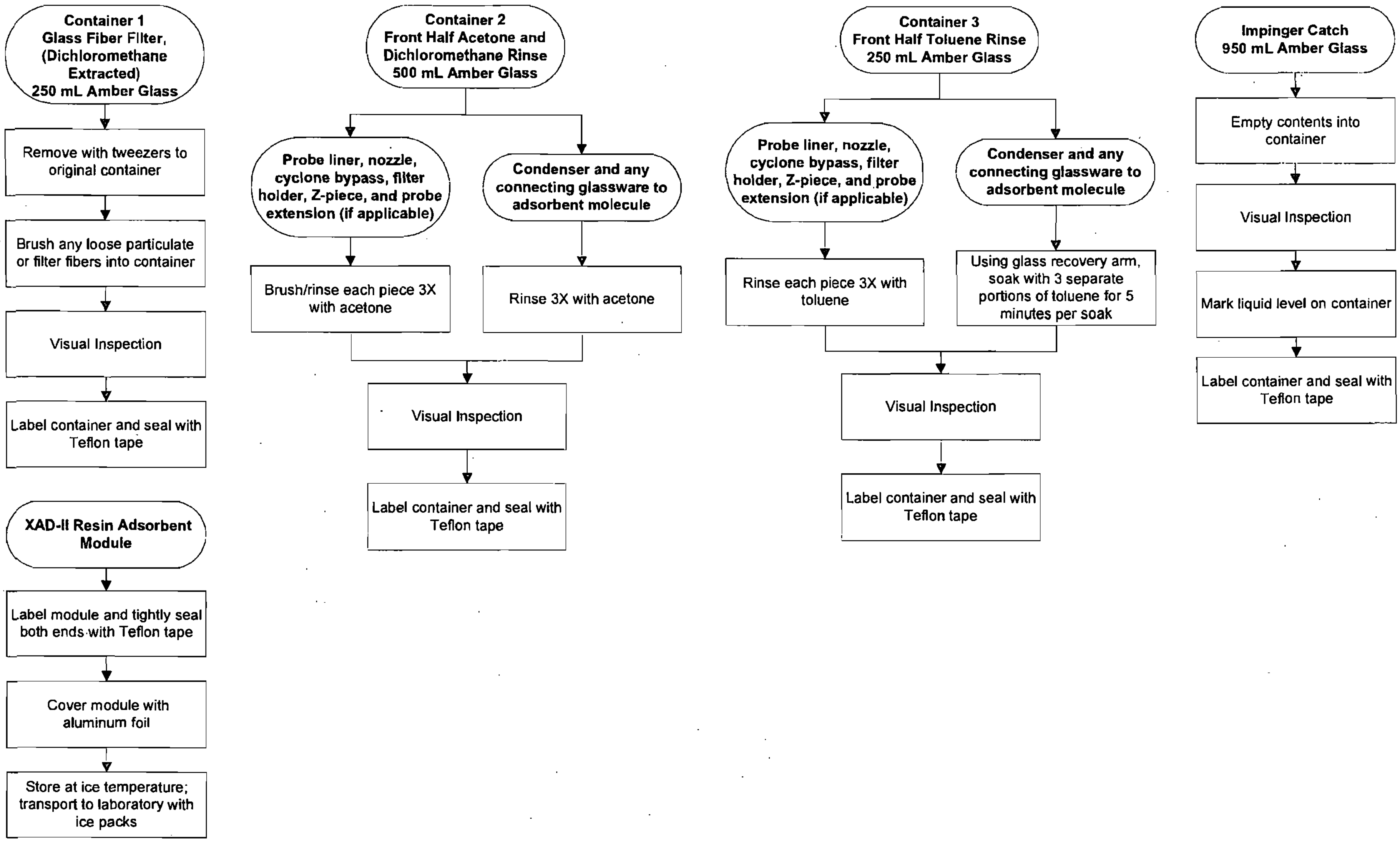
EPA Method 23
Sample Recovery Flowchart – Test Runs

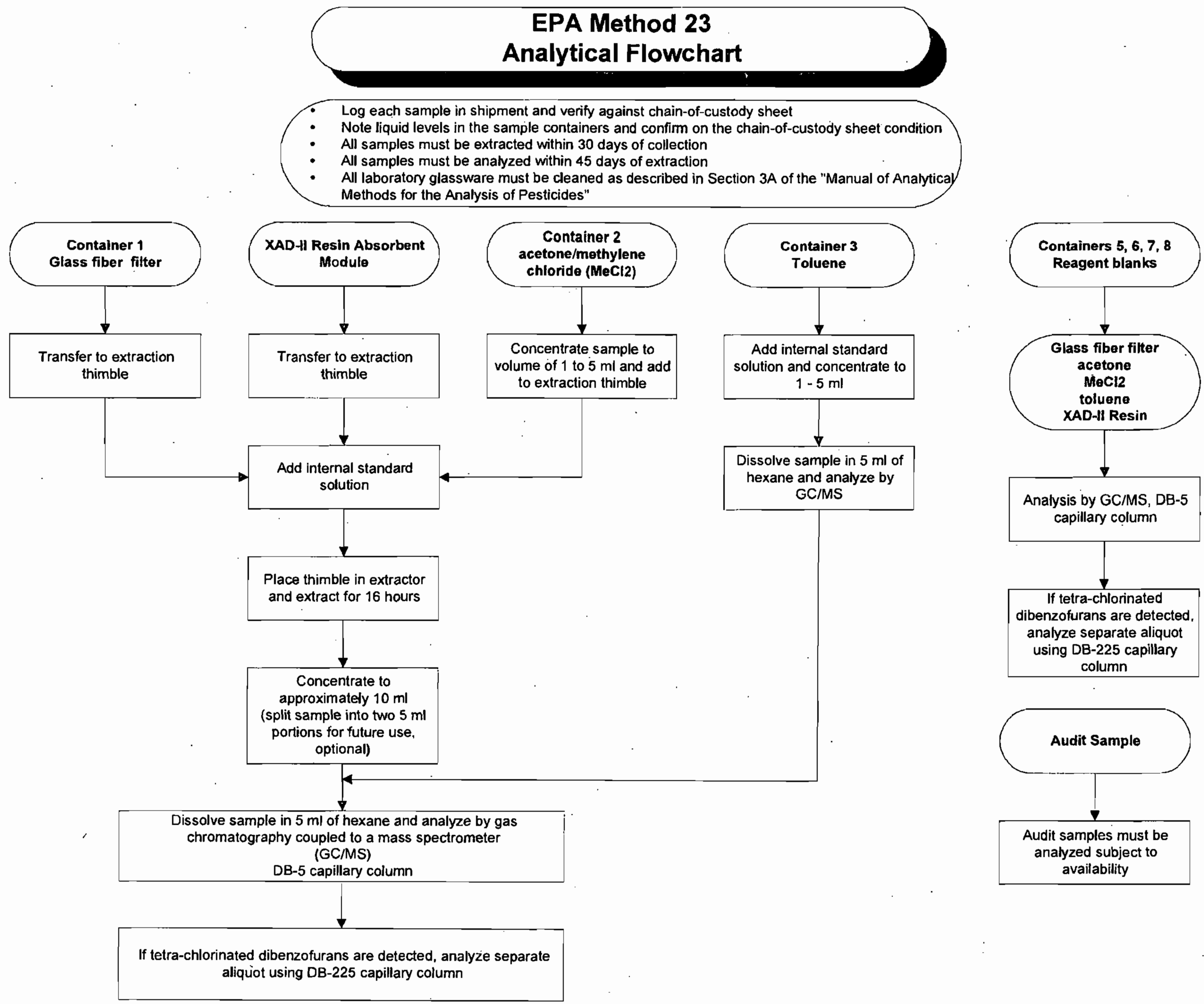


EPA Method 23
Sample Recovery Flowchart – Blanks and Proofs



EPA Method 23
Sample Recovery Flowchart – Field Train Blank




EPA Method 23
Analytical Flowchart
Log each sample in shipment and verify against chain-of-custody sheet
Note liquid levels in the sample containers and confirm on the chain-of-custody sheet condition
All samples must be extracted within 30 days of collection
All samples must be analyzed within 45 days of extraction
All laboratory glassware must be cleaned as described in Section 3A of the "Manual of Analytical Methods for the Analysis of Pesticides"
Container 1 Glass fiber filter
XAD-II Resin Absorbent Module
Container 2 acetone/methylene chloride (MeCl2)
Container 3 Toluene
Containers 5, 6, 7, 8 Reagent blanks
Transfer to extraction thimble
Transfer to extraction thimble
Concentrate sample to volume of 1 to 5 ml and add to extraction thimble
Add internal standard solution and concentrate to 1 - 5 ml
Glass fiber filter acetone MeCl2 toluene XAD-II Resin
Add internal standard solution
Dissolve sample in 5 ml of hexane and analyze by GC/MS
Analysis by GC/MS, DB-5 capillary column
Place thimble in extractor and extract for 16 hours
If tetra-chlorinated dibenzofurans are detected, analyze separate aliquot using DB-225 capillary column
Concentrate to approximately 10 ml (split sample into two 5 ml portions for future use, optional)
Audit Sample
Dissolve sample in 5 ml of hexane and analyze by gas chromatography coupled to a mass spectrometer (GC/MS) DB-5 capillary column
Audit samples must be analyzed subject to availability
If tetra-chlorinated dibenzofurans are detected, analyze separate aliquot using DB-225 capillary column

Specification Sheet for EPA Method 26A (modified)

Note: Modification includes the use of full-size impingers instead of midget impingers.

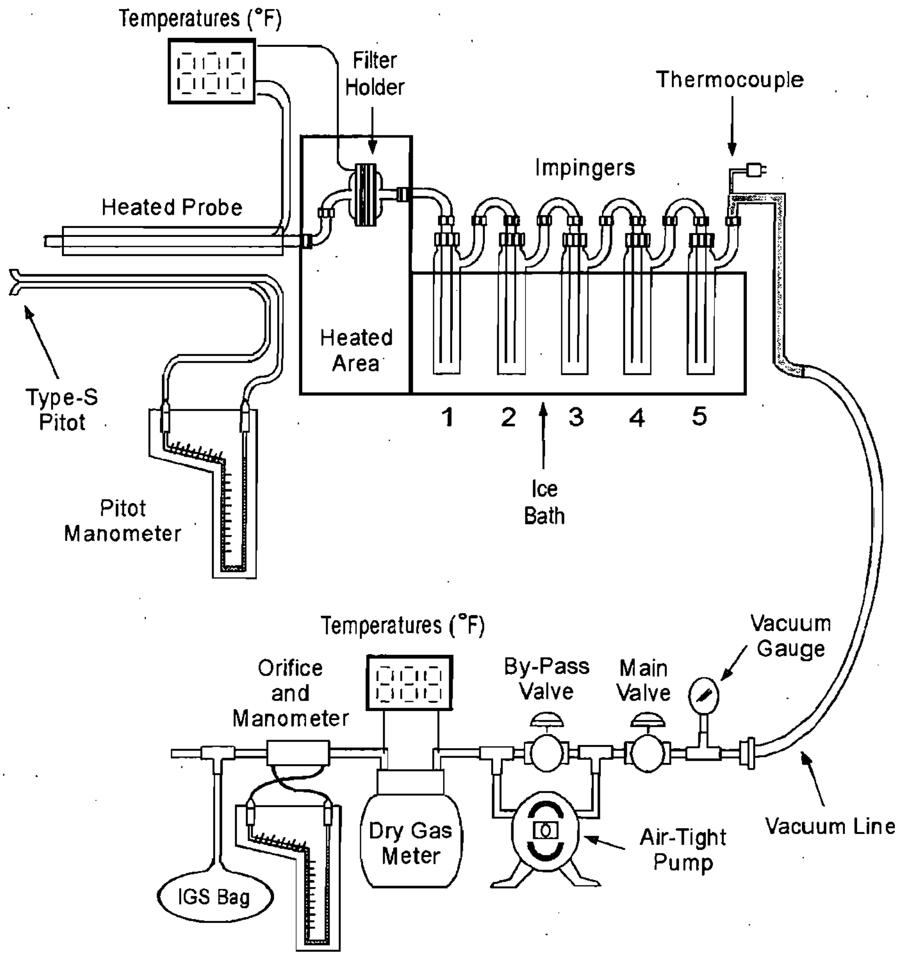
Source Location Name(s)	Units 1-3 SDA Inlets and Units 1-3 FF Outlets
Pollutant(s) to be Determined	Hydrogen Chloride (HCl)
Other Parameters to be Determined from Train	Gas Density, Moisture

	Standard Method Specification	Actual Specification Used
Pollutant Sampling Information		
Duration of Run	N/A	60 minutes
No. of Sample Traverse Points	N/A	1
Sample Time per Point	N/A	60 minutes
Sampling Rate	Constant Rate (±10%)	Constant Rate (±10%)
Sampling Probe		
Nozzle Material	N/A	None
Nozzle Design	N/A	N/A
Probe Liner Material	Borosilicate Glass	Borosilicate Glass
Effective Probe Length	N/A	4 feet
Probe Temperature Set-Point	>248°F	350°F @ Inlet, Stack Temp @ FF Outlet
Velocity Measuring Equipment		
Pitot Tube Design	None	None
Pitot Tube Coefficient	N/A	N/A
Pitot Tube Calibration by	N/A	N/A
Pitot Tube Attachment	N/A	N/A
Metering System Console		
Meter Type	Dry Gas Meter or Critical Orifice	Dry Gas Meter
Meter Accuracy	±2%	±1%
Meter Resolution	N/A	0.01 cubic feet
Meter Size	2 liters/minute	0.1 dcf/revolution
Meter Calibrated Against	Wet Test Meter	Wet Test Meter
Pump Type	Diaphragm or equivalent	Rotary Vane
Temperature Measurements	Dial Thermometer or equivalent	Type K Thermocouple/Pyrometer
Temperature Resolution	2°F-5.4°F	1.0°F
ΔP Differential Pressure Gauge	N/A	N/A
ΔH Differential Pressure Gauge	N/A	Inclined Manometer
Barometer	Mercury, aneroid or other.	Digital Barometer calibrated w/Mercury Aneroid
Filter Description		
Filter Location	After Probe	Exit of Probe
Filter Holder Material	Teflon or Quartz	Borosilicate Glass
Filter Support Material	Teflon Frit	Teflon
Cyclone Material	N/A	None
Filter Heater Set-Point	>248°F	350°F @ Inlet, Stack Temp @ FF Outlet
Filter Material	Teflon/Glass Mat (Quartz, Optional High Temp>410F)	Quartz Fiber @ Inlet, Teflon on Glass @ Outlet
Other Components		
Description	N/A	N/A
Location	N/A	N/A
Operating Temperature	N/A	N/A

Specification Sheet for EPA Method 26A (modified)

	Standard Method Specification	Actual Specification Used
Impinger Train Description		
Type of Glassware Connections	Ground Glass or Equivalent	Screw Joint with Silicone Gasket
Connection to Probe or Filter by	Direct Glass Connection	Direct Glass Connection
Number of Impingers	5 or 6 (Midget Impingers)	5
Impinger Stem Types		
Impinger 1	Shortened Stem	Shortened Stem (open tip)
Impinger 2	Greenburg-Smith	Greenburg-Smith
Impinger 3	Greenburg-Smith	Greenburg-Smith
Impinger 4	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 5	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 6		
Impinger 7		
Impinger 8		
Gas Density Determination		
Sample Collection	N/A	Single Point Integrated
Sample Collection Medium	N/A	Vinyl Bag
Sample Analysis	N/A	CEM
Sample Recovery Information		
Probe Brush Material	N/A	N/A
Probe Rinse Reagent	N/A	N/A
Probe Rinse Wash Bottle Material	N/A	N/A
Probe Rinse Storage Container	N/A	N/A
Filter Recovered?	No	No
Filter Storage Container	N/A	N/A
Impinger Contents Recovered?	Yes	Yes
Impinger Rinse Reagent	Deionized Distilled Water	Deionized Distilled Water
Impinger Wash Bottle	Polyethylene or glass	Polyethylene
Impinger Storage Container	Polyethylene	Polyethylene
Analytical Information		
Method 4 H_2O Determination by	N/A	Gravimetric
Filter Preparation Conditions	N/A	N/A
Front-Half Rinse Preparation	N/A	N/A
Back-Half Analysis	Ion Chromatography	Ion Chromatography
Additional Analysis	None	None

Modified EPA Method 26A
Sampling Train Configuration



<u>Impinger Contents</u>

Impinger 1	50 ml 0.1 N H_2SO_4
Impinger 2	100 ml 0.1 N H_2SO_4
Impinger 3	100 ml 0.1 N H_2SO_4
Impinger 4	Empty
Impinger 5	Silica Gel

EPA Method 26A
Glassware Preparation Procedures

Wash with soap and hot tap water

↓

Rinse 3X with hot tap water

↓

Rinse 3X with D.I. water

↓

Rinse 3X with acetone

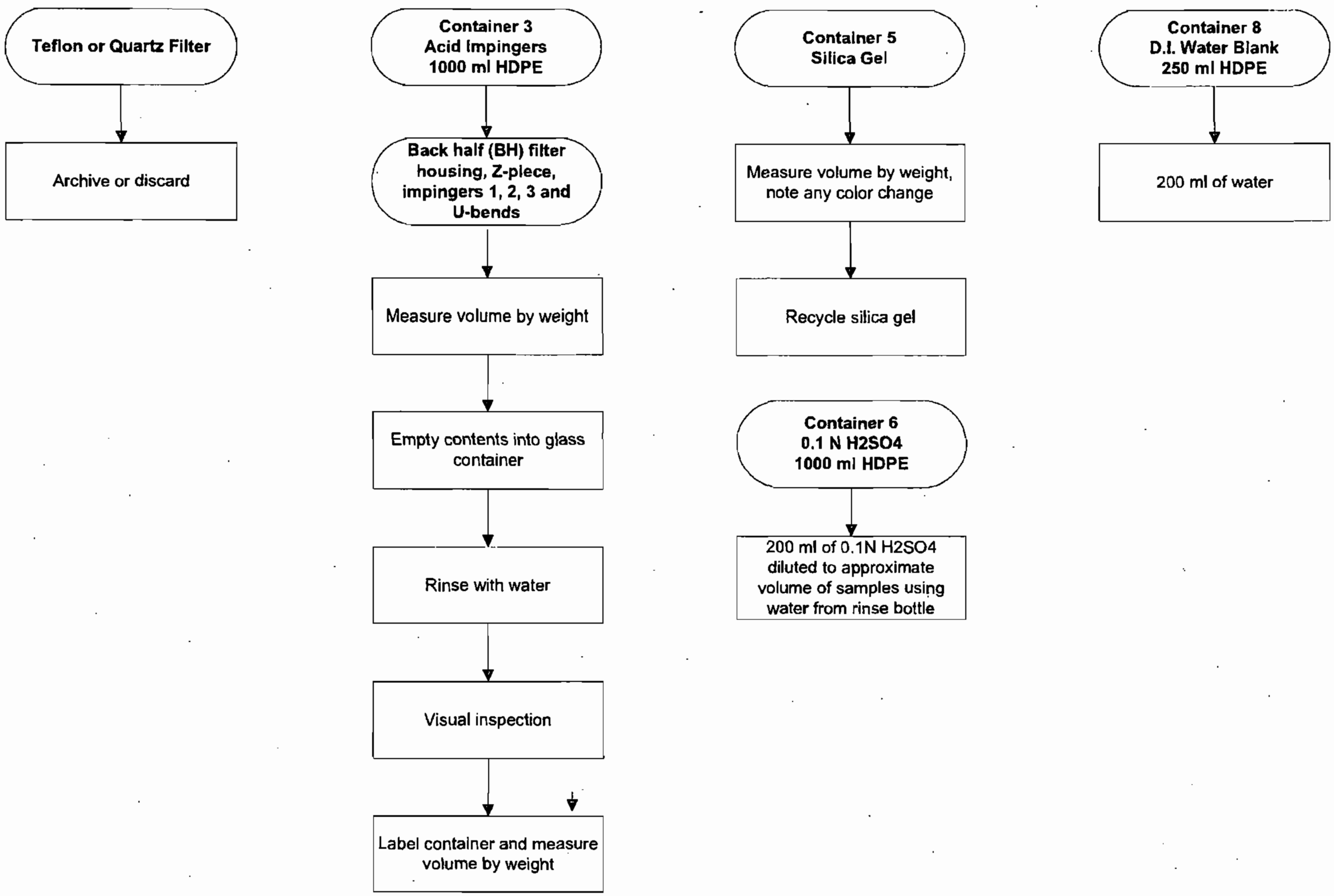
↓

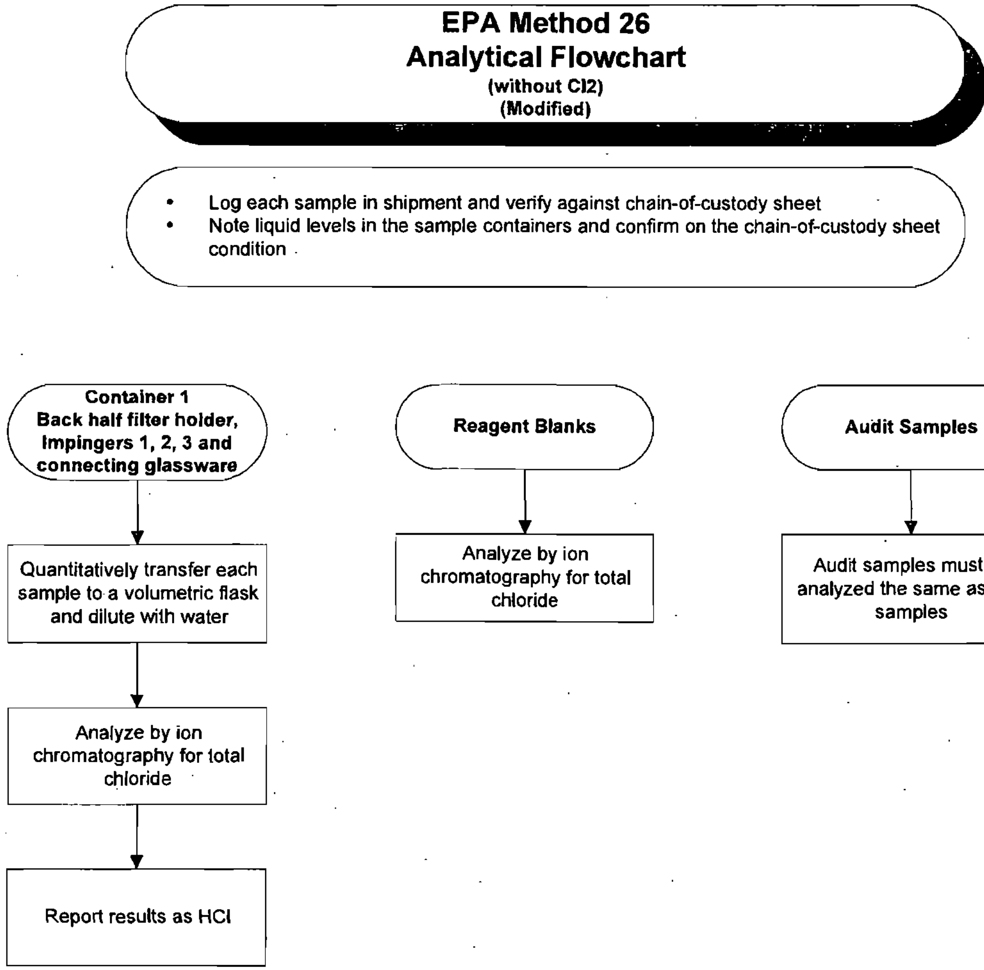
Allow to air dry

↓

Cap all openings with Kim Wipes

Modified EPA Method 26A
Sample Recovery Flowchart
(without Halogens)





End of Appendix

SAMPLE CALCULATIONS

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I herby certify that all pages contained within this Appendix have been reviewed and, to the best of my ability, verified as accurate.

QA/QC Initials: MR

Date: 4/27/12

CleanAir

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USEPA Method 5/29 (Particulate/Metals)
Sampling, Velocity and Moisture Sample Calculations

Sample data taken from Run 1

Note: The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results, and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

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1. Volume of water collected (wscf)

$$V_{wstd} = (0.04706)(V_{lc})$$

Where:

V_{lc}	= total volume of liquid collected in impingers and silica gel (ml)	=	485.8	ml
0.04706	= ideal gas conversion factor (ft^3 water vapor/ml or gm)	=	0.04706	ft^3/ml
V_{wstd}	= volume of water vapor collected at standard conditions (ft^3)	=	22.86	ft^3

2. Volume of gas metered, standard conditions (dscf)

$$V_{mstd} = \frac{(17.64)(V_m)\left(P_{bar} + \frac{\Delta H}{13.6}\right)(Y_d)}{(460 + T_m)}$$

Where:

P_{bar}	= barometric pressure (in. Hg)	=	30.05	in. Hg
T_m	= average dry gas meter temperature (°F)	=	80.62	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	74.03	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9925	
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	1.11	in. H_2O
17.64	= standard temperature to pressure ratio (°R/in. Hg)	=	17.64	°R/in. Hg
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in.H_2O/in. Hg
460	= °F to °R conversion constant	=	460	
V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	72.238	dscf

3. Sample gas pressure (in. Hg)

$$P_s = P_{bar} + \left(\frac{P_g}{13.6}\right)$$

Where:

P_{bar}	= barometric pressure (in. Hg)	=	30.05	in. Hg
P_g	= sample gas static pressure (in. H_2O)	=	-10.00	in. H_2O
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in. H_2O/in. Hg
P_s	= absolute sample gas pressure (in. Hg)	=	29.31	in. Hg

4. Actual water vapor pressure at sample gas temperature less than 212°F (in. Hg)

$$P_v = \frac{e^{\left(18.3036 - \frac{3816.44}{\frac{5}{9}(T_s - 32) + 273.15 - 46.13}\right)}}{25.4}$$

Where:

T_s	= average sample gas temperature (°F)	=	302.48	°F
18.3036	= Antoine coefficient	=	18.3036	°K
3816.44	= Antoine coefficient	=	3816.44	°K
273.15	= temperature conversion factor	=	273.15	°K
46.13	= Antoine coefficient	=	46.13	°K
25.4	= conversion factor	=	25.4	mm Hg/in. Hg
5/9	= Fahrenheit to Celsius conversion factor	=	5/9	°C/°F
32	= temperature conversion (°F)	=	32	°F
P_v	= vapor pressure, actual (in. Hg)	=	29.31	in. Hg

5. Water vapor pressure at gas temperature greater than 212°F (in. Hg)

$$P_v = P_s$$

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.31	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.31	in. Hg

6. Moisture measured in sample (% by volume)

$$B_{wo} = \frac{V_{wstd}}{\left(V_{mstd} + V_{wstd}\right)}$$

Where:

V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	72.238	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	22.86	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2404	
		=	24.04	%

7. Saturated moisture content (% by volume)

$$B_{ws} = \frac{P_v}{P_s}$$

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.31	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.31	in. Hg
B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions		1.0000	
		=	100.00	%

8. Actual water vapor in gas (% by volume)

$$B_w = MINIMUM \quad [B_{wo}, B_{ws}]$$

Where:

B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions	=	1.0000	
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2404	
B_w	= actual water vapor in gas	=	0.2404	
		=	24.04	%

9. Nitrogen (plus carbon monoxide) in gas stream (% by volume, dry)

$$N_2 + CO = 100 - CO_2 - O_2$$

Where:

CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	11.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.1	%
100	= conversion factor (%)	=	100	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.86	%

10. Molecular weight of dry gas stream (lb/lb·mole)

$$M_d = \left(M_{CO_2}\right)\frac{(CO_2)}{(100)} + \left(M_{O_2}\right)\frac{(O_2)}{(100)} + \left(M_{N_2+CO}\right)\frac{(N_2+CO)}{(100)}$$

Where:

M_{CO2}	= molecular weight of carbon dioxide (lb/lb·mole)	=	44.00	lb/lb·mole
M_{O2}	= molecular weight of oxygen (lb/lb·mole)	=	32.00	lb/lb·mole
M_{N2+CO}	= molecular weight of nitrogen and carbon monoxide (lb/lb·mole)	=	28.00	lb/lb·mole
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	11.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.1	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.9	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.09	lb/lb·mole

11. Molecular weight of sample gas (lb/lb·mole)

$$M_s = \left(M_d\right)\left(1 - B_w\right) + \left(M_{H_2O}\right)\left(B_w\right)$$

Where:

B_w	= proportion of water vapor in the gas stream by volume	=	0.2404	
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.09	lb/lb·mole
M_{H2O}	= molecular weight of water (lb/lb·mole)	=	18.00	lb/lb·mole
M_s	= molecular weight of sample gas, wet basis (lb/lb·mole)	=	27.18	lb/lb·mole

12. Velocity of sample gas (ft/sec)

$$V_s = (K_p)(C_P)\left(\sqrt{\Delta P}\right)\left(\sqrt{\frac{(\overline{T_s}+460)}{(M_s)(P_s)}}\right)$$

Where:

K_p	= velocity pressure constant	=	85.49	
C_p	= pitot tube coefficient	=	0.84	
M_s	= wet molecular weight of sample gas, wet basis (lb/lb·mole)	=	27.18	lb/lb·mole
P_s	= absolute sample gas pressure (in. Hg)	=	29.31	in. Hg
T_s	= average sample gas temperature (°F)	=	302.48	°F
$\sqrt{\Delta P}$	= average square roots of velocity heads of sample gas (in. H_2O)	=	0.626	$\sqrt{\text{in. } H_2O}$
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	44.12	ft/sec

13. Volumetric flow rate of sample gas at actual gas conditions (acfm)

$$Q_a = (60)(A_s)(V_s)$$

Where:

A_s	= cross sectional area of sampling location (ft^2)	=	64.00	ft^2
V_s	= sample gas velocity (ft/sec)	=	44.12	ft/sec
60	conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	169,425	acfm

14. Total flow of sample gas (scfm)

$$Q_s = (Q_a)\left(\frac{P_s}{29.92}\right)\left(\frac{68+460}{T_s+460}\right)$$

Where:

Q_a	= volumetric flow rate at actual conditions (acfm)	=	169,425	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.31	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	302.5	°F
68	= standard temperature (°F)	=	68	°F
460	= °F to °R conversion constant	=	460	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	114,949	scfm

15. Dry flow of sample gas (dscfm)

$$Q_{std} = (Q_s)(1 - B_w)$$

Where:

B_w	= proportion of water vapor in the gas stream by volume	=	0.2404	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	114,949	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm

16. Dry flow of sample gas corrected to 7%O_2 (dscfm)

$$Q_{std7} = (Q_{std})\left(\frac{20.9 - O_2}{20.9 - 7}\right)$$

Where:

Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
7	= oxygen content of corrected gas (%)	=	7.0	%
Q_{std7}	= volumetric flow rate at STP and 7%O_2, dry basis (dscfm)	=	80,280	dscfm

17. Hourly time basis conversion of volumetric flow rate (Q_{std} example)

$$Q_{std-hr} = (Q_{std-\min})(60)$$

Where

$Q_{std\text{-}min}$	= volumetric flow rate, english units (ft^3/min)	=	87,316	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$Q_{std\text{-}hr}$	= volumetric flow rate, hourly basis (dscf/hr)	=	5,238,945	dscf/hr

18. Metric Conversion of Gas Volumes (Q_{std} example)

$$Q_{std-metric} = (Q_{std-english})\left(\frac{60}{35.31}\right)$$

Where:

$Q_{std\text{-}english}$	= volumetric flow rate, english units (ft^3/min)	=	87,316	dscfm
35.31	= conversion factor (ft^3/m^3)	=	35.31	ft^3/m^3
60	= conversion factor (min/hr)	=	60	min/hr
$Q_{std\text{-}metric}$	= volumetric flow rate, metric units (m^3/hr)	=	148,370	dry std m^3/hr

19. Standard to Normal Conversion of Gas Volumes (Q_{std} example)

$$Q_{Normal} = (Q_{std-metric})\left(\frac{32 + 460}{68 + 460}\right)$$

Where:

$Q_{std\text{-}metric}$	= volumetric flow rate, metric units (dry std m^3/hr)	=	148,370	dry std m^3/hr
32	= normal temperature (°F)	=	32	°F
68	standard temperature (°F)	=	68	°F
460	= standard temperature in Rankine (68°F)	=	460	
Q_{Normal}	= volumetric flow rate, metric units (dry Nm^3/hr)	=	138,254	dry Nm^3/hr

20. Percent isokinetic (%)

$$I = \frac{(0.09450)(\overline{T_s} + 460)(V_{mstd})}{(P_s)(V_s)\left(\frac{(D_n)^2(\pi)}{(144)(4)}\right)(\Theta)(1 - B_w)}$$

Where:

D_n	= diameter of nozzle (in)	=	0.276	in.
B_w	= proportion of water vapor in the gas stream by volume	=	0.2404	
P_s	= absolute sample gas pressure (in. Hg)	=	29.31	in. Hg
T_s	= average sample gas temperature (°F)	=	302.5	°F
V_{mstd}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	72.238	dscf
V_s	= sample gas velocity (ft/sec)	=	44.12	ft/sec
θ	= total sampling time (min)	=	125	min
0.0945	= conversion constant	=	0.0945	
460	= °F to °R conversion constant	=	460	
I	= percent of isokinetic sampling (%)	=	102.01	%

21. Alternative Method 5 Post-Test Meter Calibration Factor

$$Y_{qa} = \frac{\Theta}{V_m}\sqrt{\frac{(0.0319)(T_m + 460)(28.96)}{(\Delta H_@)(P_{bar} + \frac{\Delta H}{13.6})(M_d)}}(\sqrt{\Delta H})_{avg}$$

Where:

θ	= total sampling time (min)	=	125	min
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	74.03	dcf
T_m	= average dry gas meter temperature (°F)	=	80.62	°F
$\Delta H_@$	= dry gas meter orifice coefficient	=	1.7792	
P_{bar}	= barometric pressure (in. Hg)	=	30.05	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H_2O)	=	1.110	in. H_2O
M_d	= dry molecular weight of sample gas (lb/lb·mole)	=	30.09	lb/lb·mole
$\sqrt{\Delta H}_{avg}$	= average of square root of pressure drop across meter orifice	=	1.049	$\sqrt{\text{in. } H_2O}$
0.0319	= conversion constant	=	0.0319	
28.96	= molecular weight of ambient air (lb/lb-mole)	=	28.96	lb/lb-mole
13.6	= conversion factor (in. H_2O/in. Hg)	=	13.6	in.H_2O/in. Hg
460	= °F to °R conversion constant	=	460	
Y_{qa}	= alternative Method 5 post-test meter calibration factor	=	0.9859	

USEPA Method 5/202 (FPM/CPM)
Sample Laboratory Analysis Calculations for FPM

Sample data taken from Run 1

Note: The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results, and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

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1. Residue mass of filter used in calculation

Carbon Feed Rate - (lbs/hr)

$$m_{fi-calc} = m_{fi} \qquad \text{if } m_{fi} \geq MDL_f$$
$$m_{fi-calc} = (MDL_f)(F_r) \qquad \text{if } m_{fi} < MDL_f$$

Where:

m_{f1}	= reported mass of filter "1" from gravimetric analysis (g)	=	0.00010	g
m_{f2}	= reported mass of filter "2" from gravimetric analysis (g)	=		g
m_{f3}	= reported mass of filter "3" from gravimetric analysis (g)	=		g
m_{f4}	= reported mass of filter "4" from gravimetric analysis (g)	=		g
MDL_f	= reported minimum gravimetric detection limit for filter fraction (g)	=	0.00010	g
F_r	= fraction of MDL applied to non-detectable run sample (g)	=	0.00	
$m_{f1-calc}$	= residue mass of filter "1" used in calculation (g)	=	0.00010	g
$m_{f2-calc}$	= residue mass of filter "2" used in calculation (g)	=		g
$m_{f3-calc}$	= residue mass of filter "3" used in calculation (g)	=		g
$m_{f4-calc}$	= residue mass of filter "4" used in calculation (g)	=		g

2. Total filter residue (g)

$$m_{filter} = \sum_{i=1}^{n} m_{fi-calc}$$

Where:

$m_{f1-calc}$	= residue mass of filter "1" used in calculation (g)	=	0.00010	g
$m_{f2-calc}$	= residue mass of filter "2" used in calculation (g)	=		g
$m_{f3-calc}$	= residue mass of filter "3" used in calculation (g)	=		g
$m_{f4-calc}$	= residue mass of filter "4" used in calculation (g)	=		g
m_{filter}	= total particulate collected on filters (g)	=	0.00010	g

3. Aliquot residue mass of blank sample used in calculation (g)

$$r_{ai-blank-calc} = r_{ai-blank} \qquad \text{if } r_{ai-blank} \geq MDL_s$$
$$r_{ai-blank-calc} = (MDL_s)(F_b) \qquad \text{if } r_{ai-blank} < MDL_s$$

Where:

			Acetone		Acetone	
$r_{ai-blank}$	= aliquot residue mass of blank sample for solvent "i" (g)	=	nd	g	0.00000	g
MDL_s	= reported minimum gravimetric detection limit for solvent rinse (g)	=	0.00010	g	0.00010	g
F_b	= fraction of MDL applied to non-detectable blank sample (g)	=	0.00		0.00	
$r_{ai-blank-calc}$	= aliquot residue mass of blank sample for solvent "i" used in calculation (g)	=	0.00000	g		

4. Aliquot residue mass of run sample used in calculation (g)

$$r_{ai-calc} = r_{ai} \qquad \text{if } r_{ai} \geq MDL_s$$
$$r_{ai-calc} = (MDL_s)(F_r) \qquad \text{if } r_{ai} < MDL_s$$

Where:

			Acetone		Acetone	
r_{ai}	= aliquot residue mass of run sample for solvent "i" (g)	=	0.00400	g	0.00000	g
MDL_s	= reported minimum gravimetric detection limit for solvent rinse (g)	=	0.00010	g	0.00010	g
F_r	= fraction of MDL applied to non-detectable run sample (g)	=	0.00		0.00	
$r_{ai-calc}$	= aliquot residue mass of run sample for solvent "i" used in calculation (g)	=	0.00400	g		

5. Residue mass of run sample (g)

$$r_{si} = \left(r_{ai-calc}\right)\left(\frac{v_{si}}{v_{ai}}\right)$$

Where:

			Acetone		Acetone	
$r_{ai-calc}$	= aliquot residue mass of run sample for solvent "i" used in calculation (g)	=	0.00400	g		
v_{si}	= liquid volume of run sample for solvent rinse "i" (mL)	=	45	mL	0	mL
v_{ai}	= aliquot volume use for solvent rinse "i" (mL) used in gravimetric analysis (mL)	=	45	mL	0	mL
r_{si}	= residue mass of run sample for solvent rinse "i" (g)	=	0.00400	g		

6. Maximum allowable blank correction for solvent rinse (g)

$$m_{bi} = MINIMUM\left[\left(\frac{\left(r_{ai-blank-calc}\right)\left(v_{si}\right)}{v_{ai-blank}}\right) \text{ or } \left(0.00001\right)\left(\rho_i\right)\left(v_{si}\right) \text{ or } \left(r_{si}\right)\right]$$

Where:

			Acetone		Acetone	
$r_{ai-blank-calc}$	= blank aliquot residue mass for solvent "i" used in calculation (g)	=	0.00000	g		
v_{si}	= liquid volume of run sample for solvent rinse "i" (mL)	=	45.0	mL	0.0	mL
$v_{ai-blank}$	= liquid volume of blank sample for solvent rinse "i" (mL)	=	145.0	mL	0.0	mL
0.00001	= EPA M-5 fraction of total rinse that can be subtracted (g)	=	0.00001		0.00001	
ρ_i	= density of solvent rinse "i" (g/mL)	=	0.7845	g/ml	0.7845	g/mL
r_{si}	= residue mass of run sample for solvent rinse "i" (g)	=	0.00400	g		
m_{bi}	= maximum allowable blank correction for solvent rinse "i" (g)	=	0.00000	g		

The first part of the expression is used for solvent rinse 1; the blank is the concentration of the blank, times the size of the sample

7. Net residue mass of run sample (g)

$$m_i = \left(r_{si} - m_{bi}\right)$$

Where:

			Acetone		Acetone	
r_{si}	= residue mass of run sample for solvent rinse "i" (g)	=	0.00400	g		
m_{bi}	= maximum allowable blank correction for solvent rinse "i" (g)	=	0.00000	g		
m_i	= net residue mass of run sample for solvent rinse "i" (g)	=	0.00400	g	0.00000	g

8. Total solvent residue - (g)

$$m_s = \sum_{i=1}^{n} m_i$$

Where:

m_1	= net residue mass of solvent rinse "1" (g)	=	0.00400	g
m_2	= net residue mass of solvent rinse "2" (g)	=	N/A	g
m_3	= net residue mass of solvent rinse "3" (g)	=	0.00000	g
m_s	= total solvent residue (g)	=	0.00400	g

9. Total gravimetric result (g)

$$m_T = m_{filter} + m_s$$

Where:

m_{filter}	= total particulate collected on filters (g)	=	0.00010	g
m_s	= total solvent residue (g)	=	0.00400	g
m_T	= total gravimetric result (g)	=	0.00410	g

10. Total gravimetric detection limit (g)

$$m_D = (MDL_f)(n_f) + (MDL_s)(n_s)$$

Where:

MDL_f	= reported minimum gravimetric detection limit for filter fraction (g)	=	0.00010	g
n_f	= number of filters in analysis	=	1	
MDL_s	= reported minimum gravimetric detection limit for solvent rinse (g)	=	0.00010	g
n_s	= number of solvent rinses in analysis	=	1	
m_D	= total gravimetric detection limit (g)	=	0.00020	g

11. Total filterable particulate matter (g)

$$m_n = MAXIMUM[m_T \quad or \quad m_D]$$

Where:

m_T	= total gravimetric result (g)	=	0.00410	g
m_D	= total gravimetric detection limit (g)	=	0.00020	g
m_n	= total filterable particulate matter (g)	=	0.00410	g

USEPA Method 5/202 (FPM/CPM)
Sample Emission Calculations for FPM

Sample data taken from Run 1

Note: The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results, and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

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1. Filterable particulate matter concentration (lb/dscf)

Carbon Feed Rate - (lbs/hr)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)\left(2.205\times10^{-3}\right)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00410	g
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
C_{sd}	= filterable particulate matter concentration (lb/dscf)	=	1.251E-07	lb/dscf

2. Filterable particulate matter concentration (gr/dscf)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)(15.43)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00410	g
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
15.43	= conversion factor (gr/g)	=	15.43	gr/g
C_{sd}	= filterable particulate matter concentration (gr/dscf)	=	0.00088	gr/dscf

3. Filterable particulate matter concentration (mg/dscm)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)(1000)(35.31)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00410	g
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
1000	= conversion factor (mg/g)	=	1000	mg/g
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= filterable particulate matter concentration (mg/dscm)	=	2.00408	mg/dscm

4. Filterable particulate matter concentration (mg/Nm3 dry)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)(1000)(35.31)\left(\frac{68+460}{32+460}\right)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00410	g
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
1000	= conversion factor (mg/g)	=	1000	mg/g
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
68	= standard temperature (°F)	=	68	°F
32	= normal temperature (°F)	=	32	°F
460	= °F to °R conversion constant	=	460	
C_{sd}	= filterable particulate matter concentration (mg/Nm3 dry)	=	2.15072	mg/Nm^3 dry

5. Filterable particulate matter concentration corrected to x% O2 (gr/dscf example)

$$C_{sdx} = C_{sd}\left(\frac{20.9 - x}{20.9 - O_2}\right)$$

Where:

C_{sd}	= filterable particulate matter concentration (gr/dscf)	=	0.00088	gr/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= filterable particulate matter concentration corrected to x%O2 (gr/dscf)	=	0.00095	gr/dscf @ x%O_2

6. Filterable particulate matter concentration corrected to y% CO2 (gr/dscf example)

$$C_{sdy} = C_{sd}\left(\frac{y}{CO_2}\right)$$

Where:

C_{sd}	= filterable particulate matter concentration (gr/dscf)	=	0.00088	gr/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	11.0	%
C_{sdy}	= filterable particulate matter concentration corrected to y%CO2 (gr/dscf)	=	0.00095	gr/dscf @ y%CO_2

7. Filterable particulate matter concentration at actual gas conditions (gr/acf example)

$$C_a = C_{sd}\left(\frac{Q_{std}}{Q_a}\right)$$

Where:

C_{sd}	= filterable particulate matter concentration (gr/dscf)	=	0.00088	gr/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	169,425	acfm
C_a	= filterable particulate matter concentration at actual gas conditions (gr/acf)	=	0.00045	gr/acf

8. Filterable particulate matter rate (lb/hr)

$$E_{lb/hr} = \left(\frac{m_n}{V_{mstd}}\right)(2.205\times10^{-3})(Q_{std})(60)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00410	g
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= filterable particulate matter rate (lb/hr)	=	0.6556	lb/hr

9. Filterable particulate matter rate (kg/hr)

$$E_{kg/hr} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{(Q_{std})(60)}{1000}\right)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00410	g
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
60	= conversion factor (min/hr)	=	60	min/hr.
1000	= conversion factor (g/kg)	=	1000	g/kg
$E_{kg/hr}$	= filterable particulate matter rate (kg/hr)	=	0.2973	kg/hr

10. Filterable particulate matter rate (Ton/yr)

$$E_{T/yr} = \left(\frac{m_n}{V_{mstd}}\right)\left(2.205\times10^{-3}\right)\left(Q_{std}\right)(60)\left(\frac{Cap}{2000}\right)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00410	g
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Cap	= capacity factor for process (hours operated/year)	=	8,760	hours/yr
2000	= conversion factor (lb/Ton)	=	2000	lb/Ton
$E_{T/yr}$	= filterable particulate matter rate (Ton/yr)	=	2.8717	Ton/yr

11. Filterable particulate matter rate - Fd-based (lb/MMBtu)

$$E_{Fd} = \left(\frac{m_n}{V_{mstd}}\right)\left(2.205\times10^{-3}\right)\left(F_d\right)\left(\frac{20.9}{20.9-O_2}\right)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00410	g
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
F_d	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	9,570	dscf/MMBtu
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= filterable particulate matter rate - Fd-based (lb/MMBtu)	=	0.00196	lb/MMBtu

12. Filterable particulate matter rate - Fc-based (lb/MMBtu)

$$E_{Fc} = \left(\frac{m_n}{V_{mstd}}\right)\left(2.205\times10^{-3}\right)\left(F_c\right)\left(\frac{100}{CO_2}\right)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00410	g
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
F_c	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	1,820	dscf/MMBtu
CO_2	= proportion of oxygen in the gas stream by volume (%)	=	11.0	%
100	= conversion factor	=	100	
E_{Fc}	= filterable particulate matter rate - Fc-based (lb/MMBtu)	=	0.00207	lb/MMBtu

LOGIC FOR TREATING DETECTION LIMITS

(all metals except mercury)

1. Logic for Determining Maximum Allowable Front-Half Blank Correction ($m_{FB\text{-}allow}$)

	CASE 1	CASE 2
	m_{FB} = D	m_{FB} = ND
Rule		
ND = 0	$m_{FB\text{-}allow}$ = M29 Rule	$m_{FB\text{-}allow} = 0$
ND=1x	$m_{FB\text{-}allow}$ = M29 Rule	$m_{FB\text{-}allow} = 0$
ND=0.5x	$m_{FB\text{-}allow}$ = M29 Rule	$m_{FB\text{-}allow} = 0$

2. Logic for Determining Blank-Corrected Front-Half Sample Amount (m_F)

	CASE 1	CASE 2
	$m_{FS} - m_{FB\text{-}allow} \geq$ MDL	$m_{FS} - m_{FB\text{-}allow} <$ MDL
Rule		
ND = 0	$m_F = m_{FS} - m_{FB\text{-}allow}$	m_F = < MDL
ND=1x	$m_F = m_{FS} - m_{FB\text{-}allow}$	m_F = < MDL
ND=0.5x	$m_F = m_{FS} - m_{FB\text{-}allow}$	m_F = < MDL

3. Logic for Determining Maximum Allowable Back-Half Blank Correction ($m_{BB\text{-}allow}$)

	CASE 1	CASE 2
	m_{BB} = D	m_{BB} = ND
Rule		
ND = 0	$m_{BB\text{-}allow}$ = M29 Rule	$m_{BB\text{-}allow} = 0$
ND=1x	$m_{BB\text{-}allow}$ = M29 Rule	$m_{BB\text{-}allow} = 0$
ND=0.5x	$m_{BB\text{-}allow}$ = M29 Rule	$m_{BB\text{-}allow} = 0$

4. Logic for Determining Blank-Corrected Back-Half Sample Amount (m_B)

	CASE 1	CASE 2
	$m_{BS} - m_{BB\text{-}allow} \geq$ MDL	$m_{BS} - m_{BB\text{-}allow} <$ MDL
Rule		
ND = 0	$m_B = m_{BS} - m_{BB\text{-}allow}$	m_B = < MDL
ND=1x	$m_B = m_{BS} - m_{BB\text{-}allow}$	m_B = < MDL
ND=0.5x	$m_B = m_{BS} - m_{BB\text{-}allow}$	m_B = < MDL

5. Logic for Adding Front and Back-Half Corrected Samples (m_n)

	CASE 1	CASE 2	CASE 3
	Both are D	One is D, other is ND	Both are ND
Rule			
ND = 0	$m_n = m_F + m_B$	m_n = D	m_n = < Sum ND
ND=1x	$m_n = m_F + m_B$	m_n = < [D + ND]	m_n = < Sum ND
ND=0.5x	$m_n = m_F + m_B$	m_n = <[D + 0.5ND]	m_n = < 0.5 Sum ND

Definitions and Notes

The term "Rule" refers to the rule being implemented for hanMDLing non-detectable quantities in summations
MDL = minimum detection limit.
D = Detectable quantity reported as D.
ND = Non-Detectable quantity reported at a value of ND.
If Front and Back-Half fractions are combined, then only Items 1 and 2 are used.

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USEPA Method 5/29
Cadmium Analyte Calculations

Sample data taken from Run 1

Note: The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results, and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

Note: Please see the preceding page concerning treatment of minimum detection limits and mathematical operations on values that are below minimum detection limits.

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S

1. Maximum front-half blank correction criteria (µg)

$$A = (1.4)\left(\frac{3.141593}{4}\right)\left(\frac{D}{2.54}\right)^2$$

Where:

D	= diameter of filter used in sample apparatus	=	8.2	cm
1.4	= allowable blank per square inch of filter area	=	1.4	µg/in^2
2.54	= conversion constant	=	2.54	cm/in
4	= conversion constant	=	4	
3.141593	= conversion constant (pi)	=	3.141593	
A	= maximum front-half blank correction criteria	=	12.46	µg

2. Allowable blank correction - combined front and back-half sample fractions (µg)

$$m_{FB-allow} = m_{FB} \text{ if } m_{FB} \leq A+1$$
$$m_{FB-allow} = MAX\left[A+1,\quad MIN\left(m_{FB},\quad 0.05 \times m_{FS}\right)\right] \text{ if } m_{FB} > A+1$$

Where:

m_{FB}	= cadmium amount in combined front- and back-half blank	=	<0.2000	µg
m_{FS}	= cadmium amount in combined front- and back-half sample	=	0.2268	µg
A+1	= max combined front- & back-half blank correction criteria	=	12.46	µg
0.05 x m_{FS}	= 5% of combined front- and back-half sample amount	=	0.0113	µg
MAX	= arithmetic operator that returns the maximum of two values			
MIN	= arithmetic operator that returns the minimum of two values			
$m_{FB-allow}$	= allowable combined Cadmium blank correction	=	0.0000	µg

NOTE: In this case, the first criteria applies.

3. Combined front- and back-half sample corrected for allowable blank (µg)

$$m_n = m_{FS} - m_{FB-allow}$$

Where:

m_{FS}	= cadmium amount in combined front- and back-half sample	=	0.2268	µg
$m_{FB-allow}$	= allowable combined cadmium blank correction	=	0.0000	µg
m_n	= blank-corrected cadmium in combined sample	=	0.2268	µg

USEPA Method 5/29
Cadmium Sample Calculations

Sample data taken from Run 1

Note: The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results, and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

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M_S

1. Cadmium concentration (lb/dscf)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{10^6}\right)$$

Where:

m_n	= cadmium collected in sample (total µg)	=	0.2268	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
C_{sd}	= cadmium concentration (lb/dscf)	=	6.9232E-12	lb/dscf

2. Cadmium concentration (µg/dscm)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)(35.31)$$

Where:

m_n	= cadmium collected in sample (total µg)	=	0.2268	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= cadmium concentration (µg/dscm)	=	1.1086E-01	µg/dscm

3. Cadmium concentration (mg/dscm)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{35.31}{1000}\right)$$

Where:

m_n	= cadmium collected in sample (total µg)	=	0.2268	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
1000	= conversion factor (µg/mg)	=	1000	µg/mg
C_{sd}	= cadmium concentration (mg/dscm)	=	1.1086E-04	mg/dscm

4. Cadmium concentration (µg/Nm3 dry)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)(35.31)\left(\frac{68+460}{32+460}\right)$$

Where:

m_n	= cadmium collected in sample (total µg)	=	0.2268	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
68	= standard temperature (°F)	=	68	°F
32	= normal temperature (°F)	=	32	°F
460	= °F to °R conversion constant	=	460	
C_{sd}	= cadmium concentration (µg/Nm3 dry)	=	1.1898E-01	µg/Nm^3 dry

5. Cadmium concentration corrected to x% oxygen (lb/dscf example)

$$C_{sdx} = C_{sd}\left(\frac{20.9-x}{20.9-O_2}\right)$$

Where:

C_{sd}	= cadmium concentration (lb/dscf)	=	6.9232E-12	lb/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= cadmium concentration corrected to x% oxygen (lb/dscf)	=	7.5299E-12	lb/dscf @ x%O_2

6. Cadmium concentration corrected to y% carbon dioxide (lb/dscf example)

$$C_{sdy} = C_{sd}\left(\frac{y}{CO_2}\right)$$

Where:

C_{sd}	= cadmium concentration (lb/dscf)	=	6.9232E-12	lb/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	11.0	%
C_{sdy}	= cadmium conc. corrected to y% carbon dioxide (lb/dscf)	=	7.5388E-12	lb/dscf @ y%CO_2

7. Cadmium concentration at actual gas conditions (lb/acf example)

$$C_a = C_{sd}\left(\frac{Q_{std}}{Q_a}\right)$$

Where:

C_{sd}	= cadmium concentration (lb/dscf)	=	6.9232E-12	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	169,425	acfm
C_a	= cadmium concentration at actual gas conditions (lb/acf)	=	3.5680E-12	lb/acf

8. Cadmium emission rate (lb/hr)

$$E_{lb/hr} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{10^6}\right)(Q_{std})(60)$$

Where:

m_n	= cadmium collected in sample (total µg)	=	0.2268	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= cadmium emission rate (lb/hr)	=	3.6270E-05	lb/hr

9. Cadmium emission rate (g/s)

$$E_{g/s} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{Q_{std}}{(10^6)(60)}\right)$$

Where:

m_n	= cadmium collected in sample (total µg)	=	0.2268	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
60	= conversion factor (sec/min)	=	60	sec/min
$E_{g/s}$	= cadmium emission rate (g/s)	=	4.5692E-06	g/s

10. Cadmium emission rate (Ton/yr)

$$E_{T/yr} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{10^6}\right)(Q_{std})(60)\left(\frac{Cap}{2000}\right)$$

Where:

m_n	= cadmium collected in sample (total µg)	=	0.2268	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Cap	= capacity factor for process (hours operated/year)	=	8,760	hours/yr
2000	= conversion factor (lb/Ton)	=	2000	lb/Ton
$E_{Ton/yr}$	= cadmium emission rate (Ton/yr)	=	1.5886E-04	Ton/yr

11. Cadmium emission rate - Fd-based (lb/MMBtu)

$$E_{Fd} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{10^6}\right)\left(F_d\right)\left(\frac{20.9}{20.9-O_2}\right)$$

Where:

m_n	= cadmium collected in sample (total µg)	=	0.2268	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
F_d	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	9,570	dscf/MMBtu
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= cadmium emission rate - Fd-based (lb/MMBtu)	=	1.0835E-07	lb/MMBtu

12. Cadmium emission rate - Fc-based (lb/MMBtu)

$$E_{Fc} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{10^6}\right)\left(F_c\right)\left(\frac{100}{CO_2}\right)$$

Where:

m_n	= cadmium collected in sample (total µg)	=	0.2268	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
F_c	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	1,820	dscf/MMBtu
CO_2	= proportion of oxygen in the gas stream by volume (%)	=	11.0	%
100	= conversion factor	=	100	
E_{Fc}	= cadmium emission rate - Fc-based (lb/MMBtu)	=	1.1434E-07	lb/MMBtu

LOGIC FOR TREATING DETECTION LIMITS

(mercury only)

1. Logic for Determining Total Blank ($m_{Total\text{-}B}$) from 5 Fractions

Rule	CASE 1 All 5 fractions are D.	CASE 2 1 to 4 fractions are ND	CASE 3 All 5 fractions are ND
ND = 0	$m_{Total\text{-}B}$ = Sum D, 1-5	$m_{Total\text{-}B}$ = Sum D	$m_{Total\text{-}B}$ = < Sum ND
ND=1x	$m_{Total\text{-}B}$ = Sum D, 1-5	$m_{Total\text{-}B}$ = Sum D	$m_{Total\text{-}B}$ = < Sum ND
ND=0.5x	$m_{Total\text{-}B}$ = Sum D, 1-5	$m_{Total\text{-}B}$ = Sum D	$m_{Total\text{-}B}$ = < 0.5 Sum ND

2. Logic for Determining Total Sample ($m_{Total\text{-}S}$) from 5 Fractions

Rule	CASE 1 All 5 fractions are D.	CASE 2 1 to 4 fractions are ND	CASE 3 All 5 fractions are ND
ND = 0	$m_{Total\text{-}S}$ = Sum D, 1-5	$m_{Total\text{-}S}$ = Sum D	$m_{Total\text{-}S}$ = < Sum ND
ND=1x	$m_{Total\text{-}S}$ = Sum D, 1-5	$m_{Total\text{-}S}$ = < [Sum D + Sum ND]	$m_{Total\text{-}S}$ = < Sum ND
ND=0.5x	$m_{Total\text{-}S}$ = Sum D, 1-5	$m_{Total\text{-}S}$ = < [SumD+0.5 SumND	$m_{Total\text{-}S}$ = < 0.5 Sum ND

3. Logic for Determining Maximum Allowable Blank Correction ($m_{T\text{-}B\text{-}allow}$)

Rule	CASE 1 All 5 fractions are D. $m_{Total\text{-}B}$ = D	CASE 2 1 to 4 sample fractions are ND $m_{Total\text{-}B}$ = D	CASE 3 All 5 fractions are ND $m_{Total\text{-}B}$ = D	CASE 4 Any type of fractions $m_{Total\text{-}B}$ = ND
ND = 0	$m_{T\text{-}B\text{-}allow}$ = M29 Rule	$m_{T\text{-}B\text{-}allow}$ = M29 Rule*	$m_{T\text{-}B\text{-}allow}$ = 0	$m_{T\text{-}B\text{-}allow}$ = 0
ND=1x	$m_{T\text{-}B\text{-}allow}$ = M29 Rule	$m_{T\text{-}B\text{-}allow}$ = M29 Rule*	$m_{T\text{-}B\text{-}allow}$ = 0	$m_{T\text{-}B\text{-}allow}$ = 0
ND=0.5x	$m_{T\text{-}B\text{-}allow}$ = M29 Rule	$m_{T\text{-}B\text{-}allow}$ = M29 Rule*	$m_{T\text{-}B\text{-}allow}$ = 0	$m_{T\text{-}B\text{-}allow}$ = 0

* M29 rule using only detected sample quantities for logical comparisons.

4. Logic for Determining Blank-Corrected Sample Amount (m_n)

Rule	CASE 1 All 5 fractions are D. $m_{Total\text{-}S} - m_{T\text{-}B\text{-}allow} \geq$ MIN(MDL)	CASE 2 1 to 4 sample fractions are ND $m_{Total\text{-}S} - m_{T\text{-}B\text{-}allow} \geq$ MIN(MDL)	CASE 3 All 5 fractions are ND $m_{Total\text{-}S}$ and $m_{T\text{-}B\text{-}allow}$ anything	CASE 4 Any type of fractions $m_{Total\text{-}S} - m_{T\text{-}B\text{-}allow}$ < MIN(MDL
ND = 0	$m_n = m_{Total\text{-}S} - m_{T\text{-}B\text{-}allow}$	$m_n = m_{Total\text{-}S} - m_{T\text{-}B\text{-}allow}$	m_n = < $m_{Total\text{-}S}$	m_n = < MIN[MDL]
ND=1x	$m_n = m_{Total\text{-}S} - m_{T\text{-}B\text{-}allow}$	m_n = < [$m_{Total\text{-}S} - m_{T\text{-}B\text{-}allow}$]	m_n = < $m_{Total\text{-}S}$	m_n = < MIN[MDL]
ND=0.5x	$m_n = m_{Total\text{-}S} - m_{T\text{-}B\text{-}allow}$	m_n = < [$m_{Total\text{-}S} - m_{T\text{-}B\text{-}allow}$]	m_n = < $m_{Total\text{-}S}$	m_n = < MIN[MDL]

__Definitions and Notes__

The term "Rule" refers to the rule being implemented for handling non-detectable quantities in summations.
MDL = minimum detection limit.
D = Detectable quantity reported as D.
ND = Non-Detectable quantity reported at a value of ND.
MIN[MDL] = lowest quantity of all detection limits for 5 fractions.

USEPA Method 29
Mercury Analyte Calculations

Sample data taken from Run 1

Note: The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results, and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

Note: Please see the preceding page concerning treatment of minimum detection limits and mathematical operations on values that are below minimum detection limits.

041612 113615
M

1. Total blank amount (μg)

$$m_{total-B} = \sum_{i=1}^{n} m_{i-B}$$

Where:

m_{1b-B}	= mercury amount in blank for Fraction 1b	=	<0.1000	μg
m_{2b-B}	= mercury amount in blank for Fraction 2b	=	<0.2000	μg
m_{3a-B}	= mercury amount in blank for Fraction 3a	=	<0.2000	μg
m_{3b-B}	= mercury amount in blank for Fraction 3b	=	<0.5000	μg
m_{3c-B}	= mercury amount in blank for Fraction 3c	=	<0.4000	μg
$m_{total-B}$	= total amount of mercury in blank	=	<1.4000	μg

2. Total sample amount (μg)

$$m_{total-S} = \sum_{i=1}^{n} m_{i-S}$$

Where:

m_{1b-S}	= mercury amount in sample for Fraction 1b	=	<0.1000	μg
m_{2b-S}	= mercury amount in sample for Fraction 2b	=	3.4141	μg
m_{3a-S}	= mercury amount in sample for Fraction 3a	=	<0.2000	μg
m_{3b-S}	= mercury amount in sample for Fraction 3b	=	<0.5000	μg
m_{3c-S}	= mercury amount in sample for Fraction 3c	=	<0.4000	μg
$m_{total-S}$	= total amount of mercury in sample	=	3.4141	μg

3. Allowable blank correction (μg)

$$m_{T-B-allow} = m_{total-B} \text{ if } m_{total-B} \leq 0.6$$
$$m_{T-B-allow} = MAX\left[0.6,\ \ MIN\left(m_{total-B},\ \ 0.05 \times m_{total-S}\right)\right] \text{ if } m_{total-B} > 0.6$$

Where:

$m_{total-B}$	= total amount of mercury in blank	=	<1.4000	μg
$m_{total-S}$	= total amount of mercury in sample	=	3.4141	μg
$0.05 \times m_{total-S}$	= 5% of $m_{total-S}$	=	0.1707	μg
MAX	= arithmetic operator that returns the maximum of two values			
MIN	= arithmetic operator that returns the minimum of two values			
$m_{T-B-allow}$	= total allowable blank correction	=	0.0000	μg

NOTE: In this case, the second criteria applies.

4. Sample corrected for allowable blank - Total (µg)

$$m_n = m_{total-S} - m_{T-B-allow}$$

Where:

$m_{total-S}$	= total amount of mercury in sample	=	3.4141	µg
$m_{T-B-allow}$	= total allowable blank correction	=	0.0000	µg
m_n	= total mercury in sample corrected for allowable blank	=	3.4141	µg

5. Sample corrected for allowable blank - Prorated for each fraction (µg)

$$m_{n-i} = \left(\frac{m_{i-S}}{m_{total-S}}\right)(m_n)$$

Where:

m_n	= total mercury in sample corrected for allowable blank	=	3.4141	µg
m_{1b-S}	= mercury amount in sample for Fraction 1b	=	<0.1000	µg
m_{2b-S}	= mercury amount in sample for Fraction 2b	=	3.4141	µg
m_{3a-S}	= mercury amount in sample for Fraction 3a	=	<0.2000	µg
m_{3b-S}	= mercury amount in sample for Fraction 3b	=	<0.5000	µg
m_{3c-S}	= mercury amount in sample for Fraction 3c	=	<0.4000	µg
$m_{total-S}$	= total amount of mercury in sample	=	3.4141	µg
m_{n-1b}	= mercury corrected for blank - prorated for Fraction 1b	=	<0.1000	µg
m_{n-2b}	= mercury corrected for blank - prorated for Fraction 2b	=	3.4141	µg
m_{n-3a}	= mercury corrected for blank - prorated for Fraction 3a	=	<0.2000	µg
m_{n-3b}	= mercury corrected for blank - prorated for Fraction 3b	=	<0.5000	µg
m_{n-3c}	= mercury corrected for blank - prorated for Fraction 3c	=	<0.4000	µg

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SS Metals-1 Version 2006-12b

USEPA Method 29
Mercury Sample Calculations

Sample data taken from Run 1

Note: The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results, and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

041612 113615
M_M

1. Mercury concentration (lb/dscf)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{10^6}\right)$$

Where:

m_n	= mercury collected in sample (total µg)	=	3.4141	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
C_{sd}	= mercury concentration (lb/dscf)	=	1.0421E-10	lb/dscf

2. Mercury concentration (µg/dscm)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)(35.31)$$

Where:

m_n	= mercury collected in sample (total µg)	=	3.4141	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= mercury concentration (µg/dscm)	=	1.6688E+00	µg/dscm

3. Mercury concentration (mg/dscm)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{35.31}{1000}\right)$$

Where:

m_n	= mercury collected in sample (total µg)	=	3.4141	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
1000	= conversion factor (µg/mg)	=	1000	µg/mg
C_{sd}	= mercury concentration (mg/dscm)	=	1.6688E-03	mg/dscm

4. Mercury concentration (µg/Nm3 dry)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)(35.31)\left(\frac{68+460}{32+460}\right)$$

Where:

m_n	= mercury collected in sample (total µg)	=	3.4141	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
68	= standard temperature (°F)	=	68	°F
32	= normal temperature (°F)	=	32	°F
460	= °F to °R conversion constant	=	460	
C_{sd}	= mercury concentration (µg/Nm3 dry)	=	1.7909E+00	µg/Nm^3 dry

5. Mercury concentration corrected to x% oxygen (lb/dscf example)

$$C_{sdx} = C_{sd}\left(\frac{20.9 - x}{20.9 - O_2}\right)$$

Where:

C_{sd}	= mercury concentration (lb/dscf)	=	1.0421E-10	lb/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= mercury concentration corrected to x% oxygen (lb/dscf)	=	1.1335E-10	lb/dscf @ x%O_2

6. Mercury concentration corrected to y% carbon dioxide (lb/dscf example)

$$C_{sdy} = C_{sd}\left(\frac{y}{CO_2}\right)$$

Where:

C_{sd}	= mercury concentration (lb/dscf)	=	1.0421E-10	lb/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	11.0	%
C_{sdy}	= mercury conc. corrected to y% carbon dioxide (lb/dscf)	=	1.1348E-10	lb/dscf @ y%CO_2

7. Mercury concentration at actual gas conditions (lb/acf example)

$$C_a = C_{sd}\left(\frac{Q_{std}}{Q_a}\right)$$

Where:

C_{sd}	= mercury concentration (lb/dscf)	=	1.0421E-10	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	169,425	acfm
C_a	= mercury concentration at actual gas conditions (lb/acf)	=	5.3708E-11	lb/acf

8. Mercury emission rate (lb/hr)

$$E_{lb/hr} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205 \times 10^{-3}}{10^6}\right)(Q_{std})(60)$$

Where:

m_n	= mercury collected in sample (total µg)	=	3.4141	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= mercury emission rate (lb/hr)	=	5.4596E-04	lb/hr

9. Mercury emission rate (g/s)

$$E_{g/s} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{Q_{std}}{(10^6)(60)}\right)$$

Where:

m_n	= mercury collected in sample (total µg)	=	3.4141	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
60	= conversion factor (sec/min)	=	60	sec/min
$E_{g/s}$	= mercury emission rate (g/s)	=	6.8779E-05	g/s

10. Mercury emission rate (Ton/yr)

$$E_{T/yr} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205 \times 10^{-3}}{10^6}\right)(Q_{std})(60)\left(\frac{Cap}{2000}\right)$$

Where:

m_n	= mercury collected in sample (total µg)	=	3.4141	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	87,316	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
Cap	= capacity factor for process (hours operated/year)	=	8,760	hours/yr
2000	= conversion factor (lb/Ton)	=	2000	lb/Ton
$E_{T/yr}$	= mercury emission rate (Ton/yr)	=	2.3913E-03	Ton/yr

11. Mercury emission rate - Fd-based (lb/MMBtu)

$$E_{Fd} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205 \times 10^{-3}}{10^6}\right)(F_d)\left(\frac{20.9}{20.9 - O_2}\right)$$

Where:

m_n	= mercury collected in sample (total µg)	=	3.4141	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
F_d	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	9,570	dscf/MMBtu
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.1	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= mercury emission rate - Fd-based (lb/MMBtu)	=	1.6310E-06	lb/MMBtu

12. Mercury emission rate - Fc-based (lb/MMBtu)

$$E_{Fc} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205 \times 10^{-3}}{10^6}\right)(F_c)\left(\frac{100}{CO_2}\right)$$

Where:

m_n	= mercury collected in sample (total µg)	=	3.4141	µg
V_{mstd}	= volume metered, standard (dscf)	=	72.2382	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
F_c	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	1,820	dscf/MMBtu
CO_2	= proportion of oxygen in the gas stream by volume (%)	=	11.0	%
100	= conversion factor	=	100	
E_{Fc}	= mercury emission rate - Fc-based (lb/MMBtu)	=	1.7211E-06	lb/MMBtu

USEPA Method 23 (PCDD/PCDF)
PCDD/PCDF Emissions Calculations

Sample data taken from Run 1

Note: The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

Note: PCDD/F results may be presented in two formats - normally expected levels and the maximum possible levels. In the normal case, data classified as ND (non-detect) or EMPC (estimated maximum possible concentration) are not counted. In the maximum possible emissions case, NDs and EMPCs are fully counted.

041612 113728

1. PCDDF concentration (ng/dscm)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right) \times 35.31$$

Where:

			Normal Case (ND & EMPC = 0)		Maximum Case (ND & EMPC fully counted)	
m_n	= total mass for PCDDs and PCDFs (ng)	=	4.6600E+01	ng	4.6700E+01	ng
V_{mstd}	= volume metered, standard (dscf)	=	145.1702	dscf	145.1702	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm	35.31	dscf/dscm
C_{sd}	= PCDD/F concentration (ng/dscm)	=	1.1335E+01	ng/dscm	1.1359E+01	ng/dscm

2. PCDDF concentration (ng/Nm3 dry)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)(35.31)\left(\frac{68+460}{32+460}\right)$$

Where:

			Normal Case		Maximum Case	
m_n	= total mass for PCDDs and PCDFs (ng)	=	4.6600E+01	ng	4.6700E+01	ng
V_{mstd}	= volume metered, standard (dscf)	=	145.1702	dscf	145.1702	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm	35.31	dscf/dscm
68	= standard temperature (°F)	=	68	°F	68	°F
32	= normal temperature (°F)	=	32	°F	32	°F
460	= °F to °R conversion constant	=	460		460	
C_{sd}	= PCDD/F concentration (ng/Nm3 dry)	=	1.2164E+01	ng/Nm^3 dry	1.2190E+01	ng/Nm^3 dry

3. PCDDF concentration at actual gas conditions (ng/acm example)

$$C_a = C_{sd}\left(\frac{Q_{std}}{Q_a}\right)$$

Where:

			Normal Case		Maximum Case	
C_{sd}	= PCDD/F concentration (ng/dscm)	=	1.1335E+01	ng/dscm	1.1359E+01	ng/dscm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscm/h)	=	154,283	dry std m^3/hr	154,283	dry std m^3/hr
Q_a	= volumetric flow rate at actual conditions (acm/h)	=	292,701	actual m^3/hr	292,701	actual m^3/hr
C_a	= PCDD/F TEQ concentration at actual gas conditions (ng/acm)	=	5.9745E+00	ng/acm	5.9873E+00	ng/acm

4. PCDDF concentration corrected to x% O2 (ng/dscm example)

$$C_{sdx} = C_{sd}\left(\frac{20.9 - x}{20.9 - O_2}\right)$$

Where:

C_{sd}	= PCDD/F concentration (ng/dscm)	=	1.1335E+01	ng/dscm	1.1359E+01	ng/dscm
x	= oxygen content of corrected gas (%)	=	7.0	%	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.8	%	8.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%	20.9	%
C_{sdx}	= PCDD/F concentration (ng/dscm corrected to x% O_2)	=	1.2989E+01	ng/dscm @ x% O_2	1.3016E+01	ng/dscm @ x% O_2

5. PCDDF concentration corrected to y% CO2 (ng/dscm example)

$$C_{sdy} = C_{sd}\left(\frac{y}{CO_2}\right)$$

Where:

C_{sd}	= PCDD/F concentration (ng/dscm)	=	1.1335E+01	ng/dscm	1.1359E+01	ng/dscm
y	= carbon dioxide content of corrected gas (%)	=	12.0	%	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.6	%	10.6	%
C_{sdy}	= PCDD/F concentration (ng/dscm corrected to y% CO_2)	=	1.2892E+01	ng/dscm @ y% CO_2	1.2920E+01	ng/dscm @ y% CO_2

6. PCDDF Emission rate (lb/hr)

$$E_{lb/hr} = \left(\frac{m_n}{V_{mstd}}\right)\left(2.205\times10^{-3}\right)\left(Q_{std}\right)\frac{(60)}{(10^9)}$$

Where:

m_n	= total mass for PCDDs and PCDFs (ng)	=	4.6600E+01	ng	4.6700E+01	ng
V_{mstd}	= volume metered, standard (dscf)	=	145.1702	dscf	145.1702	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g	2.205E-03	lb/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	90,796	dscfm	90,796	dscfm
60	= conversion factor (min/hr)	=	60	min/hr	60	min/hr
10^9	= conversion factor to convert from ng to grams	=	1.0E+09	ng/g	1.0E+09	ng/g
$E_{lb/hr}$	= PCDDF Emission rate (lb/hr)	=	3.8560E-06	lb/hr	3.8642E-06	lb/hr

7. PCDDF Emission rate (g/sec)

$$E_{g/sec} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{Q_{std}}{60 \times 10^9}\right)$$

Where:

m_n	= total mass for PCDDs and PCDFs (ng)	=	4.6600E+01	ng	4.6700E+01	ng
V_{mstd}	= volume metered, standard (dscf)	=	145.1702	dscf	145.1702	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	90,796	dscfm	90,796	dscfm
60	= conversion factor (sec/min)	=	60	sec/min	60	sec/min
10^9	= conversion factor to convert from ng to grams	=	1.0E+09	ng/g	1.0E+09	ng/g
$E_{g/sec}$	= PCDDF Emission rate (g/sec)	=	4.8576E-07	g/sec	4.8680E-07	g/sec

8. PCDDF emission rate (Ton/yr)

$$E_{T/yr} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{10^9}\right)(Q_{std})(60)\left(\frac{Cap}{2000}\right)$$

Where:

m_n	= total mass for PCDDs and PCDFs (ng)	=	4.6600E+01	ng	4.6700E+01	ng
V_{mstd}	= volume metered, standard (dscf)	=	145.1702	dscf	145.1702	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g	2.205E-03	lb/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	90,796	dscfm	90,796	dscfm
60	= conversion factor (min/hr)	=	60	min/hr	60	min/hr
Cap	= capacity factor for process (hours operated/year)	=	8,760	hours/yr	8,760	hours/yr
2000	= conversion factor (lb/Ton)	=	2,000	lb/Ton	2,000	lb/Ton
10^9	= conversion factor to convert from ng to grams	=	1.0E+09	ng/g	1.0E+09	ng/g
$E_{T/yr}$	= PCDDF Emission rate (Ton/yr)	=	1.6889E-05	Ton/yr	1.6925E-05	Ton/yr

9. PCDDF emission rate - Fd-based (lb/MMBtu)

$$E_{Fd} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{10^9}\right)(F_d)\left(\frac{20.9}{20.9-O_2}\right)$$

Where:

m_n	= total mass for PCDDs and PCDFs (ng)	=	4.6600E+01	ng	4.6700E+01	ng
V_{mstd}	= volume metered, standard (dscf)	=	145.1702	dscf	145.1702	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g	2.205E-03	lb/g
F_d	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	9,570	dscf/MMBtu	9,570	dscf/MMBtu
O_2	= proportion of oxygen in the gas stream by volume (%)	=	8.8	%	8.8	%
20.9	= oxygen content of ambient air (%)	=	20.9	%	20.9	%
10^9	= conversion factor to convert from ng to grams	=	1.0E+09	ng/g	1.0E+09	ng/g
E_{Fd}	= PCDDF Emission rate (lb/MMBtu)	=	1.1671E-08	lb/MMBtu	1.1696E-08	lb/MMBtu

10. PCDDF emission rate - Fc-based (lb/MMBtu)

$$E_{Fc} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{10^9}\right)(F_c)\left(\frac{100}{CO_2}\right)$$

Where:

m_n	= total mass for PCDDs and PCDFs (ng)	=	4.6600E+01	ng	4.6700E+01	ng
V_{mstd}	= volume metered, standard (dscf)	=	145.1702	dscf	145.1702	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g	2.205E-03	lb/g
F_c	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	1,820	dscf/MMBtu	1,820	dscf/MMBtu
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.6	%	10.6	%
100	= conversion factor	=	100		100	
10^9	= conversion factor to convert from ng to grams	=	1.0E+09	ng/g	1.0E+09	ng/g
E_{Fc}	= PCDDF Emission rate (lb/MMBtu)	=	1.2211E-08	lb/MMBtu	1.2237E-08	lb/MMBtu

USEPA Method 26A
HCl Analyte Calculations

Sample data taken from Run 1

Note: The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results, and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

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1. Chloride to HCl conversion factor

$$K_{HCl} = \frac{MW_{HCl}}{n \times MW_{Cl^-}}$$

Where:

MW_{HCl}	= molecular weight of HCl (mg/mg-mole)	=	36.461	mg/mg-mole
MW_{Cl-}	= molecular weight of chloride ion (mg/mg-mole)	=	35.453	mg/mg-mole
n	= molar ratio of chloride to HCl	=	1.0	mole Cl/mole HCl
K_{HCl}	= conversion factor to convert mass Cl^- to mass HCl	=	1.028	

2. Total HCl collected (mg)

$$m_{HCl} = K_{HCl} \times \frac{(S_{Cl\text{-}1} v_1 + S_{Cl\text{-}2} v_2)}{1000}$$

Where:

K_{HCl}	= conversion factor to convert mass Cl^- to mass HCl	=	1.028	
$S_{Cl\text{-}1}$	= chloride concentration of sample fraction 1 (mg/liter)	=	22.1000	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	710.0	ml
$S_{Cl\text{-}2}$	= chloride concentration of sample fraction 2 (mg/liter)	=	0.0000	mg/liter
v_2	= liquid volume of sample fraction 2 (ml)	=	0.0	ml
1000	= conversion factor (ml/liter)	=	1000	ml/liter
m_{HCl}	= total HCl collected in sample (mg)	=	16.1303	mg

Note: Non-detects are treated as zero in summations.

DEFINITION
Fraction 1 = entire sample except last impinger containing applicable absorbing reagent.
Fraction 2 = last impinger containing applicable absorbing reagent, analyzed separately to evaluate collection efficiency.
If entire sample is analyzed as a single fraction, then data is included as Fraction 1 (Fraction 2 = 0).

3. Allowable blank subtraction (mg)

$$m_b = K_{HCl} \times B_{Cl} \times \frac{(v_1 + v_2)}{1000}$$

$$m_b = 0 \quad \text{if } B_{Cl} < MDL$$

Where:

K_{HCl}	= conversion factor to convert mass Cl^- to mass HCl	=	1.0280	
B_{Cl}	= chloride concentration of blank (mg/liter)	=	<0.1	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	710.0	ml
v_2	= liquid volume of sample fraction 2 (ml)	=	0	ml
1000	= conversion factor (ml/liter)	=	1000.0000	ml/liter
m_b	= *allowable blank subtraction (mg)*	=	0.0000	mg

QA/QC ________
Date ________

4. Total HCl collected, corrected for blank (mg)

$$m_{nb} = m_{HCl} - m_b$$

Where:

m_{HCl}	= total HCl collected in sample (mg)	=	16.1303	mg
m_b	= allowable blank subtraction (mg)	=	0.0000	mg
m_{nb}	= *total HCl collected, corrected for blank (mg)*	=	16.130348	mg

5. Minimum detectable HCl (mg)

$$m_{MDL} = K_{HCl} \times MDL \times \frac{(v_1 + v_2)}{1000}$$

Where:

K_{HCl}	= conversion factor to convert mass Cl^- to mass HCl	=	1.028	
MDL	= minimum detectable chloride concentration	=	0.0	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	710.0	ml
v_2	= liquid volume of sample fraction 2 (ml)	=	0	ml
1000	= conversion factor (ml/liter)	=	1000	ml/liter
m_{MDL}	= minimum detectable HCl (mg)	=	0.00802868	mg

6. Total HCl value used in emission calculations (mg)

$$m_n = MAXIMUM\ [m_{nb} \quad or \quad < m_{MDL}]$$

Where:

m_{nb}	= total HCl collected, corrected for blank (mg)	=	16.1303	mg
m_{MDL}	= minimum detectable HCl (mg)	=	0.00802868	mg
m_n	= total HCl value used in emission calculations (mg)	=	16.130348	mg

7. Collection QC check (% mass collected in second fraction)

$$EFF = 100 \times \frac{K_{HCl} \times S_{Cl-2} \times \frac{v_2}{1000}}{m_{HCl}}$$

Where:

K_{HCl}	= conversion factor to convert mass Cl^- to mass HCl	=	1.0280	
S_{Cl-2}	= chloride concentration of sample fraction 2 (mg/liter)	=	0.0	mg/liter
v_2	= liquid volume of sample fraction 2 (ml)	=	0.0000	ml
m_{HCl}	= total HCl collected in sample (mg)	=	16	mg
1000	= conversion factor (ml/liter)	=	1000	ml/liter
100	= conversion factor	=	100	%
EFF	= Collection QC check *(% mass collected in second fraction)*	=	0	%

QA/QC ________
Date ________

USEPA Method 26A
HCl Sample Calculations

Sample data taken from Run 1

Note: The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results, and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

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P_@

1. HCl concentration (lb/dscf)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205\times10^{-3}}{1000}\right)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	16.1303	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.1472	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
1000	= conversion factor (mg/g)	=	1,000	mg/g
C_{sd}	= HCl concentration (lb/dscf)	=	8.8593E-07	lb/dscf

2. HCl concentration (ppmdv)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{0.850}{1000}\right)\left(\frac{10^6}{MW}\right)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	16.1303	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.1472	dscf
MW	= molecular weight of HCl (g/g-mole)	=	36.461	g/g-mole
0.850	= conversion factor (dscf/g-mole)	=	0.850	dscf/g-mole
1000	= conversion factor (mg/g)	=	1,000	mg/g
10^6	= conversion factor (ppm)	=	10^6	ppm
C_{sd}	= HCl concentration (ppmdv)	=	9.3665	ppmdv

3. HCl concentration (ppmwv)

$$C_w = C_{sd}\left(1-\frac{B_w}{100}\right)$$

Where:

C_{sd}	= HCl concentration (ppmdv)	=	9.3665	ppmdv
B_w	= actual water vapor in gas (% v/v)	=	22.6983	% v/v
100	= conversion factor (%)	=	100	%
C_w	= HCl concentration (ppmwv)	=	7.2405	ppmwv

QA/QC ________
Date ________

4. HCl concentration (mg/dscm)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)(35.31)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	16.1303	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.1472	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= HCl concentration (mg/dscm)	=	14.1869	mg/dscm

5. HCl concentration (mg/Nm^3 dry)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}}\right)(35.31)\left(\frac{68+460}{32+460}\right)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	16.1303	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.1472	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
68	= standard temperature (°F)	=	68	°F
32	= normal temperature (°F)	=	32	°F
460	= °F to °R conversion constant	=	460	
C_{sd}	= HCl concentration (mg/Nm^3 dry)	=	15.2249	mg/Nm^3 dry

6. HCl concentration corrected to x% O_2 (ppmdv example)

$$C_{sdx} = C_{sd}\left(\frac{20.9-x}{20.9-O_2}\right)$$

Where:

C_{sd}	= HCl concentration (ppmdv)	=	9.3665	ppmdv
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.2	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= HCl concentration corrected to x%O_2 (ppmdv)	=	11.0804	ppmdv @ x%O_2

7. HCl concentration corrected to y% CO_2 (ppmdv example)

$$C_{sdy} = C_{sd}\left(\frac{y}{CO_2}\right)$$

Where:

C_{sd}	= HCl concentration (ppmdv)	=	9.3665	ppmdv
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.0	%
C_{sdy}	= HCl concentration corrected to y%CO2 (ppmdv)	=	11.2963	ppmdv @ y%CO_2

QA/QC ________
Date ________

8. HCl rate - F_d-based (lb/MMBtu)

$$E_{Fd} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205 \times 10^{-3}}{1000}\right)(F_d)\left(\frac{20.9}{20.9 - O_2}\right)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	16.1303	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.1472	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
1000	= conversion factor (mg/g)	=	1,000	mg/g
F_d	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	9,750	dscf/MMBtu
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.2	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= HCl rate (lb/MMBtu)	=	1.5364E-02	lb/MMBtu

9. HCl rate - F_c-based (lb/MMBtu)

$$E_{Fc} = \left(\frac{m_n}{V_{mstd}}\right)\left(\frac{2.205 \times 10^{-3}}{1000}\right)(F_c)\left(\frac{100}{CO_2}\right)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	16.1303	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.1472	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
1000	= conversion factor (mg/g)	=	1,000	mg/g
F_c	= ratio of gas volume to heat content of fuel (dscf/MMBtu)	=	1,820	dscf/MMBtu
CO_2	= proportion of oxygen in the gas stream by volume (%)	=	10.0	%
100	= conversion factor	=	100	
E_{Fc}	= HCl rate (lb/MMBtu)	=	1.6205E-02	lb/MMBtu

QA/QC ________
Date ________

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PLANT DATA

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I herby certify that all pages contained within this Appendix have been reviewed and, to the best of my ability, verified as accurate.

QA/QC Initials: MC

Date: 4/18/12

CleanAir

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WHEELABRATOR SOUTH BROWARD
TONS OF REFUSE PROCESSED PER STACK TEST RUN LOG (2012)

UNIT #1

Date	Test	Method #	Run #	Steam (klb/hr)	Run Length (hr)	Trash Processed (tons)
3/22/2012	HCl	26A	1	186.6	1.00	33.3
3/22/2012	HCl	26A	2	186.0	1.00	33.2
3/22/2012	HCl	26A	3	188.3	1.00	33.6
3/20/2012	Particulate/Metals	5/29	1	188.0	2.22	74.5
3/20/2012	Particulate/Metals	5/29	2	187.6	2.25	75.4
3/20/2012	Particulate/Metals	5/29	3	188.6	2.27	76.5
3/21/2012	Particulate/Metals	29	4	187.5	2.33	78.0
N/A	Fluorides	13B	1	N/A	N/A	N/A
N/A	Fluorides	13B	2	N/A	N/A	N/A
N/A	Fluorides	13B	3	N/A	N/A	N/A
3/20/2012	Dioxins/Furans	23	1	188.4	4.47	150.3
3/21/2012	Dioxins/Furans	23	2	188.2	4.60	154.6
3/21/2012	Dioxins/Furans	23	3	187.9	4.38	147.0

UNIT #2

Date	Test	Method #	Run #	Steam (klb/hr)	Run Length (hr)	Trash Processed (tons)
3/20/2012	HCl	26A	1	188.0	1.00	33.6
3/20/2012	HCl	26A	2	189.1	1.00	33.8
3/20/2012	HCl	26A	3	187.4	1.00	33.5
3/21/2012	Particulate/Metals	5/29	1	187.7	2.20	73.8
3/21/2012	Particulate/Metals	5/29	2	187.5	2.25	75.3
3/21/2012	Particulate/Metals	5/29	3	188.6	2.20	74.1
3/22/2012	Particulate/Metals	29	4	187.5	2.22	74.3
N/A	Fluorides	13B	1	N/A	N/A	N/A
N/A	Fluorides	13B	2	N/A	N/A	N/A
N/A	Fluorides	13B	3	N/A	N/A	N/A
N/A	Dioxins/Furans	23	1	N/A	N/A	N/A
N/A	Dioxins/Furans	23	2	N/A	N/A	N/A
N/A	Dioxins/Furans	23	3	N/A	N/A	N/A

UNIT #3

Date	Test	Method #	Run #	Steam (klb/hr)	Run Length (hr)	Trash Processed (tons)
3/21/2012	HCl	26A	1	188.0	1.77	59.4
3/21/2012	HCl	26A	2	188.7	1.00	33.7
3/21/2012	HCl	26A	3	183.9	1.00	32.8
3/20/2012	Particulate/Metals	5/29	1	188.0	2.28	76.5
3/22/2012	Particulate/Metals	5/29	2	187.9	2.22	74.5
3/22/2012	Particulate/Metals	5/29	3	187.9	2.20	73.8
3/22/2012	Particulate/Metals	29	4	186.7	2.18	72.7
N/A	Fluorides	13B	1	N/A	N/A	N/A
N/A	Fluorides	13B	2	N/A	N/A	N/A
N/A	Fluorides	13B	3	N/A	N/A	N/A
N/A	Dioxins/Furans	23	1	N/A	N/A	N/A
N/A	Dioxins/Furans	23	2	N/A	N/A	N/A
N/A	Dioxins/Furans	23	3	N/A	N/A	N/A

Metals: Cd (cadmium) Hg (mercury) Pb (lead)

Florides and Beryllium in 2016

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/22/2012
Start Time: 7:44:00
End Time: 8:44:00
TEST 26A run 1

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 1	465.85	320.21	29.45	20.32	9.13	301.88	7.84	-10.62	186.64	575.24

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	190.45	905.25	826.66	83.84	-0.09	423.70	1095.87	5.14	5.61	8.96

Lime Slurry 3/22/2012
S.G. **1.100**
Lb/gal **1.051**

Specific Gravity	CaO lb/gal	Lime Conc %
1.100	1.051	28.223

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Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/22/2012
Start Time: 9:07:00
End Time: 10:07:00
TEST 26A run 2

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 1	473.34	320.08	31.97	24.89	7.08	301.92	8.23	-11.08	185.96	522.54

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	189.71	905.23	825.98	88.00	-0.09	428.53	1082.64	8.24	6.52	9.55

Lime Slurry	3/22/2012
S.G.	**1.117**
Lb/gal	**1.231**

Specific Gravity	CaO lb/gal	Lime Conc %
1.117	1.231	22.112

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/22/2012
Start Time: 10:32:00
End Time: 11:32:00
TEST 26A run 3

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 1	473.22	320.07	31.81	25.09	6.72	302.88	8.11	-10.82	188.28	522.53

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	192.17	906.57	825.00	86.38	-0.10	427.07	1095.80	7.38	5.86	9.05

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Lime Slurry 3/22/2012
S.G. **1.123**
Lb/gal **1.296**

Specific Gravity	CaO lb/gal	Lime Conc %
1.123	1.296	21.288

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/20/2012
Start Time: 7:52:00
End Time: 10:05:00
TEST 5/29 run 1

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 1	463.70	320.01	28.73	21.63	7.10	302.00	7.34	-10.05	187.95	525.57

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	191.67	906.08	824.24	81.85	-0.10	425.32	1085.19	5.89	5.32	8.58

Lime Slurry 3/20/2012
S.G. **1.117**
Lb/gal **1.234**

Specific Gravity	CaO lb/gal	Lime Conc %
1.117	1.234	24.613

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Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/20/2012
Start Time: 10:29:00
End Time: 12:44:00
TEST 5/29 run 2

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 1	472.17	320.05	31.12	23.01	8.10	302.12	7.65	-10.55	187.58	507.46

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	191.38	905.49	823.92	85.99	-0.10	430.21	1074.50	11.45	5.79	9.12

Lime Slurry 3/20/2012
S.G. **1.099**
Lb/gal **1.044**

Specific Gravity	CaO lb/gal	Lime Conc %
1.099	1.044	26.283

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/20/2012
Start Time: 13:04:00
End Time: 15:20:00
TEST 5/29 run 3

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 1	471.03	320.01	30.24	19.57	10.68	302.46	7.51	-10.35	188.63	561.75

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	192.78	905.84	825.68	85.43	-0.09	427.43	1098.28	9.22	5.86	8.99

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Lime Slurry 3/20/2012
S.G. **1.084**
Lb/gal **0.877**

Specific Gravity	CaO lb/gal	Lime Conc %
1.084	0.877	35.312

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/21/2012
Start Time: 13:18:00
End Time: 15:38:00
TEST 29 run 4

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 1	474.42	319.74	31.44	24.50	6.95	302.57	7.74	-10.46	187.50	532.11

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	190.95	905.85	824.54	85.15	-0.10	427.23	1099.47	4.78	6.22	9.16

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Lime Slurry 3/21/2012
S.G. **1.121**
Lb/gal **1.277**

Specific Gravity	CaO lb/gal	Lime Conc %
1.121	1.277	21.925

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/20/2012
Start Time: 11:15:00
End Time: 15:43:00
TEST 23 run 1

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 1	471.52	319.99	30.61	20.70	9.92	302.25	7.55	-10.43	188.35	549.41

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	192.27	905.75	824.95	85.55	-0.10	428.36	1089.41	10.21	5.81	9.01

Lime Slurry 3/20/2012
S.G. **1.088**
Lb/gal **0.923**

Specific Gravity	CaO lb/gal	Lime Conc %
1.088	0.923	32.531

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/21/2012
Start Time: 7:32:00
End Time: 12:08:00
TEST 23 run 2

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 1	470.40	320.92	30.02	19.50	10.52	303.34	7.57	-10.23	188.20	612.08

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	191.73	905.92	824.81	83.97	-0.10	426.16	1098.44	5.52	5.76	8.78

C - 12

Lime Slurry 3/21/2012
S.G. **1.093**
Lb/gal **0.969**

Specific Gravity	CaO lb/gal	Lime Conc %
1.093	0.969	31.975

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/21/2012
Start Time: 12:31:00
End Time: 16:54:00
TEST 23 run 3

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 1	474.27	320.37	31.22	25.12	6.10	303.28	7.73	-10.47	187.92	469.67

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 1	191.50	905.93	824.78	85.28	-0.10	426.86	1099.93	4.81	6.12	9.12

C - 13

Lime Slurry 3/21/2012
S.G. **1.121**
Lb/gal **1.284**

Specific Gravity	CaO lb/gal	Lime Conc %
1.121	1.284	21.999

Plant Name: SBWD
General Average Report
Reporting Period: 03/20/2012 to 03/20/2012

Site Name: UNIT1
Data Averaging Type: 6m

5/29 Run 1

Time of Report: 03/22/12 13:14
Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/20/12	06:54	0
	07:00	0
	07:06	0
	07:12	0
	07:18	0
	07:24	0
	07:30	0
	07:36	0
	07:42	0
	07:48	0
	07:54	1
	08:00	1
	08:06	0
	08:12	0
	08:18	0
	08:24	0
	08:30	0
	08:36	1
	08:42	1
	08:48	1
	08:54	1
	09:00	1

Average =	0
Geometric Avg. =	0
Maximum =	1
Minimum =	0
Possible Values =	22
Included Values =	22
Total =	11

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/20/2012 to 03/20/2012

Site Name: UNIT1
Data Averaging Type: 6m

5/29 RUN 2

Time of Report: 03/22/12 13:15
Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/20/12	09:30	0
	09:36	1
	09:42	1
	09:48	1
	09:54	1
	10:00	1
	10:06	1
	10:12	1
	10:18	1
	10:24	1
	10:30	1
	10:36	1
	10:42	1
	10:48	1
	10:54	1
	11:00	1
	11:06	1
	11:12	1
	11:18	1
	11:24	1
	11:30	1
	11:36	1
	11:42	1

Average =	1
Geometric Avg. =	1
Maximum =	1
Minimum =	0
Possible Values =	23
Included Values =	23
Total =	13

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/20/2012 to 03/20/2012

Site Name: UNIT1
Data Averaging Type: 6m

5/29/10 Run 3

Time of Report: 03/22/12 13:15
Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/20/12	12:06	1
	12:12	1
	12:18	1
	12:24	1
	12:30	1
	12:36	1
	12:42	1
	12:48	1
	12:54	1
	13:00	1
	13:06	1
	13:12	1
	13:18	1
	13:24	1
	13:30	1
	13:36	1
	13:42	1
	13:48	1
	13:54	1
	14:00	1
	14:06	1
	14:12	1
	14:18	1

Average =	1
Geometric Avg. =	1
Maximum =	1
Minimum =	1
Possible Values =	23
Included Values =	23
Total =	14

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD

General Average Report

Reporting Period: 03/20/2012 to 03/20/2012

Site Name: UNIT1

Data Averaging Type: 15m

5/29 RUN 1

Time of Report: 03/22/12 08:02

Rolling Average Interval: 1

Date	Time	CARFEED1 (LBS/HR)
03/20/12	07:00	6
	07:15	6
	07:30	6
	07:45	6
	08:00	6
	08:15	6
	08:30	6
	08:45	6
	09:00	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	9
Included Values =	9
Total =	55

*	- excluded values (missing, OOC, invalid, suspect)
<	- missing
T	- out-of-control
I	- invalid
S	- suspect
[illegible]	- exceedance
F	- stack not operating
B	- invalid (PADER)
U	- missing data substituted
-999	- missing value
-888	- value could not be calculated

Plant Name: SBWD

General Average Report

Reporting Period: 03/20/2012 to 03/20/2012

Site Name: UNIT1

Data Averaging Type: 15m

5/29 Run 2

Time of Report: 03/22/12 08:02

Rolling Average Interval: 1

Date	Time	CARFEED1 (LBS/HR)
03/20/12	09:30	6
	09:45	6
	10:00	6
	10:15	6
	10:30	6
	10:45	6
	11:00	6
	11:15	6
	11:30	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	9
Included Values =	9
Total =	56

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/20/2012 to 03/20/2012

Site Name: UNIT1
Data Averaging Type: 15m

5/29 Run 3

Time of Report: 03/22/12 08:02
Rolling Average Interval: 1

Date	Time	CARFEED1 (LBS/HR)
03/20/12	12:15	6
	12:30	6
	12:45	6
	13:00	6
	13:15	6
	13:30	6
	13:45	6
	14:00	6
	14:15	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	9
Included Values =	9
Total =	55

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
E - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/21/2012 to 03/21/2012

Site Name: UNIT1
Data Averaging Type: 15m

29 Run 4

Time of Report: 03/22/12 08:03
Rolling Average Interval: 1

Date	Time	CARFEED1 (LBS/HR)
03/21/12	12:30	6
	12:45	6
	13:00	6
	13:15	6
	13:30	6
	13:45	6
	14:00	6
	14:15	6
	14:30	6
Average =		6
Geometric Avg. =		6
Maximum =		6
Minimum =		6
Possible Values =		9
Included Values =		9
Total =		56

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD

General Average Report

Reporting Period: 03/20/2012 to 03/20/2012

23 RUN 1

ite Name: UNIT1

ata Averaging Type: 15m

Time of Report: 03/22/12 08:03

Rolling Average Interval: 1

Date	Time	CARFEED1 (LBS/HR)
03/20/12	10:15	6
	10:30	6
	10:45	6
	11:00	6
	11:15	6
	11:30	6
	11:45	6
	12:00	7
	12:15	6
	12:30	6
	12:45	6
	13:00	6
	13:15	6
	13:30	6
	13:45	6
	14:00	6
	14:15	6
	14:30	6
Average =		6
Geometric Avg. =		6
Maximum =		7
Minimum =		6
ossible Values =		18
cluded Values =		18
Total =		111

* - excluded values (missing, OOC, invalid, suspect)

< - missing

T - out-of-control

I - invalid

S - suspect

H - exceedance

F - stack not operating

B - invalid (PADER)

U - missing data substituted

-999 - missing value

-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/21/2012 to 03/21/2012

Site Name: UNIT1
Data Averaging Type: 15m

23 RUN 2

Time of Report: 03/22/12 08:03
Rolling Average Interval: 1

Date	Time	CARFEED1 (LBS/HR)
03/21/12	06:45	6
	07:00	6
	07:15	6
	07:30	6
	07:45	6
	08:00	6
	08:15	6
	08:30	6
	08:45	6
	09:00	6
	09:15	6
	09:30	6
	09:45	6
	10:00	6
	10:15	6
	10:30	6
	10:45	6
	11:00	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	18
Included Values =	18
Total =	110

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD

General Average Report

Reporting Period: 03/21/2012 to 03/21/2012

ite Name: UNIT1

23 hun 3

Time of Report: 03/22/12 08:05

ata Averaging Type: 15m

Rolling Average Interval: 1

Date	Time	CARFEED1 (LBS/HR)
03/21/12	11:45	6
	12:00	6
	12:15	6
	12:30	6
	12:45	6
	13:00	6
	13:15	6
	13:30	6
	13:45	6
	14:00	6
	14:15	6
	14:30	6
	14:45	6
	15:00	6
	15:15	6
	15:30	7
	15:45	10

Average =	6
Geometric Avg. =	6
Maximum =	10
Minimum =	6
Possible Values =	17
Included Values =	17
Total =	109

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/20/2012
Start Time: 8:08:00
End Time: 9:08
TEST 26A run 1

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 2	474.40	314.96	30.78	23.81	6.9748	296.95	7.54	-14.15	188.03	522.71

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 2	188.64	912.53	810.77	80.67	-0.09	393.05	1009.09	1.88	6.96	9.45

C - 24

Lime Slurry 3/20/2012
S.G. **1.118**
Lb/gal **1.249**

Specific Gravity	Cao lb/gal	Lime Conc %
1.118	1.249	22.821

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/20/2012
Start Time: 9:49:00
End Time: 10:49
TEST 26A run 2

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 2	473.64	314.87	29.78	22.31	7.4649	297.30	7.38	-13.77	189.14	511.21

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 2	187.37	911.79	798.13	78.96	-0.10	391.69	1017.33	1.93	6.88	9.43

Lime Slurry 3/20/2012
S.G. **1.109**
Lb/gal **1.141**

Specific Gravity	Cao lb/gal	Lime Conc %
1.109	1.141	25.081

C - 25

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/20/2012
Start Time: 12:22:00
End Time: 13:22
TEST 26A run 3

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 2	476.84	315.19	30.96	21.83	9.1274	296.98	7.58	-14.25	187.42	535.69

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 2	186.08	911.36	799.06	80.63	-0.10	392.63	1021.26	2.57	6.63	9.42

Lime Slurry 3/20/2012
S.G. **1.093**
Lb/gal **0.978**

Specific Gravity	Cao lb/gal	Lime Conc %
1.093	0.978	29.513

C - 27

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/21/2012
Start Time: 8:16:00
End Time: 10:28
TEST 5/29 run 1

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 2	473.82	317.08	29.36	18.61	10.7456	300.73	7.53	-13.81	187.74	567.06

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 2	186.92	911.73	801.47	79.79	-0.10	389.83	1022.25	1.90	6.88	9.20

Lime Slurry 3/21/2012
S.G. **1.084**
Lb/gal **0.880**

Specific Gravity	Cao lb/gal	Lime Conc %
1.084	0.880	37.493

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/21/2012
Start Time: 10:52:00
End Time: 13:07
TEST 5/29 run 2

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 2	481.82	315.01	33.14	25.17	7.9675	298.04	7.90	-14.80	187.47	557.72

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 2	186.09	910.96	798.15	81.33	-0.10	394.88	1025.68	1.90	7.38	9.85

Lime Slurry 3/21/2012
S.G. **1.111**
Lb/gal **1.167**

Specific Gravity	Cao lb/gal	Lime Conc %
1.111	1.167	22.585

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/21/2012
Start Time: 13:29:00
End Time: 15:41
TEST 5/29 run 3

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 2	475.66	314.08	30.67	23.58	7.0895	296.34	7.49	-13.79	188.62	543.99

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 2	186.63	911.35	792.29	79.10	-0.10	390.49	1025.66	1.91	6.91	9.43

C - 29

Lime Slurry 3/21/2012
S.G. **1.121**
Lb/gal **1.279**

Specific Gravity	Cao lb/gal	Lime Conc %
1.121	1.279	22.542

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/22/2012
Start Time: 7:43:00
End Time: 9:56
TEST 5/29 run 4

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 2	469.45	315.09	27.27	19.02	8.2483	295.07	7.43	-13.22	187.52	556.48

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
Unit 2	185.58	910.74	791.89	74.25	-0.10	384.51	1018.07	1.93	6.64	9.07

C - 30

Lime Slurry 3/22/2012
S.G. **1.107**
Lb/gal **1.124**

Specific Gravity	Cao lb/gal	Lime Conc %
1.107	1.124	28.505

Plant Name: SBWD

General Average Report

Reporting Period: 03/21/2012 to 03/21/2012

5/29 RUN 1

ite Name: UNIT2
ata Averaging Type: 6m

Time of Report: 03/22/12 08:06
Rolling Average Interval: 1

Date	Time	OPACITY2 (PERCENT)
03/21/12	07:18	0
	07:24	0
	07:30	0
	07:36	0
	07:42	0
	07:48	0
	07:54	0
	08:00	0
	08:06	0
	08:12	0
	08:18	0
	08:24	0
	08:30	0
	08:36	0
	08:42	0
	08:48	0
	08:54	0
	09:00	0
	09:06	0
	09:12	0
	09:18	0
	09:24	0

Average =	0
eometric Avg. =	
Maximum =	0
Minimum =	0
Possible Values =	22
Included Values =	22
Total =	0

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/21/2012 to 03/21/2012

Site Name: UNIT2
Data Averaging Type: 6m

5/29 run 2

Time of Report: 03/22/12 08:06
Rolling Average Interval: 1

Date	Time	OPACITY2 (PERCENT)
03/21/12	09:54	0
	10:00	0
	10:06	0
	10:12	0
	10:18	0
	10:24	0
	10:30	0
	10:36	0
	10:42	0
	10:48	0
	10:54	0
	11:00	0
	11:06	0
	11:12	0
	11:18	0
	11:24	0
	11:30	0
	11:36	0
	11:42	0
	11:48	0
	11:54	0
	12:00	0
	12:06	0

Average =	0
Geometric Avg. =	0
Maximum =	0
Minimum =	0
Possible Values =	23
Included Values =	23
Total =	0

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
E - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD

General Average Report

Reporting Period: 03/21/2012 to 03/21/2012

Site Name: UNIT2

Data Averaging Type: 6m

5/29 run 3

Time of Report: 03/22/12 08:06

Rolling Average Interval: 1

Date	Time	OPACITY2 (PERCENT)
03/21/12	12:30	0
	12:36	0
	12:42	0
	12:48	0
	12:54	0
	13:00	0
	13:06	0
	13:12	0
	13:18	0
	13:24	0
	13:30	0
	13:36	0
	13:42	0
	13:48	0
	13:54	0
	14:00	0
	14:06	0
	14:12	0
	14:18	0
	14:24	0
	14:30	0
	14:36	0

Average =	0
Geometric Avg. =	0
Maximum =	0
Minimum =	0
Possible Values =	22
Included Values =	22
Total =	1

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/21/2012 to 03/21/2012

Site Name: UNIT2
Data Averaging Type: 15m

5/29 run 1

Time of Report: 03/22/12 08:07
Rolling Average Interval: 1

Date	Time	CARFEED2 (LBS/HR)
03/21/12	07:30	6
	07:45	7
	08:00	6
	08:15	7
	08:30	7
	08:45	7
	09:00	6
	09:15	6

Average =	7
Geometric Avg. =	7
Maximum =	7
Minimum =	6
Possible Values =	8
Included Values =	8
Total =	53

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD

General Average Report

Reporting Period: 03/21/2012 to 03/21/2012

ite Name: UNIT2

ata Averaging Type: 15m

5/29 n w 2

Time of Report: 03/22/12 08:08

Rolling Average Interval: 1

Date	Time	CARFEED2 (LBS/HR)
03/21/12	10:00	6
	10:15	7
	10:30	6
	10:45	6
	11:00	7
	11:15	6
	11:30	6
	11:45	6
	12:00	6

Average =	6
Geometric Avg. =	6
Maximum =	7
Minimum =	6
Possible Values =	9
Included Values =	9
Total =	57

* - excluded values (missing, OOC, invalid, suspect)

< - missing

T - out-of-control

I - invalid

S - suspect

- exceedance

F - stack not operating

B - invalid (PADER)

U - missing data substituted

-999 - missing value

-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/21/2012 to 03/21/2012

Site Name: UNIT2
Data Averaging Type: 15m

5/29 RUN 3

Time of Report: 03/22/12 08:08
Rolling Average Interval: 1

Date	Time	CARFEED2 (LBS/HR)
03/21/12	12:30	6
	12:45	6
	13:00	7
	13:15	6
	13:30	6
	13:45	6
	14:00	6
	14:15	6
	14:30	6
	Average =	6
	Geometric Avg. =	6
	Maximum =	7
	Minimum =	6
	Possible Values =	9
	Included Values =	9
	Total =	56

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/22/2012 to 03/22/2012

Site Name: UNIT2
Data Averaging Type: 15m

29 / RUN 4

Time of Report: 03/22/12 14:28
Rolling Average Interval: 1

Date	Time	CARFEED2 (LBS/HR)
03/22/12	06:45	6
	07:00	6
	07:15	6
	07:30	6
	07:45	6
	08:00	7
	08:15	6
	08:30	6
	08:45	6

Average =	6
Geometric Avg. =	6
Maximum =	7
Minimum =	6
Possible Values =	9
Included Values =	9
Total =	56

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
[illegible] - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/21/2012
Start Time: 7:54:00
End Time: 9:40:00
TEST 26A run 1

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 3	485.34	315.75	37.85	26.30	11.54	301.70	7.06	-10.48	188.02	639.85

Unit 3	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
	193.03	900.13	825.54	83.87	-0.10	392.50	1049.01	7.26	6.58	9.62

Lime Slurry 3/21/2012
S.G. **1.088**
Lb/gal **0.924**

Specific Gravity	CaO lb/gal	Lime Conc %
1.088	0.924	26.589

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Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/21/2012
Start Time: 10:04:00
End Time: 11:04:00
TEST 26A run 2

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 3	490.97	315.76	40.60	30.41	10.19	301.19	7.07	-10.79	188.65	565.09

	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
Unit 3	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
	193.23	900.32	825.08	84.99	-0.11	395.72	1064.51	10.27	6.36	9.62

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Lime Slurry 3/21/2012
S.G. **1.088**
Lb/gal **0.924**

Specific Gravity	CaO lb/gal	Lime Conc %
1.088	0.924	24.348

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/21/2012
Start Time: 11:30:00
End Time: 12:30:00
TEST 26A run 3

Unit 3

SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
492.98	315.26	42.76	32.01	10.75	299.49	7.20	-11.04	183.85	770.93

Unit 3

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
189.55	898.25	822.27	88.07	-0.09	396.73	1058.73	8.27	7.26	10.38

Lime Slurry 3/21/2012
S.G. **1.114**
Lb/gal **1.195**

Specific Gravity	CaO lb/gal	Lime Conc %
1.114	1.195	17.051

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Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/20/2012
Start Time: 7:54:00
End Time: 10:11:00
TEST 5/29 run 1

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 3	492.09	314.99	40.33	33.94	6.39	298.00	7.09	-10.63	188.01	471.25

Unit 3	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
	192.69	900.18	824.33	83.08	-0.10	393.73	1062.31	9.46	6.38	9.62

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Lime Slurry 3/20/2012
S.G. **1.117**
Lb/gal **1.229**

Specific Gravity	CaO lb/gal	Lime Conc %
1.117	1.229	17.617

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/22/2012
Start Time: 7:37:00
End Time: 9:50:00
TEST 5/29 run 2

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 3	486.20	315.13	37.99	30.28	7.71	299.14	7.10	-10.52	187.85	514.24

Unit 3	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
	192.51	899.48	822.76	81.33	-0.10	391.46	1057.01	6.50	6.30	9.49

Lime Slurry 3/22/2012
S.G. **1.106**
Lb/gal **1.111**

Specific Gravity	CaO lb/gal	Lime Conc %
1.106	1.111	20.779

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Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/22/2012
Start Time: 10:11:00
End Time: 12:23:00
TEST 5/29 run 3

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 3	492.03	315.06	40.29	30.91	9.38	297.51	7.11	-10.74	187.87	726.82

Unit 3	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
	192.69	900.02	824.57	82.64	-0.11	393.12	1068.78	10.14	6.56	9.66

Lime Slurry 3/22/2012
S.G. **1.122**
Lb/gal **1.291**

Specific Gravity	CaO lb/gal	Lime Conc %
1.122	1.291	16.907

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/22/2012
Start Time: 12:50:00
End Time: 15:01:00
TEST 29 run 4

	SDA INLET TEMP	SDA OUTLET TEMP	TOTAL SLURRY FL	DIL WATER FLOW	LIME SLURRY	FF OUT TEMP	FF DP	ID INLET PRESS	STEAM FLOW	Lime Feed Rate
	DEG F	DEG F	GPM	GPM	GPM	DEG F	" H2O	" H2O	KLBs/hr	lb/hr
Unit 3	499.24	314.86	45.20	31.67	13.52	300.16	7.23	-11.04	186.67	1077.11

Unit 3	FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNCR CHEM FLOW	FURNACE O2	OUTLET O2
	KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
	191.55	899.23	825.19	87.11	-0.10	400.33	1060.34	11.51	6.82	9.96

Lime Slurry 3/22/2012
S.G. **1.126**
Lb/gal **1.328**

Specific Gravity	CaO lb/gal	Lime Conc %
1.126	1.328	14.751

Plant Name: SBWD
General Average Report
Reporting Period: 03/20/2012 to 03/20/2012

ite Name: UNIT3
ata Averaging Type: 6m

5/29 Run 1

Time of Report: 03/22/12 08:09
Rolling Average Interval: 1

Date	Time	OPACITY3 (PERCENT)
03/20/12	06:54	0
	07:00	0
	07:06	0
	07:12	0
	07:18	0
	07:24	0
	07:30	0
	07:36	0
	07:42	0
	07:48	0
	07:54	0
	08:00	0
	08:06	0
	08:12	0
	08:18	0
	08:24	0
	08:30	0
	08:36	0
	08:42	0
	08:48	0
	08:54	0
	09:00	0
	09:06	0

Average =	0
Geometric Avg. =	0
Maximum =	0
Minimum =	0
Possible Values =	23
Included Values =	23
Total =	2

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/22/2012 to 03/22/2012

Site Name: UNIT3
Data Averaging Type: 6m

5/29 run 2

Time of Report: 03/22/12 14:30
Rolling Average Interval: 1

Date	Time	OPACITY3 (PERCENT)
03/22/12	06:42	0
	06:48	0
	06:54	0
	07:00	0
	07:06	0
	07:12	0
	07:18	0
	07:24	0
	07:30	0
	07:36	0
	07:42	0
	07:48	0
	07:54	0
	08:00	0
	08:06	0
	08:12	0
	08:18	0
	08:24	0
	08:30	0
	08:36	0
	08:42	0
	08:48	0

Average =	0
Geometric Avg. =	0
Maximum =	0
Minimum =	0
Possible Values =	22
Included Values =	22
Total =	2

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD

General Average Report

Reporting Period: 03/22/2012 to 03/22/2012

ite Name: UNIT3

ata Averaging Type: 6m

5/29 RUN 3

Time of Report: 03/22/12 14:31

Rolling Average Interval: 1

Date	Time	OPACITY3 (PERCENT)
03/22/12	09:12	0
	09:18	0
	09:24	0
	09:30	0
	09:36	0
	09:42	0
	09:48	0
	09:54	0
	10:00	0
	10:06	0
	10:12	0
	10:18	0
	10:24	0
	10:30	0
	10:36	0
	10:42	0
	10:48	0
	10:54	0
	11:00	0
	11:06	0
	11:12	0
	11:18	0

Average =	0
eometric Avg. =	0
Maximum =	0
Minimum =	0
Possible Values =	22
Included Values =	22
Total =	3

* - excluded values (missing, OOC, invalid, suspect)

< - missing

T - out-of-control

I - invalid

S - suspect

H - exceedance

F - stack not operating

B - invalid (PADER)

U - missing data substituted

-999 - missing value

-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/20/2012 to 03/20/2012

Site Name: UNIT3
Data Averaging Type: 15m

5/29 Run 1

Time of Report: 03/22/12 08:10
Rolling Average Interval: 1

Date	Time	CARFEED3 (LBS/HR)
03/20/12	07:00	6
	07:15	6
	07:30	6
	07:45	6
	08:00	6
	08:15	5
	08:30	6
	08:45	6
	09:00	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	5
Possible Values =	9
Included Values =	9
Total =	54

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
H - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD
General Average Report
Reporting Period: 03/22/2012 to 03/22/2012

Site Name: UNIT3
Data Averaging Type: 15m

5/29 run 2

Time of Report: 03/22/12 14:29
Rolling Average Interval: 1

Date	Time	CARFEED3 (LBS/HR)
03/22/12	06:45	6
	07:00	6
	07:15	6
	07:30	6
	07:45	6
	08:00	6
	08:15	5
	08:30	5
	08:45	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	5
Possible Values =	9
Included Values =	9
Total =	53

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
[illegible] - exceedance
F - stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Plant Name: SBWD

General Average Report

Reporting Period: 03/22/2012 to 03/22/2012

Site Name: UNIT3

Data Averaging Type: 15m

5/29 run 3

Time of Report: 03/22/12 14:30

Rolling Average Interval: 1

Date	Time	CARFEED3 (LBS/HR)
03/22/12	09:15	6
	09:30	6
	09:45	6
	10:00	6
	10:15	6
	10:30	6
	10:45	6
	11:00	6
	11:15	6
	Average =	6
	Geometric Avg. =	6
	Maximum =	6
	Minimum =	6
	Possible Values =	9
	Included Values =	9
	Total =	55

* - excluded values (missing, OOC, invalid, suspect)

< - missing

T - out-of-control

I - invalid

S - suspect

H - exceedance

F - stack not operating

B - invalid (PADER)

U - missing data substituted

-999 - missing value

-888 - value could not be calculated

Plant Name: SBWD

General Average Report

Reporting Period: 03/22/2012 to 03/22/2012

Page: 1

Site Name: UNIT3

Data Averaging Type: 15m

29 run 4

Time of Report: 03/22/12 14:30

Rolling Average Interval: 1

Date	Time	CARFEED3 (LBS/HR)
03/22/12	12:00	6
	12:15	6
	12:30	6
	12:45	6
	13:00	6
	13:15	6
	13:30	6
	13:45	6
	14:00	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	9
Included Values =	9
Total =	55

* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
- exceedance
- stack not operating
B - invalid (PADER)
U - missing data substituted
-999 - missing value
-888 - value could not be calculated

Wheelabrator South Broward

Carbon Feeder Calibration

Feeder	A	B	C	D
Boiler #	3	2	1	
Time	06:31	7:01	06:35	
Old Zero	147.01	158.04	169.94	
New Zero	147.53	157.88	170.00	
Difference %	#VALUE!	#VALUE!	#DIV/0!	#VALUE!
Calibration Weight	49.26	49.26	49.26	
Scale Factor Old	4171.7798	4308.2007	4279.2793	
Scale Factor New	4064.5457	4306.5005	4290.4199	
Difference %	#VALUE!	#VALUE!	#DIV/0!	#VALUE!

Calibrated by: MIKE PICKARD

Date: 3-20-12

Wheelabrator South Broward

Carbon Feeder Calibration				
Feeder	A	B	C	D
Boiler #	3	2	1	005
Time	1757	17.41	~~18~~ 17 32	
Old Zero	151.42	157.94	169.56	
New Zero	151.19	158.45	169.70	
Difference %	-0.384%	0.844%	0.235%	
Calibration Weight	49.26	49.26	49.26	
Scale Factor Old	4064.5457	4306.5005	4290.4189	
Scale Factor New	4117.9990	4305.0020	4263.8276	
Difference %	1.080%	-0.029	-0.509%	

Calibrated by: SVoigt

Date: 3/20/2012

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Wheelabrator South Broward

Carbon Feeder Calibration

Feeder	A	B	C	D
Boiler #	3	2	1	
Time	6:29	6:17	6:39	
Old Zero	149.23	158.50	170.76	
New Zero	149.24	157.89	172.11	
Difference %	#VALUE!	#VALUE!	#DIV/0!	#VALUE!
	0.028	-1.030		
Calibration Weight	49.26	49.26	49.26	
Scale Factor Old	4117.9990	4305.0020	4263.8276	
Scale Factor New	4120.2690	4312.9042	4296.1030	
Difference %	#VALUE!	#VALUE!	#DIV/0!	#VALUE!
	0.075	0.15170	0.621	

Calibrated by: Luis Romero

Date: 3-21-12

Wheelabrator South Broward

Carbon Feeder Calibration

Feeder	A	B	C	D
Boiler #	3	2	1	005
Time	1728	1806	1837	
Old Zero	148.12	157.60	170.82	
New Zero	148.82	157.69	170.83	
Difference %	1.162	0.154	0.012	
Calibration Weight	49.26	49.26	49.26	
Scale Factor Old	4127.7554	4312.9092	4296.1030	
Scale Factor New	4112.0332	4310.6216	4282.1006	
Difference %	-0.313%	0.044%	-0.268%	

Calibrated by: S Voigt

Date: 3/21/2012

Wheelabrator South Broward

Carbon Feeder Calibration

Feeder	A	B	C	D
Boiler #	3	2	1	
Time	06:00	6:25	5:30	
Old Zero	149.39	157.77 LB	171.39	
New Zero	149.59	157.46 LB	170.27	
Difference %	0.334% #VALUE!	0.176% #VALUE!	-1.363 #DIV/0!	#VALUE!
Calibration Weight	49.26	49.26	49.26	
Scale Factor Old	417.0332	4310.6216	4242.1006	
Scale Factor New	417.5905	4310.5156	4242.4556	
Difference %	0.110% #VALUE!	-0.002% #VALUE!	0.007 #DIV/0!	#VALUE!

Calibrated by:	A. MANTINA
Date	3-22-12

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Wheelabrator South Broward

Carbon Feeder Calibration

Feeder	A	B	C	D
Boiler #	3	2	1	
Time	1714	1650	1639	
Old Zero	149.39	157.88	170.25	
New Zero	149.13	157.84	170.49	
Difference %	-0.438%	-0.067%	0.393%	
Calibration Weight	49.26	49.26	49.26	
Scale Factor Old	4117.5405	4310.5156	4282.4556	
Scale Factor New	4121.7988	4335.2617	4303.9409	
Difference %	0.085%	0.481%	0.412%	

Calibrated by: SVoigt

Date: 3/22/2012

WASTE MANAGEMENT

Wheelabrator South Broward, Inc.
4400 State Road 7
Fort Lauderdale, FL, 33314 Ph: (954) 581-6606

Reprint
Ticket# 150651

Customer Name	CHEMICALLIME CHEMICAL LIME	Carrier	LIME CHEMICAL LIME
Ticket Date	03/21/2012	Vehicle#	LIME1 Volume
Payment Type	Credit Account	Container	
Manual Ticket#		Driver	
Route		Check#	
Hauling Ticket#		Billing#	0000243
Destination		Grid	
PO#			

	Time	Scale	Operator	Inbound		
					Gross	79360 lb
In	03/21/2012 08:11:24	1	salvarez		Tare	27800 lb
Out	03/21/2012 11:42:19	3	salvarez		Net	51560 lb
					Tons	25.78

Comments 108500586

Product	LD%	Qty	UOM	Rate	Tax	Amount	Origin
1 LIME-LIME	100	25.78	Tons	0.00			WSB

Total Tax
Total Ticket

PARAMETERS

D

I herby certify that all pages contained within this Appendix have been reviewed and, to the best of my ability, verified as accurate.

QA/QC Initials: MK

Date: 4/27/12

CleanAir

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 5/29 (Particulate/Metals)
Sampling, Velocity and Moisture Parameters

Run No.		**1**	**2**	**3**	**Average**
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		07:52	10:29	13:04	
Stop Time (approx.)		10:05	12:44	15:20	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9925	0.9925	0.9925	
C_p	Pitot tube coefficient	0.8430	0.8430	0.8430	
P_g	Static pressure (in. H_2O)	-10.0000	-10.0000	-10.6000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.05	30.05	30.05	**30.0500**
D_n	Nozzle diameter (in.)	0.2760	0.2760	0.2760	
O_2	Oxygen (dry volume %)	8.1200	8.6400	8.9200	**8.5600**
CO_2	Carbon dioxide (dry volume %)	11.0200	10.5800	10.5100	**10.7033**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.8600	80.7800	80.5700	**80.7367**
V_{lc}	Total Liquid collected (ml)	485.80	467.10	463.70	
V_m	Volume metered, meter conditions (ft^3)	74.0300	77.3900	77.9750	
T_m	Dry gas meter temperature (°F)	80.6200	87.0600	86.2200	
T_s	Sample temperature (°F)	302.4800	302.7200	304.5200	**303.2400**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.1096	1.2004	1.2236	
θ	Total sampling time (min)	125.0	125.0	125.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	22.8617	21.9817	21.8217	**22.2217**
V_{mstd}	Volume metered, standard (dscf)	72.2382	74.6444	75.3286	**74.0704**
P_s	Sample gas pressure, absolute (in. Hg)	29.3147	29.3147	29.2706	**29.3000**
P_v	Vapor pressure, actual (in. Hg)	29.3147	29.3147	29.2706	**29.3000**
B_{wo}	Moisture measured in sample (% by volume)	24.0397	22.7493	22.4618	**23.0836**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	24.0397	22.7493	22.4618	**23.0836**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{}$in. H_2O)	0.6259	0.6518	0.6530	**0.6436**
M_d	MW of sample gas, dry (lb/lb-mole)	30.0880	30.0384	30.0384	**30.0549**
M_s	MW of sample gas, wet (lb/lb-mole)	27.1821	27.2998	27.3344	**27.2721**
V_s	Velocity of sample (ft/sec)	44.1210	45.8603	46.0057	**45.3290**
%I	Isokinetic sampling (%)	102.0126	99.7502	100.3612	**100.7080**
Q_a	Volumetric flow rate, actual (acfm)	169,425	176,104	176,662	**174,063**
Q_s	Volumetric flow rate, standard (scfm)	114,949	119,443	119,360	**117,917**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	87,316	92,271	92,549	**90,712**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	80,280	81,384	79,766	**80,477**
Q_a	Volumetric flow rate, actual (acf/hr)	10,165,479	10,566,211	10,599,716	**10,443,802**
Q_s	Volumetric flow rate, standard (scf/hr)	6,896,953	7,166,581	7,161,585	**7,075,040**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,238,945	5,536,237	5,552,963	**5,442,715**
Q_a	Volumetric flow rate, actual (m^3/hr)	287,892	299,241	300,190	**295,775**
Q_s	Volumetric flow rate, standard (m^3/hr)	195,326	202,962	202,820	**200,369**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	148,370	156,789	157,263	**154,141**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	136,415	138,291	135,540	**136,749**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	182,008	189,123	188,992	**186,708**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	138,254	146,099	146,541	**143,631**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	127,114	128,862	126,299	**127,425**

Comments:
Average includes 3 runs.

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MNK@

Prepared by Clean Air Engineering Proprietary Software
SS ISOKINETIC Version 2006-13e

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 5/202 (FPM/CPM)
Emission Parameters for FPM

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		07:52	10:29	13:04	
Stop Time (approx.)		10:05	12:44	15:20	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	188	188	189	188
P_1	Fabric Filter Inlet Temperature - (°F)	320	320	320	320
P_2	Carbon Feed Rate - (lbs/hr)	6	6	6	6
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	9,570
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	1,820
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	8,760
Gas Conditions					
O_2	Oxygen (dry volume %)	8.1200	8.6400	8.9200	8.5600
CO_2	Carbon dioxide (dry volume %)	11.0200	10.5800	10.5100	10.7033
T_s	Sample temperature (°F)	302.4800	302.7200	304.5200	303.2400
B_w	Actual water vapor in gas (% by volume)	24.0397	22.7493	22.4618	23.0836
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	169,425	176,104	176,662	174,063
Q_s	Volumetric flow rate, standard (scfm)	114,949	119,443	119,360	117,917
Q_{std}	Volumetric flow rate, dry standard (dscfm)	87,316	92,271	92,549	90,712
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	80,280	81,384	79,766	80,477
Q_a	Volumetric flow rate, actual (acf/hr)	10,165,479	10,566,211	10,599,716	10,443,802
Q_s	Volumetric flow rate, standard (scf/hr)	6,896,953	7,166,581	7,161,585	7,075,040
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,238,945	5,536,237	5,552,963	5,442,715
Q_a	Volumetric flow rate, actual (m^3/hr)	287,892	299,241	300,190	295,775
Q_s	Volumetric flow rate, standard (m^3/hr)	195,326	202,962	202,820	200,369
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	148,370	156,789	157,263	154,141
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	136,415	138,291	135,540	136,749
Q_s	Volumetric flow rate, normal (Nm^3/hr)	182,008	189,123	188,992	186,708
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	138,254	146,099	146,541	143,631
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	127,114	128,862	126,299	127,425
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	72.2382	74.6444	75.3286	74.0704
%I	Isokinetic sampling (%)	102.0126	99.7502	100.3612	100.7080
Laboratory Data					
m_{filter}	Matter collected on filter(s) (g)	0.00010	0.00000	0.00030	
m_s	Matter collected in solvent rinse(s) (g)	0.00400	0.00670	0.00630	
m_n	Total filterable particulate matter (g)	0.00410	0.00670	0.00660	
n_{MDL}	Number of non-detectable fractions	N/A	1 out of 2	N/A	
DLC	Detection level classification	ADL	DLL	ADL	
Filterable Particulate Matter Results					
C_{sd}	Particulate Concentration (lb/dscf)	1.2515E-07	1.9792E-07	1.9319E-07	1.7209E-07
C_{sd7}	Particulate Concentration @7% O_2 (lb/dscf)	1.3612E-07	2.2439E-07	2.2416E-07	1.9489E-07
C_{sd12}	Particulate Concentration @12% CO_2 (lb/dscf)	1.3828E-07	2.2448E-07	2.2058E-07	1.9378E-07
C_a	Particulate Concentration (lb/acf)	6.4497E-08	1.0370E-07	1.0121E-07	8.9803E-08
C_{sd}	Particulate Concentration (gr/dscf)	0.0009	0.0014	0.0014	0.0012
C_{sd7}	Particulate Concentration @7% O_2 (gr/dscf)	0.0010	0.0016	0.0016	0.0014
C_{sd12}	Particulate Concentration @12% CO_2 (gr/dscf)	0.0010	0.0016	0.0015	0.0014
C_a	Particulate Concentration (gr/acf)	0.0005	0.0007	0.0007	0.0006
C_{sd}	Particulate Concentration (mg/dscm)	2.0041	3.1694	3.0937	2.7557
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	2.1797	3.5934	3.5895	3.1209
C_{sd12}	Particulate Concentration @12% CO_2 (mg/dscm)	2.1823	3.5948	3.5323	3.1031
C_a	Particulate Concentration (mg/m^3 (actual,wet))	1.0328	1.6606	1.6207	1.4381
C_{sd}	Particulate Concentration (mg/Nm^3 dry)	2.1507	3.4013	3.3201	2.9574
C_{sd7}	Particulate Concentration @7% O_2 (mg/Nm^3 dry)	2.3392	3.8563	3.8522	3.3492
C_{sd12}	Particulate Concentration @12% CO_2 (mg/Nm^3 dry)	2.3420	3.8578	3.7908	3.3302
$E_{lb/hr}$	Particulate Rate (lb/hr)	0.6556	1.0957	1.0728	0.9414
$E_{kg/hr}$	Particulate Rate (kg/hr)	0.2973	0.4969	0.4865	0.4269
$E_{T/yr}$	Particulate Rate (Ton/yr)	2.8717	4.7993	4.6989	4.1233
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.0020	0.0032	0.0032	0.0028
E_{Fc}	Particulate Rate - F_c-based (lb/MMBtu)	0.0021	0.0034	0.0033	0.0029

Comments:

Average includes 3 runs.

Detection level classifications are defined as follows:

ADL = Above Detection Level - all fractions are above detection limit
DLL = Detection Level Limited - some fractions are below detection limit
BDL = Below Detection Limit - all fractions are below detection limit

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 5/202 (FPM/CPM)
Emission Parameters for FPM

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		07:52	10:29	13:04	
Stop Time (approx.)		10:05	12:44	15:20	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	188.0	187.6	188.6	**188.1**
P_1	Fabric Filter Inlet Temperature - (°F)	320	320	320	**320**
P_2	Carbon Feed Rate - (lbs/hr)	6	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	8.1200	8.6400	8.9200	**8.5600**
CO_2	Carbon dioxide (dry volume %)	11.0200	10.5800	10.5100	**10.7033**
T_s	Sample temperature (°F)	302.4800	302.7200	304.5200	**303.2400**
B_w	Actual water vapor in gas (% by volume)	24.0397	22.7493	22.4618	**23.0836**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	169,425	176,104	176,662	**174,063**
Q_s	Volumetric flow rate, standard (scfm)	114,949	119,443	119,360	**117,917**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	87,316	92,271	92,549	**90,712**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	80,280	81,384	79,766	**80,477**
Q_a	Volumetric flow rate, actual (acf/hr)	10,165,479	10,566,211	10,599,716	**10,443,802**
Q_s	Volumetric flow rate, standard (scf/hr)	6,896,953	7,166,581	7,161,585	**7,075,040**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,238,945	5,536,237	5,552,963	**5,442,715**
Q_a	Volumetric flow rate, actual (m^3/hr)	287,892	299,241	300,190	**295,775**
Q_s	Volumetric flow rate, standard (m^3/hr)	195,326	202,962	202,820	**200,369**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	148,370	156,789	157,263	**154,141**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	136,415	138,291	135,540	**136,749**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	182,008	189,123	188,992	**186,708**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	138,254	146,099	146,541	**143,831**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	127,114	128,862	126,299	**127,425**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	72.2382	74.6444	75.3286	**74.0704**
%I	Isokinetic sampling (%)	102.0126	99.7502	100.3612	**100.7080**
Laboratory Data					
m_{filter}	Matter collected on filter(s) (g)	0.00010	0.00000	0.00030	
m_s	Matter collected in solvent rinse(s) (g)	0.00400	0.00670	0.00630	
m_n	Total filterable particulate matter (g)	0.00410	0.00670	0.00660	
n_{MDL}	Number of non-detectable fractions	N/A	1 out of 2	N/A	
DLC	Detection level classification	ADL	DLL	ADL	
Filterable Particulate Matter Results					
C_{sd}	Particulate Concentration (lb/dscf)	1.2515E-07	1.9792E-07	1.9319E-07	**1.7209E-07**
C_{sd7}	Particulate Concentration @7% O_2 (lb/dscf)	1.3612E-07	2.2439E-07	2.2416E-07	**1.9489E-07**
C_{sd12}	Particulate Concentration @12% CO_2 (lb/dscf)	1.3628E-07	2.2448E-07	2.2058E-07	**1.9378E-07**
C_a	Particulate Concentration (lb/acf)	6.4497E-08	1.0370E-07	1.0121E-07	**8.9803E-08**
C_{sd}	Particulate Concentration (gr/dscf)	0.0009	0.0014	0.0014	**0.0012**
C_{sd7}	Particulate Concentration @7% O_2 (gr/dscf)	0.0010	0.0016	0.0016	**0.0014**
C_{sd12}	Particulate Concentration @12% CO_2 (gr/dscf)	0.0010	0.0016	0.0015	**0.0014**
C_a	Particulate Concentration (gr/acf)	0.0005	0.0007	0.0007	**0.0006**
C_{sd}	Particulate Concentration (mg/dscm)	2.0041	3.1694	3.0937	**2.7557**
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	2.1797	3.5934	3.5895	**3.1209**
C_{sd12}	Particulate Concentration @12% CO_2 (mg/dscm)	2.1823	3.5948	3.5323	**3.1031**
C_a	Particulate Concentration (mg/m^3 (actual,wet))	1.0328	1.6606	1.6207	**1.4381**
C_{sd}	Particulate Concentration (mg/Nm^3 dry)	2.1507	3.4013	3.3201	**2.9574**
C_{sd7}	Particulate Concentration @7% O_2 (mg/Nm^3 dry)	2.3392	3.8563	3.8522	**3.3492**
C_{sd12}	Particulate Concentration @12% CO_2 (mg/Nm^3 dry)	2.3420	3.8578	3.7908	**3.3302**
$E_{lb/hr}$	Particulate Rate (lb/hr)	0.6556	1.0957	1.0728	**0.9414**
$E_{kg/hr}$	Particulate Rate (kg/hr)	0.2973	0.4969	0.4865	**0.4269**
$E_{T/yr}$	Particulate Rate (Ton/yr)	2.8717	4.7993	4.6989	**4.1233**
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.0020	0.0032	0.0032	**0.0028**
E_{Fc}	Particulate Rate - F_c-based (lb/MMBtu)	0.0021	0.0034	0.0033	**0.0029**

Comments:

Average includes 3 runs.

Detection level classifications are defined as follows:

ADL = Above Detection Level - all fractions are above detection limit
DLL = Detection Level Limited - some fractions are below detection limit
BDL = Below Detection Limit - all fractions are below detection limit

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 5/29
Cadmium (Cd) Emission Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		07:52	10:29	13:04	
Stop Time (approx.)		10:05	12:44	15:20	
Process Conditions					
R_P	Steam Production Rate - (Klbs/hour)	188.0	187.6	188.6	**188.1**
P_1	Fabric Filter Inlet Temperature - (°F)	320	320	320	**320**
P_2	Carbon Feed Rate - (lbs/hr)	6	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	8.1200	8.6400	8.9200	**8.5600**
CO_2	Carbon dioxide (dry volume %)	11.0200	10.5800	10.5100	**10.7033**
T_s	Sample temperature (°F)	302.4800	302.7200	304.5200	**303.2400**
B_w	Actual water vapor in gas (% by volume)	24.0397	22.7493	22.4618	**23.0836**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	169,425	176,104	176,662	**174,063**
Q_s	Volumetric flow rate, standard (scfm)	114,949	119,443	119,360	**117,917**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	87,316	92,271	92,549	**90,712**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	72.2382	74.6444	75.3286	**74.0704**
%I	Isokinetic sampling (%)	102.0126	99.7502	100.3612	**100.7080**
Laboratory Data					
m_F	Combined front/back corrected for blank (µg)	0.2268	0.9492	0.2913	**0.4891**
m_B	Back half corrected for allowable blank (µg)	0.0000	0.0000	0.0000	**0.0000**
m_n	Total matter corrected for allowable blanks (µg)	0.2268	0.9492	0.2913	**0.4891**
Cadmium Results - Total					
C_{sd}	Concentration (lb/dscf)	6.9232E-12	2.8038E-11	8.5282E-12	**1.4496E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	7.5299E-12	3.1789E-11	9.8949E-12	**1.6404E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	7.5388E-12	3.1801E-11	9.7372E-12	**1.6359E-11**
C_a	Concentration (lb/acf)	3.5680E-12	1.4691E-11	4.4677E-12	**7.5755E-12**
C_{sd}	Concentration (µg/dscm)	1.1086E-01	4.4899E-01	1.3657E-01	**2.3214E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.2058E-01	5.0905E-01	1.5845E-01	**2.6270E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.2072E-01	5.0925E-01	1.5593E-01	**2.6197E-01**
C_{sd}	Concentration (mg/dscm)	1.1086E-04	4.4899E-04	1.3657E-04	**2.3214E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.2058E-04	5.0905E-04	1.5845E-04	**2.6270E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.2072E-04	5.0925E-04	1.5593E-04	**2.6197E-04**
C_a	Concentration (µg/m^3 (actual,wet))	5.7136E-02	2.3525E-01	7.1544E-02	**1.2131E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	1.1898E-01	4.8184E-01	1.4656E-01	**2.4913E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.2940E-01	5.4630E-01	1.7005E-01	**2.8192E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.2956E-01	5.4651E-01	1.6734E-01	**2.8114E-01**
$E_{lb/hr}$	Rate (lb/hr)	3.6270E-05	1.5523E-04	4.7357E-05	**7.9617E-05**
$E_{g/s}$	Rate (g/s)	4.5692E-06	1.9555E-05	5.9658E-06	**1.0030E-05**
$E_{T/yr}$	Rate (Ton/yr)	1.5886E-04	6.7989E-04	2.0742E-04	**3.4872E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.0835E-07	4.5742E-07	1.4238E-07	**2.3605E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.1434E-07	4.8232E-07	1.4768E-07	**2.4811E-07**

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SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 5/29
Lead (Pb) Emission Parameters

Run No.		1	2	3	**Average**
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		07:52	10:29	13:04	
Stop Time (approx.)		10:05	12:44	15:20	
Process Conditions					
R_P	Steam Production Rate - (Klbs/hour)	188.0	187.6	188.6	**188.1**
P_1	Fabric Filter Inlet Temperature - (°F)	320	320	320	**320**
P_2	Carbon Feed Rate - (lbs/hr)	6	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	8.1200	8.6400	8.9200	**8.5600**
CO_2	Carbon dioxide (dry volume %)	11.0200	10.5800	10.5100	**10.7033**
T_s	Sample temperature (°F)	302.4800	302.7200	304.5200	**303.2400**
B_w	Actual water vapor in gas (% by volume)	24.0397	22.7493	22.4618	**23.0836**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	169,425	176,104	176,662	**174,063**
Q_s	Volumetric flow rate, standard (scfm)	114,949	119,443	119,360	**117,917**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	87,316	92,271	92,549	**90,712**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	72.2382	74.6444	75.3286	**74.0704**
%I	Isokinetic sampling (%)	102.0126	99.7502	100.3612	**100.7080**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (μg)	1.9777	1.3753	2.2826	**1.8785**
Lead Results - Total					
C_{sd}	Concentration (lb/dscf)	6.0367E-11	4.0626E-11	6.6816E-11	**5.5936E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	6.5657E-11	4.6060E-11	7.7525E-11	**6.3081E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	6.5735E-11	4.6078E-11	7.6289E-11	**6.2701E-11**
C_a	Concentration (lb/acf)	3.1111E-11	2.1286E-11	3.5004E-11	**2.9134E-11**
C_{sd}	Concentration (μg/dscm)	9.6669E-01	6.5057E-01	1.0700E+00	**8.9574E-01**
C_{sd7}	Concentration @7% O_2 (μg/dscm)	1.0514E+00	7.3759E-01	1.2414E+00	**1.0101E+00**
C_{sd12}	Concentration @12% CO_2 (μg/dscm)	1.0527E+00	7.3788E-01	1.2217E+00	**1.0041E+00**
C_{sd}	Concentration (mg/dscm)	9.6669E-04	6.5057E-04	1.0700E-03	**8.9574E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.0514E-03	7.3759E-04	1.2414E-03	**1.0101E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.0527E-03	7.3788E-04	1.2217E-03	**1.0041E-03**
C_a	Concentration (μg/m^3 (actual,wet))	4.9820E-01	3.4087E-01	5.6053E-01	**4.6653E-01**
C_{sd}	Concentration (μg/Nm^3 dry)	1.0374E+00	6.9817E-01	1.1483E+00	**9.6128E-01**
C_{sd7}	Concentration @7% O_2 (μg/Nm^3 dry)	1.1283E+00	7.9156E-01	1.3323E+00	**1.0841E+00**
C_{sd12}	Concentration @12% CO_2 (μg/Nm^3 dry)	1.1297E+00	7.9187E-01	1.3110E+00	**1.0775E+00**
$E_{lb/hr}$	Rate (lb/hr)	3.1626E-04	2.2491E-04	3.7103E-04	**3.0407E-04**
$E_{g/s}$	Rate (g/s)	3.9841E-05	2.8334E-05	4.6741E-05	**3.8305E-05**
$E_{T/yr}$	Rate (Ton/yr)	1.3852E-03	9.8512E-04	1.6251E-03	**1.3318E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	9.4477E-07	6.6278E-07	1.1155E-06	**9.0769E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	9.9698E-07	6.9886E-07	1.1570E-06	**9.5096E-07**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 29 (Mercury)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	4	Average
Date (2012)		Mar 20	Mar 20	Mar 20	Mar 21	
Start Time (approx.)		07:52	10:29	13:04	13:18	
Stop Time (approx.)		10:05	12:44	15:20	15:38	
Sampling Conditions						
Y_d	Dry gas meter correction factor	0.9925	0.9925	0.9925	0.9925	
C_p	Pitot tube coefficient	0.8430	0.8430	0.8430	0.8430	
P_g	Static pressure (in. H_2O)	-10.0000	-10.0000	-10.6000	-9.9000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.05	30.05	30.05	30.05	**30.0500**
D_n	Nozzle diameter (in.)	0.2760	0.2760	0.2760	0.2760	
O_2	Oxygen (dry volume %)	8.1200	8.6400	8.9200	8.9400	**8.6550**
CO_2	Carbon dioxide (dry volume %)	11.0200	10.5800	10.5100	10.4300	**10.6350**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.8600	80.7800	80.5700	80.6300	**80.7100**
V_{lc}	Total Liquid collected (ml)	485.80	467.10	463.70	477.70	
V_m	Volume metered, meter conditions (ft^3)	74.0300	77.3900	77.9750	79.3650	
T_m	Dry gas meter temperature (°F)	80.6200	87.0600	86.2200	83.3400	
T_s	Sample temperature (°F)	302.4800	302.7200	304.5200	304.2800	**303.5000**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.1096	1.2004	1.2236	1.2788	
θ	Total sampling time (min)	125.0	125.0	125.0	125.0	
Flow Results						
V_{wstd}	Volume of water collected (ft^3)	22.8617	21.9817	21.8217	22.4806	**22.2864**
V_{mstd}	Volume metered, standard (dscf)	72.2382	74.6444	75.3286	77.0882	**74.8248**
P_s	Sample gas pressure, absolute (in. Hg)	29.3147	29.3147	29.2706	29.3221	**29.3055**
P_v	Vapor pressure, actual (in. Hg)	29.3147	29.3147	29.2706	29.3221	**29.3055**
B_{wo}	Moisture measured in sample (% by volume)	24.0397	22.7493	22.4618	22.5779	**22.9572**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	24.0397	22.7493	22.4618	22.5779	**22.9572**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{\text{in. } H_2O}$)	0.6259	0.6518	0.6530	0.6617	**0.6481**
M_d	MW of sample gas, dry (lb/lb-mole)	30.0880	30.0384	30.0384	30.0264	**30.0478**
M_s	MW of sample gas, wet (lb/lb-mole)	27.1821	27.2998	27.3344	27.3111	**27.2818**
V_s	Velocity of sample (ft/sec)	44.1210	45.8603	46.0057	46.5888	**45.6440**
%I	Isokinetic sampling (%)	102.0126	99.7502	100.3612	101.3620	**100.8715**
Q_a	Volumetric flow rate, actual (acfm)	169,425	176,104	176,662	178,901	**175,273**
Q_s	Volumetric flow rate, standard (scfm)	114,949	119,443	119,360	121,123	**118,719**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	87,316	92,271	92,549	93,776	**91,478**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	80,280	81,384	79,766	80,688	**80,529**
Q_a	Volumetric flow rate, actual (acf/hr)	10,165,479	10,566,211	10,599,716	10,734,070	**10,516,369**
Q_s	Volumetric flow rate, standard (scf/hr)	6,896,953	7,166,581	7,161,585	7,267,394	**7,123,128**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,238,945	5,536,237	5,552,963	5,626,567	**5,488,678**
Q_a	Volumetric flow rate, actual (m^3/hr)	287,892	299,241	300,190	303,995	**297,830**
Q_s	Volumetric flow rate, standard (m^3/hr)	195,326	202,962	202,820	205,817	**201,731**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	148,370	156,789	157,263	159,348	**155,443**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	136,415	138,291	135,540	137,108	**136,838**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	182,008	189,123	188,992	191,784	**187,977**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	138,254	146,099	146,541	148,483	**144,844**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	127,114	128,862	126,299	127,760	**127,509**

Comments:

Average includes 4 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters

Run No.		1	2	3	4	Average
Date (2012)		Mar 20	Mar 20	Mar 20	Mar 21	
Start Time (approx.)		07:52	10:29	13:04	13:18	
Stop Time (approx.)		10:05	12:44	15:20	15:38	
Process Conditions						
R_P	Steam Production Rate - (Klbs/hour)	188	188	189	188	**188**
P_1	Fabric Filter Inlet Temperature - (°F)	320	320	320	320	**320**
P_2	Carbon Injection Rate - (lbs/hr)	6	6	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	8,760	**8,760**
Gas Conditions						
O_2	Oxygen (dry volume %)	8.1200	8.6400	8.9200	8.9400	**8.6550**
CO_2	Carbon dioxide (dry volume %)	11.0200	10.5800	10.5100	10.4300	**10.6350**
T_s	Sample temperature (°F)	302.4800	302.7200	304.5200	304.2800	**303.5000**
B_w	Actual water vapor in gas (% by volume)	24.0397	22.7493	22.4618	22.5779	**22.9572**
Gas Flow Rate						
Q_a	Volumetric flow rate, actual (acfm)	169,425	176,104	176,662	178,901	**175,273**
Q_s	Volumetric flow rate, standard (scfm)	114,949	119,443	119,360	121,123	**118,719**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	87,316	92,271	92,549	93,776	**91,478**
Sampling Data						
V_{mstd}	Volume metered, standard (dscf)	72.2382	74.6444	75.3286	77.0882	**74.8248**
%I	Isokinetic sampling (%)	102.0126	99.7502	100.3612	101.3620	**100.8715**
Laboratory Data						
m_{n-1b}	Fraction 1B Prorated (µg)	<0.1000	<0.1000	<0.1000	<0.1000	**<0.1000**
m_{n-2b}	Fraction 2B Prorated (µg)	3.4141	3.3755	3.3764	3.7572	**3.4808**
m_{n-3a}	Fraction 3A Prorated (µg)	<0.2000	<0.2000	<0.2000	<0.2000	**<0.2000**
m_{n-3b}	Fraction 3B Prorated (µg)	<0.5000	<0.5000	<0.5000	<0.5000	**<0.5000**
m_{n-3c}	Fraction 3C Prorated (µg)	<0.4000	<0.4000	<0.4000	<0.4000	**<0.4000**
m_n	Total matter corrected for allowable blanks (µg)	3.4141	3.3755	3.3764	3.7572	**3.4808**
Mercury Results - Total						
C_{sd}	Concentration (lb/dscf)	1.0421E-10	9.9711E-11	9.8833E-11	1.0747E-10	**1.0256E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	1.1335E-10	1.1305E-10	1.1467E-10	1.2490E-10	**1.1649E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	1.1348E-10	1.1309E-10	1.1284E-10	1.2365E-10	**1.1577E-10**
C_a	Concentration (lb/acf)	5.3708E-11	5.2244E-11	5.1776E-11	5.6333E-11	**5.3515E-11**
C_{sd}	Concentration (µg/dscm)	1.6688E+00	1.5967E+00	1.5827E+00	1.7210E+00	**1.6423E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.8151E+00	1.8103E+00	1.8363E+00	2.0001E+00	**1.8655E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.8172E+00	1.8110E+00	1.8070E+00	1.9800E+00	**1.8538E+00**
C_{sd}	Concentration (mg/dscm)	1.6688E-03	1.5967E-03	1.5827E-03	1.7210E-03	**1.6423E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.8151E-03	1.8103E-03	1.8363E-03	2.0001E-03	**1.8655E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.8172E-03	1.8110E-03	1.8070E-03	1.9800E-03	**1.8538E-03**
C_a	Concentration (µg/m^3 (actual,wet))	8.6005E-01	8.3662E-01	8.2913E-01	9.0210E-01	**8.5697E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	1.7909E+00	1.7136E+00	1.6985E+00	1.8469E+00	**1.7625E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.9479E+00	1.9428E+00	1.9707E+00	2.1465E+00	**2.0020E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.9502E+00	1.9436E+00	1.9393E+00	2.1249E+00	**1.9895E+00**
$E_{lb/hr}$	Rate (lb/hr)	5.4596E-04	5.5202E-04	5.4882E-04	6.0468E-04	**5.6287E-04**
$E_{g/s}$	Rate (g/s)	6.8779E-05	6.9542E-05	6.9138E-05	7.6176E-05	**7.0909E-05**
$E_{T/yr}$	Rate (Ton/yr)	2.3913E-03	2.4179E-03	2.4038E-03	2.6485E-03	**2.4654E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.6310E-06	1.6267E-06	1.6501E-06	1.7973E-06	**1.6763E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.7211E-06	1.7153E-06	1.7115E-06	1.8753E-06	**1.7558E-06**

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Wheelabrator South Broward, Inc.
Clean Air Project No: **11414**
Unit 1 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Front Half Results

Run No.		**1**	**2**	**3**	**4**	**Average**
Date (2012)		Mar 20	Mar 20	Mar 20	Mar 21	
Start Time (approx.)		07:52	10:29	13:04	13:18	
Stop Time (approx.)		10:05	12:44	15:20	15:38	
Mercury Results - Front Half						
C_{sd}	Concentration (lb/dscf)	<3.0524E-12	<2.9540E-12	<2.9272E-12	<2.8604E-12	**<2.9485E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<3.3199E-12	<3.3492E-12	<3.3963E-12	<3.3243E-12	**<3.3474E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<3.3239E-12	<3.3505E-12	<3.3422E-12	<3.2909E-12	**<3.3269E-12**
C_a	Concentration (lb/acf)	<1.5731E-12	<1.5478E-12	<1.5335E-12	<1.4993E-12	**<1.5384E-12**
C_{sd}	Concentration (μg/dscm)	<4.8880E-02	<4.7304E-02	<4.6875E-02	<4.5805E-02	**<4.7216E-02**
C_{sd7}	Concentration @7% O_2 (μg/dscm)	<5.3164E-02	<5.3632E-02	<5.4387E-02	<5.3235E-02	**<5.3604E-02**
C_{sd12}	Concentration @12% CO_2 (μg/dscm)	<5.3227E-02	<5.3653E-02	<5.3520E-02	<5.2700E-02	**<5.3275E-02**
C_{sd}	Concentration (mg/dscm)	<4.8880E-05	<4.7304E-05	<4.6875E-05	<4.5805E-05	**<4.7216E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<5.3164E-05	<5.3632E-05	<5.4387E-05	<5.3235E-05	**<5.3604E-05**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<5.3227E-05	<5.3653E-05	<5.3520E-05	<5.2700E-05	**<5.3275E-05**
C_a	Concentration (μg/m^3 (actual,wet))	<2.5191E-02	<2.4785E-02	<2.4557E-02	<2.4010E-02	**<2.4636E-02**
C_{sd}	Concentration (μg/Nm^3 dry)	<5.2457E-02	<5.0766E-02	<5.0304E-02	<4.9156E-02	**<5.0671E-02**
C_{sd7}	Concentration @7% O_2 (μg/Nm^3 dry)	<5.7054E-02	<5.7556E-02	<5.8367E-02	<5.7130E-02	**<5.7527E-02**
C_{sd12}	Concentration @12% CO_2 (μg/Nm^3 dry)	<5.7121E-02	<5.7579E-02	<5.7436E-02	<5.6556E-02	**<5.7173E-02**
$E_{lb/hr}$	Rate (lb/hr)	<1.5991E-05	<1.6354E-05	<1.6255E-05	<1.6094E-05	**<1.6173E-05**
$E_{g/s}$	Rate (g/s)	<2.0145E-06	<2.0602E-06	<2.0477E-06	<2.0275E-06	**<2.0375E-06**
$E_{T/yr}$	Rate (Ton/yr)	<7.0042E-05	<7.1631E-05	<7.1195E-05	<7.0492E-05	**<7.0840E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<4.7772E-08	<4.8192E-08	<4.8871E-08	<4.7835E-08	**<4.8168E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<5.0412E-08	<5.0816E-08	<5.0689E-08	<4.9912E-08	**<5.0457E-08**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 1-3 Results

Run No.		1	2	3	4	Average
Date (2012)		Mar 20	Mar 20	Mar 20	Mar 21	
Start Time (approx.)		07:52	10:29	13:04	13:18	
Stop Time (approx.)		10:05	12:44	15:20	15:38	
Mercury Results - Impingers 1-3 Solution						
C_{sd}	Concentration (lb/dscf)	1.0421E-10	9.9711E-11	9.8833E-11	1.0747E-10	**1.0256E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	1.1335E-10	1.1305E-10	1.1467E-10	1.2490E-10	**1.1649E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	1.1348E-10	1.1309E-10	1.1284E-10	1.2365E-10	**1.1577E-10**
C_a	Concentration (lb/acf)	5.3708E-11	5.2244E-11	5.1776E-11	5.6333E-11	**5.3515E-11**
C_{sd}	Concentration (µg/dscm)	1.6688E+00	1.5967E+00	1.5827E+00	1.7210E+00	**1.6423E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.8151E+00	1.8103E+00	1.8363E+00	2.0001E+00	**1.8655E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.8172E+00	1.8110E+00	1.8070E+00	1.9800E+00	**1.8538E+00**
C_{sd}	Concentration (mg/dscm)	1.6688E-03	1.5967E-03	1.5827E-03	1.7210E-03	**1.6423E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.8151E-03	1.8103E-03	1.8363E-03	2.0001E-03	**1.8655E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.8172E-03	1.8110E-03	1.8070E-03	1.9800E-03	**1.8538E-03**
C_a	Concentration (µg/m^3 (actual,wet))	8.6005E-01	8.3662E-01	8.2913E-01	9.0210E-01	**8.5697E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	1.7909E+00	1.7136E+00	1.6985E+00	1.8469E+00	**1.7625E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.9479E+00	1.9428E+00	1.9707E+00	2.1465E+00	**2.0020E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.9502E+00	1.9436E+00	1.9393E+00	2.1249E+00	**1.9895E+00**
$E_{lb/hr}$	Rate (lb/hr)	5.4596E-04	5.5202E-04	5.4882E-04	6.0468E-04	**5.6287E-04**
$E_{g/s}$	Rate (g/s)	6.8779E-05	6.9542E-05	6.9138E-05	7.6176E-05	**7.0909E-05**
$E_{T/yr}$	Rate (Ton/yr)	2.3913E-03	2.4179E-03	2.4038E-03	2.6485E-03	**2.4654E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.6310E-06	1.6267E-06	1.6501E-06	1.7973E-06	**1.6763E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.7211E-06	1.7153E-06	1.7115E-06	1.8753E-06	**1.7558E-06**

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Prepared by Clean Air Engineering Proprietary Software
SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 4 Results

Run No.		1	2	3	4	**Average**
Date (2012)		Mar 20	Mar 20	Mar 20	Mar 21	
Start Time (approx.)		07:52	10:29	13:04	13:18	
Stop Time (approx.)		10:05	12:44	15:20	15:38	
Mercury Results - Impinger 4 Solution						
C_{sd}	Concentration (lb/dscf)	<6.1048E-12	<5.9080E-12	<5.8544E-12	<5.7207E-12	**<5.8970E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<6.6398E-12	<6.6983E-12	<6.7926E-12	<6.6487E-12	**<6.6949E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<6.6477E-12	<6.7010E-12	<6.6843E-12	<6.5818E-12	**<6.6537E-12**
C_a	Concentration (lb/acf)	<3.1462E-12	<3.0955E-12	<3.0670E-12	<2.9987E-12	**<3.0769E-12**
C_{sd}	Concentration (µg/dscm)	<9.7760E-02	<9.4609E-02	<9.3749E-02	<9.1609E-02	**<9.4432E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<1.0633E-01	<1.0726E-01	<1.0877E-01	<1.0647E-01	**<1.0721E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<1.0645E-01	<1.0731E-01	<1.0704E-01	<1.0540E-01	**<1.0655E-01**
C_{sd}	Concentration (mg/dscm)	<9.7760E-05	<9.4609E-05	<9.3749E-05	<9.1609E-05	**<9.4432E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<1.0633E-04	<1.0726E-04	<1.0877E-04	<1.0647E-04	**<1.0721E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<1.0645E-04	<1.0731E-04	<1.0704E-04	<1.0540E-04	**<1.0655E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<5.0382E-02	<4.9571E-02	<4.9113E-02	<4.8020E-02	**<4.9271E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<1.0491E-01	<1.0153E-01	<1.0061E-01	<9.8313E-02	**<1.0134E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<1.1411E-01	<1.1511E-01	<1.1673E-01	<1.1426E-01	**<1.1505E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<1.1424E-01	<1.1516E-01	<1.1487E-01	<1.1311E-01	**<1.1435E-01**
$E_{lb/hr}$	Rate (lb/hr)	<3.1983E-05	<3.2708E-05	<3.2509E-05	<3.2188E-05	**<3.2347E-05**
$E_{g/s}$	Rate (g/s)	<4.0291E-06	<4.1205E-06	<4.0954E-06	<4.0549E-06	**<4.0750E-06**
$E_{T/yr}$	Rate (Ton/yr)	<1.4008E-04	<1.4326E-04	<1.4239E-04	<1.4098E-04	**<1.4168E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<9.5543E-08	<9.6385E-08	<9.7742E-08	<9.5670E-08	**<9.6335E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<1.0082E-07	<1.0163E-07	<1.0138E-07	<9.9825E-08	**<1.0091E-07**

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SS Metals-1 Version 2008-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 5-6 Results

Run No.		1	2	3	4	Average
Date (2012)		Mar 20	Mar 20	Mar 20	Mar 21	
Start Time (approx.)		07:52	10:29	13:04	13:18	
Stop Time (approx.)		10:05	12:44	15:20	15:38	
Mercury Results - Filtered Permanganate Solution						
C_{sd}	Concentration (lb/dscf)	<1.5262E-11	<1.4770E-11	<1.4636E-11	<1.4302E-11	**<1.4742E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.6600E-11	<1.6746E-11	<1.6982E-11	<1.6622E-11	**<1.6737E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.6619E-11	<1.6752E-11	<1.6711E-11	<1.6455E-11	**<1.6634E-11**
C_a	Concentration (lb/acf)	<7.8655E-12	<7.7389E-12	<7.6674E-12	<7.4967E-12	**<7.6921E-12**
C_{sd}	Concentration (µg/dscm)	<2.4440E-01	<2.3652E-01	<2.3437E-01	<2.2902E-01	**<2.3608E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.6582E-01	<2.6816E-01	<2.7194E-01	<2.6617E-01	**<2.6802E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.6613E-01	<2.6827E-01	<2.6760E-01	<2.6350E-01	**<2.6637E-01**
C_{sd}	Concentration (mg/dscm)	<2.4440E-04	<2.3652E-04	<2.3437E-04	<2.2902E-04	**<2.3608E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.6582E-04	<2.6816E-04	<2.7194E-04	<2.6617E-04	**<2.6802E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.6613E-04	<2.6827E-04	<2.6760E-04	<2.6350E-04	**<2.6637E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<1.2596E-01	<1.2393E-01	<1.2278E-01	<1.2005E-01	**<1.2318E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.6228E-01	<2.5383E-01	<2.5152E-01	<2.4578E-01	**<2.5335E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.8527E-01	<2.8778E-01	<2.9183E-01	<2.8565E-01	**<2.8763E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.8561E-01	<2.8790E-01	<2.8718E-01	<2.8278E-01	**<2.8587E-01**
$E_{lb/hr}$	Rate (lb/hr)	<7.9957E-05	<8.1770E-05	<8.1273E-05	<8.0470E-05	**<8.0867E-05**
$E_{g/s}$	Rate (g/s)	<1.0073E-05	<1.0301E-05	<1.0238E-05	<1.0137E-05	**<1.0187E-05**
$E_{T/yr}$	Rate (Ton/yr)	<3.5021E-04	<3.5815E-04	<3.5597E-04	<3.5246E-04	**<3.5420E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.3886E-07	<2.4096E-07	<2.4435E-07	<2.3918E-07	**<2.4084E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.5206E-07	<2.5408E-07	<2.5345E-07	<2.4956E-07	**<2.5229E-07**
Mercury Results - HCl Rinse + HCl/MnO2 Precipitate						
C_{sd}	Concentration (lb/dscf)	<1.2210E-11	<1.1816E-11	<1.1709E-11	<1.1441E-11	**<1.1794E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.3280E-11	<1.3397E-11	<1.3585E-11	<1.3297E-11	**<1.3390E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.3295E-11	<1.3402E-11	<1.3369E-11	<1.3164E-11	**<1.3307E-11**
C_a	Concentration (lb/acf)	<6.2924E-12	<6.1911E-12	<6.1339E-12	<5.9974E-12	**<6.1537E-12**
C_{sd}	Concentration (µg/dscm)	<1.9552E-01	<1.8922E-01	<1.8750E-01	<1.8322E-01	**<1.8886E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.1265E-01	<2.1453E-01	<2.1755E-01	<2.1294E-01	**<2.1442E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.1291E-01	<2.1461E-01	<2.1408E-01	<2.1080E-01	**<2.1310E-01**
C_{sd}	Concentration (mg/dscm)	<1.9552E-04	<1.8922E-04	<1.8750E-04	<1.8322E-04	**<1.8886E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.1265E-04	<2.1453E-04	<2.1755E-04	<2.1294E-04	**<2.1442E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.1291E-04	<2.1461E-04	<2.1408E-04	<2.1080E-04	**<2.1310E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<1.0076E-01	<9.9142E-02	<9.8226E-02	<9.6039E-02	**<9.8543E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.0983E-01	<2.0306E-01	<2.0122E-01	<1.9663E-01	**<2.0268E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.2821E-01	<2.3023E-01	<2.3347E-01	<2.2852E-01	**<2.3011E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.2849E-01	<2.3032E-01	<2.2974E-01	<2.2622E-01	**<2.2869E-01**
$E_{lb/hr}$	Rate (lb/hr)	<6.3965E-05	<6.5416E-05	<6.5018E-05	<6.4376E-05	**<6.4694E-05**
$E_{g/s}$	Rate (g/s)	<8.0581E-06	<8.2409E-06	<8.1907E-06	<8.1099E-06	**<8.1499E-06**
$E_{T/yr}$	Rate (Ton/yr)	<2.8017E-04	<2.8652E-04	<2.8478E-04	<2.8197E-04	**<2.8336E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<1.9109E-07	<1.9277E-07	<1.9548E-07	<1.9134E-07	**<1.9267E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.0165E-07	<2.0326E-07	<2.0276E-07	<1.9965E-07	**<2.0183E-07**

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SS Metals-1 Version 2008-12b

Wheelabrator South Broward
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 23 (PCDD/PCDF)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 21	Mar 21	
Start Time (approx.)		11:15	07:32	12:31	
Stop Time (approx.)		15:43	12:08	16:54	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9992	0.9992	0.9992	
C_p	Pitot tube coefficient	0.8280	0.8280	0.8280	
P_g	Static pressure (in. H_2O)	-10.0000	-10.0000	-9.9000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.05	30.10	30.10	**30.0833**
D_n	Nozzle diameter (in.)	0.2740	0.2740	0.2740	
O_2	Oxygen (dry volume %)	8.7700	9.4700	8.9700	**9.0700**
CO_2	Carbon dioxide (dry volume %)	10.5500	9.7900	10.5200	**10.2867**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.6800	80.7400	80.5100	**80.6433**
V_{lc}	Total Liquid collected (ml)	882.10	829.90	899.70	
V_m	Volume metered, meter conditions (ft^3)	148.9350	148.0150	150.9000	
T_m	Dry gas meter temperature (°F)	84.8400	81.9200	82.8600	
T_s	Sample temperature (°F)	303.2000	304.0000	304.4800	**303.8933**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.0876	1.0512	1.0980	
θ	Total sampling time (min)	250.0	250.0	250.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	41.5116	39.0551	42.3399	**40.9689**
V_{mstd}	Volume metered, standard (dscf)	145.1702	145.2787	147.8707	**146.1065**
P_s	Sample gas pressure, absolute (in. Hg)	29.3147	29.3647	29.3721	**29.3505**
P_v	Vapor pressure, actual (in. Hg)	29.3147	29.3647	29.3721	**29.3505**
B_{wo}	Moisture measured in sample (% by volume)	22.2366	21.1872	22.2595	**21.8944**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	22.2366	21.1872	22.2595	**21.8944**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{}$in. H_2O)	0.6497	0.6392	0.6423	**0.6437**
M_d	MW of sample gas, dry (lb/lb-mole)	30.0388	29.9452	30.0420	**30.0087**
M_s	MW of sample gas, wet (lb/lb-mole)	27.3618	27.4144	27.3615	**27.3792**
V_s	Velocity of sample (ft/sec)	44.8580	44.0764	44.3462	**44.4269**
%I	Isokinetic sampling (%)	100.0181	100.4453	103.0560	**101.1732**
Q_a	Volumetric flow rate, actual (acfm)	172,255	169,253	170,289	**170,599**
Q_s	Volumetric flow rate, standard (scfm)	116,759	114,800	115,459	**115,673**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	90,796	90,477	89,759	**90,344**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	79,234	74,400	77,037	**76,890**
Q_a	Volumetric flow rate, actual (acf/hr)	10,335,272	10,155,203	10,217,366	**10,235,947**
Q_s	Volumetric flow rate, standard (scf/hr)	7,005,537	6,888,002	6,927,548	**6,940,362**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,447,746	5,428,629	5,385,512	**5,420,629**
Q_a	Volumetric flow rate, actual (m^3/hr)	292,701	287,601	289,362	**289,888**
Q_s	Volumetric flow rate, standard (m^3/hr)	198,401	195,072	196,192	**196,555**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	154,283	153,742	152,521	**153,515**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	134,637	126,422	130,905	**130,655**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	184,874	181,772	182,815	**183,154**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	143,764	143,260	142,122	**143,048**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	125,457	117,803	121,979	**121,746**

Comments:
Average includes 3 runs. * indicates that the run is not included in the average.

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Wheelabrator South Broward
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 23 (PCDD/PCDF) Parameters (NDs & EMPCs counted as Zero)
Total Tetra- through Octa-PCDD/F Results (using USEPA/INTL 2005 TEFs)

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 21	Mar 21	
Start Time (approx.)		11:15	07:32	12:31	
Stop Time (approx.)		15:43	12:08	16:54	
Process Conditions					
R_P	Steam Production Rate - (klbs/hour)	188.4	188.2	187.9	188.2
P_1	Fabric Filter Inlet Temperature - (°F)	320	321	320	320
P_2	Carbon Feed Rate - (lbs/hr)	6	6	6	6
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	9,570
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	1,820
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	8,760
Gas Conditions					
O_2	Oxygen (dry volume %)	8.7700	9.4700	8.9700	9.0700
CO_2	Carbon dioxide (dry volume %)	10.5500	9.7900	10.5200	10.2867
T_s	Sample temperature (°F)	303.2	304.0	304.5	303.9
B_w	Actual water vapor in gas (% by volume)	22.2366	21.1872	22.2595	21.8944
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	172,255	169,253	170,289	170,599
Q_s	Volumetric flow rate, standard (scfm)	116,759	114,800	115,459	115,673
Q_{std}	Volumetric flow rate, dry standard (dscfm)	90,796	90,477	89,759	90,344
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	79,234	74,400	77,037	76,890
Q_a	Volumetric flow rate, actual (acf/hr)	10,335,272	10,155,203	10,217,366	10,235,947
Q_s	Volumetric flow rate, standard (scf/hr)	7,005,537	6,888,002	6,927,548	6,940,362
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,447,746	5,428,629	5,385,512	5,420,629
Q_a	Volumetric flow rate, actual (m^3/hr)	292,701	287,601	289,362	289,888
Q_s	Volumetric flow rate, standard (m^3/hr)	198,401	195,072	196,192	196,555
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	154,283	153,742	152,521	153,515
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	134,637	126,422	130,905	130,655
Q_s	Volumetric flow rate, normal (Nm^3/hr)	184,874	181,772	182,815	183,154
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	143,764	143,260	142,122	143,048
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	125,457	117,803	121,979	121,746
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	145.1702	145.2787	147.8707	146.1065
%I	Isokinetic sampling (%)	100.0181	100.4453	103.0560	101.1732
Laboratory Data from USEPA Method 23 (PCDD/PCDF)					
	Total PCDDs (ng)	39.72000	36.81000	40.98000	
	Total PCDFs (ng)	6.86900	6.28650	7.07220	
m_n	Total PCDDs & PCDFs (ng)	46.60000	43.10000	48.10000	
m_{n_TEQ}	Total TEQ PCDDs & PCDFs (ng)	0.32700	0.28100	0.33700	
Total PCDD/F Results (TEF=1)					
C_{sd}	PCDD/F Concentration (ng/dscm)	1.1335E+01	1.0475E+01	1.1486E+01	1.1099E+01
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/dscm)	1.2989E+01	1.2739E+01	1.3382E+01	1.3037E+01
C_{sd12}	PCDD/F Concentration @12% CO_2 (ng/dscm)	1.2892E+01	1.2840E+01	1.3102E+01	1.2945E+01
C_{sd}	PCDD/F Concentration (ng/Nm^3 dry)	1.2164E+01	1.1242E+01	1.2326E+01	1.1911E+01
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/Nm^3 dry)	1.3939E+01	1.3671E+01	1.4362E+01	1.3991E+01
C_{sd12}	PCDD/F Concentration @12% CO_2 (ng/Nm^3 dry)	1.3836E+01	1.3780E+01	1.4060E+01	1.3892E+01
$E_{lb/hr}$	PCDD/F Rate (lb/hr)	3.8560E-06	3.5512E-06	3.8628E-06	3.7566E-06
$E_{g/s}$	PCDD/F Rate (g/s)	4.8576E-07	4.4737E-07	4.8662E-07	4.7325E-07
$E_{T/yr}$	PCDD/F Rate (Ton/yr)	1.6889E-05	1.5554E-05	1.6919E-05	1.6454E-05
E_{Fd}	PCDD/F Rate - F_d-based (lb/MMBtu)	1.1671E-08	1.1447E-08	1.2025E-08	1.1714E-08
E_{Fc}	PCDD/F Rate - F_c-based (lb/MMBtu)	1.2211E-08	1.2161E-08	1.2409E-08	1.2260E-08
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)					
C_{sdTEQ}	TEQ Concentration (ng/dscm)	7.9537E-02	6.8297E-02	8.0472E-02	7.6102E-02
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/dscm)	9.1143E-02	8.3056E-02	9.3760E-02	8.9320E-02
$C_{sd12TEQ}$	TEQ Concentration @12% CO_2 (ng/dscm)	9.0468E-02	8.3715E-02	9.1793E-02	8.8659E-02
C_{sdTEQ}	TEQ Concentration (ng/Nm^3 dry)	8.5357E-02	7.3294E-02	8.6360E-02	8.1670E-02
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/Nm^3 dry)	9.7812E-02	8.9133E-02	1.0062E-01	9.5855E-02
$C_{sd12TEQ}$	TEQ Concentration @12% CO_2 (ng/Nm^3 dry)	9.7088E-02	8.9840E-02	9.8510E-02	9.5146E-02
$E_{lb/hrTEQ}$	TEQ Rate (lb/hr)	2.7058E-08	2.3153E-08	2.7063E-08	2.5758E-08
$E_{g/sTEQ}$	TEQ Rate (g/sec)	3.4087E-09	2.9167E-09	3.4094E-09	3.2449E-09
$E_{T/yrTEQ}$	TEQ Rate (Ton/yr)	1.1851E-07	1.0141E-07	1.1854E-07	1.1282E-07
E_{FdTEQ}	TEQ Rate - F_d-based (lb/MMBtu)	8.1899E-11	7.4632E-11	8.4251E-11	8.0260E-11
E_{FcTEQ}	TEQ Rate - F_c-based (lb/MMBtu)	8.5684E-11	7.9287E-11	8.6938E-11	8.3970E-11

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Wheelabrator South Broward
Clean Air Project No: 11414
Unit 1 FF Outlet

Max

USEPA Method 23 (PCDD/PCDF) Maximum Emissions Parameters (NDs & EMPCs included
Total Tetra- through Octa-PCDD/F Results (TEQ based on USEPA/INTL 2005 TEFs)

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 21	Mar 21	
Start Time (approx.)		11:15	07:32	12:31	
Stop Time (approx.)		15:43	12:08	16:54	
Process Conditions					
R_P	Steam Production Rate - (klbs/hour)	188.4	188.2	187.9	**188.2**
P_1	Fabric Filter Inlet Temperature - (°F)	320	321	320	**320**
P_2	Carbon Injection Rate - (lbs/hr)	6	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	8.7700	9.4700	8.9700	**9.0700**
CO_2	Carbon dioxide (dry volume %)	10.5500	9.7900	10.5200	**10.2867**
T_s	Sample temperature (°F)	303.2	304.0	304.5	**303.9**
B_w	Actual water vapor in gas (% by volume)	22.2366	21.1872	22.2595	**21.8944**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	172,255	169,253	170,289	**170,599**
Q_s	Volumetric flow rate, standard (scfm)	116,759	114,800	115,459	**115,673**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	90,796	90,477	89,759	**90,344**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	79,234	74,400	77,037	**76,890**
Q_a	Volumetric flow rate, actual (acf/hr)	10,335,272	10,155,203	10,217,366	**10,235,947**
Q_s	Volumetric flow rate, standard (scf/hr)	7,005,537	6,888,002	6,927,548	**6,940,362**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,447,746	5,428,629	5,385,512	**5,420,629**
Q_a	Volumetric flow rate, actual (m^3/hr)	292,701	287,601	289,362	**289,888**
Q_s	Volumetric flow rate, standard (m^3/hr)	198,401	195,072	196,192	**196,555**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	154,283	153,742	152,521	**153,515**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	134,637	126,422	130,905	**130,655**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	184,874	181,772	182,815	**183,154**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	143,764	143,260	142,122	**143,048**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	125,457	117,803	121,979	**121,746**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	145.1702	145.2787	147.8707	**146.1065**
%I	Isokinetic sampling (%)	100.0181	100.4453	103.0560	**101.1732**
Laboratory Data from USEPA Method 23 (PCDD/PCDF), including NDs and EMPCs					
m_n	Total PCDDs & PCDFs (ng)	46.70000	43.20000	48.10000	
m_{n_TEQ}	Total TEQ PCDDs & PCDFs (ng)	0.32700	0.30000	0.33700	
Total PCDD/F Results (TEF=1)					
C_{sd}	PCDD/F Concentration (ng/dscm)	1.1359E+01	1.0500E+01	1.1486E+01	**1.1115E+01**
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/dscm)	1.3016E+01	1.2769E+01	1.3382E+01	**1.3056E+01**
C_{sd12}	PCDD/F Concentration @12% CO_2 (ng/dscm)	1.2920E+01	1.2870E+01	1.3102E+01	**1.2964E+01**
C_{sd}	PCDD/F Concentration (ng/Nm^3 dry)	1.2190E+01	1.1268E+01	1.2326E+01	**1.1928E+01**
C_{sd7}	PCDD/F Concentration @7% O_2 (ng/Nm^3 dry)	1.3969E+01	1.3703E+01	1.4362E+01	**1.4011E+01**
C_{sd12}	PCDD/F Concentration @12% CO_2 (ng/Nm^3 dry)	1.3865E+01	1.3812E+01	1.4060E+01	**1.3912E+01**
$E_{lb/hr}$	PCDD/F Rate (lb/hr)	3.8642E-06	3.5594E-06	3.8628E-06	**3.7621E-06**
$E_{g/s}$	PCDD/F Rate (g/s)	4.8880E-07	4.4840E-07	4.8662E-07	**4.7394E-07**
$E_{T/yr}$	PCDD/F Rate (Ton/yr)	1.6925E-05	1.5590E-05	1.6919E-05	**1.6478E-05**
E_{Fd}	PCDD/F - F_d-based (lb/MMBtu)	1.1696E-08	1.1474E-08	1.2025E-08	**1.1732E-08**
E_{Fc}	PCDD/F Rate - F_c-based (lb/MMBtu)	1.2237E-08	1.2189E-08	1.2409E-08	**1.2278E-08**
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)					
C_{sdTEQ}	TEQ Concentration (ng/dscm)	7.9537E-02	7.2915E-02	8.0472E-02	**7.7641E-02**
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/dscm)	9.1143E-02	8.8672E-02	9.3760E-02	**9.1192E-02**
$C_{sd12TEQ}$	TEQ Concentration @12% CO_2 (ng/dscm)	9.0468E-02	8.9375E-02	9.1793E-02	**9.0546E-02**
C_{sdTEQ}	TEQ Concentration (ng/Nm^3 dry)	8.5357E-02	7.8250E-02	8.6360E-02	**8.3322E-02**
C_{sd7TEQ}	TEQ Concentration @7% O_2 (ng/Nm^3 dry)	9.7812E-02	9.5160E-02	1.0062E-01	**9.7864E-02**
$C_{sd12TEQ}$	TEQ Concentration @12% CO_2 (ng/Nm^3 dry)	9.7088E-02	9.5915E-02	9.8510E-02	**9.7171E-02**
$E_{lb/hrTEQ}$	TEQ Rate (lb/hr)	2.7058E-08	2.4718E-08	2.7063E-08	**2.6280E-08**
$E_{g/sTEQ}$	TEQ Rate (g/sec)	3.4087E-09	3.1139E-09	3.4094E-09	**3.3106E-09**
$E_{T/yrTEQ}$	TEQ Rate (Ton/yr)	1.1851E-07	1.0827E-07	1.1854E-07	**1.1511E-07**
E_{FdTEQ}	TEQ Rate - F_d-based (lb/MMBtu)	8.1899E-11	7.9678E-11	8.4251E-11	**8.1943E-11**
E_{FcTEQ}	TEQ Rate - F_c-based (lb/MMBtu)	8.5684E-11	8.4648E-11	8.6938E-11	**8.5757E-11**

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SS PCDD-F v2011-01b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 SDA Inlet

USEPA Method 26A (HCl)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:44	09:07	10:32	
Stop Time (approx.)		08:44	10:07	11:32	
Sampling Conditions					
Y_d	Dry gas meter correction factor	1.0059	1.0059	1.0059	
C_p	Pitot tube coefficient	0.8310	0.8310	0.8310	
P_g	Static pressure (in. H_2O)	-1.4000	-1.4000	-1.3000	
A_s	Sample location area (ft^2)	60.1320	60.1320	60.1320	
P_{bar}	Barometric pressure (in. Hg)	30.10	30.10	30.10	**30.1000**
O_2	Oxygen (dry volume %)	6.9800	7.1100	7.8500	**7.3133**
CO_2	Carbon dioxide (dry volume %)	11.8300	11.8200	11.0600	**11.5700**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	81.1900	81.0700	81.0900	**81.1167**
V_{lc}	Total Liquid collected (ml)	197.10	212.80	196.20	
V_m	Volume metered, meter conditions (ft^3)	35.0850	35.4300	35.8900	
T_m	Dry gas meter temperature (°F)	83.3750	88.2917	90.0833	
T_s	Sample temperature (°F)	471.2500	476.7500	482.3333	**476.7778**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.1833	1.1917	1.2000	
θ	Total sampling time (min)	60.0	60.0	60.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	9.2755	10.0144	9.2332	**9.5077**
V_{mstd}	Volume metered, standard (dscf)	34.5856	34.6132	34.9491	**34.7160**
P_s	Sample gas pressure, absolute (in. Hg)	29.9971	29.9971	30.0044	**29.9995**
P_v	Vapor pressure, actual (in. Hg)	29.9971	29.9971	30.0044	**29.9995**
B_{wo}	Moisture measured in sample (% by volume)	21.1475	22.4399	20.8979	**21.4951**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	21.1475	22.4399	20.8979	**21.4951**
M_d	MW of sample gas, dry (lb/lb-mole)	30.1720	30.1756	30.0836	**30.1437**
M_s	MW of sample gas, wet (lb/lb-mole)	27.5979	27.4434	27.5584	**27.5332**

Comments:

Average includes 3 runs.

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SS ISOKINETIC Version 2006-13e

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 SDA Inlet

USEPA Method 26A
HCl Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:44	09:07	10:32	
Stop Time (approx.)		08:44	10:07	11:32	
Process Conditions					
R_P	Production Rate (Klbs/hour)	186.6	186.0	188.3	**187.0**
P_1	Fabric Filter Inlet Temperature (°F)	320	320	320	**320**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,750	9,750	9,750	**9,750**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	6.9800	7.1100	7.8500	**7.3133**
CO_2	Carbon dioxide (dry volume %)	11.8300	11.8200	11.0600	**11.5700**
T_s	Sample temperature (°F)	471.2500	476.7500	482.3333	**476.7778**
B_w	Actual water vapor in gas (% by volume)	21.1475	22.4399	20.8979	**21.4951**
Sampling Data					
V_{mstd}	*Volume metered, standard (dscf)*	34.5856	34.6132	34.9491	**34.7160**
Laboratory Data					
m_n	Total HCl collected (mg)	815.1937	892.8437	867.3544	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	5.1973E-05	5.6878E-05	5.4723E-05	**5.4524E-05**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	5.1898E-05	5.7331E-05	5.8287E-05	**5.5839E-05**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	5.2719E-05	5.7744E-05	5.9374E-05	**5.6612E-05**
C_{sd}	HCl Concentration (ppmdv)	549.4850	601.3454	578.5633	**576.4646**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	548.6955	606.1422	616.2475	**590.3617**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	557.3813	610.5029	627.7359	**598.5400**
C_w	HCl Concentration (ppmwv)	433.2828	466.4043	457.6557	**452.4476**
C_{sd}	HCl Concentration (mg/dscm)	832.2681	910.8175	876.3109	**873.1322**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	831.0723	918.0829	933.3887	**894.1813**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	844.2280	924.6878	950.7895	**906.5684**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	893.1657	977.4626	940.4313	**937.0199**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	891.8824	985.2597	1001.6854	**959.6092**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	906.0007	992.3479	1020.3594	**972.9027**
$E_{lb/hr}$	HCl Rate (lb/hr)	0.0000	0.0000	0.0000	**0.0000**
$E_{kg/hr}$	HCl Rate (kg/hr)	0.0000	0.0000	0.0000	**0.0000**
$E_{T/yr}$	HCl Rate (Ton/yr)	0.0000	0.0000	0.0000	**0.0000**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.7608	0.8405	0.8545	**0.8186**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.7996	0.8758	0.9005	**0.8586**

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Date ________

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 26A (HCl)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:44	09:07	10:32	
Stop Time (approx.)		08:44	10:07	11:32	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9925	0.9925	0.9925	
P_g	Static pressure (in. H_2O)	-10.5000	-10.8000	-10.7000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.10	30.10	30.10	**30.1000**
O_2	Oxygen (dry volume %)	9.1500	8.6800	9.2000	**9.0100**
CO_2	Carbon dioxide (dry volume %)	9.9500	10.3400	9.7900	**10.0267**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.9000	80.9800	81.0100	**80.9633**
V_{lc}	Total Liquid collected (ml)	250.50	260.80	246.00	
V_m	Volume metered, meter conditions (ft^3)	40.9350	41.2200	41.6450	
T_m	Dry gas meter temperature (°F)	79.2917	82.5417	85.5833	
T_s	Sample temperature (°F)	301.0000	302.3333	302.5000	**301.9444**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.5000	1.5000	1.5000	
θ	Total sampling time (min)	60.0	60.0	60.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	11.7885	12.2732	11.5768	**11.8795**
V_{mstd}	Volume metered, standard (dscf)	40.1472	40.1845	40.3725	**40.2347**
P_s	Sample gas pressure, absolute (in. Hg)	29.3279	29.3059	29.3132	**29.3157**
P_v	Vapor pressure, actual (in. Hg)	29.3279	29.3059	29.3132	**29.3157**
B_{wo}	Moisture measured in sample (% by volume)	22.6983	23.3964	22.2847	**22.7932**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	22.6983	23.3964	22.2847	**22.7932**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9580	30.0016	29.9344	**29.9647**
M_s	MW of sample gas, wet (lb/lb-mole)	27.2437	27.1937	27.2749	**27.2374**

Comments:
Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 26A
HCl Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:44	09:07	10:32	
Stop Time (approx.)		08:44	10:07	11:32	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	186.6	186.0	188.3	**187.0**
P_1	Fabric Filter Inlet Temperature (°F)	320	320	320	**320**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,750	9,750	9,750	**9,750**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.1500	8.6800	9.2000	**9.0100**
CO_2	Carbon dioxide (dry volume %)	9.9500	10.3400	9.7900	**10.0267**
T_s	Sample temperature (°F)	301.0000	302.3333	302.5000	**301.9444**
B_w	Actual water vapor in gas (% by volume)	22.6983	23.3964	22.2847	**22.7932**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	40.1472	40.1845	40.3725	**40.2347**
Laboratory Data					
m_n	Total HCl collected (mg)	16.1303	15.2880	13.5135	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	8.8593E-07	8.3888E-07	7.3806E-07	**8.2096E-07**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	1.0480E-06	9.5421E-07	8.7684E-07	**9.5969E-07**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	1.0685E-06	9.7356E-07	9.0467E-07	**9.8223E-07**
C_{sd}	HCl Concentration (ppmdv)	9.3665	8.8692	7.8032	**8.6796**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	11.0804	10.0885	9.2705	**10.1465**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	11.2963	10.2930	9.5647	**10.3847**
C_w	HCl Concentration (ppmwv)	7.2405	6.7941	6.0643	**6.6996**
C_{sd}	HCl Concentration (mg/dscm)	14.1869	13.4335	11.8190	**13.1465**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	16.7828	15.2803	14.0414	**15.3682**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	17.1098	15.5902	14.4870	**15.7290**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	15.2249	14.4165	12.6838	**14.1084**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	18.0108	16.3984	15.0688	**16.4927**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	18.3617	16.7309	15.5470	**16.8799**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.0154	0.0140	0.0129	**0.0141**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.0162	0.0148	0.0137	**0.0149**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 5/29 (Particulate/Metals)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 21	Mar 21	Mar 21	
Start Time (approx.)		08:16	10:52	13:29	
Stop Time (approx.)		10:28	13:07	15:41	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9915	0.9915	0.9915	
C_p	Pitot tube coefficient	0.8350	0.8350	0.8350	
P_g	Static pressure (in. H_2O)	-14.5000	-13.5000	-13.3000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.10	30.10	30.10	**30.1000**
D_n	Nozzle diameter (in.)	0.2770	0.2770	0.2770	
O_2	Oxygen (dry volume %)	9.1000	9.5400	9.6600	**9.4333**
CO_2	Carbon dioxide (dry volume %)	10.0300	9.8000	9.8200	**9.8833**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.8700	80.6600	80.5200	**80.6833**
V_{lc}	Total Liquid collected (ml)	411.90	429.50	414.90	
V_m	Volume metered, meter conditions (ft^3)	75.2600	77.2250	76.8350	
T_m	Dry gas meter temperature (°F)	89.2200	89.8600	91.3400	
T_s	Sample temperature (°F)	299.0000	295.6800	293.9200	**296.2000**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.1540	1.2208	1.2108	
θ	Total sampling time (min)	125.0	125.0	125.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	19.3840	20.2123	19.5252	**19.7072**
V_{mstd}	Volume metered, standard (dscf)	72.3433	74.1578	73.5834	**73.3615**
P_s	Sample gas pressure, absolute (in. Hg)	29.0338	29.1074	29.1221	**29.0877**
P_v	Vapor pressure, actual (in. Hg)	29.0338	29.1074	29.1221	**29.0877**
B_{wo}	Moisture measured in sample (% by volume)	21.1322	21.4181	20.9703	**21.1736**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	21.1322	21.4181	20.9703	**21.1736**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{}$in. H_2O)	0.6229	0.6432	0.6387	**0.6349**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9688	29.9496	29.9576	**29.9587**
M_s	MW of sample gas, wet (lb/lb-mole)	27.4395	27.3902	27.4501	**27.4266**
V_s	Velocity of sample (ft/sec)	43.4029	44.7002	44.2757	**44.1262**
%I	Isokinetic sampling (%)	99.8050	99.0137	98.3474	**99.0554**
Q_a	Volumetric flow rate, actual (acfm)	166,667	171,649	170,019	**169,445**
Q_s	Volumetric flow rate, standard (scfm)	112,508	116,675	115,895	**115,026**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	88,733	91,685	91,592	**90,670**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	75,327	74,931	74,064	**74,774**
Q_a	Volumetric flow rate, actual (acf/hr)	10,000,026	10,298,919	10,201,112	**10,166,685**
Q_s	Volumetric flow rate, standard (scf/hr)	6,750,500	7,000,495	6,953,711	**6,901,569**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,323,969	5,501,122	5,495,494	**5,440,195**
Q_a	Volumetric flow rate, actual (m^3/hr)	283,207	291,671	288,901	**287,927**
Q_s	Volumetric flow rate, standard (m^3/hr)	191,178	198,258	196,933	**195,456**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	150,778	155,795	155,636	**154,070**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	127,999	127,326	125,852	**127,059**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	178,143	184,741	183,506	**182,130**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	140,498	145,173	145,024	**143,565**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	119,271	118,645	117,271	**118,396**

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 5/202 (FPM/CPM)
Emission Parameters for FPM

Run No.		1	2	3	Average
Date (2012)		Mar 21	Mar 21	Mar 21	
Start Time (approx.)		08:16	10:52	13:29	
Stop Time (approx.)		10:28	13:07	15:41	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	187.7	187.5	188.6	187.9
P_1	Fabric Filter Inlet Temperature - (°F)	317	315	314	315
P_2	Carbon Feed Rate - (lbs/hr)	7	8	6	6
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	9,570
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	1,820
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	8,760
Gas Conditions					
O_2	Oxygen (dry volume %)	9.1000	9.5400	9.6600	9.4333
CO_2	Carbon dioxide (dry volume %)	10.0300	9.8000	9.8200	9.8833
T_s	Sample temperature (°F)	299.0000	295.6800	293.9200	296.2000
B_w	Actual water vapor in gas (% by volume)	21.1322	21.4181	20.9703	21.1736
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	166,667	171,649	170,019	169,445
Q_s	Volumetric flow rate, standard (scfm)	112,508	116,675	115,895	115,026
Q_{std}	Volumetric flow rate, dry standard (dscfm)	88,733	91,685	91,592	90,670
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	75,327	74,931	74,064	74,774
Q_a	Volumetric flow rate, actual (acf/hr)	10,000,026	10,298,919	10,201,112	10,166,685
Q_s	Volumetric flow rate, standard (scf/hr)	6,750,500	7,000,495	6,953,711	6,901,569
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,323,969	5,501,122	5,495,494	5,440,195
Q_a	Volumetric flow rate, actual (m^3/hr)	283,207	291,671	288,901	287,927
Q_s	Volumetric flow rate, standard (m^3/hr)	191,178	198,258	196,933	195,456
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	150,778	155,795	155,636	154,070
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	127,999	127,326	125,852	127,059
Q_s	Volumetric flow rate, normal (Nm^3/hr)	178,143	184,741	183,506	182,130
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	140,498	145,173	145,024	143,565
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	119,271	118,645	117,271	118,396
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	72.3433	74.1578	73.5834	73.3615
%I	Isokinetic sampling (%)	99.8050	99.0137	98.3474	99.0554
Laboratory Data					
m_{filter}	Matter collected on filter(s) (g)	0.00220	0.00380	0.00260	
m_s	Matter collected in solvent rinse(s) (g)	0.00670	0.00520	0.00290	
m_n	Total filterable particulate matter (g)	0.00890	0.00900	0.00550	
n_{MDL}	Number of non-detectable fractions	N/A	N/A	N/A	
DLC	Detection level classification	ADL	ADL	ADL	
Filterable Particulate Matter Results					
C_{sd}	Particulate Concentration (lb/dscf)	2.7127E-07	2.6761E-07	1.6481E-07	2.3456E-07
C_{sd7}	Particulate Concentration @7% O_2 (lb/dscf)	3.1955E-07	3.2744E-07	2.0382E-07	2.8360E-07
C_{sd12}	Particulate Concentration @12% CO_2 (lb/dscf)	3.2455E-07	3.2768E-07	2.0140E-07	2.8454E-07
C_a	Particulate Concentration (lb/acf)	1.4442E-07	1.4294E-07	8.8787E-08	1.2538E-07
C_{sd}	Particulate Concentration (gr/dscf)	0.0019	0.0019	0.0012	0.0016
C_{sd7}	Particulate Concentration @7% O_2 (gr/dscf)	0.0022	0.0023	0.0014	0.0020
C_{sd12}	Particulate Concentration @12% CO_2 (gr/dscf)	0.0023	0.0023	0.0014	0.0020
C_a	Particulate Concentration (gr/acf)	0.0010	0.0010	0.0006	0.0009
C_{sd}	Particulate Concentration (mg/dscm)	4.3440	4.2853	2.6392	3.7562
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	5.1171	5.2435	3.2638	4.5415
C_{sd12}	Particulate Concentration @12% CO_2 (mg/dscm)	5.1972	5.2473	3.2252	4.5566
C_a	Particulate Concentration (mg/m^3 (actual,wet))	2.3127	2.2890	1.4218	2.0078
C_{sd}	Particulate Concentration (mg/Nm^3 dry)	4.6619	4.5989	2.8324	4.0310
C_{sd7}	Particulate Concentration @7% O_2 (mg/Nm^3 dry)	5.4915	5.6272	3.5027	4.8738
C_{sd12}	Particulate Concentration @12% CO_2 (mg/Nm^3 dry)	5.5775	5.6313	3.4611	4.8900
$E_{lb/hr}$	Particulate Rate (lb/hr)	1.4442	1.4721	0.9057	1.2740
$E_{kg/hr}$	Particulate Rate (kg/hr)	0.6550	0.6676	0.4108	0.5778
$E_{T/yr}$	Particulate Rate (Ton/yr)	6.3257	6.4479	3.9671	5.5802
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.0046	0.0047	0.0029	0.0041
E_{Fc}	Particulate Rate - F_c-based (lb/MMBtu)	0.0049	0.0050	0.0031	0.0043

Comments:

Average includes 3 runs.

Detection level classifications are defined as follows:

ADL = Above Detection Level - all fractions are above detection limit
DLL = Detection Level Limited - some fractions are below detection limit
BDL = Below Detection Limit - all fractions are below detection limit

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 5/29
Cadmium (Cd) Emission Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 21	Mar 21	Mar 21	
Start Time (approx.)		08:16	10:52	13:29	
Stop Time (approx.)		10:28	13:07	15:41	
Process Conditions					
R_P	Steam Production Rate - (Klbs/hour)	187.7	187.5	188.6	**187.9**
P_1	Fabric Filter Inlet Temperature - (°F)	317	315	314	**315**
P_2	Carbon Feed Rate - (lbs/hr)	7	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.1000	9.5400	9.6600	**9.4333**
CO_2	Carbon dioxide (dry volume %)	10.0300	9.8000	9.8200	**9.8833**
T_s	Sample temperature (°F)	299.0000	295.6800	293.9200	**296.2000**
B_w	Actual water vapor in gas (% by volume)	21.1322	21.4181	20.9703	**21.1736**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	166,667	171,649	170,019	**169,445**
Q_s	Volumetric flow rate, standard (scfm)	112,508	116,675	115,895	**115,026**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	88,733	91,685	91,592	**90,670**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	72.3433	74.1578	73.5834	**73.3615**
%I	Isokinetic sampling (%)	99.8050	99.0137	98.3474	**99.0554**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	2.5502	2.0332	1.4806	**2.0213**
Cadmium Results - Total					
C_{sd}	Concentration (lb/dscf)	7.7730E-11	6.0456E-11	4.4367E-11	**6.0851E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	9.1563E-11	7.3973E-11	5.4867E-11	**7.3468E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	9.2996E-11	7.4027E-11	5.4216E-11	**7.3747E-11**
C_a	Concentration (lb/acf)	4.1383E-11	3.2292E-11	2.3901E-11	**3.2525E-11**
C_{sd}	Concentration (µg/dscm)	1.2447E+00	9.6812E-01	7.1048E-01	**9.7444E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.4662E+00	1.1846E+00	8.7861E-01	**1.1765E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.4892E+00	1.1854E+00	8.6820E-01	**1.1810E+00**
C_{sd}	Concentration (mg/dscm)	1.2447E-03	9.6812E-04	7.1048E-04	**9.7444E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.4662E-03	1.1846E-03	8.7861E-04	**1.1765E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.4892E-03	1.1854E-03	8.6820E-04	**1.1810E-03**
C_a	Concentration (µg/m^3 (actual,wet))	6.6269E-01	5.1711E-01	3.8274E-01	**5.2085E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	1.3358E+00	1.0390E+00	7.6246E-01	**1.0457E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.5735E+00	1.2713E+00	9.4290E-01	**1.2626E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.5982E+00	1.2722E+00	9.3173E-01	**1.2674E+00**
$E_{lb/hr}$	Rate (lb/hr)	4.1383E-04	3.3257E-04	2.4382E-04	**3.3007E-04**
$E_{g/s}$	Rate (g/s)	5.2133E-05	4.1897E-05	3.0715E-05	**4.1582E-05**
$E_{T/yr}$	Rate (Ton/yr)	1.8126E-03	1.4567E-03	1.0679E-03	**1.4457E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.3175E-06	1.0644E-06	7.8950E-07	**1.0572E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.4104E-06	1.1228E-06	8.2228E-07	**1.1185E-06**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 5/29
Lead (Pb) Emission Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 21	Mar 21	Mar 21	
Start Time (approx.)		08:16	10:52	13:29	
Stop Time (approx.)		10:28	13:07	15:41	
Process Conditions					
R_P	Steam Production Rate - (Klbs/hour)	187.7	187.5	188.6	**187.9**
P_1	Fabric Filter Inlet Temperature - (°F)	317	315	314	**315**
P_2	Carbon Feed Rate - (lbs/hr)	7	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.1000	9.5400	9.6600	**9.4333**
CO_2	Carbon dioxide (dry volume %)	10.0300	9.8000	9.8200	**9.8833**
T_s	Sample temperature (°F)	299.0000	295.6800	293.9200	**296.2000**
B_w	Actual water vapor in gas (% by volume)	21.1322	21.4181	20.9703	**21.1736**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	166,667	171,649	170,019	**169,445**
Q_s	Volumetric flow rate, standard (scfm)	112,508	116,675	115,895	**115,026**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	88,733	91,685	91,592	**90,670**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	72.3433	74.1578	73.5834	**73.3615**
%I	Isokinetic sampling (%)	99.8050	99.0137	98.3474	**99.0554**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	23.7408	22.6439	10.9037	**19.0961**
Lead Results - Total					
C_{sd}	Concentration (lb/dscf)	7.2361E-10	6.7329E-10	3.2674E-10	**5.7455E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	8.5239E-10	8.2383E-10	4.0407E-10	**6.9343E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	8.6574E-10	8.2444E-10	3.9928E-10	**6.9648E-10**
C_a	Concentration (lb/acf)	3.8525E-10	3.5964E-10	1.7602E-10	**3.0697E-10**
C_{sd}	Concentration (µg/dscm)	1.1588E+01	1.0782E+01	5.2323E+00	**9.2006E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.3650E+01	1.3193E+01	6.4706E+00	**1.1104E+01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.3864E+01	1.3202E+01	6.3939E+00	**1.1153E+01**
C_{sd}	Concentration (mg/dscm)	1.1588E-02	1.0782E-02	5.2323E-03	**9.2006E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.3650E-02	1.3193E-02	6.4706E-03	**1.1104E-02**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.3864E-02	1.3202E-02	6.3939E-03	**1.1153E-02**
C_a	Concentration (µg/m^3 (actual,wet))	6.1692E+00	5.7591E+00	2.8187E+00	**4.9157E+00**
C_{sd}	Concentration (µg/Nm^3 dry)	1.2436E+01	1.1571E+01	5.6152E+00	**9.8738E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.4649E+01	1.4158E+01	6.9440E+00	**1.1917E+01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.4878E+01	1.4168E+01	6.8617E+00	**1.1969E+01**
$E_{lb/hr}$	Rate (lb/hr)	3.8525E-03	3.7039E-03	1.7956E-03	**3.1173E-03**
$E_{g/s}$	Rate (g/s)	4.8532E-04	4.6660E-04	2.2620E-04	**3.9271E-04**
$E_{T/yr}$	Rate (Ton/yr)	1.6874E-02	1.6223E-02	7.8648E-03	**1.3654E-02**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.2265E-05	1.1854E-05	5.8143E-06	**9.9781E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.3130E-05	1.2504E-05	6.0557E-06	**1.0563E-05**

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SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 29 (Mercury)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	4	Average
Date (2012)		Mar 21	Mar 21	Mar 21	Mar 22	
Start Time (approx.)		08:16	10:52	13:29	07:43	
Stop Time (approx.)		10:28	13:07	15:41	09:56	
Sampling Conditions						
Y_d	Dry gas meter correction factor	0.9915	0.9915	0.9915	0.9915	
C_p	Pitot tube coefficient	0.8350	0.8350	0.8350	0.8350	
P_g	Static pressure (in. H_2O)	-14.5000	-13.5000	-13.3000	-13.3000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.10	30.10	30.10	30.10	**30.1000**
D_n	Nozzle diameter (in.)	0.2770	0.2770	0.2770	0.2760	
O_2	Oxygen (dry volume %)	9.1000	9.5400	9.6600	9.1700	**9.3675**
CO_2	Carbon dioxide (dry volume %)	10.0300	9.8000	9.8200	9.9600	**9.9025**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.8700	80.6600	80.5200	80.8700	**80.7300**
V_{lc}	Total Liquid collected (ml)	411.90	429.50	414.90	383.40	
V_m	Volume metered, meter conditions (ft^3)	75.2600	77.2250	76.8350	70.6950	
T_m	Dry gas meter temperature (°F)	89.2200	89.8600	91.3400	88.1600	
T_s	Sample temperature (°F)	299.0000	295.6800	293.9200	293.1600	**295.4400**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.1540	1.2208	1.2108	1.0372	
θ	Total sampling time (min)	125.0	125.0	125.0	125.0	
Flow Results						
V_{wstd}	Volume of water collected (ft^3)	19.3840	20.2123	19.5252	18.0428	**19.2911**
V_{mstd}	Volume metered, standard (dscf)	72.3433	74.1578	73.5834	68.0672	**72.0379**
P_s	Sample gas pressure, absolute (in. Hg)	29.0338	29.1074	29.1221	29.1221	**29.0963**
P_v	Vapor pressure, actual (in. Hg)	29.0338	29.1074	29.1221	29.1221	**29.0963**
B_{wo}	Moisture measured in sample (% by volume)	21.1322	21.4181	20.9703	20.9532	**21.1185**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	21.1322	21.4181	20.9703	20.9532	**21.1185**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{in.\ H_2O}$)	0.6229	0.6432	0.6387	0.6020	**0.6267**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9688	29.9496	29.9576	29.9604	**29.9591**
M_s	MW of sample gas, wet (lb/lb-mole)	27.4395	27.3902	27.4501	27.4543	**27.4335**
V_s	Velocity of sample (ft/sec)	43.4029	44.7002	44.2757	41.7084	**43.5218**
%I	Isokinetic sampling (%)	99.8050	99.0137	98.3474	97.1565	**98.5807**
Q_a	Volumetric flow rate, actual (acfm)	166,667	171,649	170,019	160,160	**167,124**
Q_s	Volumetric flow rate, standard (scfm)	112,508	116,675	115,895	109,285	**113,591**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	88,733	91,685	91,592	86,387	**89,599**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	75,327	74,931	74,064	72,900	**74,306**
Q_a	Volumetric flow rate, actual (acf/hr)	10,000,026	10,298,919	10,201,112	9,609,610	**10,027,417**
Q_s	Volumetric flow rate, standard (scf/hr)	6,750,500	7,000,495	6,953,711	6,557,117	**6,815,456**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,323,969	5,501,122	5,495,494	5,183,192	**5,375,944**
Q_a	Volumetric flow rate, actual (m^3/hr)	283,207	291,671	288,901	272,150	**283,982**
Q_s	Volumetric flow rate, standard (m^3/hr)	191,178	198,258	196,933	185,701	**193,018**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	150,778	155,795	155,636	146,791	**152,250**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	127,999	127,326	125,852	123,875	**126,263**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	178,143	184,741	183,506	173,040	**179,857**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	140,498	145,173	145,024	136,783	**141,869**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	119,271	118,645	117,271	115,429	**117,654**

Comments:

Average includes 4 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters

Run No.		1	2	3	4	Average
Date (2012)		Mar 21	Mar 21	Mar 21	Mar 22	
Start Time (approx.)		08:16	10:52	13:29	07:43	
Stop Time (approx.)		10:28	13:07	15:41	09:56	
Process Conditions						
R_P	Steam Production Rate - (Klbs/hour)	187.7	187.5	188.6	187.5	**187.8**
P_1	Fabric Filter Inlet Temperature - (°F)	317	315	314	315	**315**
P_2	Carbon Injection Rate - (lbs/hr)	7	6	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	8,760	**8,760**
Gas Conditions						
O_2	Oxygen (dry volume %)	9.1000	9.5400	9.6600	9.1700	**9.3675**
CO_2	Carbon dioxide (dry volume %)	10.0300	9.8000	9.8200	9.9600	**9.9025**
T_s	Sample temperature (°F)	299.0000	295.6800	293.9200	293.1600	**295.4400**
B_w	Actual water vapor in gas (% by volume)	21.1322	21.4181	20.9703	20.9532	**21.1185**
Gas Flow Rate						
Q_a	Volumetric flow rate, actual (acfm)	166,667	171,649	170,019	160,160	**167,124**
Q_s	Volumetric flow rate, standard (scfm)	112,508	116,675	115,895	109,285	**113,591**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	88,733	91,685	91,592	86,387	**89,599**
Sampling Data						
V_{mstd}	Volume metered, standard (dscf)	72.3433	74.1578	73.5834	68.0672	**72.0379**
%I	Isokinetic sampling (%)	99.8050	99.0137	98.3474	97.1565	**98.5807**
Laboratory Data						
$m_{n\text{-}1b}$	Fraction 1B Prorated (µg)	<0.1000	<0.1000	<0.1000	<0.1000	**<0.1000**
$m_{n\text{-}2b}$	Fraction 2B Prorated (µg)	2.4063	2.0337	1.6400	2.1908	**2.0677**
$m_{n\text{-}3a}$	Fraction 3A Prorated (µg)	<0.2000	<0.2000	<0.2000	<0.2000	**<0.2000**
$m_{n\text{-}3b}$	Fraction 3B Prorated (µg)	<0.5000	<0.5000	<0.5000	<0.5000	**<0.5000**
$m_{n\text{-}3c}$	Fraction 3C Prorated (µg)	<0.4000	<0.4000	<0.4000	<0.4000	**<0.4000**
m_n	Total matter corrected for allowable blanks (µg)	2.4063	2.0337	1.6400	2.1908	**2.0677**
Mercury Results - Total						
C_{sd}	Concentration (lb/dscf)	7.3344E-11	6.0470E-11	4.9143E-11	7.0971E-11	**6.3482E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	8.6397E-11	7.3991E-11	6.0773E-11	8.4100E-11	**7.6315E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	8.7750E-11	7.4045E-11	6.0053E-11	8.5507E-11	**7.6839E-11**
C_a	Concentration (lb/acf)	3.9048E-11	3.2300E-11	2.6474E-11	3.8280E-11	**3.4026E-11**
C_{sd}	Concentration (µg/dscm)	1.1745E+00	9.6835E-01	7.8696E-01	1.1365E+00	**1.0166E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.3835E+00	1.1849E+00	9.7320E-01	1.3468E+00	**1.2221E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.4052E+00	1.1857E+00	9.6166E-01	1.3693E+00	**1.2305E+00**
C_{sd}	Concentration (mg/dscm)	1.1745E-03	9.6835E-04	7.8696E-04	1.1365E-03	**1.0166E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.3835E-03	1.1849E-03	9.7320E-04	1.3468E-03	**1.2221E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.4052E-03	1.1857E-03	9.6166E-04	1.3693E-03	**1.2305E-03**
C_a	Concentration (µg/m^3 (actual,wet))	6.2530E-01	5.1724E-01	4.2395E-01	6.1300E-01	**5.4487E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	1.2604E+00	1.0392E+00	8.4454E-01	1.2197E+00	**1.0910E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.4848E+00	1.2716E+00	1.0444E+00	1.4453E+00	**1.3115E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.5080E+00	1.2725E+00	1.0320E+00	1.4695E+00	**1.3205E+00**
$E_{lb/hr}$	Rate (lb/hr)	3.9048E-04	3.3265E-04	2.7007E-04	3.6786E-04	**3.4027E-04**
$E_{g/s}$	Rate (g/s)	4.9192E-05	4.1906E-05	3.4022E-05	4.6341E-05	**4.2865E-05**
$E_{T/yr}$	Rate (Ton/yr)	1.7103E-03	1.4570E-03	1.1829E-03	1.6112E-03	**1.4904E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.2432E-06	1.0647E-06	8.7449E-07	1.2102E-06	**1.0981E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.3309E-06	1.1230E-06	9.1080E-07	1.2969E-06	**1.1654E-06**

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SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Front Half Results

Run No.		**1**	**2**	**3**	**4**	**Average**
Date (2012)		Mar 21	Mar 21	Mar 21	Mar 22	
Start Time (approx.)		08:16	10:52	13:29	07:43	
Stop Time (approx.)		10:28	13:07	15:41	09:56	
Mercury Results - Front Half						
C_{sd}	Concentration (lb/dscf)	<3.0480E-12	<2.9734E-12	<2.9966E-12	<3.2394E-12	**<3.0643E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<3.5904E-12	<3.6382E-12	<3.7058E-12	<3.8387E-12	**<3.6933E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<3.6466E-12	<3.6409E-12	<3.6618E-12	<3.9029E-12	**<3.7131E-12**
C_a	Concentration (lb/acf)	<1.6227E-12	<1.5882E-12	<1.6143E-12	<1.7473E-12	**<1.6431E-12**
C_{sd}	Concentration (μg/dscm)	<4.8809E-02	<4.7615E-02	<4.7986E-02	<5.1875E-02	**<4.9071E-02**
C_{sd7}	Concentration @7% O_2 (μg/dscm)	<5.7495E-02	<5.8261E-02	<5.9343E-02	<6.1472E-02	**<5.9143E-02**
C_{sd12}	Concentration @12% CO_2 (μg/dscm)	<5.8396E-02	<5.8304E-02	<5.8639E-02	<6.2500E-02	**<5.9460E-02**
C_{sd}	Concentration (mg/dscm)	<4.8809E-05	<4.7615E-05	<4.7986E-05	<5.1875E-05	**<4.9071E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<5.7495E-05	<5.8261E-05	<5.9343E-05	<6.1472E-05	**<5.9143E-05**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<5.8396E-05	<5.8304E-05	<5.8639E-05	<6.2500E-05	**<5.9460E-05**
C_a	Concentration (μg/m^3 (actual,wet))	<2.5986E-02	<2.5433E-02	<2.5851E-02	<2.7980E-02	**<2.6313E-02**
C_{sd}	Concentration (μg/Nm^3 dry)	<5.2380E-02	<5.1099E-02	<5.1498E-02	<5.5671E-02	**<5.2662E-02**
C_{sd7}	Concentration @7% O_2 (μg/Nm^3 dry)	<6.1702E-02	<6.2524E-02	<6.3685E-02	<6.5970E-02	**<6.3470E-02**
C_{sd12}	Concentration @12% CO_2 (μg/Nm^3 dry)	<6.2668E-02	<6.2570E-02	<6.2930E-02	<6.7073E-02	**<6.3810E-02**
$E_{lb/hr}$	Rate (lb/hr)	<1.6227E-05	<1.6357E-05	<1.6468E-05	<1.6791E-05	**<1.6461E-05**
$E_{g/s}$	Rate (g/s)	<2.0443E-06	<2.0606E-06	<2.0746E-06	<2.1152E-06	**<2.0737E-06**
$E_{T/yr}$	Rate (Ton/yr)	<7.1076E-05	<7.1644E-05	<7.2129E-05	<7.3543E-05	**<7.2098E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<5.1664E-08	<5.2352E-08	<5.3324E-08	<5.5237E-08	**<5.3144E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<5.5307E-08	<5.5220E-08	<5.5538E-08	<5.9195E-08	**<5.6315E-08**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 1-3 Results

Run No.		1	2	3	4	Average
Date (2012)		Mar 21	Mar 21	Mar 21	Mar 22	
Start Time (approx.)		08:16	10:52	13:29	07:43	
Stop Time (approx.)		10:28	13:07	15:41	09:56	
Mercury Results - Impingers 1-3 Solution						
C_{sd}	Concentration (lb/dscf)	7.3344E-11	6.0470E-11	4.9143E-11	7.0971E-11	**6.3482E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	8.6397E-11	7.3991E-11	6.0773E-11	8.4100E-11	**7.6315E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	8.7750E-11	7.4045E-11	6.0053E-11	8.5507E-11	**7.6839E-11**
C_a	Concentration (lb/acf)	3.9048E-11	3.2300E-11	2.6474E-11	3.8280E-11	**3.4026E-11**
C_{sd}	Concentration (µg/dscm)	1.1745E+00	9.6835E-01	7.8696E-01	1.1365E+00	**1.0166E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.3835E+00	1.1849E+00	9.7320E-01	1.3468E+00	**1.2221E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.4052E+00	1.1857E+00	9.6166E-01	1.3693E+00	**1.2305E+00**
C_{sd}	Concentration (mg/dscm)	1.1745E-03	9.6835E-04	7.8696E-04	1.1365E-03	**1.0166E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.3835E-03	1.1849E-03	9.7320E-04	1.3468E-03	**1.2221E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.4052E-03	1.1857E-03	9.6166E-04	1.3693E-03	**1.2305E-03**
C_a	Concentration (µg/m³ (actual,wet))	6.2530E-01	5.1724E-01	4.2395E-01	6.1300E-01	**5.4487E-01**
C_{sd}	Concentration (µg/Nm³ dry)	1.2604E+00	1.0392E+00	8.4454E-01	1.2197E+00	**1.0910E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm³ dry)	1.4848E+00	1.2716E+00	1.0444E+00	1.4453E+00	**1.3115E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm³ dry)	1.5080E+00	1.2725E+00	1.0320E+00	1.4695E+00	**1.3205E+00**
$E_{lb/hr}$	Rate (lb/hr)	3.9048E-04	3.3265E-04	2.7007E-04	3.6786E-04	**3.4027E-04**
$E_{g/s}$	Rate (g/s)	4.9192E-05	4.1906E-05	3.4022E-05	4.6341E-05	**4.2865E-05**
$E_{T/yr}$	Rate (Ton/yr)	1.7103E-03	1.4570E-03	1.1829E-03	1.6112E-03	**1.4904E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.2432E-06	1.0647E-06	8.7449E-07	1.2102E-06	**1.0981E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.3309E-06	1.1230E-06	9.1080E-07	1.2969E-06	**1.1654E-06**

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SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 4 Results

Run No.		1	2	3	4	Average
Date (2012)		Mar 21	Mar 21	Mar 21	Mar 22	
Start Time (approx.)		08:16	10:52	13:29	07:43	
Stop Time (approx.)		10:28	13:07	15:41	09:56	
Mercury Results - Impinger 4 Solution						
C_{sd}	Concentration (lb/dscf)	<6.0959E-12	<5.9468E-12	<5.9932E-12	<6.4789E-12	**<6.1287E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<7.1808E-12	<7.2764E-12	<7.4115E-12	<7.6775E-12	**<7.3866E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<7.2932E-12	<7.2818E-12	<7.3237E-12	<7.8059E-12	**<7.4261E-12**
C_a	Concentration (lb/acf)	<3.2454E-12	<3.1764E-12	<3.2286E-12	<3.4946E-12	**<3.2863E-12**
C_{sd}	Concentration (µg/dscm)	<9.7618E-02	<9.5229E-02	<9.5973E-02	<1.0375E-01	**<9.8143E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<1.1499E-01	<1.1652E-01	<1.1869E-01	<1.2294E-01	**<1.1829E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<1.1679E-01	<1.1661E-01	<1.1728E-01	<1.2500E-01	**<1.1892E-01**
C_{sd}	Concentration (mg/dscm)	<9.7618E-05	<9.5229E-05	<9.5973E-05	<1.0375E-04	**<9.8143E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<1.1499E-04	<1.1652E-04	<1.1869E-04	<1.2294E-04	**<1.1829E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<1.1679E-04	<1.1661E-04	<1.1728E-04	<1.2500E-04	**<1.1892E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<5.1971E-02	<5.0866E-02	<5.1702E-02	<5.5960E-02	**<5.2625E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<1.0476E-01	<1.0220E-01	<1.0300E-01	<1.1134E-01	**<1.0532E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<1.2340E-01	<1.2505E-01	<1.2737E-01	<1.3194E-01	**<1.2694E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<1.2534E-01	<1.2514E-01	<1.2586E-01	<1.3415E-01	**<1.2762E-01**
$E_{lb/hr}$	Rate (lb/hr)	<3.2455E-05	<3.2714E-05	<3.2936E-05	<3.3581E-05	**<3.2921E-05**
$E_{g/s}$	Rate (g/s)	<4.0885E-06	<4.1212E-06	<4.1491E-06	<4.2305E-06	**<4.1473E-06**
$E_{T/yr}$	Rate (Ton/yr)	<1.4215E-04	<1.4329E-04	<1.4426E-04	<1.4709E-04	**<1.4420E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<1.0333E-07	<1.0470E-07	<1.0665E-07	<1.1047E-07	**<1.0629E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<1.1061E-07	<1.1044E-07	<1.1108E-07	<1.1839E-07	**<1.1263E-07**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 5-6 Results

	Run No.	1	2	3	4	Average
	Date (2012)	Mar 21	Mar 21	Mar 21	Mar 22	
	Start Time (approx.)	08:16	10:52	13:29	07:43	
	Stop Time (approx.)	10:28	13:07	15:41	09:56	
Mercury Results - Filtered Permanganate Solution						
C_{sd}	Concentration (lb/dscf)	<1.5240E-11	<1.4867E-11	<1.4983E-11	<1.6197E-11	**<1.5322E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.7952E-11	<1.8191E-11	<1.8529E-11	<1.9194E-11	**<1.8466E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.8233E-11	<1.8204E-11	<1.8309E-11	<1.9515E-11	**<1.8565E-11**
C_a	Concentration (lb/acf)	<8.1136E-12	<7.9411E-12	<8.0716E-12	<8.7364E-12	**<8.2157E-12**
C_{sd}	Concentration (µg/dscm)	<2.4404E-01	<2.3807E-01	<2.3993E-01	<2.5938E-01	**<2.4536E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.8748E-01	<2.9130E-01	<2.9671E-01	<3.0736E-01	**<2.9571E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.9198E-01	<2.9152E-01	<2.9320E-01	<3.1250E-01	**<2.9730E-01**
C_{sd}	Concentration (mg/dscm)	<2.4404E-04	<2.3807E-04	<2.3993E-04	<2.5938E-04	**<2.4536E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.8748E-04	<2.9130E-04	<2.9671E-04	<3.0736E-04	**<2.9571E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.9198E-04	<2.9152E-04	<2.9320E-04	<3.1250E-04	**<2.9730E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<1.2993E-01	<1.2717E-01	<1.2925E-01	<1.3990E-01	**<1.3156E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.6190E-01	<2.5549E-01	<2.5749E-01	<2.7835E-01	**<2.6331E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<3.0851E-01	<3.1262E-01	<3.1842E-01	<3.2985E-01	**<3.1735E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<3.1334E-01	<3.1285E-01	<3.1465E-01	<3.3537E-01	**<3.1905E-01**
$E_{lb/hr}$	Rate (lb/hr)	<8.1136E-05	<8.1785E-05	<8.2339E-05	<8.3953E-05	**<8.2303E-05**
$E_{g/s}$	Rate (g/s)	<1.0221E-05	<1.0303E-05	<1.0373E-05	<1.0576E-05	**<1.0368E-05**
$E_{T/yr}$	Rate (Ton/yr)	<3.5538E-04	<3.5822E-04	<3.6064E-04	<3.6772E-04	**<3.6049E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.5832E-07	<2.6176E-07	<2.6662E-07	<2.7619E-07	**<2.6572E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.7654E-07	<2.7610E-07	<2.7769E-07	<2.9597E-07	**<2.8157E-07**
Mercury Results - HCl Rinse + HCl/MnO2 Precipitate						
C_{sd}	Concentration (lb/dscf)	<1.2192E-11	<1.1894E-11	<1.1986E-11	<1.2958E-11	**<1.2257E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.4362E-11	<1.4553E-11	<1.4823E-11	<1.5355E-11	**<1.4773E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.4586E-11	<1.4564E-11	<1.4647E-11	<1.5612E-11	**<1.4852E-11**
C_a	Concentration (lb/acf)	<6.4909E-12	<6.3529E-12	<6.4573E-12	<6.9891E-12	**<6.5725E-12**
C_{sd}	Concentration (µg/dscm)	<1.9524E-01	<1.9046E-01	<1.9195E-01	<2.0750E-01	**<1.9629E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.2998E-01	<2.3304E-01	<2.3737E-01	<2.4589E-01	**<2.3657E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.3358E-01	<2.3321E-01	<2.3456E-01	<2.5000E-01	**<2.3784E-01**
C_{sd}	Concentration (mg/dscm)	<1.9524E-04	<1.9046E-04	<1.9195E-04	<2.0750E-04	**<1.9629E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.2998E-04	<2.3304E-04	<2.3737E-04	<2.4589E-04	**<2.3657E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.3358E-04	<2.3321E-04	<2.3456E-04	<2.5000E-04	**<2.3784E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<1.0394E-01	<1.0173E-01	<1.0340E-01	<1.1192E-01	**<1.0525E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.0952E-01	<2.0439E-01	<2.0599E-01	<2.2268E-01	**<2.1065E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.4681E-01	<2.5010E-01	<2.5474E-01	<2.6388E-01	**<2.5388E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.5067E-01	<2.5028E-01	<2.5172E-01	<2.6829E-01	**<2.5524E-01**
$E_{lb/hr}$	Rate (lb/hr)	<6.4909E-05	<6.5428E-05	<6.5871E-05	<6.7163E-05	**<6.5843E-05**
$E_{g/s}$	Rate (g/s)	<8.1770E-06	<8.2424E-06	<8.2982E-06	<8.4609E-06	**<8.2946E-06**
$E_{T/yr}$	Rate (Ton/yr)	<2.8430E-04	<2.8657E-04	<2.8852E-04	<2.9417E-04	**<2.8839E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.0666E-07	<2.0941E-07	<2.1329E-07	<2.2095E-07	**<2.1258E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.2123E-07	<2.2088E-07	<2.2215E-07	<2.3678E-07	**<2.2526E-07**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 SDA Inlet

USEPA Method 26A (HCl)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		08:08	09:49	12:22	
Stop Time (approx.)		09:08	10:49	13:22	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9994	0.9994	0.9994	
P_g	Static pressure (in. H_2O)	-4.5000	-4.5000	-4.5000	
A_s	Sample location area (ft^2)	60.1320	60.1320	60.1320	
P_{bar}	Barometric pressure (in. Hg)	30.05	30.05	30.05	**30.0500**
O_2	Oxygen (dry volume %)	8.4600	8.1700	8.5200	**8.3833**
CO_2	Carbon dioxide (dry volume %)	10.7200	11.0400	10.7900	**10.8500**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.8200	80.7900	80.6900	**80.7667**
V_{lc}	Total Liquid collected (ml)	171.90	168.80	161.30	
V_m	Volume metered, meter conditions (ft^3)	37.1050	37.1800	37.2350	
T_m	Dry gas meter temperature (°F)	83.0833	85.5000	86.3333	
T_s	Sample temperature (°F)	477.9167	477.5000	475.9167	**477.1111**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.2000	1.2000	1.2000	
θ	Total sampling time (min)	60.0	60.0	60.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	8.0896	7.9437	7.5908	**7.8747**
V_{mstd}	Volume metered, standard (dscf)	36.3013	36.2135	36.2117	**36.2422**
P_s	Sample gas pressure, absolute (in. Hg)	29.7191	29.7191	29.7191	**29.7191**
P_v	Vapor pressure, actual (in. Hg)	29.7191	29.7191	29.7191	**29.7191**
B_{wo}	Moisture measured in sample (% by volume)	18.2236	17.9896	17.3295	**17.8476**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	18.2236	17.9896	17.3295	**17.8476**
M_d	MW of sample gas, dry (lb/lb-mole)	30.0536	30.0932	30.0672	**30.0713**
M_s	MW of sample gas, wet (lb/lb-mole)	27.8570	27.9177	27.9760	**27.9169**

Comments:
Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 SDA Inlet

USEPA Method 26A
HCl Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		08:08	09:49	12:22	
Stop Time (approx.)		09:08	10:49	13:22	
Process Conditions					
R_P	Production Rate (Klbs/hour)	188.0	189.1	187.4	**188.2**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,750	9,750	9,750	**9,750**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	8.4600	8.1700	8.5200	**8.3833**
CO_2	Carbon dioxide (dry volume %)	10.7200	11.0400	10.7900	**10.8500**
T_s	Sample temperature (°F)	477.9167	477.5000	475.9167	**477.1111**
B_w	Actual water vapor in gas (% by volume)	18.2236	17.9896	17.3295	**17.8476**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	36.3013	36.2135	36.2117	**36.2422**
Laboratory Data					
m_n	Total HCl collected (mg)	743.5534	753.9722	678.6116	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	4.5165E-05	4.5909E-05	4.1322E-05	**4.4132E-05**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	5.0465E-05	5.0128E-05	4.6395E-05	**4.8996E-05**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	5.0557E-05	4.9901E-05	4.5956E-05	**4.8805E-05**
C_{sd}	HCl Concentration (ppmdv)	477.5082	485.3727	436.8801	**466.5870**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	533.5501	529.9827	490.5196	**518.0175**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	534.5241	527.5790	485.8722	**515.9917**
C_w	HCl Concentration (ppmwv)	390.4890	398.0558	361.1707	**383.2385**
C_{sd}	HCl Concentration (mg/dscm)	723.2496	735.1614	661.7129	**706.7079**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	808.1326	802.7292	742.9571	**784.6063**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	809.6077	799.0884	735.9179	**781.5380**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	776.1703	788.9537	710.1309	**758.4183**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	867.2642	861.4655	797.3198	**842.0165**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	868.8473	857.5583	789.7656	**838.7237**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.7398	0.7349	0.6802	**0.7183**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.7668	0.7568	0.6970	**0.7402**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 26A (HCl)
Sampling, Velocity and Moisture Parameters

Run No.		**1**	**2**	**3**	**Average**
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		08:08	09:49	12:22	
Stop Time (approx.)		09:08	10:49	13:22	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9915	0.9915	0.9915	
P_g	Static pressure (in. H_2O)	-14.7000	-16.0000	-15.8000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.05	30.05	30.05	**30.0500**
O_2	Oxygen (dry volume %)	9.6400	9.6900	9.6000	**9.6433**
CO_2	Carbon dioxide (dry volume %)	9.5200	9.7200	9.8000	**9.6800**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.8400	80.5900	80.6000	**80.6767**
V_{lc}	Total Liquid collected (ml)	226.80	222.10	222.90	
V_m	Volume metered, meter conditions (ft^3)	41.2700	41.7550	41.3650	
T_m	Dry gas meter temperature (°F)	87.3333	99.2083	89.2917	
T_s	Sample temperature (°F)	292.3333	294.6667	293.3333	**293.4444**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.5000	1.5000	1.5000	
θ	Total sampling time (min)	60.0	60.0	60.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	10.6732	10.4520	10.4897	**10.5383**
V_{mstd}	Volume metered, standard (dscf)	39.7749	39.3878	39.7244	**39.6290**
P_s	Sample gas pressure, absolute (in. Hg)	28.9691	28.8735	28.8882	**28.9103**
P_v	Vapor pressure, actual (in. Hg)	28.9691	28.8735	28.8882	**28.9103**
B_{wo}	Moisture measured in sample (% by volume)	21.1568	20.9712	20.8899	**21.0060**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	21.1568	20.9712	20.8899	**21.0060**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9088	29.9428	29.9520	**29.9345**
M_s	MW of sample gas, wet (lb/lb-mole)	27.3893	27.4382	27.4552	**27.4276**

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 26A
HCl Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		08:08	09:49	12:22	
Stop Time (approx.)		09:08	10:49	13:22	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	188.0	189.1	187.4	**188.2**
P_1	Fabric Filter Inlet Temperature (°F)	315	315	315	**315**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,750	9,750	9,750	**9,750**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.6400	9.6900	9.6000	**9.6433**
CO_2	Carbon dioxide (dry volume %)	9.5200	9.7200	9.8000	**9.6800**
T_s	Sample temperature (°F)	292.3333	294.6667	293.3333	**293.4444**
B_w	Actual water vapor in gas (% by volume)	21.1568	20.9712	20.8899	**21.0060**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	39.7749	39.3878	39.7244	**39.6290**
Laboratory Data					
m_n	Total HCl collected (mg)	7.2216	7.7832	6.8106	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	4.0035E-07	4.3572E-07	3.7804E-07	**4.0470E-07**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	4.9421E-07	5.4027E-07	4.6502E-07	**4.9983E-07**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	5.0464E-07	5.3792E-07	4.6290E-07	**5.0182E-07**
C_{sd}	HCl Concentration (ppmdv)	4.2327	4.6066	3.9968	**4.2787**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	5.2251	5.7121	4.9165	**5.2845**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	5.3353	5.6872	4.8941	**5.3055**
C_w	HCl Concentration (ppmwv)	3.3372	3.6406	3.1619	**3.3799**
C_{sd}	HCl Concentration (mg/dscm)	6.4110	6.9774	6.0538	**6.4807**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	7.9141	8.6517	7.4467	**8.0041**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	8.0811	8.6140	7.4128	**8.0360**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	6.8801	7.4879	6.4967	**6.9549**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	8.4932	9.2847	7.9915	**8.5898**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	8.6724	9.2443	7.9552	**8.6240**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.0072	0.0079	0.0068	**0.0073**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.0077	0.0082	0.0070	**0.0076**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 5/29 (Particulate/Metals) Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	**Average**
Date (2012)		Mar 20	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	
Stop Time (approx.)		10:11	09:50	12:23	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9888	0.9953	0.9953	
C_p	Pitot tube coefficient	0.8350	0.8430	0.8430	
P_g	Static pressure (in. H_2O)	-12.1000	-10.0000	-12.3000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.05	30.10	30.10	**30.0833**
D_n	Nozzle diameter (in.)	0.2770	0.2770	0.2770	
O_2	Oxygen (dry volume %)	9.4800	8.8500	9.2300	**9.1867**
CO_2	Carbon dioxide (dry volume %)	9.8100	10.1600	10.0500	**10.0067**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.7100	80.9900	80.7200	**80.8067**
V_{lc}	Total Liquid collected (ml)	470.30	493.90	479.00	
V_m	Volume metered, meter conditions (ft^3)	77.3350	80.1150	79.9150	
T_m	Dry gas meter temperature (°F)	82.2000	80.6000	85.1000	
T_s	Sample temperature (°F)	294.4400	296.6400	296.0400	**295.7067**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.2320	1.2752	1.2680	
θ	Total sampling time (min)	125.0	125.0	125.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	22.1323	23.2429	22.5417	**22.6390**
V_{mstd}	Volume metered, standard (dscf)	74.9852	78.5611	77.7167	**77.0877**
P_s	Sample gas pressure, absolute (in. Hg)	29.1603	29.3647	29.1956	**29.2402**
P_v	Vapor pressure, actual (in. Hg)	29.1603	29.3647	29.1956	**29.2402**
B_{wo}	Moisture measured in sample (% by volume)	22.7892	22.8311	22.4836	**22.7013**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	22.7892	22.8311	22.4836	**22.7013**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{}$in. H_2O)	0.6538	0.6696	0.6641	**0.6625**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9488	29.9796	29.9772	**29.9685**
M_s	MW of sample gas, wet (lb/lb-mole)	27.2258	27.2445	27.2843	**27.2515**
V_s	Velocity of sample (ft/sec)	45.4961	46.9335	46.6240	**46.3512**
%I	Isokinetic sampling (%)	99.7678	100.9673	100.5945	**100.4432**
Q_a	Volumetric flow rate, actual (acfm)	174,705	180,225	179,036	**177,989**
Q_s	Volumetric flow rate, standard (scfm)	119,164	123,431	122,007	**121,534**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	92,007	95,250	94,576	**93,944**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	75,592	82,573	79,403	**79,189**
Q_a	Volumetric flow rate, actual (acf/hr)	10,482,309	10,813,476	10,742,163	**10,679,316**
Q_s	Volumetric flow rate, standard (scf/hr)	7,149,843	7,405,835	7,320,429	**7,292,035**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,520,449	5,715,005	5,674,530	**5,636,662**
Q_a	Volumetric flow rate, actual (m^3/hr)	296,865	306,244	304,224	**302,445**
Q_s	Volumetric flow rate, standard (m^3/hr)	202,488	209,738	207,319	**206,515**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	156,342	161,852	160,706	**159,634**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	128,448	140,311	134,924	**134,561**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	188,682	195,437	193,183	**192,434**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	145,683	150,817	149,749	**148,749**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	119,690	130,744	125,724	**125,386**

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 5/202 (FPM/CPM)
Emission Parameters for FPM

	Run No.	1	2	3	Average
	Date (2012)	Mar 20	Mar 22	Mar 22	
	Start Time (approx.)	07:54	07:37	10:11	
	Stop Time (approx.)	10:11	09:50	12:23	
Process Conditions					
R_P	Steam Production Rate (Klbs/hr)	188.0	187.9	187.9	**187.9**
P_1	Fabric Filter Inlet Temperature - (°F)	315	315	315	**315**
P_2	Carbon Feed Rate - (lbs/hr)	6	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.4800	8.8500	9.2300	**9.1867**
CO_2	Carbon dioxide (dry volume %)	9.8100	10.1600	10.0500	**10.0067**
T_s	Sample temperature (°F)	294.4400	296.6400	296.0400	**295.7067**
B_w	Actual water vapor in gas (% by volume)	22.7892	22.8311	22.4836	**22.7013**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	174,705	180,225	179,036	**177,989**
Q_s	Volumetric flow rate, standard (scfm)	119,164	123,431	122,007	**121,534**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	92,007	95,250	94,576	**93,944**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	75,592	82,573	79,403	**79,189**
Q_a	Volumetric flow rate, actual (acf/hr)	10,482,309	10,813,476	10,742,163	**10,679,316**
Q_s	Volumetric flow rate, standard (scf/hr)	7,149,843	7,405,835	7,320,429	**7,292,035**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,520,449	5,715,005	5,674,530	**5,636,662**
Q_a	Volumetric flow rate, actual (m^3/hr)	296,865	306,244	304,224	**302,445**
Q_s	Volumetric flow rate, standard (m^3/hr)	202,488	209,738	207,319	**206,515**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	156,342	161,852	160,706	**159,634**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	128,448	140,311	134,924	**134,561**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	188,682	195,437	193,183	**192,434**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	145,683	150,817	149,749	**148,749**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	119,690	130,744	125,724	**125,386**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	74.9852	78.5611	77.7167	**77.0877**
%I	Isokinetic sampling (%)	99.7678	100.9673	100.5945	**100.4432**
Laboratory Data					
m_{filter}	Matter collected on filter(s) (g)	0.00190	0.00200	0.00270	
m_r	Matter collected in solvent rinse(s) (g)	0.00540	0.00490	0.00410	
m_n	Total filterable particulate matter (g)	0.00730	0.00690	0.00680	
n_{MDL}	Number of non-detectable fractions	N/A	N/A	N/A	
DLC	Detection level classification	ADL	ADL	ADL	
Filterable Particulate Matter Results					
C_{sd}	Particulate Concentration (lb/dscf)	2.1466E-07	1.9366E-07	1.9293E-07	**2.0042E-07**
C_{sd7}	Particulate Concentration @7% O_2 (lb/dscf)	2.6128E-07	2.2340E-07	2.2980E-07	**2.3816E-07**
C_{sd12}	Particulate Concentration @12% CO_2 (lb/dscf)	2.6258E-07	2.2874E-07	2.3037E-07	**2.4056E-07**
C_a	Particulate Concentration (lb/acf)	1.1305E-07	1.0235E-07	1.0192E-07	**1.0577E-07**
C_{sd}	Particulate Concentration (gr/dscf)	0.0015	0.0014	0.0014	**0.0014**
C_{sd7}	Particulate Concentration @7% O_2 (gr/dscf)	0.0018	0.0016	0.0016	**0.0017**
C_{sd12}	Particulate Concentration @12% CO_2 (gr/dscf)	0.0018	0.0016	0.0016	**0.0017**
C_a	Particulate Concentration (gr/acf)	0.0008	0.0007	0.0007	**0.0007**
C_{sd}	Particulate Concentration (mg/dscm)	3.4375	3.1013	3.0895	**3.2094**
C_{sd7}	Particulate Concentration @7% O_2 (mg/dscm)	4.1840	3.5774	3.6799	**3.8138**
C_{sd12}	Particulate Concentration @12% CO_2 (mg/dscm)	4.2049	3.6629	3.6890	**3.8523**
C_a	Particulate Concentration (mg/m^3 (actual,wet))	1.8104	1.6390	1.6320	**1.6938**
C_{sd}	Particulate Concentration (mg/Nm^3 dry)	3.6890	3.3282	3.3156	**3.4443**
C_{sd7}	Particulate Concentration @7% O_2 (mg/Nm^3 dry)	4.4902	3.8392	3.9492	**4.0928**
C_{sd12}	Particulate Concentration @12% CO_2 (mg/Nm^3 dry)	4.5126	3.9309	3.9589	**4.1341**
$E_{lb/hr}$	Particulate Rate (lb/hr)	1.1850	1.1066	1.0948	**1.1289**
$E_{kg/hr}$	Particulate Rate (kg/hr)	0.5374	0.5019	0.4965	**0.5120**
$E_{T/yr}$	Particulate Rate (Ton/yr)	5.1904	4.8476	4.7952	**4.9445**
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.0038	0.0032	0.0033	**0.0034**
E_{Fc}	Particulate Rate - F_c-based (lb/MMBtu)	0.0040	0.0035	0.0035	**0.0036**

Comments:

Average includes 3 runs.

Detection level classifications are defined as follows:

ADL = Above Detection Level - all fractions are above detection limit

DLL = Detection Level Limited - some fractions are below detection limit

BDL = Below Detection Limit - all fractions are below detection limit

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 5/29
Cadmium (Cd) Emission Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	
Stop Time (approx.)		10:11	09:50	12:23	
Process Conditions					
R_P	Steam Production Rate - (Klbs/hour)	188.0	187.9	187.9	**187.9**
P_1	Fabric Filter Inlet Temperature - (°F)	315	315	315	**315**
P_2	Carbon Feed Rate - (lbs/hr)	6	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.4800	8.8500	9.2300	**9.1867**
CO_2	Carbon dioxide (dry volume %)	9.8100	10.1600	10.0500	**10.0067**
T_s	Sample temperature (°F)	294.4400	296.6400	296.0400	**295.7067**
B_w	Actual water vapor in gas (% by volume)	22.7892	22.8311	22.4836	**22.7013**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	174,705	180,225	179,036	**177,989**
Q_s	Volumetric flow rate, standard (scfm)	119,164	123,431	122,007	**121,534**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	92,007	95,250	94,576	**93,944**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	74.9852	78.5611	77.7167	**77.0877**
%I	Isokinetic sampling (%)	99.7678	100.9673	100.5945	**100.4432**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (µg)	1.6744	2.2224	1.7914	**1.8961**
Cadmium Results - Total					
C_{sd}	Concentration (lb/dscf)	4.9238E-11	6.2378E-11	5.0827E-11	**5.4148E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	5.9931E-11	7.1954E-11	6.0539E-11	**6.4141E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	6.0230E-11	7.3674E-11	6.0689E-11	**6.4864E-11**
C_a	Concentration (lb/acf)	2.5931E-11	3.2967E-11	2.6849E-11	**2.8582E-11**
C_{sd}	Concentration (µg/dscm)	7.8848E-01	9.9889E-01	8.1392E-01	**8.6710E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	9.5971E-01	1.1522E+00	9.6945E-01	**1.0271E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	9.6450E-01	1.1798E+00	9.7184E-01	**1.0387E+00**
C_{sd}	Concentration (mg/dscm)	7.8848E-04	9.9889E-04	8.1392E-04	**8.6710E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	9.5971E-04	1.1522E-03	9.6945E-04	**1.0271E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	9.6450E-04	1.1798E-03	9.7184E-04	**1.0387E-03**
C_a	Concentration (µg/m^3 (actual,wet))	4.1525E-01	5.2792E-01	4.2995E-01	**4.5771E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	8.4618E-01	1.0720E+00	8.7347E-01	**9.3054E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.0299E+00	1.2366E+00	1.0404E+00	**1.1023E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.0351E+00	1.2661E+00	1.0430E+00	**1.1147E+00**
$E_{lb/hr}$	Rate (lb/hr)	2.7182E-04	3.5649E-04	2.8842E-04	**3.0557E-04**
$E_{g/s}$	Rate (g/s)	3.4243E-05	4.4909E-05	3.6334E-05	**3.8495E-05**
$E_{T/yr}$	Rate (Ton/yr)	1.1906E-03	1.5614E-03	1.2633E-03	**1.3384E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	8.6237E-07	1.0354E-06	8.7112E-07	**9.2296E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	9.1349E-07	1.1174E-06	9.2044E-07	**9.8378E-07**
E_{Hi}	Rate - Heat Input-based (lb/MMBtu)	N/A	N/A	N/A	
E_{Rp}	Rate - Production-based (lb/xxxxx)	1.4458E-06	1.8972E-06	1.5350E-06	**1.6260E-06**
E_{Rp}	Rate - Production-based (g/xxxxx)	6.5571E-04	8.6042E-04	6.9612E-04	**7.3742E-04**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 5/29
Lead (Pb) Emission Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 20	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	
Stop Time (approx.)		10:11	09:50	12:23	
Process Conditions					
R_P	Steam Production Rate - (Klbs/hour)	188.0	187.9	187.9	**187.9**
P_1	Fabric Filter Inlet Temperature - (°F)	315	315	315	**315**
P_2	Carbon Feed Rate - (lbs/hr)	6	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.4800	8.8500	9.2300	**9.1867**
CO_2	Carbon dioxide (dry volume %)	9.8100	10.1600	10.0500	**10.0067**
T_s	Sample temperature (°F)	294.4400	296.6400	296.0400	**295.7067**
B_w	Actual water vapor in gas (% by volume)	22.7892	22.8311	22.4836	**22.7013**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	174,705	180,225	179,036	**177,989**
Q_s	Volumetric flow rate, standard (scfm)	119,164	123,431	122,007	**121,534**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	92,007	95,250	94,576	**93,944**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	74.9852	78.5611	77.7167	**77.0877**
%I	Isokinetic sampling (%)	99.7678	100.9673	100.5945	**100.4432**
Laboratory Data					
m_n	Total matter corrected for allowable blanks (μg)	23.1840	15.2666	15.5427	**17.9978**
Lead Results - Total					
C_{sd}	Concentration (lb/dscf)	6.8174E-10	4.2849E-10	4.4098E-10	**5.1707E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	8.2979E-10	4.9428E-10	5.2525E-10	**6.1644E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	8.3394E-10	5.0609E-10	5.2655E-10	**6.2219E-10**
C_a	Concentration (lb/acf)	3.5904E-10	2.2646E-10	2.3295E-10	**2.7282E-10**
C_{sd}	Concentration (μg/dscm)	1.0917E+01	6.8617E+00	7.0617E+00	**8.2802E+00**
C_{sd7}	Concentration @7% O_2 (μg/dscm)	1.3288E+01	7.9152E+00	8.4111E+00	**9.8714E+00**
C_{sd12}	Concentration @12% CO_2 (μg/dscm)	1.3354E+01	8.1044E+00	8.4319E+00	**9.9635E+00**
C_{sd}	Concentration (mg/dscm)	1.0917E-02	6.8617E-03	7.0617E-03	**8.2802E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.3288E-02	7.9152E-03	8.4111E-03	**9.8714E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.3354E-02	8.1044E-03	8.4319E-03	**9.9635E-03**
C_a	Concentration (μg/m^3 (actual,wet))	5.7495E+00	3.6265E+00	3.7303E+00	**4.3688E+00**
C_{sd}	Concentration (μg/Nm^3 dry)	1.1716E+01	7.3638E+00	7.5784E+00	**8.8861E+00**
C_{sd7}	Concentration @7% O_2 (μg/Nm^3 dry)	1.4260E+01	8.4943E+00	9.0266E+00	**1.0594E+01**
C_{sd12}	Concentration @12% CO_2 (μg/Nm^3 dry)	1.4332E+01	8.6974E+00	9.0489E+00	**1.0693E+01**
$E_{lb/hr}$	Rate (lb/hr)	3.7635E-03	2.4488E-03	2.5024E-03	**2.9049E-03**
$E_{g/s}$	Rate (g/s)	4.7412E-04	3.0850E-04	3.1524E-04	**3.6595E-04**
$E_{T/yr}$	Rate (Ton/yr)	1.6484E-02	1.0726E-02	1.0960E-02	**1.2724E-02**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.1940E-05	7.1124E-06	7.5580E-06	**8.8702E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.2648E-05	7.6757E-06	7.9860E-06	**9.4366E-06**
E_{Hi}	Rate - Heat Input-based (lb/MMBtu)	N/A	N/A	N/A	
E_{Rp}	Rate - Production-based (lb/xxxxx)	2.0019E-05	1.3033E-05	1.3318E-05	**1.5456E-05**
E_{Rp}	Rate - Production-based (g/xxxxx)	9.0788E-03	5.9105E-03	6.0397E-03	**7.0097E-03**

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SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 29 (Mercury)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	4	Average
Date (2012)		Mar 20	Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	12:50	
Stop Time (approx.)		10:11	09:50	12:23	15:01	
Sampling Conditions						
Y_d	Dry gas meter correction factor	0.9888	0.9953	0.9953	0.9953	
C_p	Pitot tube coefficient	0.8350	0.8430	0.8430	0.8430	
P_g	Static pressure (in. H_2O)	-12.1000	-10.0000	-12.3000	-11.6000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.05	30.10	30.10	30.10	**30.0875**
D_n	Nozzle diameter (in.)	0.2770	0.2770	0.2770	0.2770	
O_2	Oxygen (dry volume %)	9.4800	8.8500	9.2300	9.2400	**9.2000**
CO_2	Carbon dioxide (dry volume %)	9.8100	10.1600	10.0500	10.0400	**10.0150**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.7100	80.9900	80.7200	80.7200	**80.7850**
V_{lc}	Total Liquid collected (ml)	470.30	493.90	479.00	510.80	
V_m	Volume metered, meter conditions (ft^3)	77.3350	80.1150	79.9150	85.1200	
T_m	Dry gas meter temperature (°F)	82.2000	80.6000	85.1000	84.7800	
T_s	Sample temperature (°F)	294.4400	296.6400	296.0400	296.4800	**295.9000**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.2320	1.2752	1.2680	1.4320	
θ	Total sampling time (min)	125.0	125.0	125.0	125.0	
Flow Results						
V_{wstd}	Volume of water collected (ft^3)	22.1323	23.2429	22.5417	24.0382	**22.9888**
V_{mstd}	Volume metered, standard (dscf)	74.9852	78.5611	77.7167	82.8602	**78.5308**
P_s	Sample gas pressure, absolute (in..Hg)	29.1603	29.3647	29.1956	29.2471	**29.2419**
P_v	Vapor pressure, actual (in. Hg)	29.1603	29.3647	29.1956	29.2471	**29.2419**
B_{wo}	Moisture measured in sample (% by volume)	22.7892	22.8311	22.4836	22.4870	**22.6477**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	22.7892	22.8311	22.4836	22.4870	**22.6477**
$\sqrt{\Delta P}$	Velocity head ($\sqrt{}$in. H_2O)	0.6538	0.6696	0.6641	0.7064	**0.6735**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9488	29.9796	29.9772	29.9760	**29.9704**
M_s	MW of sample gas, wet (lb/lb-mole)	27.2258	27.2445	27.2843	27.2830	**27.2594**
V_s	Velocity of sample (ft/sec)	45.4961	46.9335	46.6240	49.5673	**47.1552**
%I	Isokinetic sampling (%)	99.7678	100.9673	100.5945	100.7688	**100.5246**
Q_a	Volumetric flow rate, actual (acfm)	174,705	180,225	179,036	190,339	**181,076**
Q_s	Volumetric flow rate, standard (scfm)	119,164	123,431	122,007	129,862	**123,616**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	92,007	95,250	94,576	100,660	**95,623**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dscfm)	75,592	82,573	79,403	84,439	**80,502**
Q_a	Volumetric flow rate, actual (acf/hr)	10,482,309	10,813,476	10,742,163	11,420,311	**10,864,565**
Q_s	Volumetric flow rate, standard (scf/hr)	7,149,843	7,405,835	7,320,429	7,791,750	**7,416,964**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	5,520,449	5,715,005	5,674,530	6,039,620	**5,737,401**
Q_a	Volumetric flow rate, actual (m^3/hr)	296,865	306,244	304,224	323,430	**307,691**
Q_s	Volumetric flow rate, standard (m^3/hr)	202,488	209,738	207,319	220,667	**210,053**
Q_{std}	Volumetric flow rate, dry standard (dry m^3/hr)	156,342	161,852	160,706	171,046	**162,487**
Q_{std7}	Volumetric flow rate, dry std@7%O_2 (dry m^3/hr)	128,448	140,311	134,924	143,481	**136,791**
Q_s	Volumetric flow rate, normal (Nm^3/hr)	188,682	195,437	193,183	205,621	**195,731**
Q_{std}	Volumetric flow rate, dry normal (Nm^3/hr)	145,683	150,817	149,749	159,383	**151,408**
Q_{std7}	Volumetric flow rate, dry normal @7%O_2 (Nm^3/hr)	119,690	130,744	125,724	133,699	**127,464**

Comments:

Average includes 4 runs.

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SS ISOKINETIC Version 2008-13e

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters

Run No.		1	2	3	4	Average
Date (2012)		Mar 20	Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	12:50	
Stop Time (approx.)		10:11	09:50	12:23	15:01	
Process Conditions						
R_P	Steam Production Rate - (Klbs/hour)	188.0	187.9	187.9	186.7	**187.6**
P_1	Fabric Filter Inlet Temperature - (°F)	315	315	315	315	**315**
P_2	Carbon Injection Rate - (lbs/hr)	6	6	6	6	**6**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,570	9,570	9,570	9,570	**9,570**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	1,820	**1,820**
Cap	*Capacity factor (hours/year)*	8,760	8,760	8,760	8,760	**8,760**
Gas Conditions						
O_2	Oxygen (dry volume %)	9.4800	8.8500	9.2300	9.2400	**9.2000**
CO_2	Carbon dioxide (dry volume %)	9.8100	10.1600	10.0500	10.0400	**10.0150**
T_s	Sample temperature (°F)	294.4400	296.6400	296.0400	296.4800	**295.9000**
B_w	Actual water vapor in gas (% by volume)	22.7892	22.8311	22.4836	22.4870	**22.6477**
Gas Flow Rate						
Q_a	Volumetric flow rate, actual (acfm)	174,705	180,225	179,036	190,339	**181,076**
Q_s	Volumetric flow rate, standard (scfm)	119,164	123,431	122,007	129,862	**123,616**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	92,007	95,250	94,576	100,660	**95,623**
Sampling Data						
V_{mstd}	Volume metered, standard (dscf)	74.9852	78.5611	77.7167	82.8602	**78.5308**
%I	Isokinetic sampling (%)	99.7678	100.9673	100.5945	100.7688	**100.5246**
Laboratory Data						
m_{n-1b}	Fraction 1B Prorated (µg)	<0.1000	<0.1000	0.1378	<0.1000	**<0.1095**
m_{n-2b}	Fraction 2B Prorated (µg)	3.0947	3.0276	3.2500	5.2098	**3.6455**
m_{n-3a}	Fraction 3A Prorated (µg)	<0.2000	<0.2000	<0.2000	<0.2000	**<0.2000**
m_{n-3b}	Fraction 3B Prorated (µg)	<0.5000	<0.5000	<0.5000	<0.5000	**<0.5000**
m_{n-3c}	Fraction 3C Prorated (µg)	<0.4000	<0.4000	<0.4000	<0.4000	**<0.4000**
m_n	Total matter corrected for allowable blanks (µg)	3.0947	3.0276	3.3878	5.2098	**3.6800**
Mercury Results - Total						
C_{sd}	Concentration (lb/dscf)	9.1001E-11	8.4976E-11	9.6120E-11	1.3864E-10	**1.0268E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	1.1076E-10	9.8022E-11	1.1449E-10	1.6527E-10	**1.2214E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	1.1132E-10	1.0037E-10	1.1477E-10	1.6570E-10	**1.2304E-10**
C_a	Concentration (lb/acf)	4.7925E-11	4.4910E-11	5.0775E-11	7.3319E-11	**5.4232E-11**
C_{sd}	Concentration (µg/dscm)	1.4573E+00	1.3608E+00	1.5392E+00	2.2201E+00	**1.6443E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.7737E+00	1.5697E+00	1.8334E+00	2.6466E+00	**1.9558E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.7826E+00	1.6072E+00	1.8379E+00	2.6535E+00	**1.9703E+00**
C_{sd}	Concentration (mg/dscm)	1.4573E-03	1.3608E-03	1.5392E-03	2.2201E-03	**1.6443E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.7737E-03	1.5697E-03	1.8334E-03	2.6466E-03	**1.9558E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.7826E-03	1.6072E-03	1.8379E-03	2.6535E-03	**1.9703E-03**
C_a	Concentration (µg/m^3 (actual,wet))	7.6746E-01	7.1918E-01	8.1309E-01	1.1741E+00	**8.6846E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	1.5639E+00	1.4603E+00	1.6519E+00	2.3825E+00	**1.7647E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.9035E+00	1.6845E+00	1.9675E+00	2.8403E+00	**2.0989E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.9130E+00	1.7248E+00	1.9724E+00	2.8477E+00	**2.1145E+00**
$E_{lb/hr}$	Rate (lb/hr)	5.0237E-04	4.8564E-04	5.4543E-04	8.3732E-04	**5.9269E-04**
$E_{g/s}$	Rate (g/s)	6.3287E-05	6.1179E-05	6.8712E-05	1.0548E-04	**7.4665E-05**
$E_{T/yr}$	Rate (Ton/yr)	2.2004E-03	2.1271E-03	2.3890E-03	3.6675E-03	**2.5960E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.5938E-06	1.4105E-06	1.6474E-06	2.3782E-06	**1.7575E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.6883E-06	1.5222E-06	1.7407E-06	2.5132E-06	**1.8661E-06**

Prepared by Clean Air Engineering Proprietary Software
SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Front Half Results

Run No.		1	2	3	4	Average
Date (2012)		Mar 20	Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	12:50	
Stop Time (approx.)		10:11	09:50	12:23	15:01	
Mercury Results - Front Half						
C_{sd}	Concentration (lb/dscf)	<2.9406E-12	<2.8067E-12	3.9102E-12	<2.6611E-12	**<3.0797E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<3.5792E-12	<3.2376E-12	4.6574E-12	<3.1723E-12	**<3.6616E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<3.5970E-12	<3.3150E-12	4.6689E-12	<3.1806E-12	**<3.6904E-12**
C_a	Concentration (lb/acf)	<1.5486E-12	<1.4834E-12	2.0656E-12	<1.4073E-12	**<1.6262E-12**
C_{sd}	Concentration (µg/dscm)	<4.7089E-02	<4.4946E-02	6.2617E-02	<4.2614E-02	**<4.9317E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<5.7315E-02	<5.1846E-02	7.4582E-02	<5.0800E-02	**<5.8636E-02**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<5.7602E-02	<5.3086E-02	7.4767E-02	<5.0933E-02	**<5.9097E-02**
C_{sd}	Concentration (mg/dscm)	<4.7089E-05	<4.4946E-05	6.2617E-05	<4.2614E-05	**<4.9317E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<5.7315E-05	<5.1846E-05	7.4582E-05	<5.0800E-05	**<5.8636E-05**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<5.7602E-05	<5.3086E-05	7.4767E-05	<5.0933E-05	**<5.9097E-05**
C_a	Concentration (µg/m^3 (actual,wet))	<2.4799E-02	<2.3754E-02	3.3077E-02	<2.2536E-02	**<2.6042E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<5.0535E-02	<4.8235E-02	6.7199E-02	<4.5732E-02	**<5.2925E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<6.1509E-02	<5.5640E-02	8.0040E-02	<5.4518E-02	**<6.2927E-02**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<6.1816E-02	<5.6970E-02	8.0237E-02	<5.4660E-02	**<6.3421E-02**
$E_{lb/hr}$	Rate (lb/hr)	<1.6233E-05	<1.6040E-05	2.2189E-05	<1.6072E-05	**<1.7634E-05**
$E_{g/s}$	Rate (g/s)	<2.0450E-06	<2.0207E-06	2.7953E-06	<2.0247E-06	**<2.2214E-06**
$E_{T/yr}$	Rate (Ton/yr)	<7.1102E-05	<7.0257E-05	9.7187E-05	<7.0396E-05	**<7.7235E-05**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<5.1502E-08	<4.6588E-08	6.7018E-08	<4.5648E-08	**<5.2689E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<5.4555E-08	<5.0278E-08	7.0812E-08	<4.8239E-08	**<5.5971E-08**

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SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 1-3 Results

Run No.		**1**	**2**	**3**	**4**	**Average**
Date (2012)		Mar 20	Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	12:50	
Stop Time (approx.)		10:11	09:50	12:23	15:01	
Mercury Results - Impingers 1-3 Solution						
C_{sd}	Concentration (lb/dscf)	9.1001E-11	8.4976E-11	9.2210E-11	1.3864E-10	**1.0171E-10**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	1.1076E-10	9.8022E-11	1.0983E-10	1.6527E-10	**1.2097E-10**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	1.1132E-10	1.0037E-10	1.1010E-10	1.6570E-10	**1.2187E-10**
C_a	Concentration (lb/acf)	4.7925E-11	4.4910E-11	4.8710E-11	7.3319E-11	**5.3716E-11**
C_{sd}	Concentration (µg/dscm)	1.4573E+00	1.3608E+00	1.4766E+00	2.2201E+00	**1.6287E+00**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	1.7737E+00	1.5697E+00	1.7588E+00	2.6466E+00	**1.9372E+00**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	1.7826E+00	1.6072E+00	1.7631E+00	2.6535E+00	**1.9516E+00**
C_{sd}	Concentration (mg/dscm)	1.4573E-03	1.3608E-03	1.4766E-03	2.2201E-03	**1.6287E-03**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	1.7737E-03	1.5697E-03	1.7588E-03	2.6466E-03	**1.9372E-03**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	1.7826E-03	1.6072E-03	1.7631E-03	2.6535E-03	**1.9516E-03**
C_a	Concentration (µg/m^3 (actual,wet))	7.6746E-01	7.1918E-01	7.8002E-01	1.1741E+00	**8.6019E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	1.5639E+00	1.4603E+00	1.5847E+00	2.3825E+00	**1.7479E+00**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	1.9035E+00	1.6845E+00	1.8875E+00	2.8403E+00	**2.0789E+00**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	1.9130E+00	1.7248E+00	1.8921E+00	2.8477E+00	**2.0944E+00**
$E_{lb/hr}$	Rate (lb/hr)	5.0237E-04	4.8564E-04	5.2325E-04	8.3732E-04	**5.8714E-04**
$E_{g/s}$	Rate (g/s)	6.3287E-05	6.1179E-05	6.5917E-05	1.0548E-04	**7.3966E-05**
$E_{T/yr}$	Rate (Ton/yr)	2.2004E-03	2.1271E-03	2.2918E-03	3.6675E-03	**2.5717E-03**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	1.5938E-06	1.4105E-06	1.5804E-06	2.3782E-06	**1.7407E-06**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	1.6883E-06	1.5222E-06	1.6699E-06	2.5132E-06	**1.8484E-06**
E_{Rp}	Rate - Production-based (g/xxxxx)	1.2118E-03	1.1724E-03	1.2631E-03	2.0343E-03	**1.4204E-03**

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SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 4 Results

Run No.		1	2	3	4	Average
Date (2012)		Mar 20	Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	12:50	
Stop Time (approx.)		10:11	09:50	12:23	15:01	
Mercury Results - Impinger 4 Solution						
C_{sd}	Concentration (lb/dscf)	<5.8812E-12	<5.6135E-12	<5.6745E-12	<5.3222E-12	**<5.6228E-12**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<7.1583E-12	<6.4753E-12	<6.7588E-12	<6.3447E-12	**<6.6843E-12**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<7.1941E-12	<6.6301E-12	<6.7755E-12	<6.3612E-12	**<6.7402E-12**
C_a	Concentration (lb/acf)	<3.0973E-12	<2.9668E-12	<2.9975E-12	<2.8146E-12	**<2.9691E-12**
C_{sd}	Concentration (µg/dscm)	<9.4179E-02	<8.9892E-02	<9.0868E-02	<8.5228E-02	**<9.0042E-02**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<1.1463E-01	<1.0369E-01	<1.0823E-01	<1.0160E-01	**<1.0704E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<1.1520E-01	<1.0617E-01	<1.0850E-01	<1.0187E-01	**<1.0794E-01**
C_{sd}	Concentration (mg/dscm)	<9.4179E-05	<8.9892E-05	<9.0868E-05	<8.5228E-05	**<9.0042E-05**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<1.1463E-04	<1.0369E-04	<1.0823E-04	<1.0160E-04	**<1.0704E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<1.1520E-04	<1.0617E-04	<1.0850E-04	<1.0187E-04	**<1.0794E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<4.9599E-02	<4.7509E-02	<4.8001E-02	<4.5073E-02	**<4.7545E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<1.0107E-01	<9.6469E-02	<9.7517E-02	<9.1464E-02	**<9.6630E-02**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<1.2302E-01	<1.1128E-01	<1.1615E-01	<1.0904E-01	**<1.1487E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<1.2363E-01	<1.1394E-01	<1.1644E-01	<1.0932E-01	**<1.1583E-01**
$E_{lb/hr}$	Rate (lb/hr)	<3.2467E-05	<3.2081E-05	<3.2200E-05	<3.2144E-05	**<3.2223E-05**
$E_{g/s}$	Rate (g/s)	<4.0900E-06	<4.0414E-06	<4.0564E-06	<4.0494E-06	**<4.0593E-06**
$E_{T/yr}$	Rate (Ton/yr)	<1.4220E-04	<1.4051E-04	<1.4104E-04	<1.4079E-04	**<1.4114E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<1.0300E-07	<9.3176E-08	<9.7255E-08	<9.1296E-08	**<9.6183E-08**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<1.0911E-07	<1.0056E-07	<1.0276E-07	<9.6478E-08	**<1.0223E-07**

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SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 5-6 Results

Run No.		1	2	3	4	Average
Date (2012)		Mar 20	Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	12:50	
Stop Time (approx.)		10:11	09:50	12:23	15:01	
Mercury Results - Filtered Permanganate Solution						
C_{sd}	Concentration (lb/dscf)	<1.4703E-11	<1.4034E-11	<1.4186E-11	<1.3306E-11	**<1.4057E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.7896E-11	<1.6188E-11	<1.6897E-11	<1.5862E-11	**<1.6711E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.7985E-11	<1.6575E-11	<1.6939E-11	<1.5903E-11	**<1.6851E-11**
C_a	Concentration (lb/acf)	<7.7432E-12	<7.4169E-12	<7.4938E-12	<7.0366E-12	**<7.4226E-12**
C_{sd}	Concentration (µg/dscm)	<2.3545E-01	<2.2473E-01	<2.2717E-01	<2.1307E-01	**<2.2510E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.8658E-01	<2.5923E-01	<2.7058E-01	<2.5400E-01	**<2.6760E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.8801E-01	<2.6543E-01	<2.7125E-01	<2.5466E-01	**<2.6984E-01**
C_{sd}	Concentration (mg/dscm)	<2.3545E-04	<2.2473E-04	<2.2717E-04	<2.1307E-04	**<2.2510E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.8658E-04	<2.5923E-04	<2.7058E-04	<2.5400E-04	**<2.6760E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.8801E-04	<2.6543E-04	<2.7125E-04	<2.5466E-04	**<2.6984E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<1.2400E-01	<1.1877E-01	<1.2000E-01	<1.1268E-01	**<1.1886E-01**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.5267E-01	<2.4117E-01	<2.4379E-01	<2.2866E-01	**<2.4158E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<3.0755E-01	<2.7820E-01	<2.9038E-01	<2.7259E-01	**<2.8718E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<3.0908E-01	<2.8485E-01	<2.9110E-01	<2.7330E-01	**<2.8958E-01**
$E_{lb/hr}$	Rate (lb/hr)	<8.1167E-05	<8.0202E-05	<8.0500E-05	<8.0360E-05	**<8.0557E-05**
$E_{g/s}$	Rate (g/s)	<1.0225E-05	<1.0104E-05	<1.0141E-05	<1.0124E-05	**<1.0148E-05**
$E_{T/yr}$	Rate (Ton/yr)	<3.5551E-04	<3.5129E-04	<3.5259E-04	<3.5198E-04	**<3.5284E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.5751E-07	<2.3294E-07	<2.4314E-07	<2.2824E-07	**<2.4046E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.7278E-07	<2.5139E-07	<2.5690E-07	<2.4120E-07	**<2.5557E-07**
Mercury Results - HCl Rinse + HCl/MnO2 Precipitate						
C_{sd}	Concentration (lb/dscf)	<1.1762E-11	<1.1227E-11	<1.1349E-11	<1.0644E-11	**<1.1246E-11**
C_{sd7}	Concentration @7% O_2 (lb/dscf)	<1.4317E-11	<1.2951E-11	<1.3518E-11	<1.2689E-11	**<1.3369E-11**
C_{sd12}	Concentration @12% CO_2 (lb/dscf)	<1.4388E-11	<1.3260E-11	<1.3551E-11	<1.2722E-11	**<1.3480E-11**
C_a	Concentration (lb/acf)	<6.1946E-12	<5.9335E-12	<5.9950E-12	<5.6293E-12	**<5.9381E-12**
C_{sd}	Concentration (µg/dscm)	<1.8836E-01	<1.7978E-01	<1.8174E-01	<1.7046E-01	**<1.8008E-01**
C_{sd7}	Concentration @7% O_2 (µg/dscm)	<2.2926E-01	<2.0739E-01	<2.1646E-01	<2.0320E-01	**<2.1408E-01**
C_{sd12}	Concentration @12% CO_2 (µg/dscm)	<2.3041E-01	<2.1234E-01	<2.1700E-01	<2.0373E-01	**<2.1587E-01**
C_{sd}	Concentration (mg/dscm)	<1.8836E-04	<1.7978E-04	<1.8174E-04	<1.7046E-04	**<1.8008E-04**
C_{sd7}	Concentration @7% O_2 (mg/dscm)	<2.2926E-04	<2.0739E-04	<2.1646E-04	<2.0320E-04	**<2.1408E-04**
C_{sd12}	Concentration @12% CO_2 (mg/dscm)	<2.3041E-04	<2.1234E-04	<2.1700E-04	<2.0373E-04	**<2.1587E-04**
C_a	Concentration (µg/m^3 (actual,wet))	<9.9197E-02	<9.5017E-02	<9.6002E-02	<9.0145E-02	**<9.5090E-02**
C_{sd}	Concentration (µg/Nm^3 dry)	<2.0214E-01	<1.9294E-01	<1.9503E-01	<1.8293E-01	**<1.9326E-01**
C_{sd7}	Concentration @7% O_2 (µg/Nm^3 dry)	<2.4604E-01	<2.2256E-01	<2.3230E-01	<2.1807E-01	**<2.2974E-01**
C_{sd12}	Concentration @12% CO_2 (µg/Nm^3 dry)	<2.4727E-01	<2.2788E-01	<2.3288E-01	<2.1864E-01	**<2.3167E-01**
$E_{lb/hr}$	Rate (lb/hr)	<6.4933E-05	<6.4162E-05	<6.4400E-05	<6.4288E-05	**<6.4446E-05**
$E_{g/s}$	Rate (g/s)	<8.1801E-06	<8.0829E-06	<8.1128E-06	<8.0988E-06	**<8.1186E-06**
$E_{T/yr}$	Rate (Ton/yr)	<2.8441E-04	<2.8103E-04	<2.8207E-04	<2.8158E-04	**<2.8227E-04**
E_{Fd}	Rate - Fd-based (lb/MMBtu)	<2.0601E-07	<1.8635E-07	<1.9451E-07	<1.8259E-07	**<1.9237E-07**
E_{Fc}	Rate - Fc-based (lb/MMBtu)	<2.1822E-07	<2.0111E-07	<2.0552E-07	<1.9296E-07	**<2.0445E-07**

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Prepared by Clean Air Engineering Proprietary Software
SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 SDA Inlet

USEPA Method 26A (HCl)
Sampling, Velocity and Moisture Parameters

Run No.		1A*	1B*	1	2	3	Average
Date (2012)		Mar 21	Mar 21	Mar 21	Mar 21	Mar 21	
Start Time (approx.)		07:54	08:54	07:54	10:04	11:30	
Stop Time (approx.)		08:09	09:39	09:39	11:04	12:30	
Sampling Conditions				interpolated			
Y_d	Dry gas meter correction factor	0.9994	1.0059	1.0043	1.0059	1.0059	
P_g	Static pressure (in. H_2O)	-1.4000	-1.4000	-1.4000	-1.5000	-1.4000	
A_s	Sample location area (ft^2)	60.1320	60.1320	60.1320	60.1320	60.1320	
P_{bar}	Barometric pressure (in. Hg)	30.10	30.10	30.10	30.10	30.10	**30.1000**
O_2	Oxygen (dry volume %)	9.0000	9.0000	9.0000	8.4300	8.6700	**8.7000**
CO_2	Carbon dioxide (dry volume %)	10.3500	10.3500	10.3500	10.7500	10.5900	**10.5633**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.6500	80.6500	80.6500	80.8200	80.7400	**80.7367**
V_{lc}	Total Liquid collected (ml)	40.18	120.53	160.70	165.60	173.20	
V_m	Volume metered, meter conditions (ft^3)	9.2350	26.1700	35.4050	35.6450	35.7850	
T_m	Dry gas meter temperature (°F)	80.5000	82.7222	82.1667	89.5417	92.3333	
T_s	Sample temperature (°F)	494.3333	488.1111	489.6667	488.0000	492.3333	**490.0000**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.2000	1.1889	1.1917	1.2000	1.2000	
θ	Total sampling time (min)	15.0	45.0	60.0	60.0	60.0	
Flow Results							
V_{wstd}	Volume of water collected (ft^3)	1.8906	5.6719	7.5625	7.7931	8.1508	**7.8355**
V_{mstd}	Volume metered, standard (dscf)	9.0932	25.8289	34.9230	34.7447	34.7049	**34.7909**
P_s	Sample gas pressure, absolute (in. Hg)	29.9971	29.9971	29.9971	29.9897	29.9971	**29.9946**
P_v	Vapor pressure, actual (in. Hg)	29.9971	29.9971	29.9971	29.9897	29.9971	**29.9946**
B_{wo}	Moisture measured in sample (% by volume)	17.2129	18.0056	17.8003	18.3205	19.0192	**18.3800**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	17.2129	18.0056	17.8003	18.3205	19.0192	**18.3800**
M_d	MW of sample gas, dry (lb/lb-mole)	30.0160	30.0160	30.0160	30.0572	30.0412	**30.0381**
M_s	MW of sample gas, wet (lb/lb-mole)	27.9477	27.8524	27.8771	27.8483	27.7511	**27.8255**

Comments:

Average Inlcudes 3 Runs

Meter was changed out after 15 minutes

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Prepared by Clean Air Engineering Proprietary Software
SS ISOKINETIC Version 2008-13a

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 SDA Inlet

USEPA Method 26A
HCl Parameters

Run No.		1	2	3	3
Date (2012)		Mar 21	Mar 21	Mar 21	
Start Time (approx.)		07:54	07:54	10:04	
Stop Time (approx.)		09:39	09:39	11:04	
Process Conditions					
R_P	Production Rate (Klbs/hour)	188.0	188.7	183.9	**186.9**
P_1	Fabric Filter Inlet Temperature (°F)	316	316	315	**316**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,750	9,750	9,750	**9,750**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.0000	9.0000	8.4300	**8.8100**
CO_2	Carbon dioxide (dry volume %)	10.3500	10.3500	10.7500	**10.4833**
T_s	Sample temperature (°F)	489.6667	489.6667	488.0000	**489.1111**
B_w	Actual water vapor in gas (% by volume)	17.8003	17.8003	18.3205	**17.9737**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	35.4050	34.9230	34.7447	**35.0243**
Laboratory Data					
m_n	Total HCl collected (mg)	812.9424	760.0117	733.0133	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	5.0630E-05	4.7986E-05	4.6519E-05	**4.8378E-05**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	5.9139E-05	5.6051E-05	5.1854E-05	**5.5681E-05**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	5.8701E-05	5.5636E-05	5.1928E-05	**5.5422E-05**
C_{sd}	HCl Concentration (ppmdv)	535.2856	507.3395	491.8279	**511.4843**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	625.2495	592.6067	548.2283	**588.6948**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	620.6209	588.2197	549.0171	**585.9526**
C_w	HCl Concentration (ppmwv)	440.0033	417.0318	401.7227	**419.5859**
C_{sd}	HCl Concentration (mg/dscm)	810.7611	768.4331	744.9386	**774.7109**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	947.0234	897.5815	830.3646	**891.6565**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	940.0128	890.9369	831.5594	**887.5031**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	870.0851	824.6599	799.4463	**831.3971**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	1016.3178	963.2582	891.1230	**956.8997**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	1008.7943	956.1275	892.4052	**952.4423**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.8670	0.8217	0.7602	**0.8163**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.8903	0.8438	0.7876	**0.8406**

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SS EPA26-1 Version 2006-10a (CI)

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Date ________

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 26A (HCl)
Sampling, Velocity and Moisture Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 21	Mar 21	Mar 21	
Start Time (approx.)		07:54	10:04	11:30	
Stop Time (approx.)		09:40	11:04	12:30	
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.9953	0.9953	0.9953	
P_g	Static pressure (in. H_2O)	-12.7000	-12.7000	-10.7000	
A_s	Sample location area (ft^2)	64.0000	64.0000	64.0000	
P_{bar}	Barometric pressure (in. Hg)	30.05	30.05	30.05	**30.0500**
O_2	Oxygen (dry volume %)	9.4800	9.2200	9.2500	**9.3167**
CO_2	Carbon dioxide (dry volume %)	9.7700	10.0200	10.0600	**9.9500**
N_2+CO	Nitrogen plus carbon monoxide (dry volume %)	80.7500	80.7600	80.6900	**80.7333**
V_{lc}	Total Liquid collected (ml)	239.40	243.40	244.50	
V_m	Volume metered, meter conditions (ft^3)	41.4650	41.8350	41.7450	
T_m	Dry gas meter temperature (°F)	80.6250	85.0833	86.2917	
T_s	Sample temperature (°F)	295.3333	295.8333	295.3333	**295.5000**
ΔH	Meter box orifice pressure drop (in. H_2O)	1.5000	1.5000	1.5000	
θ	Total sampling time (min)	60.0	60.0	60.0	
Flow Results					
V_{wstd}	Volume of water collected (ft^3)	11.2662	11.4544	11.5062	**11.4089**
V_{mstd}	Volume metered, standard (dscf)	40.6138	40.6411	40.4639	**40.5729**
P_s	Sample gas pressure, absolute (in. Hg)	29.1162	29.1162	29.2632	**29.1652**
P_v	Vapor pressure, actual (in. Hg)	29.1162	29.1162	29.2632	**29.1652**
B_{wo}	Moisture measured in sample (% by volume)	21.7158	21.9873	22.1400	**21.9477**
B_{ws}	Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	**100.0000**
B_w	Actual water vapor in gas (% by volume)	21.7158	21.9873	22.1400	**21.9477**
M_d	MW of sample gas, dry (lb/lb-mole)	29.9424	29.9720	29.9796	**29.9647**
M_s	MW of sample gas, wet (lb/lb-mole)	27.3490	27.3397	27.3273	**27.3387**

Comments:

Average includes 3 runs.

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SS ISOKINETIC Version 2006-13e

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 26A
HCl Parameters

Run No.		1	2	3	Average
Date (2012)		Mar 21	Mar 21	Mar 21	
Start Time (approx.)		07:54	10:04	11:30	
Stop Time (approx.)		09:40	11:04	12:30	
Process Conditions					
R_P	Steam Production Rate (Klbs/hour)	188.0	188.7	183.9	**186.9**
P_1	Fabric Filter Inlet Temperature (°F)	316	316	315	**316**
F_d	Oxygen-based F-factor (dscf/MMBtu)	9,750	9,750	9,750	**9,750**
F_c	Carbon dioxide-based F-factor (dscf/MMBtu)	1,820	1,820	1,820	**1,820**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	9.4800	9.2200	9.2500	**9.3167**
CO_2	Carbon dioxide (dry volume %)	9.7700	10.0200	10.0600	**9.9500**
T_s	Sample temperature (°F)	295.3333	295.8333	295.3333	**295.5000**
B_w	Actual water vapor in gas (% by volume)	21.7158	21.9873	22.1400	**21.9477**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	40.6138	40.6411	40.4639	**40.5729**
Laboratory Data					
m_n	Total HCl collected (mg)	22.6912	24.7117	20.3079	
Hydrogen Chloride (HCl) Results					
C_{sd}	HCl Concentration (lb/dscf)	1.2320E-06	1.3407E-06	1.1066E-06	**1.2264E-06**
C_{sd7}	HCl Concentration @7% O_2 (lb/dscf)	1.4995E-06	1.5956E-06	1.3204E-06	**1.4718E-06**
C_{sd12}	HCl Concentration @12% CO_2 (lb/dscf)	1.5131E-06	1.6057E-06	1.3200E-06	**1.4796E-06**
C_{sd}	HCl Concentration (ppmdv)	13.0249	14.1752	11.7001	**12.9667**
C_{sd7}	HCl Concentration @7% O_2 (ppmdv)	15.8534	16.8694	13.9597	**15.5609**
C_{sd12}	HCl Concentration @12% CO_2 (ppmdv)	15.9979	16.9763	13.9563	**15.6435**
C_w	HCl Concentration (ppmwv)	10.1965	11.0584	9.1097	**10.1215**
C_{sd}	HCl Concentration (mg/dscm)	19.7280	21.4702	17.7213	**19.6398**
C_{sd7}	HCl Concentration @7% O_2 (mg/dscm)	24.0122	25.5510	21.1439	**23.5690**
C_{sd12}	HCl Concentration @12% CO_2 (mg/dscm)	24.2309	25.7128	21.1387	**23.6941**
C_{sd}	HCl Concentration (mg/Nm^3 dry)	21.1715	23.0412	19.0180	**21.0769**
C_{sd7}	HCl Concentration @7% O_2 (mg/Nm^3 dry)	25.7691	27.4206	22.6910	**25.2936**
C_{sd12}	HCl Concentration @12% CO_2 (mg/Nm^3 dry)	26.0039	27.5942	22.6855	**25.4278**
E_{Fd}	HCl Rate - Fd-based (lb/MMBtu)	0.0220	0.0234	0.0194	**0.0216**
E_{Fc}	HCl Rate - Fc-based (lb/MMBtu)	0.0229	0.0244	0.0200	**0.0224**

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Prepared by Clean Air Engineering Proprietary Software
SS EPA26-1 Version 2006-10a (CI)

QA/QC ________
Date ________

Wheelabrator South Broward, Inc.
CleanAir Project No. 11414
Lime Silo

Visible Emission Parameters

Run 1

Date (2012) Mar 21
Start Time 8:28

Time (min)	15	30	45	60	Time (min)	15	30	45	60	Time (min)	15	30	45	60
0	0	0	0	0	**0**	0	0	0	0	**0**	0	0	0	0
1	0	0	0	0	**1**	0	0	0	0	**1**	0	0	0	0
2	0	0	0	0	**2**	0	0	0	0	**2**	0	0	0	0
3	0	0	0	0	**3**	0	0	0	0	**3**	0	0	0	0
4	0	0	0	0	**4**	0	0	0	0	**4**	0	0	0	0
5	0	0	0	0	**5**	0	0	0	0	**5**	0	0	0	0
6	0	0	0	0	**6**	0	0	0	0	**6**	0	0	0	0
7	0	0	0	0	**7**	0	0	0	0	**7**	0	0	0	0
8	0	0	0	0	**8**	0	0	0	0	**8**	0	0	0	0
9	0	0	0	0	**9**	0	0	0	0	**9**	0	0	0	0
10	0	0	0	0	**10**	0	0	0	0	**10**	0	0	0	0
11	0	0	0	0	**11**	0	0	0	0	**11**	0	0	0	0
12	0	0	0	0	**12**	0	0	0	0	**12**	0	0	0	0
13	0	0	0	0	**13**	0	0	0	0	**13**	0	0	0	0
14	0	0	0	0	**14**	0	0	0	0	**14**	0	0	0	0
15	0	0	0	0	**15**	0	0	0	0	**15**	0	0	0	0
16	0	0	0	0	**16**	0	0	0	0	**16**	0	0	0	0
17	0	0	0	0	**17**	0	0	0	0	**17**	0	0	0	0
18	0	0	0	0	**18**	0	0	0	0	**18**	0	0	0	0
19	0	0	0	0	**19**	0	0	0	0	**19**	0	0	0	0
20	0	0	0	0	**20**	0	0	0	0	**20**	0	0	0	0
21	0	0	0	0	**21**	0	0	0	0	**21**	0	0	0	0
22	0	0	0	0	**22**	0	0	0	0	**22**	0	0	0	0
23	0	0	0	0	**23**	0	0	0	0	**23**	0	0	0	0
24	0	0	0	0	**24**	0	0	0	0	**24**	0	0	0	0
25	0	0	0	0	**25**	0	0	0	0	**25**	0	0	0	0
26	0	0	0	0	**26**	0	0	0	0	**26**	0	0	0	0
27	0	0	0	0	**27**	0	0	0	0	**27**	0	0	0	0
28	0	0	0	0	**28**	0	0	0	0	**28**	0	0	0	0
29	0	0	0	0	**29**	0	0	0	0	**29**	0	0	0	0
30	0	0	0	0	**30**	0	0	0	0	**30**	0	0	0	0
31	0	0	0	0	**31**	0	0	0	0	**31**	0	0	0	0
32	0	0	0	0	**32**	0	0	0	0	**32**	0	0	0	0
33	0	0	0	0	**33**	0	0	0	0	**33**	0	0	0	0
34	0	0	0	0	**34**	0	0	0	0	**34**	0	0	0	0
35	0	0	0	0	**35**	0	0	0	0	**35**	0	0	0	0
36	0	0	0	0	**36**	0	0	0	0	**36**	0	0	0	0
37	0	0	0	0	**37**	0	0	0	0	**37**	0	0	0	0
38	0	0	0	0	**38**	0	0	0	0	**38**	0	0	0	0
39	0	0	0	0	**39**	0	0	0	0	**39**	0	0	0	0
40	0	0	0	0	**40**	0	0	0	0	**40**	0	0	0	0
41	0	0	0	0	**41**	0	0	0	0	**41**	0	0	0	0
42	0	0	0	0	**42**	0	0	0	0	**42**	0	0	0	0
43	0	0	0	0	**43**	0	0	0	0	**43**	0	0	0	0
44	0	0	0	0	**44**	0	0	0	0	**44**	0	0	0	0
45	0	0	0	0	**45**	0	0	0	0	**45**	0	0	0	0
46	0	0	0	0	**46**	0	0	0	0	**46**	0	0	0	0
47	0	0	0	0	**47**	0	0	0	0	**47**	0	0	0	0
48	0	0	0	0	**48**	0	0	0	0	**48**	0	0	0	0
49	0	0	0	0	**49**	0	0	0	0	**49**	0	0	0	0
50	0	0	0	0	**50**	0	0	0	0	**50**	0	0	0	0
51	0	0	0	0	**51**	0	0	0	0	**51**	0	0	0	0
52	0	0	0	0	**52**	0	0	0	0	**52**	0	0	0	0
53	0	0	0	0	**53**	0	0	0	0	**53**	0	0	0	0
54	0	0	0	0	**54**	0	0	0	0	**54**	0	0	0	0
55	0	0	0	0	**55**	0	0	0	0	**55**	0	0	0	0
56	0	0	0	0	**56**	0	0	0	0	**56**	0	0	0	0
57	0	0	0	0	**57**	0	0	0	0	**57**	0	0	0	0
58	0	0	0	0	**58**	0	0	0	0	**58**	0	0	0	0
59	0	0	0	0	**59**	0	0	0	0	**59**				

Average Opacity 0
Minimum Reading 0
Maximum Reading 0
No. of Readings >5% 0

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End of Appendix

ASTM D 6866-08 AND 7459-08 CO_2 SAMPLING/ANALYSIS RESULTS

E

I herby certify that all pages contained within this Appendix have been reviewed and, to the best of my ability, verified as accurate.

QA/QC Initials: MK

Date: 4/27/12

CleanAir

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Run Number	Run Date	Run Time	Steam Flow Klbs/hour	Flue Gas Temp Deg F	Air Flow ACFM	O_2 %	CO_2 %	CO_2 Sample Rate (lpm)[1]	Stack Flow 2RSD (%)	Air Flow, DSCFM	Air Flow, DSCFM@ 7%O_2
1-O-M23-1	3/20/2012	11:15-15:43	188.4	303	172,255	8.8	10.6	0.2	12.1%	90,796	79,234
1-O-M23-2	3/21/2012	07:32-12:08	188.2	304	169,253	9.5	9.8	0.2	11.3%	90,477	74,400
		Average	**184.5**	**299**	**161,348**	**8.9**	**10.6**	**NA**	**11.7%**	**85,180**	**73,579**

[1] CO_2 gas sample flow rate was within 10% of initial flow rate throughout all test runs.

BETA

ISO-17025 Accredited Testing Laboratory

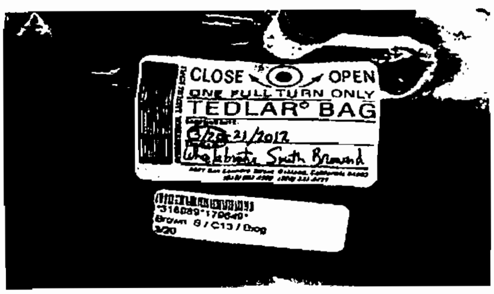
PJLA ISO/IEC 17025:2005 Testing Accreditation# 59423

Beta Analytic Inc.
4985 SW 74 Court
Miami, Florida 33155 USA
Tel: 305-667-5167
Fax: 305-663-0964
info@betalabservices.com
www.betalabservices.com

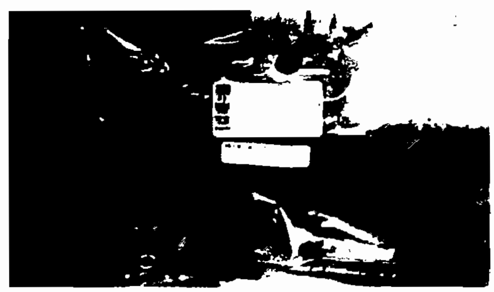
Summary of Results : Biogenic CO2 Determination using ASTM-D6866-08

Submitter:	Mr. Scott A. Brown	**Date Received**	March 23, 2012
Company:	Clean Air Engineering	**Date Reported**	March 26, 2012

Laboratory Number	Submitter Label	Material	Mean Biogenic CO2 Content*
Beta-318989	Wheelabrator South Broward: 3/20-21/2012	Biogenic CO2	62 %



Package received -labeling COC


View of content

* ASTM-D6866 cites precision on the Mean Biogenic CO2 Content as +/- 3% (absolute). This is the most conservative estimate of error in the measurement of complex biomass containing solids and liquids based on empirical results. Real precision for readily combustible and homogenous materials (e.g. gasoline) and especially samples recieved as CO2 (e.g. flue gas or CEMS exhaust) can be as low as +/- 0.5-2%. The result only applies to the analyzed material. Fluctuations in carbon content within a batch of product, gasoline or flue gas must be determined separately (e.g. averaged measurements of multiple solids or liquids, and single measurement of the combination of gas aliquots collected over time). The accuracy of the result as it applies to the analyzed product, fuel, or flue gas relies upon all the carbon in the analyzed material originating from either recently respired atmospheric carbon dioxide (within the last decade) or fossil carbon (more than 50,000 years old). "Percent biomass" specifically relates % renewable (or fossil) carbon to total carbon, not to total mass or molecular weight. Mean Biogenic CO2 estimates greater than 100% are assigned a value of 100% for simplification.

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4985 SW 74 Court
Miami, Florida 33155 USA
Tel: 305-667-5167
Fax: 305-663-0964
info@betalabservices.com
www.betalabservices.com

Summary of Results : Biogenic CO2 Determination using ASTM-D6866-08

Submitter: Mr. Scott A. Brown **Date received** March 23, 2012

Company: Clean Air Engineering **Date reported** March 26, 2012

Submitter label	Material	Laboratory Number	Percent modern carbon (pmc)	Atmospheric correction factor
Wheelabrator South Broward: 3/20-21/2012	Biogenic CO2	Beta-318989	66.2 +/- 0.2 pMC	x 0.93

* ASTM-D6866 cites precision on the Mean Biogenic CO2 Content as +/- 3% (absolute). This is the most conservative estimate of error in the measurement of complex biomass containing solids and liquids based on empirical results. Real precision for readily combustible and homogenous materials (e.g. gasoline) and especially samples recieved as CO2 (e.g. flue gas or CEMS exhaust) can be as low as +/- 0.5-2%. The result only applies to the analyzed material. Fluctuations in carbon content within a batch of product, gasoline or flue gas must be determined separately (e.g. averaged measurements of multiple solids or liquids, and single measurement of the combination of gas aliquots collected over time). The accuracy of the result as it applies to the analyzed product, fuel, or flue gas relies upon all the carbon in the analyzed material originating from either recently respired atmospheric carbon dioxide (within the last decade) or fossil carbon (more than 50,000 years old). "Percent biomass" specifically relates % renewable (or fossil) carbon to total carbon, not to total mass or molecular weight. Mean Biogenic CO2 estimates greater than 100% are assigned a value of 100% for simplification.

Beta Analytic Inc.
4985 SW 74 Court
Miami, Florida 33155 USA
Tel: 305-667-5167
Fax: 305-663-0964
info@betalabservices.com
www.betalabservices.com

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Report of Biogenic CO2 Content Analysis using ASTM-D6866-08

Submitter: Clean Air Engineering

Submitter Label: Wheelabrator South Broward: 3/20-21/2012

Laboratory Number: Beta-318989

Material: Biogenic CO2

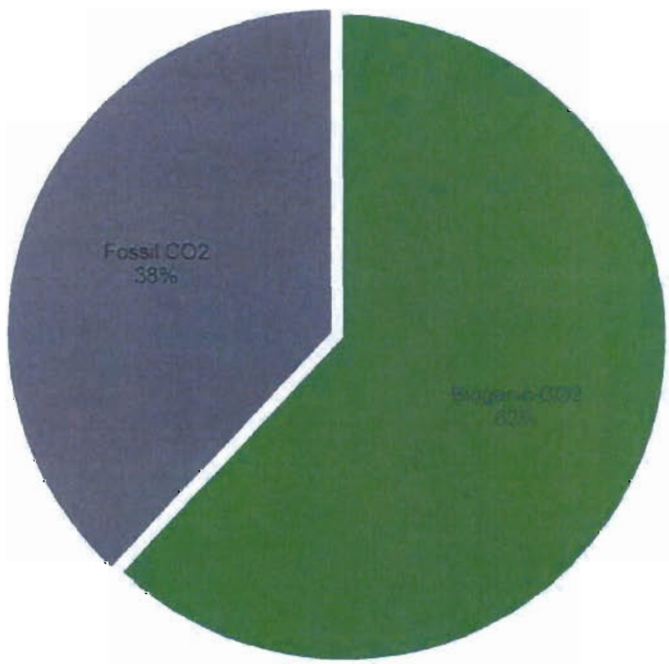
Date Receieved: March 23, 2012

Date Reported: March 26, 2012

Biogenic CO2 : 62 % *

(carbon-neutral CO2) (renewable carbon to total carbon)

Proportions Biogenic CO2 vs. Fossil CO2
indicated by C14 content



* ASTM-D6866 cites precision on the Mean Biogenic CO2 Content as +/- 3% (absolute). This is the most conservative estimate of error in the measurement of complex biomass containing solids and liquids based on empirical results. Real precision for readily combustible and homogenous materials (e.g. gasoline) and especially samples recieved as CO2 (e.g. flue gas or CEMS exhaust) can be as low as +/- 0.5-2%. The result only applies to the analyzed material. Fluctuations in carbon content within a batch of product, gasoline or flue gas must be determined separately (e.g. averaged measurements of multiple solids or liquids, and single measurement of the combination of gas aliquots collected over time). The accuracy of the result as it applies to the analyzed product, fuel, or flue gas relies upon all the carbon in the analyzed material originating from either recently respired atmospheric carbon dioxide (within the last decade) or fossil carbon (more than 50,000 years old). "Percent biomass" specifically relates % renewable (or fossil) carbon to total carbon, not to total mass or molecular weight. Mean Biogenic CO2 estimates greater than 100% are assigned a value of 100% for simplification.

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Miami, Florida 33155 USA
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Fax: 305-663-0964
info@betalabservices.com
www.betalabservices.com

Explanation of Results

Biomass Analysis using ASTM-D6866

The application of ASTM-D6866 to derive a "Biogenic CO2 content" for carbon dioxide effluents is built upon the same concepts as those used by the US Department of Agriculture to derive the biobased content of manufactured products containing biomass carbon. It is done by comparing a relative amount of radiocarbon (C14) in an unknown sample to that of a modern reference standard. The ratio in contemporary biomass will be 100% and the ratio in fossil materials will be zero. Carbon dioxide derived from combustion of a mixture of present day biomass and fossil carbon will yield an ASTM-D6866 result that directly correlates to the amount of biomass carbon combusted and carbon-neutral CO2 generated.

The modern reference standard is a National Institute of Standards and Technology (NIST) standard with a defined radiocarbon content of 100% contemporary carbon for the year AD 1950. AD 1950 was chosen since it represented a time prior to thermo-nuclear weapons testing which introduced large amounts of excess radiocarbon into the atmosphere with each explosion (termed "bomb carbon"). This was a logical point in time to use as a reference since this excess bomb carbon would change with increased or decreased weapons testing. A fixed correction for this effect is applied per the ASTM-D6866 requirements, applying specifically to carbon removed from the atmospheric CO2 reservoir since about 1996. Carbon removed prior to about 1996 will contain elevated radiocarbon signatures, not directly applicable to the ASTM-D6866 correction. Typical areas to which the correction may not apply are landfills more than 5-10 years old and to trees which began to grow more than 10 years ago.

Carbon dioxide effluent derived from combustion of 100% present day biomass will yield results of 100% renewable content. Carbon dioxide effluent derived from the combustion of 100% fossil fuel will yield results of 0% renewable content. Carbon dioxide produced from mixed fuels (biomass plus fossil fuel) will yield a percentage result in direct proportion to the biomass carbon consumed vs. fossil carbon consumed in the combustion. The final result is referred to as the MEAN BIOMASS CO2 CONTENT and assumes all the carbon in the carbon dioxide was derived from either present day living or fossil sources.

The results provided in this report involved materials provided without any source information. This situation is highly probable in a real life situation. The MEAN VALUE quoted in this report encompasses an absolute range of 6% (plus and minus 3% on either side of the MEAN BIOGENIC CO2 CONTENT to account for variations in end component radiocarbon signatures (a conservative approximation). It is presumed that all materials are present day or fossil in origin and that the desired result is the amount of biomass component "present" in the material, not the amount of biomass material "used" in the manufacturing process. The most conservative interpretation of the reported percentages is as maximum values.

ASTM-D6866 results relate directly to the percentage carbon-neutral CO2 in an incineration effluent. A value of 71% renewable content measured on CO2 effluent would indicate that 71% of the exhausted CO2 was from biomass (29% from fossil fuel). It does not represent the weight of biomass combusted or the weight of fossil fuel combusted. This is advantageous since the weight of the fuels only indirectly relate to the up-take of carbon dioxide from the atmosphere. The respiration uptake compound was carbon dioxide and the combustion effluent was carbon dioxide. The ASTM-D6866 result directly and specifically relates to the amount of carbon-neutral CO2 consumed and expelled.

ASTM-D6866 results presume all the carbon in the analyte was either present day or fossil. This assumption does not apply well to landfills older than 5-10 years since they will include excess bomb carbon from perhaps 20-40 years ago, or to older trees that began growing more than 20 years ago. The "present day" end-component is ambiguous in such cases. The method best applies to high concentration CO2 effluents from combustion sources. Results obtained which are greater than 100 % are reported as 100% for simplification.

*318989*179649*
Brown, S / C13 / Biog
3/20

66-11414SB-17

CLIENT Wheelabrator
PLANT South Broward
PROJECT MANAGER S. Brown

PROJECT 11414SB
DEPT. 66

CleanAir.
ENGINEERING
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
ASTM-D6866	1	Tedlar Bag

FORWARDING LAB
Beta Analytic, Inc.
4985 SW 74 Court
Miami, FL 33155
305-667-5167

ANALYSIS REQUESTED

LAB ID NUMBER	RUN NUMBER	TEST LOCATION	DATE (2012)	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	ASTM-D6866			Archive	ADDITIONAL INFORMATION
	1	Wheelabrator South Broward	3/20-21/2012	Tedlar Bag	1		X				
											Please return Tedlar Bags to:
											CleanAir
											500 West Wood Street
											Palatine, IL 60067
											Attn: Scott Brown

Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:
S. Brown						S. Brown
Received By: (signature)	Date / Time	Received By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Signature Date

QA/QC DATA

F

I herby certify that all pages contained within this Appendix have been reviewed and, to the best of my ability, verified as accurate.

QA/QC Initials: ML

Date: 4/27/12

CleanAir

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 5/29 (Particulate/Metals)
QA/QC Results

Run No.		1	2	3	
Date (2012)		Mar 20	Mar 20	Mar 20	
Start Time (approx.)		07:52	10:29	13:04	
Stop Time (approx.)		10:05	12:44	15:20	
Total Duration of Test Run (min.)		133	135	136	
Net Sampling Time (min.)		125	125	125	
Sampling System Calibration Summary					
	Nozzle ID No:	276-1	276-1	276-1	
D_n	Nozzle Diameter (in):	0.276	0.276	0.276	
	Probe ID No:	67-8-21	67-8-21	67-8-21	
C_p	Pitot Coefficient:	0.8430	0.8430	0.8430	
	Meter Box ID. No:	85-3	85-3	85-3	
Y_d	Meter Box Yd - Field Sheet	0.9925	0.9925	0.9925	
	Meter Box Yd - Database	0.9925	0.9925	0.9925	
	Meter Box ΔH@ - Field Sheet	1.7792	1.7792	1.7792	
	Meter Box ΔH@ - Database	1.7792	1.7792	1.7792	
QA/QC					
	Final Leak Check				
	(a) 4% of Sampling Rate (cfm)	0.0237	0.0248	0.0250	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0020	0.0010	0.0010	
	Sample Volume				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	72.238	74.644	75.329	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)				
$\sqrt{\Delta H}_{avg}$	Average of Square Root of ΔH (in. W.C.)	1.0493	1.0929	1.1016	
Y_{qa}	Alternative Meter Calibration Factor	0.9859	0.9888	0.9884	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	-0.7%	-0.4%	-0.4%	**-0.5%**
	Mean Isokinetic Sampling Rate Variation				
	Minimum Allowable (%)	90	90	90	
	Maximum Allowable (%)	110	110	110	
%I	Actual Variation (%)	102.01	99.75	100.36	
	Point-by-Point Isokinetic Variation				
	Number of points <90%	0	0	0	
	Number of points >110%	0	0	0	
	Number of points <80%	0	0	0	
	Number of points >120%	0	0	0	

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MNK@

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 29 (Mercury) QA/QC Results

	Run No.	1	2	3	4	
	Date (2012)	Mar 20	Mar 20	Mar 20	Mar 21	
	Start Time (approx.)	07:52	10:29	13:04	13:18	
	Stop Time (approx.)	10:05	12:44	15:20	15:38	
	Total Duration of Test Run (min.)	133	135	136	140	
	Net Sampling Time (min.)	125	125	125	125	
Sampling System Calibration Summary						
	Nozzle ID No:	276-1	276-1	276-1	276-1	
D_n	Nozzle Diameter (in):	0.276	0.276	0.276	0.276	
	Probe ID No:	67-8-21	67-8-21	67-8-21	67-8-21	
C_p	Pitot Coefficient:	0.8430	0.8430	0.8430	0.843	
	Meter Box ID. No:	85-3	85-3	85-3	85-3	
Y_d	Meter Box Yd - Field Sheet	0.9925	0.9925	0.9925	0.9925	
	Meter Box Yd - Database	0.9925	0.9925	0.9925	0.9925	
	Meter Box ΔH@ - Field Sheet	1.7792	1.7792	1.7792	1.7792	
	Meter Box ΔH@ - Database	1.7792	1.7792	1.7792	1.7792	
QA/QC						
	Final Leak Check					
	(a) 4% of Sampling Rate (cfm)	0.0237	0.0248	0.0250	0.0254	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0020	0.0010	0.0010	0.0090	
	Sample Volume					
	Minimum Volume Required (dscf)	30.00	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	72.238	74.644	75.329	77.088	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)					
$\sqrt{\Delta H}_{avg}$	Average of Square Root of ΔH (in. W.C.)	1.0493	1.0929	1.1016	1.1281	
Y_{qa}	Alternative Meter Calibration Factor	0.9859	0.9888	0.9884	0.9920	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	-0.7%	-0.4%	-0.4%	-0.1%	**-0.4%**
	Mean Isokinetic Sampling Rate Variation					
	Minimum Allowable (%)	90	90	90	90	
	Maximum Allowable (%)	110	110	110	110	
%I	Actual Variation (%)	102.01	99.75	100.36	101.36	
	Point-by-Point Isokinetic Variation					
	Number of points <90%	0	0	0	0	
	Number of points >110%	0	0	0	0	
	Number of points <80%	0	0	0	0	
	Number of points >120%	0	0	0	0	

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEAP Method 23 (PCDD/PCDF)
QA/QC Results

Run No.		**1**	**2**	**3**	
Date (2012)		Mar 20	Mar 21	Mar 21	
Start Time (approx.)		11:15	07:32	12:31	
Stop Time (approx.)		15:43	12:08	16:54	
Total Duration of Test Run (min.)		268	276	263	
Net Sampling Time (min.)		250	250	250	
Sampling System Calibration Summary					
	Nozzle ID No:	274-1	276-1	276-1	
D_n	Nozzle Diameter (in):	0.274	0.276	0.276	
	Probe ID No:	67-8-14	67-8-21	67-8-21	
C_p	Pitot Coefficient:	0.8280	0.8430	0.8430	
	Meter Box ID. No:	61-5	61-5	61-5	
Y_d	Meter Box Yd - Field Sheet	0.9992	0.9992	0.9992	
	Meter Box Yd - Database	0.9992	0.9992	0.9992	
	Meter Box ΔH@ - Field Sheet	1.7185	1.7185	1.7185	
	Meter Box ΔH@ - Database	1.7185	1.7185	1.7185	
QA/QC					
	Final Leak Check				
	(a) 4% of Sampling Rate (cfm)	0.0238	0.0237	0.0241	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0020	0.0030	0.0020	
	Sample Volume				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	145.170	145.279	147.871	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)				
$\sqrt{\Delta H_{avg}}$	Average of Square Root of ΔH (in. W.C.)	1.0383	1.0275	1.0441	
Y_{qa}	Alternative Meter Calibration Factor	0.9926	0.9459	0.9532	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	-0.7%	-5.3%	-4.6%	**-3.5%**
	Mean Isokinetic Sampling Rate Variation				
	Minimum Allowable (%)	90	90	90	
	Maximum Allowable (%)	110	110	110	
%I	Actual Variation (%)	100.02	100.45	103.06	
	Point-by-Point Isokinetic Variation				
	Number of points <90%	0	0	0	
	Number of points >110%	0	0	0	
	Number of points <80%	0	0	0	
	Number of points >120%	0	0	0	

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 SDA Inlet

USEPA Method 26A (HCl)
QA/QC Results

Run No.		1	2	3	
Date (2012)		Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:44	09:07	10:32	
Stop Time (approx.)		08:44	10:07	11:32	
Total Duration of Test Run (min.)		60	60	60	
Net Sampling Time (min.)		60	60	60	
Sampling System Calibration Summary					
	Probe ID No:	66-4-7	66-4-7	66-4-7	
C_p	Pitot Coefficient:	0.8310	0.8310	0.8310	
	Meter Box ID. No:	66-20	66-20	66-20	
Y_d	Meter Box Yd - Field Sheet	1.0059	1.0059	1.0059	
	Meter Box Yd - Database	1.0059	1.0059	1.0059	
	Meter Box ΔH@ - Field Sheet	1.8082	1.8082	1.8082	
	Meter Box ΔH@ - Database	1.8082	1.8082	1.8082	
QA/QC					
	Final Leak Check				
	(a) 4% of Sampling Rate (cfm)	0.0234	0.0236	0.0239	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0030	0.0030	0.0020	
	Sample Volume				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	34.586	34.613	34.949	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)				
$\sqrt{\Delta H}_{avg}$	Average of Square Root of ΔH (in. W.C.)	1.0877	1.0916	1.0954	
Y_{qa}	Alternative Meter Calibration Factor	1.0269	1.0251	1.0188	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	2.1%	1.9%	1.3%	**1.8%**

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MJK@

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SS ISOKINETIC Version 2006-13e

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 26A (HCl)
QA/QC Results

Run No.		1	2	3	
Date (2012)		Mar 22	Mar 22	Mar 22	
Start Time (approx.)		07:44	09:07	10:32	
Stop Time (approx.)		08:44	10:07	11:32	
Total Duration of Test Run (min.)		60	60	60	
Net Sampling Time (min.)		60	60	60	
Sampling System Calibration Summary					
	Nozzle ID No:	NA	NA	NA	
D_n	Nozzle Diameter (in):	NA	NA	NA	
	Probe ID No:	67-4-1	67-4-1	67-4-1	
C_p	Pitot Coefficient:	NA	NA	NA	
	Meter Box ID. No:	85-3	85-3	85-3	
Y_d	Meter Box Yd - Field Sheet	0.9925	0.9925	0.9925	
	Meter Box Yd - Database	0.9925	0.9925	0.9925	
	Meter Box ΔH@ - Field Sheet	1.7792	1.7792	1.7792	
	Meter Box ΔH@ - Database	1.7792	1.7792	1.7792	
QA/QC					
	Final Leak Check				
	(a) 4% of Sampling Rate (cfm)	0.0273	0.0275	0.0278	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0020	0.0020	0.0040	
	Sample Volume				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	40.147	40.185	40.373	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)				
$\sqrt{\Delta H_{avg}}$	Average of Square Root of ΔH (in. W.C.)	1.2247	1.2247	1.2247	
Y_{qa}	Alternative Meter Calibration Factor	0.9985	0.9939	0.9876	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	0.6%	0.1%	-0.5%	**0.1%**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 5/29 (Particulate/Metals)
QA/QC Results

	Run No.	**1**	**2**	**3**	
	Date (2012)	Mar 21	Mar 21	Mar 21	
	Start Time (approx.)	08:16	10:52	13:29	
	Stop Time (approx.)	10:28	13:07	15:41	
	Total Duration of Test Run (min.)	132	135	132	
	Net Sampling Time (min.)	125	125	125	
	Sampling System Calibration Summary				
	Nozzle ID No:	277-1	277-1	277-1	
D_n	Nozzle Diameter (in):	0.277	0.277	0.277	
	Probe ID No:	67-8-19	67-8-19	67-8-19	
C_p	Pitot Coefficient:	0.8350	0.8350	0.8350	
	Meter Box ID. No:	66-11	66-11	66-11	
Y_d	Meter Box Yd - Field Sheet	0.9915	0.9915	0.9915	
	Meter Box Yd - Database	0.9915	0.9915	0.9915	
	Meter Box ΔH@ - Field Sheet	1.8118	1.8118	1.8118	
	Meter Box ΔH@ - Database	1.8118	1.8118	1.8118	
	QA/QC				
	Final Leak Check				
	(a) 4% of Sampling Rate (cfm)	0.0241	0.0247	0.0246	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0020	0.0030	0.0040	
	Sample Volume				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	72.343	74.158	73.583	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)				
$\sqrt{\Delta H}_{avg}$	Average of Square Root of ΔH (in. W.C.)	1.0712	1.1013	1.0983	
Y_{qa}	Alternative Meter Calibration Factor	0.9899	0.9927	0.9962	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	-0.2%	0.1%	0.5%	**0.1%**
	Mean Isokinetic Sampling Rate Variation				
	Minimum Allowable (%)	90	90	90	
	Maximum Allowable (%)	110	110	110	
%I	Actual Variation (%)	99.81	99.01	98.35	
	Point-by-Point Isokinetic Variation				
	Number of points <90%	0	0	0	
	Number of points >110%	0	0	0	
	Number of points <80%	0	0	0	
	Number of points >120%	0	0	0	

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 29 (Mercury)
QA/QC Results

Run No.		1	2	3	4	
Date (2012)		Mar 21	Mar 21	Mar 21	Mar 22	
Start Time (approx.)		08:16	10:52	13:29	07:43	
Stop Time (approx.)		10:28	13:07	15:41	09:56	
Total Duration of Test Run (min.)		132	135	132	133	
Net Sampling Time (min.)		125	125	125	125	
Sampling System Calibration Summary						
	Nozzle ID No:	277-1	277-1	277-1	276-1	
D_n	Nozzle Diameter (in):	0.277	0.277	0.277	0.276	
	Probe ID No:	67-8-19	67-8-19	67-8-19	67-8-19	
C_p	Pitot Coefficient:	0.8350	0.8350	0.8350	0.835	
	Meter Box ID. No:	66-11	66-11	66-11	66-11	
Y_d	Meter Box Yd - Field Sheet	0.9915	0.9915	0.9915	0.9915	
	Meter Box Yd - Database	0.9915	0.9915	0.9915	0.9915	
	Meter Box ΔH@ - Field Sheet	1.8118	1.8118	1.8118	1.8118	
	Meter Box ΔH@ - Database	1.8118	1.8118	1.8118	1.8118	
QA/QC						
	Final Leak Check					
	(a) 4% of Sampling Rate (cfm)	0.0241	0.0247	0.0246	0.0226	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0020	0.0030	0.0040	0.0010	
	Sample Volume					
	Minimum Volume Required (dscf)	30.00	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	72.343	74.158	73.583	68.067	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)					
$\sqrt{\Delta H_{avg}}$	Average of Square Root of ΔH (in. W.C.)	1.0712	1.1013	1.0983	1.0169	
Y_{qa}	Alternative Meter Calibration Factor	0.9899	0.9927	0.9962	0.9997	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	-0.2%	0.1%	0.5%	0.8%	**0.3%**
	Mean Isokinetic Sampling Rate Variation					
	Minimum Allowable (%)	90	90	90	90	
	Maximum Allowable (%)	110	110	110	110	
%I	Actual Variation (%)	99.81	99.01	98.35	97.16	
	Point-by-Point Isokinetic Variation					
	Number of points <90%	0	0	0	0	
	Number of points >110%	0	0	0	0	
	Number of points <80%	0	0	0	0	
	Number of points >120%	0	0	0	0	

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 SDA Inlet

USEPA Method 26A (HCl)
QA/QC Results

	Run No.	**1**	**2**	**3**	
	Date (2012)	Mar 20	Mar 20	Mar 20	
	Start Time (approx.)	08:08	09:49	12:22	
	Stop Time (approx.)	09:08	10:49	13:22	
	Total Duration of Test Run (min.)	60	60	60	
	Net Sampling Time (min.)	60	60	60	
	Sampling System Calibration Summary				
	Nozzle ID No:	NA	NA	NA	
D_n	Nozzle Diameter (in):	NA	NA	NA	
	Probe ID No:	66-4-7	66-4-7	66-4-7	
C_p	Pitot Coefficient:	0.8310	0.8310	0.8310	
	Meter Box ID. No:	66-7	66-7	66-7	
Y_d	Meter Box Yd - Field Sheet	0.9994	0.9994	0.9994	
	Meter Box Yd - Database	0.9994	0.9994	0.9994	
	Meter Box ΔH@ - Field Sheet	1.7396	1.7396	1.7396	
	Meter Box ΔH@ - Database	1.7396	1.7396	1.7396	
	QA/QC				
	Final Leak Check				
	(a) 4% of Sampling Rate (cfm)	0.0247	0.0248	0.0248	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0040	0.0020	0.0020	
	Sample Volume				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	36.301	36.213	36.212	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)				
$\sqrt{\Delta H}_{avg}$	Average of Square Root of ΔH (in. W.C.)	1.0954	1.0954	1.0954	
Y_{qa}	Alternative Meter Calibration Factor	0.9996	0.9991	0.9988	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	0.0%	0.0%	-0.1%	**0.0%**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 26A (HCl)
QA/QC Results

Run No.		1	2	3	
	Date (2012)	Mar 20	Mar 20	Mar 20	
	Start Time (approx.)	08:08	09:49	12:22	
	Stop Time (approx.)	09:08	10:49	13:22	
	Total Duration of Test Run (min.)	60	60	60	
	Net Sampling Time (min.)	60	60	60	
Sampling System Calibration Summary					
	Nozzle ID No:	NA	NA	NA	
D_n	Nozzle Diameter (in):	NA	NA	NA	
	Probe ID No:	67-4-1	67-4-1	67-4-1	
C_p	Pitot Coefficient:	NA	NA	NA	
	Meter Box ID. No:	66-11	66-11	66-11	
Y_d	Meter Box Yd - Field Sheet	0.9915	0.9915	0.9915	
	Meter Box Yd - Database	0.9915	0.9915	0.9915	
	Meter Box ΔH@ - Field Sheet	1.8118	1.8118	1.8118	
	Meter Box ΔH@ - Database	1.8118	1.8118	1.8118	
QA/QC					
	Final Leak Check				
	(a) 4% of Sampling Rate (cfm)	0.0275	0.0278	0.0276	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0060	0.0020	0.0020	
	Sample Volume				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	39.775	39.388	39.724	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)				
$\sqrt{\Delta H}_{avg}$	Average of Square Root of ΔH (in. W.C.)	1.2247	1.2247	1.2247	
Y_{qa}	Alternative Meter Calibration Factor	0.9904	0.9889	0.9892	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	-0.1%	-0.3%	-0.2%	**-0.2%**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 5/29 (Particulate/Metals)
QA/QC Results

Run No.		1	2	3	
Date (2012)		Mar 20	Mar 22	Mar 22	
Start Time (approx.)		07:54	07:37	10:11	
Stop Time (approx.)		10:11	09:50	12:23	
Total Duration of Test Run (min.)		137	133	132	
Net Sampling Time (min.)		125	125	125	
Sampling System Calibration Summary					
	Nozzle ID No:	277-1	277-2	277-2	
D_n	Nozzle Diameter (in):	0.277	0.277	0.277	
	Probe ID No:	67-8-19	67-8-28	67-8-21	
C_p	Pitot Coefficient:	0.8350	0.8430	0.8430	
	Meter Box ID. No:	66-21	66-4	66-4	
Y_d	Meter Box Yd - Field Sheet	0.9888	0.9953	0.9953	
	Meter Box Yd - Database	0.9888	0.9953	0.9953	
	Meter Box ΔH@ - Field Sheet	1.8162	1.7374	1.7374	
	Meter Box ΔH@ - Database	1.8162	1.7374	1.7374	
QA/QC					
	Final Leak Check				
	(a) 4% of Sampling Rate (cfm)	0.0247	0.0256	0.0256	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0010	0.0020	0.0030	
	Sample Volume				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	74.985	78.561	77.717	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)				
$\sqrt{\Delta H}_{avg}$	Average of Square Root of ΔH (in. W.C.)	1.1074	1.1270	1.1237	
Y_{qa}	Alternative Meter Calibration Factor	0.9894	0.9909	0.9946	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	0.1%	-0.4%	-0.1%	**-0.1%**
	Mean Isokinetic Sampling Rate Variation				
	Minimum Allowable (%)	90	90	90	
	Maximum Allowable (%)	110	110	110	
%I	Actual Variation (%)	99.77	100.97	100.59	
	Point-by-Point Isokinetic Variation				
	Number of points <90%	2	0	0	
	Number of points >110%	0	0	0	
	Number of points <80%	0	0	0	
	Number of points >120%	0	0	0	

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 29 (Mercury)
QA/QC Results

	Run No.	**1**	**2**	**3**	**4**	
	Date (2012)	Mar 20	Mar 22	Mar 22	Mar 22	
	Start Time (approx.)	07:54	07:37	10:11	12:50	
	Stop Time (approx.)	10:11	09:50	12:23	15:01	
	Total Duration of Test Run (min.)	137	133	132	131	
	Net Sampling Time (min.)	125	125	125	125	
	Sampling System Calibration Summary					
	Nozzle ID No:	277-1	277-2	277-2	277-2	
D_n	Nozzle Diameter (in):	0.277	0.277	0.277	0.277	
	Probe ID No:	67-8-19	67-8-28	67-8-21	67-8-21	
C_p	Pitot Coefficient:	0.8350	0.8430	0.8430	0.843	
	Meter Box ID. No:	66-21	66-4	66-4	66-4	
Y_d	Meter Box Yd - Field Sheet	0.9888	0.9953	0.9953	0.9953	
	Meter Box Yd - Database	0.9888	0.9953	0.9953	0.9953	
	Meter Box ΔH@ - Field Sheet	1.8162	1.7374	1.7374	1.7374	
	Meter Box ΔH@ - Database	1.8162	1.7374	1.7374	1.7374	
QA/QC						
	Final Leak Check					
	(a) 4% of Sampling Rate (cfm)	0.0247	0.0256	0.0256	0.0272	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0010	0.0020	0.0030	0.0040	
	Sample Volume					
	Minimum Volume Required (dscf)	30.00	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	74.985	78.561	77.717	82.860	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)					
$\sqrt{\Delta H_{avg}}$	Average of Square Root of ΔH (in. W.C.)	1.1074	1.1270	1.1237	1.1933	
Y_{qa}	Alternative Meter Calibration Factor	0.9894	0.9909	0.9946	0.9911	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	0.1%	-0.4%	-0.1%	-0.4%	**-0.2%**
	Mean Isokinetic Sampling Rate Variation					
	Minimum Allowable (%)	90	90	90	90	
	Maximum Allowable (%)	110	110	110	110	
%I	Actual Variation (%)	99.77	100.97	100.59	100.77	
	Point-by-Point Isokinetic Variation					
	Number of points <90%	2	0	0	0	
	Number of points >110%	0	0	0	0	
	Number of points <80%	0	0	0	0	
	Number of points >120%	0	0	0	0	

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 SDA Inlet

USEPA Method 26A (HCl)
QA/QC Results

	Run No.	1A*	1B*	2	3	
	Date (2012)	Mar 21	Mar 21	Mar 21	Mar 21	
	Start Time (approx.)	07:54	08:54	10:04	11:30	
	Stop Time (approx.)	08:09	09:39	11:04	12:30	
	Total Duration of Test Run (min.)	15	45	60	60	
	Net Sampling Time (min.)	15	45	60	60	
	Sampling System Calibration Summary					
	Probe ID No:	66-4-7	66-4-7	66-4-7	66-4-7	
C_p	Pitot Coefficient:	0.8310	0.8310	0.8310	0.831	
	Meter Box ID. No:	66-7	66-20	66-20	66-20	
Y_d	Meter Box Yd - Field Sheet	0.9994	1.0059	1.0059	1.0059	
	Meter Box Yd - Database	0.9994	1.0059	1.0059	1.0059	
	Meter Box ΔH@ - Field Sheet	1.7396	1.8082	1.8082	1.8082	
	Meter Box ΔH@ - Database	1.7396	1.8082	1.8082	1.8082	
QA/QC						
	Final Leak Check					
	(a) 4% of Sampling Rate (cfm)	0.0246	0.0233	0.0238	0.0239	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0040	0.0040	0.0020	0.0030	
	Sample Volume					
	Minimum Volume Required (dscf)	NA	NA	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	NA	NA	34.745	34.705	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)					
$\sqrt{\Delta H}_{avg}$	Average of Square Root of ΔH (in. W.C.)	1.0954	1.0903	1.0954	1.0954	**66-20**
Y_{qa}	Alternative Meter Calibration Factor	1.0014	1.0371	1.0257	1.0246	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	0.2%	3.1%	2.0%	1.9%	**2.3%**

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 26A (HCl)
QA/QC Results

	Run No.	1	2	3	
	Date (2012)	Mar 21	Mar 21	Mar 21	
	Start Time (approx.)	07:54	10:04	11:30	
	Stop Time (approx.)	09:40	11:04	12:30	
	Total Duration of Test Run (min.)	106	60	60	
	Net Sampling Time (min.)	60	60	60	
Sampling System Calibration Summary					
	Nozzle ID No:	NA	NA	NA	
D_n	Nozzle Diameter (in):	NA	NA	NA	
	Probe ID No:	67-4-1	67-4-1	67-4-1	
C_p	Pitot Coefficient:	NA	NA	NA	
	Meter Box ID. No:	66-4	66-4	66-4	
Y_d	Meter Box Yd - Field Sheet	0.9953	0.9953	0.9953	
	Meter Box Yd - Database	0.9953	0.9953	0.9953	
	Meter Box ΔH@ - Field Sheet	1.7374	1.7374	1.7374	
	Meter Box ΔH@ - Database	1.7374	1.7374	1.7374	
QA/QC					
	Final Leak Check				
	(a) 4% of Sampling Rate (cfm)	0.0276	0.0279	0.0278	
	(b) Allowable Rate from Method (cfm)	0.0200	0.0200	0.0200	
	Allowable Limit - minimum of a and b (cfm)	0.0200	0.0200	0.0200	
	Actual Final Leak Rate (cfm)	0.0020	0.0020	0.0020	
	Sample Volume				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	
V_{mstd}	Actual Sample Volume (dscf)	40.614	40.641	40.464	
	Alternative Method 5 Post-Test Calibration (EPA ALT-009)				
$\sqrt{\Delta H_{avg}}$	Average of Square Root of ΔH (in. W.C.)	1.2247	1.2247	1.2247	
Y_{qa}	Alternative Meter Calibration Factor	0.9999	0.9946	0.9977	**Average**
	Variation from full-test Y_d (average ≤ ±5%)	0.5%	-0.1%	0.2%	**0.2%**

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Nozzle Calibration Sheet

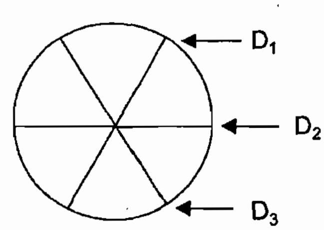
Client	Wheelabrator South/North	Project Number	11414
Calibrated by	S. Brown	Caliper ID	11679028
Date	3/19/12	Unit / Runs	

	Nozzle Identification	D_1 (inches)	D_2 (inches)	D_3 (inches)	ΔD (inches)	D_{ave} (inches)
5/29	0.276-1	0.2760	0.2765	0.2750	0.0010	~~0.2758~~ SB 0.276
5/29	0.277-1	0.2770	0.2770	0.2695	0.0005	0.277
23	0.274-1	0.2740	0.2750	0.2740	0.0010	0.274
5/29	0.277-2	0.2770	0.2770	0.2760	0.0010	0.277
5/29	0.274-2	0.2750	0.2740	0.2740	0.0010	0.274

D_1, D_2, D_3 = three nozzle diameter measurements

ΔD = maximum difference between any two diameters
$\Delta D \leq 0.004$ inches*

D_{ave} = average of D_1, D_2, D_3



* (40 CFR 60, Appendix A, Method 5, Section 5.1)

QA/QC SB
Date 3/28

CleanAir ENGINEERING

Meter Box Full Test Calibration

Meter Box Serial No: 61-5

Calibration Signature:

Date of Calibration: 5/2/2011

Meter Box Yd: 0.9992

Standard Meter Serial No: 11AH6

Meter Box ΔH@: 1.7185

Date of Calibration: 10/26/2010

Barometer Serial No: W12637

Calibration Conducted by: Oleg Lavrov

Barometric Pressure: 29.39

				Standard Meter Gas Volume (ft^3)			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)			Time (min.)	Calibration Results	
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	T_{is} In	T_{os} Out	T_{ds} Avg.	T_i In	T_o Out	T_d Avg.	Θ	Y_d	ΔH@
0.980	3.00	-1.80	1.0000	0.000	10.000	10.000	696.428	706.508	10.080	70.0	70.0	70.00	84.0	76.0	80.00	9.98	0.9987	1.6997
0.979	3.00	-1.80	1.0000	0.000	10.000	10.000	706.508	716.627	10.119	70.0	70.0	70.00	85.0	77.0	81.00	9.99	0.9967	1.6999
0.389	0.50	-1.00	1.0000	0.000	5.000	5.000	752.146	757.182	5.036	70.0	70.0	70.00	78.0	76.0	77.00	12.58	1.0022	1.8004
0.389	0.50	-1.00	1.0000	0.000	5.000	5.000	757.182	762.223	5.041	70.0	70.0	70.00	78.0	76.0	77.00	12.58	1.0012	1.8004
0.703	1.50	-1.40	1.0000	0.000	10.000	10.000	776.034	786.160	10.126	70.0	70.0	70.00	83.0	76.0	79.50	13.92	0.9980	1.6533
0.701	1.50	-1.40	1.0000	0.000	10.000	10.000	786.160	796.294	10.134	70.0	70.0	70.00	83.0	77.0	80.00	13.95	0.9981	1.6573
																Averages	0.99916	1.71849

Nomenclature

- P_b Barometric Pressure (in. Hg)
- Q Flow Rate (cfm)
- ΔH Orifice Pressure differential (in. H_2O)
- ΔP Inlet Pressure Differential (in. H_2O)
- V_d Gas Meter Volume - Dry (ft^3)
- V_{ds} Standard Meter Volume - Dry (ft^3)
- T_d Average Meter Box Temperature (°F)
- T_o Outlet Meter Box Temperature (°F)
- T_{ds} Average Standard Meter Temperature (°F)
- Y_d Meter Correction Factor (unitless), $Y_i \le Y_{avg} \pm 0.02$
- Y_{ds} Standard Meter Correction Factor (unitless)
- ΔH@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \le \Delta H@_{avg} \pm 0.2$
- Θ Duration of Run (minutes)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
5.1	5.0
10.1	10.0
15.2	15.0
20.2	20.0
25.3	25.0

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CleanAir ENGINEERING

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 61-5 Office: ____

Calibrated by: Oleg Lavrov Client: ____

Date: 5/2/11 Job No: ____

Temperature Scale Used: Fahrenheit Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	51	51	51				
100	101	101	101				
150	151	151	150				
200	201	201	201				
250	251	251	251				
300	301	301	300				
350	351	351	350				
400	401	401	400				
450	451	451	450				
500	501	501	500				
550	551	551	550				
600	601	601	600				

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A Serial No: T-279500

Calibrated By: JH Metrology Date Calibrated: 8/17/2010

Calibration Report No: 1000150487 Calibration Due Date: 8/17/2011

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Meter Box Critical Orifice Post-Test Calibration Data

Project No.	11414	Meter No.	61-5	Orifice	A-4
Location	warehouse	Meter Yd	0.9992	Orifice K'	0.4997
Test Date	04/16/12	Meter ΔH@	1.7185	Orifice Cal. Date	02/10/12
Operator	P. Bihun	Full Test Cal. Date	05/02/11		

Leak Checks

Negative Pressure

No movement of manometer in one-minute ☑ Pass

Positive Pressure

No movement of manometer in one-minute ☑ Pass

Important: All leak checks must pass in order for calibration to be valid.

Barom. Press. (P_b) 29.23 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. - T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - Θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run T_m (°F)	DGM Calibration Factor - Y_i	Percent Variation - ΔY_i
	0.0	830.70	69	68								
1	5.0	834.01	70	69	71	1.30	19	5.0	3.31	69.0	0.9791	-0.1%
2	10.0	837.30	71	69	73	1.30	19	5.0	3.29	69.8	0.9846	0.4%
3	15.0	840.61	71	69	75	1.30	19	5.0	3.31	70.0	0.9773	-0.3%
										Average Y_i	0.9804	
										Cal. Error	-1.9%	

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times \left(P_b + \Delta H/13.6\right) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \overline{Y_i}}{\overline{Y_i}} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y_i} - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

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CleanAir ENGINEERING

Client: Source	**Reviewed By:** M. Vaquero	**Calibration Signature:**	
ID No: 66-4	**Calibrated By:** Jeff Ivens	**Meter Box Yd:** 0.9953	
Dept No: 66	**Date of Calibration:** 11/02/11	**Meter Box ΔH@:** 1.7374	
Meter Box Serial No: 08R-5010-63-M	**Due Date of Calibration:** 11/02/12	**Barometer Serial No:** W12637	
Manufacturer Part No: 0028	**Meter Box Vacuum:** 1.0 in. H_2O	**Barometric Pressure:** 29.27 in. Hg	

				Standard Meter Gas Volume (ft^3)			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)			Time (min.)	Calibration Results	
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	T_{is} In	T_{os} Out	T_{ds} Avg.	T_i In	T_o Out	T_d Avg.	Θ	Y_d	ΔH@
0.398	0.50	-1.20	1.0000	0.000	5.000	5.000	916.700	921.788	5.088	70.5	70.5	70.50	80.0	77.0	78.50	12.23	0.9933	1.7086
0.398	0.50	-1.20	1.0000	0.000	5.000	5.000	921.788	926.864	5.076	70.5	70.5	70.50	80.0	77.0	78.50	12.23	0.9956	1.7086
0.681	1.50	-1.50	1.0000	0.000	10.000	10.000	888.600	898.746	10.146	70.5	70.5	70.50	83.0	77.0	80.00	14.30	0.9957	1.7520
0.679	1.50	-1.50	1.0000	0.000	10.000	10.000	898.746	908.895	10.149	70.5	70.5	70.50	84.0	78.0	81.00	14.33	0.9973	1.7561
0.967	3.00	-1.80	1.0000	0.000	10.000	10.000	855.200	865.292	10.092	70.5	70.5	70.50	83.0	76.0	79.50	10.07	0.9956	1.7408
0.962	3.00	-1.80	1.0000	0.000	10.000	10.000	865.292	875.408	10.116	70.5	70.5	70.50	84.0	76.0	80.00	10.12	0.9942	1.7582
																Averages	0.99529	1.73738

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Nomenclature

- P_b Barometric Pressure (in. Hg)
- Q Flow Rate (cfm)
- ΔH Orifice Pressure differential (in. H_2O)
- ΔP Inlet Pressure Differential (in. H_2O)
- V_d Gas Meter Volume - Dry (ft^3)
- V_{ds} Standard Meter Volume - Dry (ft^3)
- T_d Average Meter Box Temperature (°F)
- T_o Outlet Meter Box Temperature (°F)
- T_{ds} Average Standard Meter Temperature (°F)
- Y_d Meter Correction Factor (unitless), $Y_i \leq Y_{avg} \pm 0.02$
- Y_{ds} Standard Meter Correction Factor (unitless)
- ΔH@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$
- Θ Duration of Run (minutes)

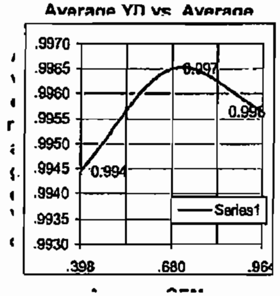
Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Average YD vs. Average



Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
5.2	5.0
10.2	10.0
15.2	15.0
20.0	20.0
25.3	25.0

Calibration Reference Information (Standard Meter)

Reference Used: Wet Test Meter	Serial No: 11AH6
Calibrated By: Martin Vaquero	Date Calibrated: 10/26/2011
Percent Error: 0.196%	Calibration Due Date: 10/26/2012

Meter Box Pre-Calibration Inspection

Positive Leak Check:	Pass	Electrical Check:	Pass
Negative Leak Check:	Pass	Pyrometer Chec!	Pass
Vacuum Gauge Check	Pass	YD Tolerance: ± 2%	Pass

CleanAir ENGINEERING

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-4

Office:

Calibrated by: Jeff Ivens

Client: SOURCE 66

Date: 11/2/11

Job No:

Temperature Scale Used: Fahrenheit

Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	50	52	52				
100	100	102	102				
150	150	152	152				
200	200	202	202				
250	250	252	252				
300	300	302	302				
350	350	352	352				
400	400	402	402				
450	450	452	452				
500	500	502	502				
550	550	552	552				
600	600	602	602				

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A

Serial No: T-225950

Calibrated By: JH Metrology

Date Calibrated: 11/10/2011

Calibration Report No: R044791

Calibration Due Date: 11/10/2012

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Meter Box Critical Orifice Post-Test Calibration Data

Project No.	11414	Meter No.	66-4	Orifice	A-4
Location	warehouse	Meter Yd	0.9953	Orifice K'	0.4997
Test Date	04/06/12	Meter ΔH@	1.7374	Orifice Cal. Date	02/10/12
Operator	k. sullivan	Full Test Cal. Date	11/02/11		

Leak Checks

Negative Pressure

No movement of manometer in one-minute ☑ Pass

Positive Pressure

No movement of manometer in one-minute ☑ Pass

Important: All leak checks must pass in order for calibration to be valid.

Barom. Press. (P_b) 29.55 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. - T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - Θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run - T_m (°F)	DGM Calibration Factor - Y_i	Percent Variation - ΔY_i
	0.0	410.10	68	66								
	5.0	413.35	69	66	69	1.30	16	5.0	3.25	67.3	0.9958	0.0%
	10.0	416.61	71	67	69	1.30	16	5.0	3.26	68.3	0.9947	-0.1%
	15.0	419.87	72	67	70	1.30	16	5.0	3.26	69.3	0.9956	0.0%

Average Y_i	0.9954
Cal. Error	0.0%

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times \left(P_b + \Delta H/13.6\right) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \overline{Y_i}}{\overline{Y_i}} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y_i} - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CleanAir ENGINEERING

Client: Source
ID No: 66-7
Dept No: 66
Meter Box Serial No: 66-7
Manufacturer Part No: 0028

Reviewed By: M. Vaquero
Calibrated By: Jeff Ivens
Date of Calibration: 11/09/11
Due Date of Calibration: 11/09/12
Meter Box Vacuum: 1.0 in. H_2O

Calibration Signature:
Meter Box Yd: 0.9994
Meter Box ΔH@: 1.7396
Barometer Serial No: W12637
Barometric Pressure: 28.65 in. Hg

				Standard Meter Gas Volume (ft^3)			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)			Time (min.)	Calibration Results	
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	T_{is} In	T_{os} Out	T_{ds} Avg.	T_i In	T_o Out	T_d Avg.	Θ	Y_d	ΔH@
0.387	0.50	-1.20	1.0000	0.000	5.000	5.000	986.900	991.961	5.061	69.5	69.5	69.50	79.0	77.0	78.00	12.33	0.9994	1.7676
0.388	0.50	-1.20	1.0000	0.000	5.000	5.000	991.961	997.013	5.052	69.5	69.5	69.50	79.0	77.0	78.00	12.31	1.0012	1.7619
0.682	1.50	-1.50	1.0000	0.000	10.000	10.000	13.702	23.844	10.142	69.5	69.5	69.50	84.0	77.0	80.50	14.00	0.9988	1.7091
0.682	1.50	-1.50	1.0000	0.000	10.000	10.000	23.844	34.006	10.162	69.5	69.5	69.50	85.0	77.0	81.00	13.99	0.9977	1.7067
0.954	3.00	-1.80	1.0000	0.000	10.000	10.000	952.202	962.327	10.125	69.0	69.0	69.00	87.0	78.0	82.50	10.01	1.0005	1.7409
0.953	3.00	-1.80	1.0000	0.000	10.000	10.000	962.327	972.462	10.135	69.0	69.0	69.00	87.0	77.0	82.00	10.03	0.9986	1.7512
																Averages	0.99936	1.73955

Nomenclature

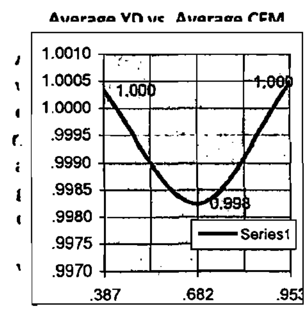
P_b	Barometric Pressure (in. Hg)
Q	Flow Rate (cfm)
ΔH	Orifice Pressure differential (in. H_2O)
ΔP	Inlet Pressure Differential (in. H_2O)
V_d	Gas Meter Volume - Dry (ft^3)
V_{ds}	Standard Meter Volume - Dry (ft^3)
T_d	Average Meter Box Temperature (°F)
T_o	Outlet Meter Box Temperature (°F)
T_{ds}	Average Standard Meter Temperature (°F)
Y_d	Meter Correction Factor (unitless), $Y_i \le Y_{avg} \pm 0.02$
Y_{ds}	Standard Meter Correction Factor (unitless)
ΔH@	Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \le \Delta H@_{avg} \pm 0.2$
Θ	Duration of Run (minutes)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$



Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
5.2	5.0
10.0	10.0
15.0	15.0
19.7	20.0
24.9	25.0

Calibration Reference Information (Standard Meter)

Reference Used: Wet Test Meter
Calibrated By: Martin Vaquero
Percent Error: 0.196%
Serial No: 11AH6
Date Calibrated: 10/26/2011
Calibration Due Date: 10/26/2012

Meter Box Pre-Calibration Inspection

Positive Leak Check: Pass
Electrical Check: Pass
Negative Leak Check: ss
Vacuum Gauge Check: ss

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Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-7

Office:

Calibrated by: Jeff Ivens

Client: SOURCE 66

Date: 11/9/11

Job No:

Temperature Scale Used: Fahrenheit

Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	50	50	51				
100	99	100	101				
150	150	150	151				
200	201	200	201				
250	252	250	251				
300	302	300	301				
350	351	350	351				
400	400	400	401				
450	450	450	451				
500	500	500	501				
550	550	550	551				
600	601	600	601				

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A

Serial No: T-225950

Calibrated By: JH Metrology

Date Calibrated: 11/10/2011

Calibration Report No: R044791

Calibration Due Date: 11/10/2012

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Meter Box Critical Orifice Post-Test Calibration Data

Project No. 11414
Location warehouse
Test Date 04/16/12
Operator P. Bihun

Meter No. 66-7
Meter Yd 0.9994
Meter ΔH@ 1.7396
Full Test Cal. Date 01/19/11

Orifice A-4
Orifice K' 0.4997
Orifice Cal. Date 02/10/12

Leak Checks

Negative Pressure

No movement of manometer in one-minute ☑ Pass

Positive Pressure

No movement of manometer in one-minute ☑ Pass

Important: All leak checks must pass in order for calibration to be valid.

Barom. Press. (P_b) 29.23 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. - T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - Θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run T_m (°F)	DGM Calibration Factor - Y_i	Percent Variation - ΔY_i
	0.0	443.70	71	69								
1	5.0	446.97	71	69	69	1.30	20	5.0	3.27	70.0	0.9949	0.4%
2	10.0	450.25	71	69	72	1.30	20	5.0	3.28	70.0	0.9890	-0.2%
3	15.0	453.53	71	69	72	1.30	20	5.0	3.28	70.0	0.9890	-0.2%
										Average Y_i	0.9910	
										Cal. Error	-0.8%	

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times \left(P_b + \Delta H / 13.6\right) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

CDS005B-Meter Post-CO, February 2004

CleanAir ENGINEERING

Meter Box Full Test Calibration

Meter Box Serial No: 66-11

Date of Calibration: 7/25/2011

Standard Meter Serial No: 11AH6

Date of Calibration: 10/26/2010

Calibration Conducted by: Martin Vaquero

Calibration Signature: Martin Vaquero

Meter Box Yd: 0.9915

Meter Box ΔH@: 1.8118

Barometer Serial No: W12637

Barometric Pressure: 29.22

				Standard Meter Gas Volume (ft³)			Meter Box Gas Volume (ft³)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)			Time (min.)	Calibration Results	
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	T_{is} In	T_{os} Out	T_{ds} Avg.	T_i In	T_o Out	T_d Avg.	Θ	Y_d	ΔH@
0.953	3.00	-1.80	1.0000	0.000	10.000	10.000	48.593	58.716	10.123	79.0	79.0	79.00	94.0	81.0	87.50	10.03	0.9914	1.7694
0.952	3.00	-1.80	1.0000	0.000	10.000	10.000	58.716	68.869	10.153	79.0	79.0	79.00	95.0	83.0	89.00	10.04	0.9912	1.7664
0.378	0.50	-0.90	1.0000	0.000	5.000	5.000	73.527	78.626	5.099	78.5	78.5	78.50	89.0	84.0	86.50	12.67	0.9917	1.8684
0.378	0.50	-0.90	1.0000	0.000	5.000	5.000	78.626	83.727	5.101	78.5	78.5	78.50	89.0	84.0	86.50	12.67	0.9913	1.8684
0.665	1.50	-1.50	1.0000	0.000	10.000	10.000	89.422	99.637	10.215	78.5	78.5	78.50	94.0	86.0	90.00	14.39	0.9923	1.8010
0.665	1.50	-1.50	1.0000	0.000	10.000	10.000	99.637	109.873	10.236	78.5	78.5	78.50	94.0	87.0	90.50	14.39	0.9912	1.7977
																Averages	0.99151	1.81185

Nomenclature

- P_b Barometric Pressure (in. Hg)
- Q Flow Rate (cfm)
- ΔH Orifice Pressure differential (in. H_2O)
- ΔP Inlet Pressure Differential (in. H_2O)
- V_d Gas Meter Volume - Dry (ft³)
- V_{ds} Standard Meter Volume - Dry (ft³)
- T_d Average Meter Box Temperature (°F)
- T_o Outlet Meter Box Temperature (°F)
- T_{ds} Average Standard Meter Temperature (°F)
- Y_d Meter Correction Factor (unitless), $Y_i \le Y_{avg} \pm 0.02$
- Y_{ds} Standard Meter Correction Factor (unitless)
- ΔH@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \le \Delta H@_{avg} \pm 0.2$
- Θ Duration of Run (minutes)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
5.0	4.7
10.0	9.9
15.0	15.0
20.0	20.3
25.0	25.9

CleanAir ENGINEERING

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Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-11

Office:

Calibrated by: Martin Vaquero

Client:

Date: 7/25/11

Job No:

Temperature Scale Used: Fahrenheit

Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	48	51	51				
100	98	101	101				
150	148	151	151				
200	198	201	201				
250	248	251	250				
300	298	301	301				
350	348	351	351				
400	398	401	401				
450	448	451	451				
500	498	501	501				
550	548	551	550				
600	598	601	601				

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A

Serial No: T-279500

Calibrated By: JH Metrology

Date Calibrated: 8/17/2010

Calibration Report No: 1000150487

Calibration Due Date: 8/17/2011

Meter Box Critical Orifice Post-Test Calibration Data

Project No.	11414	Meter No.	66-11	Orifice	A-4
Location	Warehouse	Meter Yd	0.9915	Orifice K'	0.4997
Test Date	04/03/12	Meter ΔH@	1.8118	Orifice Cal. Date	02/10/12
Operator	J Rooney	Full Test Cal. Date	07/25/11		

Leak Checks

Negative Pressure

No movement of manometer in one-minute ☑ Pass

Positive Pressure

No movement of manometer in one-minute ☑ Pass

Important: All leak checks must pass in order for calibration to be valid.

Barom. Press. (P_b) 29.05 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. - T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - Θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run T_m (°F)	DGM Calibration Factor - Y_i	Percent Variation - ΔY_i
	0.0	895.00	69	68								
	5.0	898.29	70	69	73	1.30	20	5.0	3.29	69.0	0.9832	0.1%
	10.0	901.60	71	69	75	1.30	20	5.0	3.31	69.8	0.9768	-0.5%
	15.0	904.88	72	70	76	1.30	20	5.0	3.28	70.5	0.9862	0.4%
										Average Y_i	0.9821	
										Cal. Error	-0.9%	

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times \left(P_b + \Delta H/13.6\right) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \overline{Y_i}}{\overline{Y_i}} \times 100 \qquad \text{Spec.}: \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y_i} - Y_d}{Y_d} \times 100 \qquad \text{Spec.}: Cal.Error \le \pm 5\%$$

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Clean Air Engineering - Meter Box Full Test Calibration

Client:	Source	**Reviewed By:**	M. Vaquero	**Calibration Signature:**	
ID No:	66-20	**Calibrated By:**	Jeff Ivens	**Meter Box Yd:**	1.0059
Dept No:	Source	**Date of Calibration:**	03/15/12	**Meter Box ΔH@:**	1.8082
Meter Box Serial No:	n/a	**Due Date of Calibration:**	03/16/13	**Barometer Serial No:**	W12637
Manufacturer Part No:	0028	**Meter Box Vacuum:**	1.0 in. H_2O	**Barometric Pressure:**	29.21 in. Hg

				Standard Meter Gas Volume (ft^3)			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)			Time (min.)	Calibration Results	
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	T_{is} In	T_{os} Out	T_{ds} Avg.	T_i In	T_o Out	T_d Avg.	Θ	Y_d	ΔH@
0.391	0.50	-1.20	1.0000	0.000	5.000	5.000	702.400	707.435	5.035	72.5	72.5	72.50	85.0	81.0	83.00	12.36	1.0083	1.7489
0.396	0.50	-1.20	1.0000	0.000	5.000	5.000	707.435	712.472	5.037	72.5	72.6	72.50	84.0	81.0	82.50	12.21	1.0070	1.7067
0.649	1.50	-1.50	1.0000	0.000	10.000	10.000	729.482	739.599	10.117	73.0	73.0	73.00	89.0	82.0	85.50	14.89	1.0040	1.9037
0.654	1.50	-1.50	1.0000	0.000	10.000	10.000	739.599	749.723	10.124	73.0	73.0	73.00	90.0	83.0	86.50	14.79	1.0052	1.8747
0.945	3.00	-1.80	1.0000	0.000	10.000	10.000	675.703	685.757	10.054	72.5	72.5	72.50	90.0	81.0	85.50	10.24	1.0067	1.8006
0.941	3.00	-1.80	1.0000	0.000	10.000	10.000	685.757	695.823	10.066	72.5	72.5	72.50	89.0	81.0	85.00	10.28	1.0046	1.8147
																Averages	1.00595	1.80823

Nomenclature

- P_b Barometric Pressure (in. Hg)
- Q Flow Rate (cfm)
- ΔH Orifice Pressure differential (in. H_2O)
- ΔP Inlet Pressure Differential (in. H_2O)
- V_d Gas Meter Volume - Dry (ft^3)
- V_{ds} Standard Meter Volume - Dry (ft^3)
- T_d Average Meter Box Temperature (°F)
- T_o Outlet Meter Box Temperature (°F)
- T_{ds} Average Standard Meter Temperature (°F)
- Y_d Meter Correction Factor (unitless), $Y_i \leq Y_{avg} \pm 0.02$
- Y_{ds} Standard Meter Correction Factor (unitless)
- ΔH@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$
- Θ Duration of Run (minutes)

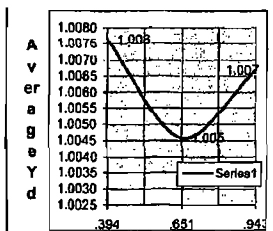
Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P/13.6}{P_b + \Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Average YD vs. Average CFM



Average CFM

Vacuum Gauge	
Standard (in.Hg)	Gauge (in.Hg)
4.9	5.0
9.3	10.0
14.1	15.0
19.1	20.0
24.1	25.0

Calibration Reference Information (Standard Meter)

Reference Used:	Wet Test Meter	Serial No:	11AH6
Calibrated By:	Martin Vaquero	Date Calibrated:	10/26/2011
Percent Error:	0.230%	Calibration Due Date:	10/26/2012

Meter Box Pre-Calibration Inspection

Positive Leak Check:	Pass	Electrical Check:	Pass
Negative Leak Check:	Pass	Pyrometer Check	Pass
Vacuum Gauge Check	Pass	YD Tolerance: ± 2% of 1.0000	Pass

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Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-20 | Office: n/a

Calibrated by: Jeff Ivens | Client: Source

Date: 3/15/12 | Job No: n/a

Temperature Scale Used: Fahrenheit | Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6	7
50	52	52	52	52	51		
100	102	102	102	102	101		
150	152	152	152	152	151		
200	202	202	202	202	201		
250	252	252	252	251	251		
300	302	302	302	301	301		
350	352	352	352	351	351		
400	402	402	402	401	401		
450	452	452	452	451	451		
500	502	502	502	501	501		
550	552	552	552	551	551		
600	601	602	602	602	601		

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A | Serial No: T-279500

Calibrated By: JH Metrology | Date Calibrated: 8/18/2011

Calibration Report No: 1000150187 | Calibration Due Date: 8/18/2012

Meter Box Full Test Calibration

Meter Box Serial No: 85-3

Date of Calibration: 5/16/2011

Standard Meter Serial No: 11AH6

Date of Calibration: 10/26/2010

Calibration Conducted by: Martin Vaquero

Calibration Signature: Martin Vaquero

Meter Box Yd: 0.9925

Meter Box ΔH@: 1.7792

Barometer Serial No: W12637

Barometric Pressure: 29.25

				Standard Meter Gas Volume (ft³)			Meter Box Gas Volume (ft³)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)			Time (min.)	Calibration Results	
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	T_{is} In	T_{os} Out	T_{ds} Avg.	T_i In	T_o Out	T_d Avg.	Θ	Y_d	ΔH@
0.959	3.00	-1.70	1.0000	0.000	10.000	10.000	52.139	62.429	10.290	66.5	66.5	66.50	86.0	79.0	82.50	10.22	0.9896	1.7575
0.960	3.00	-1.70	1.0000	0.000	10.000	10.000	62.429	72.719	10.290	66.5	66.5	66.50	87.0	80.0	83.50	10.21	0.9914	1.7508
0.387	0.50	-0.80	1.0000	0.000	5.000	5.000	74.125	79.278	5.153	66.5	66.5	66.50	81.0	79.0	80.00	12.65	0.9919	1.7951
0.387	0.50	-0.80	1.0000	0.000	5.000	5.000	79.278	84.430	5.152	66.5	66.5	66.50	81.0	79.0	80.00	12.65	0.9921	1.7951
0.672	1.50	-1.30	1.0000	0.000	10.000	10.000	85.517	95.788	10.271	66.5	66.5	66.50	85.0	79.0	82.00	14.58	0.9952	1.7885
0.672	1.50	-1.30	1.0000	0.000	10.000	10.000	95.788	106.065	10.277	66.5	66.5	66.50	85.0	79.0	82.00	14.58	0.9947	1.7885
																Averages	0.99251	1.77923

Nomenclature

- P_b Barometric Pressure (in. Hg)
- Q Flow Rate (cfm)
- ΔH Orifice Pressure differential (in. H_2O)
- ΔP Inlet Pressure Differential (in. H_2O)
- V_d Gas Meter Volume - Dry (ft³)
- V_{ds} Standard Meter Volume - Dry (ft³)
- T_d Average Meter Box Temperature (°F)
- T_o Outlet Meter Box Temperature (°F)
- T_{ds} Average Standard Meter Temperature (°F)
- Y_d Meter Correction Factor (unitless), $Y_i \le Y_{avg} \pm 0.02$
- Y_{ds} Standard Meter Correction Factor (unitless)
- ΔH@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O) $\Delta H@_i \le \Delta H@_{avg} \pm 0.2$
- Θ Duration of Run (minutes)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d+460}{T_{ds}+460}\right]\left[\frac{P_b+\Delta P/13.6}{P_b+\Delta H/13.6}\right]$$

$$\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o+460)}\left[\frac{(T_{ds}+460)\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds}+460)(\Theta)}$$

Vacuum Gauge

Standard (in.Hg)	Gauge (in.Hg)
4.4	5.0
9.6	10.0
14.4	15.0
19.2	20.0
24.6	25.0

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Meter Box - Pyrometer Calibration Sheet

Meter Box No: 85-3

Office: PALATINE

Calibrated by: Martin Vaquero

Client:

Date: 5/16/11

Job No:

Temperature Scale Used: Fahrenheit

Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1 Stack	2 Probe	3 Filter	4 Imp Out	5 Aux	6 DGM In	7 DGM Out
50	51	50	51				
100	100	100	102				
150	151	151	152				
200	201	201	202				
250	251	251	252				
300	301	301	302				
350	352	351	352				
400	401	401	402				
450	451	450	452				
500	501	500	502				
550	551	550	552				
600	601	600	601				

Tolerance = ±2°F difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A

Serial No: T-279500

Calibrated By: JH Metrology

Date Calibrated: 8/17/2010

Calibration Report No: 1000150487

Calibration Due Date: 8/17/2011

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 11414
Location warehouse
Test Date 04/06/12
Operator k. sullivan

Meter No. 85-3
Meter Yd 0.9925
Meter ΔH@ 1.7792
Full Test Cal. Date 05/16/11

Orifice A-4
Orifice K' 0.4997
Orifice Cal. Date 02/10/12

Leak Checks

Negative Pressure

No movement of manometer in one-minute ☑ Pass

Positive Pressure

No movement of manometer in one-minute ☑ Pass

Important: All leak checks must pass in order for calibration to be valid.

Barom. Press. (P_b) 29.55 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. - T_{amb} (°F)	Orifice ΔH (in. W.C.)	Vacuum (in. Hg)	Net Run Time - Θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run T_m (°F)	DGM Calibration Factor - Y_i	Percent Variation - ΔY_i
	0.0	216.30	69	69								
	5.0	219.57	69	70	71	1.30	22	5.0	3.27	69.3	0.9916	0.4%
	10.0	222.86	70	69	72	1.30	22	5.0	3.29	69.5	0.9851	-0.2%
	15.0	226.15	71	69	72	1.30	22	5.0	3.29	69.8	0.9856	-0.2%

Average Y_i	0.9874
Cal. Error	-0.5%

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times \left(P_b + \Delta H / 13.6\right) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \overline{Y_i}}{\overline{Y_i}} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y_i} - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

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CDS005B-Meter Post-CO, February 2004

Sample Probe Calibration

Probe Type: M5 with S-Type Pitot

I.D. Number: 67-4-1
Project Number: 11414

Thermocouple Calibration

Reference Type: Thermocouple Reference I.D. No: 15-078-39 Pyrometer I.D. No: 80512890 Units: °F

Point No.	Target Temp.	Reference Temp.	Indicated Temp.	Temp. Difference	% Difference*	Specification
1	Ambient	72	71	1	0.19%	
2	200°F-250°F	247	250	-3	0.42%	%Difference ≤ 1.5

* Based on Absolute Temperature (Rankine)

Does thermocouple assembly meet specifications? → **YES**

Pitot Tube Calibration (Wind Tunnel Method @ 49 ft/sec)

Reference Pitot I.D. No: Wind Tunnel Reference Pitot Cp: 0.99

Pitot Side 'A' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(A)}$**
1	0.542	0.782	0.824	0.001
2	0.541	0.786	0.821	0.002
3	0.542	0.784	0.823	0.000
		Side 'A' Average Probe $C_{p(A)}$=	0.8228	0.0012

Specification
Avg. C_p Deviations ≤ 0.01

Pitot Side 'B' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(B)}$**
1	0.548	0.779	0.831	0.002
2	0.546	0.782	0.827	0.001
3	0.546	0.783	0.827	0.002
		Side 'B' Average Probe $C_{p(B)}$=	0.8282	0.0016

Specification
Avg. C_p Deviations ≤ 0.01

'A' Average C_p		'B' Average C_p		Difference	Specification
0.823	−	0.828	=	-0.005	|Difference| ≤ 0.01

Does assembly meet specifications? **YES** → **If "Yes", C_p= Average of Side 'A' and 'B' Cp values. If "No", Pitot must be replaced.**

$$^{*}C_{P(S)} = C_{P(STD)}\sqrt{\frac{\Delta p_{(STD)}}{\Delta p_{(S)}}}$$

$$^{**}Deviation = \left|C_{P(S)} - \overline{C}_{P\,(\mathrm{A\,or\,B})}\right|$$

All specifications are from EPA 600/9-76-005, section 3.1.

Probe Cp= 0.826 Calibrated by: B ARNOLD Date: 03/12/2012

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ENGINEERING

CDS002C-Pitot_TNL, Dec 2008

Sample Probe Calibration

Probe Type: M5 with S-Type Pitot

I.D. Number: 66-4-7
Project Number: 11414

Thermocouple Calibration

Reference Type: Thermocouple Reference I.D. No: 15-078-39 Pyrometer I.D. No: 80512890 Units: °F

Point No.	Target Temp.	Reference Temp.	Indicated Temp.	Temp. Difference	% Difference*	Specification
1	Ambient	70	71	-1	0.19%	
2	200°F-250°F	247	244	3	0.42%	%Difference ≤ 1.5

* Based on Absolute Temperature (Rankine)

Does thermocouple assembly meet specifications? → **YES**

Pitot Tube Calibration (Wind Tunnel Method @ 49 ft/sec)

Reference Pitot I.D. No: Wind Tunnel Reference Pitot Cp: 0.99

Pitot Side 'A' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(A)}$**
1	0.537	0.780	0.821	0.002
2	0.539	0.777	0.824	0.000
3	0.542	0.778	0.826	0.002
		Side 'A' Average Probe $C_{p(A)}$=	0.8237	0.0016

Specification
Avg. C_p Deviations ≤ 0.01

Pitot Side 'B' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(B)}$**
1	0.545	0.774	0.831	0.000
2	0.538	0.770	0.828	0.003
3	0.544	0.766	0.835	0.004
		Side 'B' Average Probe $C_{p(B)}$=	0.8311	0.0024

Specification
Avg. C_p Deviations ≤ 0.01

'A' Average C_p		'B' Average C_p		Difference	Specification
0.824	−	0.831	=	-0.007	|Difference| ≤ 0.01

Does assembly meet specifications? YES → **If "Yes", C_p= Average of Side 'A' and 'B' Cp values. If "No", Pitot must be replaced.**

$$^{*}C_{P(S)} = C_{P(STD)}\sqrt{\frac{\Delta p_{(STD)}}{\Delta p_{(S)}}}$$

$$^{**}Deviation = \left|C_{P(S)} - \overline{C}_{P\,(\mathrm{A\,or\,B})}\right|$$

All specifications are from EPA 600/9-76-005, section 3.1

Probe Cp= 0.827 Calibrated by: B ARNOLD Date: 03/12/2012

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CDS002C-Pitot_TNL, Dec 2008

Sample Probe Calibration

Probe Type: M5 with S-Type Pitot **I.D. Number:** 67-8-14
Project Number: 11414

Thermocouple Calibration

Reference Type: Thermocouple Reference I.D. No: 15-078-39 Pyrometer I.D. No: 80512890 Units: °F

Point No.	Target Temp.	Reference Temp.	Indicated Temp.	Temp. Difference	% Difference*	Specification
1	Ambient	73	73	0	0.00%	
2	200°F-250°F	245	247	-2	0.28%	%Difference ≤ 1.5

* Based on Absolute Temperature (Rankine)

Does thermocouple assembly meet specifications? → **YES**

Pitot Tube Calibration (Wind Tunnel Method @ 50 ft/sec)

Reference Pitot I.D. No: Wind Tunnel Reference Pitot Cp: 0.99

Pitot Side 'A' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(A)}$**
1	0.547	0.775	0.832	0.000
2	0.545	0.769	0.834	0.002
3	0.545	0.774	0.831	0.001
		Side 'A' Average Probe $C_{p(A)}$=	0.8322	0.0011

Specification
Avg. C_p Deviations ≤ 0.01

Pitot Side 'B' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(B)}$**
1	0.545	0.789	0.823	0.001
2	0.537	0.777	0.823	0.000
3	0.539	0.777	0.824	0.001
		Side 'B' Average Probe $C_{p(B)}$=	0.8233	0.0008

Specification
Avg. C_p Deviations ≤ 0.01

'A' Average C_p		'B' Average C_p		Difference	Specification
0.832	−	0.823	=	0.009	|Difference| ≤ 0.01

Does assembly meet specifications? **YES** → **If "Yes", C_p= Average of Side 'A' and 'B' Cp values. If "No", Pitot must be replaced.**

$$^{*}C_{P(S)} = C_{P(STD)}\sqrt{\frac{\Delta p_{(STD)}}{\Delta p_{(S)}}}$$

$$^{**}Deviation = \left|C_{P(S)} - \overline{C}_{P(\mathrm{A\ or\ B})}\right|$$

All specifications are from EPA-600/9-76-005, section 3.1

Probe Cp= 0.828 Calibrated by: B ARNOLD Date: 03/12/2012

CleanAir ENGINEERING

CDS002C-Pitot_TNL, Dec 2008

Sample Probe Calibration

Probe Type: M5 with S-Type Pitot **I.D. Number:** 67-8-19
Project Number: 11414

Thermocouple Calibration

Reference Type: Thermocouple Reference I.D. No: 15-078-39 Pyrometer I.D. No: 80512890 Units: °F

Point No.	Target Temp.	Reference Temp.	Indicated Temp.	Temp. Difference	% Difference*	Specification
1	Ambient	75	74	1	0.19%	
2	200°F-250°F	253	250	3	0.42%	%Difference ≤ 1.5

* Based on Absolute Temperature (Rankine)

Does thermocouple assembly meet specifications? ⟶ **YES**

Pitot Tube Calibration (Wind Tunnel Method @ 49 ft/sec)

Reference Pitot I.D. No: Wind Tunnel Reference Pitot Cp: 0.99

Pitot Side 'A' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(A)}$**
1	0.541	0.763	0.834	0.004
2	0.543	0.761	0.836	0.002
3	0.547	0.754	0.843	0.006
		Side 'A' Average Probe $C_{p(A)}$=	0.8377	0.0038

Specification
Avg. C_p Deviations ≤ 0.01

Pitot Side 'B' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(B)}$**
1	0.540	0.756	0.837	0.004
2	0.534	0.759	0.831	0.002
3	0.538	0.765	0.830	0.002
		Side 'B' Average Probe $C_{p(B)}$=	0.8325	0.0027

Specification
Avg. C_p Deviations ≤ 0.01

'A' Average C_p		'B' Average C_p		Difference	Specification
0.838	−	0.833	=	0.005	|Difference| ≤ 0.01

Does assembly meet specifications? **YES** ⟶ **If "Yes", C_p= Average of Side 'A' and 'B' Cp values. If "No", Pitot must be replaced.**

$$^{*}C_{P(S)} = C_{P(STD)}\sqrt{\frac{\Delta p_{(STD)}}{\Delta p_{(S)}}}$$

$$^{**}Deviation = \left|C_{P(S)} - \overline{C}_{P\,(\mathrm{A\ or\ B})}\right|$$

All specifications are from EPA-600/9-76-005, section 3.1

Probe Cp= 0.835 Calibrated by: B ARNOLD Date: 05/12/2011

CleanAir. ENGINEERING

CDS002C-Pitot TNL, Dec 2008

Sample Probe Calibration

Probe Type: M5 with S-Type Pitot **I.D. Number:** 67-8-21
Project Number: 11414

Thermocouple Calibration

Reference Type: Thermocouple Reference I.D. No: 15-078-39 Pyrometer I.D. No: 80512890 Units: °F

Point No.	Target Temp.	Reference Temp.	Indicated Temp.	Temp. Difference	% Difference*	Specification
1	Ambient	72	73	-1	0.19%	
2	200°F-250°F	241	245	-4	0.57%	%Difference ≤ 1.5

* Based on Absolute Temperature (Rankine)

Does thermocouple assembly meet specifications? → **YES**

Pitot Tube Calibration (Wind Tunnel Method @50ft/sec)

Reference Pitot I.D. No: Wind Tunnel Reference Pitot Cp: 0.99

Pitot Side 'A' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(A)}$**
1	0.552	0.764	0.841	0.002
2	0.546	0.760	0.839	0.000
3	0.545	0.763	0.837	0.002
		Side 'A' Average Probe $C_{p(A)}$=	0.8394	0.0015

Specification
Avg. C_p Deviations ≤ 0.01

Pitot Side 'B' :

Trial No.	Reference ΔP	Probe ΔP	Probe $C_{p(S)}$*	Abs. Deviation from Avg. $C_{p(B)}$**
1	0.555	0.764	0.844	0.002
2	0.556	0.759	0.847	0.001
3	0.552	0.755	0.846	0.001
		Side 'B' Average Probe $C_{p(B)}$=	0.8458	0.0013

Specification
Avg. C_p Deviations ≤ 0.01

'A' Average C_p		'B' Average C_p		Difference	Specification
0.839	−	0.846	=	-0.007	|Difference| ≤ 0.01

Does assembly meet specifications? **YES** → **If "Yes", C_p= Average of Side 'A' and 'B' Cp values. If "No", Pitot must be replaced.**

$$^{*}C_{P(S)} = C_{P(STD)}\sqrt{\frac{\Delta p_{(STD)}}{\Delta p_{(S)}}}$$

$$^{**}Deviation = \left|C_{P(S)} - \overline{C}_{P\,(\mathrm{A\ or\ B})}\right|$$

All specifications are from EPA 600/9-76-005, section 3.

Probe Cp= 0.843 Calibrated by: B ARNOLD Date: 03/12/2012

CleanAir. ENGINEERING

CDS002C-Pitot_TNL, Dec 2008

Caliper Calibration Sheet

Calibrated by	D. Leishman		
Calibration Date	3-12-12	Expiration Date	3-12-13

Caliper ID	11679028

Standard Caliper ID	101460021

Inside Jaw Check		
Standard Caliper Setting (in)	Caliper Reading (in)	Deviation (ΔD)
0.150	0.150	0.000
0.300	0.300	0.000
0.500	0.500	0.000

Outside Jaw Check		
Standard Caliper Setting (in)	Caliper Reading (in)	Deviation (ΔD)
0.150	0.150	0.000
0.300	0.300	0.000
0.500	0.500	0.000

ΔD = maximum deviation between standard and caliper being calibrated

ΔD ≤ 0.001 inch for every reading

CleanAir ENGINEERING

Calibration
Certificate No. 1750.01

Calibration complies with ISO/IEC 17025, ANSI/NCSL Z540-1, and 9001

Cert. No.: 3415-4158722

Traceable® Certificate of Calibration for Digital Calipers

Manufactured for and distributed by: Fisher Scientific, 300 Industry Drive, Pittsburgh, PA 15275-1001

Instrument Identification:

Clean Air Engineering, 500 West Wood Street, Attn. David Leishman, Palatine, IL 60067 U.S.A. (RMA:967540)

Model Numbers: 14-648-17, FB70250, 32599 S/N: 101460021 Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Gage Set	99146223	10/03/12	1000305379

Certificate Information:

Technician: 57 Procedure: CAL-05 Cal Date: 2/02/12 **Cal Due: 2/02/13**

Test Conditions: 23.5°C 45.0 %RH 1018 mBar

Calibration Data:

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
in	0.0000	0.0000	Y	0.0000	0.0000	Y	-0.0010	0.0010	0.0003	3.3:1
in	0.1000	0.0995	Y	0.1000	0.1000	Y	0.0990	0.1010	0.0003	3.3:1
in	1.9995	1.9995	Y	1.9995	2.0000	Y	1.9975	2.0015	0.0003	>4:1
in	3.9990	3.9990	Y	3.9990	3.9995	Y	3.9950	4.0030	0.0004	>4:1
in	5.9995	5.9990	Y	5.9995	5.9995	Y	5.9935	6.0055	0.0004	>4:1
in depth	1.9995	1.9995	Y	1.9995	1.9995	Y	1.9975	2.0015	0.0003	>4:1
in step	1.9990	1.9995	Y	1.9990	2.0000	Y	1.9980	2.0000	0.0004	2.7:1
in inside	0.9995	1.0000	Y	0.9995	1.0000	Y	0.9985	1.0005	0.0003	3.1:1

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 Digital Calipers should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Digital Caliperss 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).

CARSTAN SCALE
ACCU-DATA SYSTEMS, INC.
214 E. HELLEN ST.
PALATINE, IL 60067
847-934-6666 FAX 847-934-9272

FIELD SERVICE ORDER # - 29471
DATE: 8/18/11
P.O.#:
CONTACT:

BILL TO:

CUST. ID:
CUSTOMER: [illegible]
ADDRESS: 500 W. Wood St.
CITY/STATE/ZIP: Palatine IL 60067
PHONE: ( ) X

☐ CALL SERVICE ☒ INSPECTION ☐ WARRANTY ☐ INSTALLATION ☐ CALL BACK ☐ RENTAL

M	MOD	SERIAL #	DESCRIPTION
Ohaus	CV4101	8028801606	1000 = 1000.0 2000 = 2000.0 - O.K.
4100g x .1g			3000 = 3000.0 4000 = 4000.0
Mettler	PE160	C39248	40 = 40.00 80 = 80.00 - O.K.
160g x .01g			120 = 120.00 160 = 160.00
A&D	FX-6000	402362	1000 = 1000.00 2000 = 2000.00 - O.K. Resisting
6000g x .01g			4000 = 4000.00 5000 = 5000.00

MATERIALS USED

QTY	PART NUMBER	DESCRIPTION	PRICE	EXTENSION
		Inspection of all Scales		
		See Calibration Reports		
		[illegible] Rate 175		

MATERIAL TOTAL:

TIME START	TIME STOP	JOB STATUS
:	:	☒ COMPLETE ☐ INCOMPLETE ☐ TO SHOP ☐ LOANER

MEMO
TO:

REGULAR HOURS 2 @ 72.50 — 145.00
OVERTIME HOURS @
FREIGHT
☒ ZONE CHARGE ☐ MILEAGE 1 — 59.00
☒ I.M.E.
☐ RESALE # TAX
TOTAL THIS REPORT 203.00

TECHNICIAN [signature]

X [signature]
CUSTOMER SIGNATURE

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: ______ B: ______ C: ______

Model: AP250D Unit Number: 1
Manufacturer: Ohaus
Serial Number: 1127211987
Capacity: 200 g
Resolution: .0001 g
Location:
Weight Standards Used: CTG2
Pass: Initial / Final

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0000	—		
100	100.0000	—		
150	150.0000	—		
200	200.0000	—		

Comments: O.K.

Model: IR120 Unit Number: 2
Manufacturer: Denver Inst
Serial Number: 23103436
Capacity: 120 g
Resolution: .001 g
Location:
Weight Standards Used: CTG2
Pass: Initial / Final

Calibration Test

Wgt App.	Inital Rd	Error	Final Rd	Error
10	10.000	—		
20	20.000	—		
50	50.000	—		
100	100.000	—		

Comments: O.K.

Model: GA200D Unit Number: 3
Manufacturer: Ohaus
Serial Number: 2204
Capacity: 40 g/200 g
Resolution: .0001 g
Location:
Weight Standards Used: CTG2
Pass: Initial / Final

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0001	+.0001	50.0000	—
100	100.0003	+.0003	100.0000	—
150	150.0010	+.0010	150.0000	—
200	200.0023	+.0023	200.0000	—

Comments: Recal / O.K.

Model: AV3102 Unit Number: 4
Manufacturer: Ohaus
Serial Number: 8029361053
Capacity: 3100 g
Resolution: .01 g
Location:
Weight Standards Used: CTG2
Pass: Initial / Final

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	500.00	—		
1000	1000.00	—		
2000	2000.00	—		
3000	3000.00	—		

Comments: O.K.

Model: AJ100 Unit Number: 5
Manufacturer: Mettler
Serial Number: M26013
Capacity: 100 g
Resolution: .0001 g
Location:
Weight Standards Used: CTG2
Pass: Initial / Final

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
10	10.0000	—		
20	20.0000	—		
50	50.0000	—		
100	100.0000	—		

Comments: Scale has a bind - Adjusted platter Recal. O.K.

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: [signature]

QMF12 1

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: ______ B: ______ C: ______

Model: GA200D **Unit Number:** 7
Manufacturer: Ohaus
Serial Number: 4139
Capacity: 200g
Resolution: .0001g
Location:
Weight Standards Used: [illegible]

Pass: Initial ☐ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0015	+.0015	50.0000	—
100	100.0035	+.0035	100.0000	—
150	150.0071	+.0071	150.0000	—
200	200.0142	+.0142	200.0000	—

Comments: Recal Ok

Model: Discovery **Unit Number:** 11
Manufacturer: Ohaus
Serial Number: 1123173913
Capacity: 200g
Resolution: .01mg/.1m
Location: LAB6
Weight Standards Used: [illegible]

Pass: Initial ☐ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.[illegible]	+[illegible]	[illegible]	—
100	100.[illegible]	+[illegible]	[illegible]	—
150	150.[illegible]	+.0004	150.0000	—
200	200.[illegible]	+.0004	200.0000	—

Comments: [illegible] Ok

Model: Discovery **Unit Number:** 12
Manufacturer: Ohaus
Serial Number: 1123181459
Capacity: 200g
Resolution: .01mg/.1m
Location: LAB6
Weight Standards Used: [illegible]

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.[illegible]	—		
100	100.[illegible]	—		
150	150.0000	—		
200	200.[illegible]	—		

Comments: Ok

Model: Adventurer **Unit Number:** 13
Manufacturer: Ohaus
Serial Number: 8028101133
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: [illegible]

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
1000	1000.0	—		
2000	2000.0	—		
3000	3000.0	—		
4000	4000.0	—		

Comments: Ok

Model: Adventurer **Unit Number:** 15
Manufacturer: Ohaus
Serial Number: 8028301069
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: [illegible]

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
1000	1000.0	—		
2000	2000.0	—		
3000	3000.0	—		
4000	4000.0	—		

Comments: Ok

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: [signature]

QMF12 2

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: ______ B: ______ C: ______

Model: Adventurer **Unit Number:** 16
Manufacturer: Ohaus
Serial Number: 8028301068
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: [illegible]

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
1000	1000.0	—		
2000	2000.0	—		
3000	3000.0	—		
4000	4000.0	—		

Comments: O.K.

Model: Adventurer **Unit Number:** 17
Manufacturer: Ohaus
Serial Number: 8028101135
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: [illegible]

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
1000	1000.0	—		
2000	2000.0	—		
3000	3000.0	—		
4000	4000.0	—		

Comments: O.K.

Model: Discoverer **Unit Number:** 18
Manufacturer: Ohaus
Serial Number: 1129400331
Capacity: 210 g
Resolution: .0001
Location:
Weight Standards Used: [illegible]

Pass: Initial ☐ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0001	+.0001	50	—
100	100.0003	+.0003	100.0000	—
150	150.0006	+.0006	150.0000	—
200	200.0013	+.0013	200.0002	—

Comments: Rec. L O K

Model: 1600 **Unit Number:** 19
Manufacturer: Ohaus
Serial Number: 3BB-10
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: [illegible]

Pass: Initial ☐ Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	500	—		
1000	1000	—		
1500	1500	—		
2000	2000	—		

Comments: O.K.

Model: 1600 **Unit Number:** 20
Manufacturer: Ohaus
Serial Number: 3BB-09
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: [illegible]

Pass: Initial ☐ Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500				
1000				
1500				
2000				

Comments: Scale will not calibrate Must replace

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: [signature]

QMF12 3

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: ______ B: ______ C: ______

Model: 1600 Unit Number: 21
Manufacturer: Ohaus
Serial Number: 3BB-08
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: CTC-1

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	500	—		
1000	1000	—		
1500	1500	—		
2000	2000	—		

Comments: OK

Model: 1600 Unit Number: 22
Manufacturer: Ohaus
Serial Number: 3BB-07
Capacity: 2610 g
Resolution:
Location:
Weight Standards Used: CTC-2

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	500	—		
1000	1000	—		
1500	1510	—		
2000	2000	—		

Comments: OK

Model: Adventurer Unit Number: 23
Manufacturer: Ohaus
Serial Number: 8032261010
Capacity: 5100g
Resolution: .01
Location: LAB 01
Weight Standards Used: CTC-2

Pass: Initial ☐ Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	499.95	[illegible]	[illegible]	—
1000	999.56	[illegible]	1000.00	—
2000	1999.93	[illegible]	2000.00	—
3000	2999.51	.49	3000.00	—

Comments: Cal OK

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: [signature]

QMF12 4

CARSTAN SCALE
ACCU-DATA SYSTEMS, INC.
214 E. HELLEN ST.
PALATINE, IL 60067
847-934-6666 FAX 847-934-9272

FIELD SERVICE ORDER # - 29471
DATE: 8/18/11
P.O.#:
CONTACT:

BILL TO:

CUST. ID:
CUSTOMER: [illegible] Engineering
ADDRESS: 500 [illegible] Wood St.
CITY/STATE/ZIP: Palatine IL 60067
PHONE: ( ) X
( ) X

☐ CALL SERVICE ☒ INSPECTION ☐ WARRANTY ☐ INSTALLATION ☐ CALL BACK ☐ RENTAL

	M	MOD	SERIAL #	DESCRIPTION
4	Ohaus	AV4101	8028301670	1000 = 1000.0 2000 = 2000.0 -0.1
	4100g x	.1g		3000 = 3000.0 4000 = 4000.0
9	[illegible]	[illegible]	C59248	40 = 40.00 80 = 80.00 -0.1
	160g x	.01g		120 = 120.00 160 = 160.00
6	A&D	FR2000	[illegible]402362	1000 = 1000.00 2000 = 2000.00 -0.1 Resisting
	100g x	.01g		4000 = 4000.00 5000 = 5000.00

MATERIALS USED

QTY	PART NUMBER	DESCRIPTION	PRICE	EXTENSION
		Inspection of 11 Scales		
		See Calibration Reports		
		For Results		

MATERIAL TOTAL:

TIME START	TIME STOP	JOB STATUS
:	:	☒ COMPLETE ☐ INCOMPLETE ☐ TO SHOP ☐ LOANER

MEMO
TO:

REGULAR HOURS 2 @ 72.00 — 144.00
OVERTIME HOURS @
FREIGHT
☒ ZONE CHARGE ☐ MILEAGE 1 — 59.00
☒ I.M.E.
☐ RESALE # TAX
TOTAL THIS REPORT. 203.00

TECHNICIAN

X [signature]
CUSTOMER SIGNATURE

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: ______ B: ______ C: ______

Model: AP250D **Unit Number:** 1
Manufacturer: Ohaus
Serial Number: 1127211987
Capacity: 200 g
Resolution: .0001 g
Pass Initial / Final
Location:
Weight Standards Used: CTG2

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0000	—		
100	100.0000	—		
150	150.0000	—		
200	200.0000	—		

Comments: O.K.

Model: IR120 **Unit Number:** 2
Manufacturer: Denver Inst
Serial Number: 23103436
Capacity: 120 g
Resolution: .001 g
Pass Initial / Final
Location:
Weight Standards Used: CTG2

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
10	10.000	—		
20	20.000	—		
50	50.000	—		
100	100.000	—		

Comments: O.K.

Model: GA200D **Unit Number:** 3
Manufacturer: Ohaus
Serial Number: 2204
Capacity: 40 g/200 g
Resolution: .0001 g
Pass Initial / Final
Location:
Weight Standards Used: CTG2

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0001	+.0001	50.0000	—
100	100.0003	+.0003	100.0000	—
150	150.0010	+.0010	150.0000	—
200	200.0023	+.0023	200.0000	—

Comments: Recal / O.K.

Model: AV3102 **Unit Number:** 4
Manufacturer: Ohaus
Serial Number: 8029361053
Capacity: 3100 g
Resolution: .01 g
Pass Initial / Final
Location:
Weight Standards Used: CTG2

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	500.00	—		
1000	1000.00	—		
2000	2000.00	—		
3000	3000.00	—		

Comments: O.K.

Model: AJ100 **Unit Number:** 5
Manufacturer: Mettler
Serial Number: M26013
Capacity: 100 g
Resolution: .0001 g
Pass Initial / Final
Location:
Weight Standards Used: CTG2

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
10	10.0000	—		
20	20.0000	—		
50	50.0000	—		
100	100.0000	—		

Comments: Scale has a bind. Adjusted feather
Recal / O.K.

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: [signature]

QMF12 1

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: B: C:

Model: GA200D **Unit Number:** 7
Manufacturer: Ohaus
Serial Number: 4139
Capacity: 200g
Resolution: .0001g
Location:
Weight Standards Used: [illegible]

Pass: Initial ☐ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0015	+.0015	50.0000	—
100	100.0035	+.0035	100.0000	—
150	150.0021	+.0021	150.0000	—
200	200.0142	+.0142	200.0000	—

Comments: [illegible]

Model: Discovery **Unit Number:** 11
Manufacturer: Ohaus
Serial Number: 1123173913
Capacity: 200g
Resolution: .01mg/.1m
Location: LAB6
Weight Standards Used: [illegible]

Pass: Initial ☐ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50 [illegible]	[illegible]	[illegible]	—
100	100 [illegible]	[illegible]	[illegible]	—
150	150 [illegible]	[illegible]	150.0000	—
200	200 [illegible]	[illegible]	200.0000	—

Comments: [illegible]

Model: Discovery **Unit Number:** 12
Manufacturer: Ohaus
Serial Number: 1123181459
Capacity: 200g
Resolution: .01mg/.1m
Location: LAB6
Weight Standards Used: [illegible]

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0000	—		
100	100.0000	—		
150	150.0000	—		
200	200.0000			

Comments: O.K.

Model: Adventurer **Unit Number:** 13
Manufacturer: Ohaus
Serial Number: 8028101133
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: [illegible]

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
1000	1000.0	—		
2000	2000.0	—		
3000	3000.0	—		
4000	4000.0	—		

Comments: O.K.

Model: Adventurer **Unit Number:** 15
Manufacturer: Ohaus
Serial Number: 8028301069
Capacity: 4100 g
Resolution: .1
Location:
Weight Standards Used: [illegible]

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
1000	1000.0			
2000	2000.0			
3000	3000.0	—		
4000	4000.0			

Comments: O.K.

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: [illegible]

QMF12 2

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: ______ B: ______ C: ______

Model: Adventurer Unit Number: 16
Manufacturer: Ohaus
Serial Number: 8028301068
Capacity: 4100 g
Resolution: .1
Pass: Initial ✓ Final ✓
Location:
Weight Standards Used: 1/1-2

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
1000	1000.0	—		
2000	2000.0	—		
3000	3000.0	—		
4000	4000.0	—		

Comments: O.K.

Model: Adventurer Unit Number: 17
Manufacturer: Ohaus
Serial Number: 8028101135
Capacity: 4100 g
Resolution: .1
Pass: Initial ✓ Final ✓
Location:
Weight Standards Used: 1/1/2

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
1000	1000.0	—		
2000	2000.0	—		
3000	3000.0	—		
4000	4000.0	—		

Comments: O.K.

Model: Discoverer Unit Number: 18
Manufacturer: Ohaus
Serial Number: 1129400331
Capacity: 210 g
Resolution: .0001
Pass: Initial Final ✓
Location:
Weight Standards Used: 1/1/2

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
50	50.0001	+.0001	50	—
100	100.0003	+.0003	100.0000	—
150	150.0006	+.0006	150.0000	—
200	200.0012	+.0012	200.0000	—

Comments: Pass / O.K.

Model: 1600 Unit Number: 19
Manufacturer: Ohaus
Serial Number: 3BB-10
Capacity: 2610 g
Resolution:
Pass: Initial Final
Location:
Weight Standards Used: 1/1/2

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	500	—		
1000	1000	—		
1500	1500	—		
2000	2000	—		

Comments: O.K.

Model: 1600 Unit Number: 20
Manufacturer: Ohaus
Serial Number: 3BB-09
Capacity: 2610 g
Resolution:
Pass: Initial Final
Location:
Weight Standards Used: 1/1/2

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500				
1000				
1500				
2000				

Comments: Scale will not balance Must replace

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by:

QMF12 3

Date: 8/17/2011

Company: CLEANAI1

Carstan Scale/Accu Data Systems
214 E. Hellen Rd.
Palatine, IL 60067
(847) 934-6666

Standard Used: A: ______ B: ______ C: ______

Model: 1600 **Unit Number:** 21

Manufacturer: Ohaus

Serial Number: 3BB-08

Capacity: 2610 g

Resolution:

Location:

Weight Standards Used: CTC2

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	500	—		
1000	1000	—		
1500	1500	—		
2000	2000	—		

Comments: OK

Model: 1600 **Unit Number:** 22

Manufacturer: Ohaus

Serial Number: 3BB-07

Capacity: 2610 g

Resolution:

Location:

Weight Standards Used: CTC2

Pass: Initial ☑ Final ☑

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	500	—		
1000	1000	—		
1500	1500	—		
2000	2000	—		

Comments: OK

Model: Adventurer **Unit Number:** 23

Manufacturer: Ohaus

Serial Number: 8032361010

Capacity: 3100 g

Resolution: .01

Location: LAB 01

Weight Standards Used: CTC2

Pass: Initial ☐ Final ☐

Calibration Test

Wgt App	Inital Rd	Error	Final Rd	Error
500	499.58	-.42	500.00	—
1000	999.56	-.44	1000.00	—
2000	1999.63	-.37	2000.00	—
3000	2999.51	-.49	3000.00	[illegible]

Comments: [illegible]

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by NIST as specified in Handbook 44 or Manufacturers Specifications. Best measurement for uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%.

Calibrated by: [illegible]

QMF12

AIR LIQUIDE Air Liquide America Specialty Gases LLC Scott

RATA CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 59092-71-65000
Document # : 42679778-006

Customer
CLEAN AIR ENGINEERING

DON ALLEN
500 WEST WOOD STREET
PALATINE IL 60067
US

ANALYTICAL INFORMATION Gas Type : OC2

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM036149 **Certification Date:** 15Aug2011 **Exp. Date:** 14Aug2014
Cylinder Pressure*:** 2000 PSIG **Batch No:** TRO0039465

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
OXYGEN	6.00 %	+/- 1%	Direct NIST and VSL
CARBON DIOXIDE	13.9 %	+/- 1%	Direct NIST and VSL
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2350	01Dec2011	K016398	23.20 %	OXYGEN
NTRM 2300	17Aug2016	K026052	23.04 %	CARBON DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
CAI/110P/V03018	20Jul2011	PARAMAGNETIC
PIR/2000/809015	02Aug2011	NDIR

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

	First Triad Analysis	Second Triad Analysis	Calibration Curve
OXYGEN	Date: 16Aug2011 Response Unit: % Z1=0.00000 R1=23.20000 T1=6.02000 R2=23.20000 Z2=0.00000 T2=6.02000 Z3=0.00000 T3=6.02000 R3=23.20000 Avg. Concentration: 6.005 %		Concentration=A+Bx+Cx2+Dx3+Ex4 r=0.999998 Constants: A=-0.01525256 B=1.000032519 C=0 D=0 E=0
CARBON DIOXIDE	Date: 15Aug2011 Response Unit: MV Z1=0.00000 R1=98.40000 T1=74.50000 R2=98.40000 Z2=0.00000 T2=74.50000 Z3=0.00000 T3=74.50000 R3=98.40000 Avg. Concentration: 13.89 %		Concentration=A+Bx+Cx2+Dx3+Ex4 r=0.999996 Constants: A=-0.00179303 B=0.134633752 C=-0.000327 D=1.2834E-05 E=0

APPROVED BY: JEFF CROTEAU

AIR LIQUIDE Air Liquide America Specialty Gases LLC Scott™

Shipped From:
1290 COMBERMERE STREET
TROY MI 48083
Phone: 248-589-2950 Fax: 248-589-2134

C E R T I F I C A T E O F A N A L Y S I S

ALA-CYL-ROMEOVILLE, IL (84131)
UNIT A FOR CAE
TRANSFER ACCOUNT
27 FORESTWOOD CT
ROMEOVILLE IL 60446
US

DOCUMENT#:44355918 -002
PO#: CAE
ITEM #: 763-30AL
DATE: 12Dec2011

CYLINDER #: ALM028189
FILL PRESSURE: 2015 PRODUCT EXPIRATION: 11Dec2014

PURE MATERIAL: NITROGEN CAS# 7727-37-9

GRADE: ZERO GAS

PURITY: 99.998%

IMPURITY	MAXIMUM CONCENTRATIONS	ACTUAL CONCENTRATIONS
THC	0.5 PPM	< 0.5 PPM

LOT# NITFILL112211

QC BATCH : TRO0048351

ANALYST: [signature]
ROBERT MCCRANDALL

AIR LIQUIDE Air Liquide America Specialty Gases LLC Scott

RATA CLASS

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 58745-71-65000
Document # : 40716347-004

Customer
CLEAN AIR ENGINEERING

DON ALLEN
500 WEST WOOD STREET
PALATINE IL 60067
US

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALMX067937 **Certification Date:** 28Feb2011 **Exp. Date:** 27Feb2014
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
OXYGEN	14.0 %	+/- 1%	Direct NIST and VSL
CARBON DIOXIDE	5.99 %	+/- 1%	Direct NIST and VSL
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2350	01Dec2011	K016398	23.20 %	OXYGEN
NTRM 2300	17Aug2016	K026052	23.04 %	CARBON DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
CAI/110P/V03018	24Feb2011	PARAMAGNETIC
PIR/2000/609015	04Feb2011	NDIR

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis | Second Triad Analysis | Calibration Curve

OXYGEN

Date: 01Mar2011 Response Unit: %

Z1=0.00000	R1=23.20000	T1=14.05000
R2=23.20000	Z2=0.00000	T2=14.06000
Z3=0.00000	T3=14.06000	R3=23.20000

Avg. Concentration: 14.04 %

Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.999998
Constants: A=-0.01314124
B=1.000039653 C=0
D=0 E=0

CARBON DIOXIDE

Date: 01Mar2011 Response Unit: MV

Z1=0.00000	R1=100.0000	T1=41.70000
R2=100.0000	Z2=0.00000	T2=41.70000
Z3=0.00000	T3=41.70000	R3=100.0000

Avg. Concentration: 5.989 %

Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.999994
Constants: A=-0.0032159
B=0.134654642 C=-0.0003116
D=1.26756E-05 E=0

APPROVED BY: JEFF CROTEAU

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CleanAir

CleanAir Engineering
500 W. Wood Street
Palatine, IL 60067-4975
www.cleanair.com

Wheelabrator South Broward, Inc.
4400 South State Road 7
Ft. Lauderdale, FL 33314

REPORT ON COMPLIANCE TESTING

Performed for:

WHEELABRATOR SOUTH BROWARD, INC.
UNITS 1, 2 AND 3 SDA INLETS, FF OUTLETS, ASH HANDLING SYSTEM AND LIME SILO VENT
FT. LAUDERDALE, FL
VOLUME II OF II

Client Reference No: Service Agreement
CleanAir Project No: 11414-1
Revision 0: May 2, 2012

FIELD DATA

G

I herby certify that all pages contained within this Appendix have been reviewed and, to the best of my ability, verified as accurate.

QA/QC Initials: ML

Date: 4/27/12

CleanAir

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TEST LOCATION: RF Outlet Particulate/Metals TESTING METHOD: 5/29 PAGE 1 OF 2

UNIT: 1 RUN: 1 FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	N. Broward	Date	3/20/12
Meter Operator	J. Bihun		
Probe Operator	J. Bihun		

Meter Box	85-3	Sample Box No.	M3
Meter Y_d	0.9925	Meter $\Delta H_@$	1.7792
K Factor	2.80	Pitot C_p	0.843
Leak Rate Before	0.001 [cfm] [Lpm]	@	11 (in. Hg)
Leak Rate After	0.002 [cfm] [Lpm]	@	10 (in. Hg)
Pitot Leak Check Before: ☒	After: Good ☒ Bad ☐		

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)	96x86		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-10.0	10.0		

Amb. Temp. (°F)	72	Bar. Press.	30.05 [in. Hg] [mbar]
Probe I.D. No.	47-8-24		
Liner Material	Glass		

Filter No.	~~80822~~58 e28-08		
Thimble No.	N/A		
Nozzle Diameter	0.276	Nozzle I.D.	276-1

Start Time:	7:52	Stop Time:	~~10:06~~ 10:05 3/20/12

Traverse Point Number	Min/pt 5 Elapsed Times	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F)	Filter T_f (°F)	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator approx (%dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
				714.680		Set Points 250	212							
1-1	5	0.40	1.1	717.66	303	243	245	66	74	74	4.0	9.1	N/A	
2	10	0.39	1.1	720.55	304	245	253	66	75	74	4.0	8.2		
3	15	0.45	1.3	723.77	304	246	252	60	77	74	4.0	8.2		
4	20	0.47	1.3	726.98	303	247	252	56	79	75	4.5	8.3		
5	25	0.49	1.4	730.320	304	247	253	55	80	75	4.5	7.9		730.385
2-1	30	0.40	1.1	733.27	301	246	250	57	79	75	3.5	8.7		-007
2	35	0.33	0.92	735.95	303	247	254	59	81	76	3.5	8.2		
3	40	0.43	1.2	739.04	304	245	247	61	81	76	4.0	8.4		
4	45	0.48	1.3	742.29	304	248	249	62	83	77	4.5	7.9		
5	50	0.47	1.3	745.540	303	248	250	62	83	78	4.5	7.5		745.585
3-1	55	0.33	0.92	748.32	303	247	249	63	82	78	3.5	8.3		-0.06
2	60	0.33	0.92	751.04	303	248	254	62	83	79	3.5	8.2		
	Total	15.6416		74.58200										
	Average	0.1259	1.1096		302.480				80.6290					

Sum of square roots. 13.86 74.030 Circle correct bracketed units on data sheet. 1868

3639

QA/QC PB
Date 7/20/12

new general datasheet, December 2006

CleanAir ENGINEERING

G-3

TEST LOCATION: FF Outlet Part/Metals **TESTING** METHOD: 5/29 PAGE 2 OF 2

UNIT: 1 RUN: 1 **FIELD DATA SHEET**

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/20/12
Meter Operator	P. Bihun		
Probe Operator	P. Bihun		

Meter Box		Sample Box No.	
Meter Y_d		Meter $\Delta H_@$	
K Factor		Pitot C_p	
Leak Rate Before	[cfm] [Lpm]	@	(in. Hg)
Leak Rate After	[cfm] [Lpm]	@	(in. Hg)
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐		

Cross Section of Test Location

[N] [UP]

Duct Dimensions (in.)			
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)		Bar. Press.	[in. Hg] [mbar]
Probe I.D. No.			
Liner Material			

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	

Start Time:	Stop Time:

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp T_c (°F)	DGM Inlet $T_{m,in}$ (°F)	DGM Outlet $T_{m,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator, approx (%, dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3	65	0.35	0.98	753.84	303	249	250	61	85	79	3.5	7.8	N/A	
4	70	0.43	1.2	756.95	303	249	250	61	85	80	4.0	8.1		760.250
5	75	0.46	1.3	760.190	303	249	250	61	85	80	4.0	8.1		-0.06
4-1	80	0.42	1.2	763.35	302	248	248	63	84	80	4.0	8.7		
2	85	0.31	0.87	765.97	302	249	250	63	85	80	3.5	8.7		
3	90	0.36	1.0	768.80	303	249	251	63	84	80	4.0	8.0		
4	95	0.42	1.2	771.90	303	249	254	63	84	80	4.0	8.4		
5	100	0.51	1.4	775.230	303	250	251	64	85	80	4.5	8.1		
5-1	105	0.25	0.71	777.67	298	249	250	65	85	81	3.5	8.2		K=2.85
2	110	0.35	1.0	780.46	301	249	250	65	86	82	3.5	7.9		
3	115	0.30	0.86	783.08	300	250	249	64	88	82	3.5	8.6		775.290
4	120	0.30	0.86	785.72	301	250	248	63	88	83	3.5	7.9		-0.06
5	125	0.44	1.3	788.950	301	250	250	63	89	83	4.5	8.3		
	Total	*												
Traverse	Average													

* Sum of square roots. Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC PB

Date 3/20/12

G-5

TEST LOCATION: FF Outlet Part/Metals **TESTING** **METHOD:** 5/29 **PAGE** 1 **OF** 2

UNIT: 1 **RUN:** 2

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/20/12
Meter Operator	P. Buhyn		
Probe Operator	P. Buhyn		

Meter Box	85-3	Sample Box No.	M11
Meter Y_d	0.9925	Meter $\Delta H_@$	1.7792
K Factor	2.85	Pitot C_p	0.843
Leak Rate Before	0.004 [cfm] [Lpm] @ 15 (in. Hg)		
Leak Rate After	0.001 [cfm] [Lpm] @ 9 (in. Hg)		
Pitot Leak Check Before: ☒	After: Good ☒ Bad ☐		

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)	96x96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-10.0	10.0		

Amb. Temp. (°F)	75	Bar. Press.	30.05 [in. Hg] [mbar]
Probe I.D. No.	67-8-2		
Liner Material	Glass		

Filter No.	e28-09		
Thimble No.	N/A		
Nozzle Diameter	0.226	Nozzle I.D.	226-1

Start Time:	10:29	Stop Time:	12:44

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F)	Filter T_f (°F)	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
						Set Points								
				789.300		250	250							
1-1	5	0.35	1.0	792.18	302	242	251	66	82	82	3.0	11.0	N/A	
2	10	0.40	1.1	795.06	303	244	253	66	84	82	3.0	8.6		
3	15	0.44	1.3	798.32	304	245	257	64	85	82	3.5	8.0		
4	20	0.48	1.4	801.69	303	246	257	63	86	83	4.0	8.1		805.040
5	25	0.45	1.3	804.955	303	246	250	64	87	83	3.5	8.8		-0.085
2-1	30	0.40	1.1	807.96	301	245	247	63	86	83	3.5	8.1		
2	35	0.35	1.0	810.79	303	246	252	56	86	83	3.5	8.4		
3	40	0.40	1.1	813.20	303	247	250	54	87	84	3.5	8.2		
4	45	0.49	1.4	817.07	304	248	250	54	88	84	4.0	8.9		
5	50	0.52	1.5	820.540	303	248	247	57	89	85	4.0	8.5		820.600
3-1	55	0.45	1.3	823.83	302	247	250	62	88	85	3.5	8.6		-0.060
2	60	0.37	1.1	826.78	303	245	253	61	88	85	3.0	8.5		
	Total	16.059		37.390										
	Average	0.6518	1.2001		302.720				87.0000					

Sum of square roots. 14.6 3434 Circle correct bracketed units on data sheet. 2037

CleanAir ENGINEERING 44254

QA/QC [initials]
Date 3/20/12

TEST LOCATION: PF Outlet Part/Metals **TESTING** **METHOD:** 5/29 **PAGE** 2 **OF** 2

UNIT: 1 **RUN:** 2

FIELD DATA SHEET

Client: Wheelabrator	Project No. 11414	Amb. Temp. (°F)	Bar. Press. [in. Hg] [mbar]
Plant: S. Broward	Date 3/20/12	Probe I.D. No.	
Meter Operator: P. Bihun		Liner Material	
Probe Operator: P. Bihun			

Cross-Section of Test Location

[N] [UP]

Meter Box	Sample Box No.
Meter Y_d	Meter $\Delta H_@$
K Factor	Pitot C_p
Leak Rate Before [cfm] [Lpm] @ (in. Hg)	
Leak Rate After [cfm] [Lpm] @ (in. Hg)	
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐

Duct Dimensions (in.)

Static Pres (in. H_2O)	Port Len (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	
Start Time:	Stop Time:	

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 280	Filter T_f (°F) Set Points 212	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3	65	0.40	1.1	829.71	304	249	246	63	90	86	3.5	8.8	N/A	
4	70	0.49	1.4	833.07	304	249	251	63	90	86	4.0	8.3		836.325
5	75	0.47	1.3	836.310	303	~~249~~	251	63	90	86	4.0	8.5		-0.065
4-1	80	0.45	1.3	839.62	302	249	253	64	89	86	4.0	9.1		
2	85	0.36	1.0	842.49	304	249	251	65	90	86	3.5	8.4		
3	90	0.36	1.0	845.36	303	249	250	65	90	86	3.5	9.0		
4	95	0.44	1.2	848.47	303	250	251	62	92	87	4.0	8.3		K=2.25
5	100	0.55	1.5	851.905	304	250	249	62	92	87	4.0	8.6		857.950
5-1	105	0.41	1.1	854.91	300	249	251	64	92	88	3.5	8.8		-0.045
2	110	0.47	1.3	858.11	303	249	251	64	92	88	4.0	8.3		
3	115	0.33	0.91	860.83	300	250	250	62	93	88	3.5	8.4		
4	120	0.37	1.0	863.68	301	250	251	63	93	88	4.0	8.4		
5	125	0.47	1.3	866.945	303	250	251	64	93	88	4.0	8.4		
	Total	*												
	Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

2316

CleanAir ENGINEERING

QA/QC PB
Date 3/20/12

G-7

TEST LOCATION: FF Outlet Part / Metals **TESTING** **METHOD:** 5129 **PAGE** 1 **OF** 2

UNIT: 1 **RUN:** 3

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/20/12
Meter Operator	J. Bihun		
Probe Operator	J. Bihun		

Meter Box	85-3	Sample Box No.	M10
Meter Y_d	0.9925	Meter $\Delta H_@$	1.7792
K Factor	2.75	Pitot C_p	0.843
Leak Rate Before	0.005 [cfm] [Lpm] @ 15 (in. Hg)		
Leak Rate After	0.001 [cfm] [Lpm] @ 8 (in. Hg)		
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐		

Cross-Section of Test Location

[N] (UP)

1 5

Duct Dimensions (in.)	96x96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] (Out) of page	First point all the way [In] (Out)
-10.6	10.0		

Amb. Temp. (°F)	75	Bar. Press.	30.05 (in. Hg) [mbar]
Probe I.D. No.	675-21		
Liner Material	Glass		

Filter No.	C28-11		
Thimble No.	N/A		
Nozzle Diameter	0.276	Nozzle I.D.	276-1

Start Time:	13:04	Stop Time:	15:20

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init Vol (ft³) [L]	Stack Temp Ts (°F)	Probe T_p (°F)	Filter T_f (°F)	Cond. Temp. T_c (°F)	DGM Inlet $T_{m,in}$ (°F)	DGM Outlet $T_{m,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
				867.395		Set Points 250	250							
4-1	5	0.50	1.4	870.76	304	242	256	66	86	86	4.5	8.9	N/A	
2	10	0.36	0.99	873.59	304	244	255	66	86	88	4.5	8.9		
3	15	0.33	0.91	876.31	304	245	254	63	86	84	4.0	8.8		
4	20	0.44	1.2	879.44	304	246	253	61	88	84	4.5	8.9		883.160
5	25	0.59	1.6	883.030	305	246	249	61	89	84	5.5	9.1		-0.13
5-1	30	0.44	1.3	886.40	303	245	251	64	86	84	5.0	9.2		K=2.85
2	35	0.30	0.86	889.04	301	247	252	65	89	84	4.0	8.7		
3	40	0.35	1.0	891.88	304	246	248	64	88	84	4.5	8.7		
4	45	0.30	0.86	894.53	302	248	250	58	89	84	4.0	9.4		898.380
5	50	0.58	1.7	898.195	305	247	253	56	89	84	5.5	9.2		-0.185
1-1	55	0.41	1.2	901.53	304	247	250	63	88	84	4.5	8.9		
2	60	0.38	1.1	904.45	305	248	252	57	90	84	4.5	9.1		
	Total	*14.3262		77.975										
	Average	0.6530	1.2236		304.520				86.220					

* Sum of square roots. 14.12

Circle correct bracketed units on data sheet. 3045 20165

QA/QC PB
Date 3/20/12

CleanAir ENGINEERING

TEST LOCATION: FF Outlet Part / Metals **TESTING** **METHOD:** 5/29 **PAGE** 2 **OF** 2

UNIT: 1 **RUN:** 3

FIELD DATA SHEET

Client Wheelabrator	Project No. 11414		
Plant S. Broward	Date 3/20/12		
Meter Operator	P. Bihun		
Probe Operator	P. Bihun		

Cross-Section of Test Location

[N] [UP]

Amb. Temp. (°F)	Bar. Press. [in. Hg] [mbar]
Probe I.D. No.	
Liner Material	

Meter Box	Sample Box No.
Meter Y_d	Meter $\Delta H_@$
K Factor	Pitot C_p
Leak Rate Before [cfm] [Lpm] @ (in. Hg)	
Leak Rate After [cfm] [Lpm] @ (in. Hg)	
Pitot Leak Check Before ☐	After: Good ☐ Bad ☐

Duct Dimensions (in.)			
Static Pres (in. H_2O)	Port Len (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	
Start Time:	Stop Time:	

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)*	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol (ft³) [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 252	Filter T_f (°F) Set Points 250	Cond Temp. T_c (°F)	DGM Inlet $T_{m in}$ (°F)	DGM Outlet $T_{m out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator, approx. (%, dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3	65	0.44	1.3	907.66	305	249	250	54	91	85	5.0	8.8	N/A	
4	70	0.45	1.3	910.89	305	249	250	55	90	85	5.0	8.5		914.150
5	75	0.45	1.3	914.075	305	249	250	57	88	84	5.0	8.4		-0.075
2-1	80	0.40	1.1	917.12	304	248	247	60	88	84	4.5	9.3		
2	85	0.37	1.1	920.08	306	249	250	61	89	84	4.5	8.5		
3	90	0.46	1.3	923.30	306	249	249	61	89	84	5.0	9.1		
4	95	0.47	1.3	926.54	305	250	250	61	91	84	5.0	8.0		
5	100	0.51	1.5	929.950	306	249	250	63	88	84	5.5	8.4		930.095
3-1	105	0.44	1.3	933.32	304	248	253	64	88	82	5.0	8.6		-0.145
2	110	0.34	0.97	936.09	305	249	251	60	88	83	4.5	8.9		
3	115	0.40	1.1	939.06	305	250	252	57	89	83	5.0	8.9		
4	120	0.50	1.4	942.40	306	250	249	59	90	83	5.5	8.8		
5	125	0.54	1.5	945.905	306	250	249	59	91	84	5.5	8.3		
	Total	*												
	Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC PB
Date 7/20/12

2.66

TEST LOCATION: FF outlet Metals **TESTING METHOD:** SB 29 **PAGE** 1 **OF** 2

UNIT: 1 **RUN:** 4 **FIELD DATA SHEET**

Client	Wheel.	Project No.	11414
Plant	S Broward	Date	3/21/12
Meter Operator	K Sullivan		
Probe Operator	A Obuchowski		

Meter Box	65-3	Sample Box No.	M3
Meter Y_d	0.9925	Meter $\Delta H_@$	1.7792
K Factor	~~2.86~~ 2.94	Pitot C_p	
Leak Rate Before	0.001 [cfm] [Lpm]	@ 15	(in. Hg)
Leak Rate After	0.001 [cfm] [Lpm]	@ 6	(in. Hg)
Pitot Leak Check Before	☐	After: Good ☑	Bad ☐

Cross-Section of Test Location

cems

[UP]

1 5

Duct Dimensions (in.) 96

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-9.9	10		

Amb Temp. (°F)	85	Bar. Press.	30.05 [in Hg] [mbar]
Probe I.D. No.	62-8-21		
Liner Material	Pyrex		

Filter No.	e 28-14		
Thimble No.	N/A		
Nozzle Diameter	0.226	Nozzle I.D.	226-1

Start Time	13:18	Stop Time	15:38

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 946.600	Stack Temp. T_s (°F)
3-1	5	0.50	1.4	949.97	304
2	10	0.39	1.1	952.97	305
3	15	0.43	1.2	956.07	306
4	20	0.48	1.4	959.36	306
5	25 KS 2.94	0.52	1.5	962.78	305
4-1	30	0.58	~~1.7~~ 1.5	966.30	306
2	35	0.40	1.2	969.41	304
3	40	0.33	0.97	972.21	305
4	45	0.43	1.3	975.44	304
5	50	0.58	1.7	979.10	307
5-1	55	0.42	1.2	982.43	303
2	60	0.38	1.1	985.32	304
3	65	0.35	1.0	988.20	298
	Total	* 16.5432	31.97	79.365	4607
	Average	0.6617	1.2788		304.2800

Traverse Point Number	Probe T_p (°F) Set Point 250	Filter T_f (°F) Set Point 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3-1	245	250	66	83	82	4	9.7		
2	248	251	58	84	82	4	9.8		
3	248	248	56	85	82	4	8.5		V_i 962.78
4	248	251	55	87	83	4	8.6		V_f 962.90 ΔV 0.12
5	248	250	55	86	83	4	8.9		
4-1	247	247	62	84	82	4	8.8		
2	248	251	63	84	82	4	8.8		
3	249	249	63	85	82	4	8.5		
4	249	249	64	85	82	4	9.2		
5	249	250	65	85	82	4	8.7		V_i 979.10
5-1	248	251	66	83	82	4	~~10.~~ KS 9.4		V_f ~~979.22~~ 979.35
2	249	251	66	84	82	4	8.7		ΔV ~~0.12~~ KS
3	249	253	62	85	82	4	9.2		0.25
Total				2123	2044				
Average				83.3400					

* Sum of square roots.

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC KS
Date 3/21/12

TEST LOCATION: FF out Metals **TESTING METHOD:** 5/29 **PAGE** 2 **OF** 2

UNIT: 1 **RUN:** 4

FIELD DATA SHEET

Client	Wheat.	Project No.	11414
Plant	S Bran.	Date	3/21/12
Meter Operator	KS		
Probe Operator	AO		

Meter Box		Sample Box No.	
Meter Y_d		Meter $\Delta H_@$	
K Factor		Pitot C_p	
Leak Rate Before	[cfm] [Lpm] @	(in. Hg)	
Leak Rate After	[cfm] [Lpm] @	(in. Hg)	
Pitot Leak Check Before ☐	After: Good ☐ Bad ☐		

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)		Bar. Press.	[in. Hg] [mbar]
Probe ID No.			
Liner Material			

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	
Start Time:	Stop Time:	

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 988.20	Stack Temp. Ts (°F)	Probe T_p (°F) Set Point 250	Filter T_f (°F) Set Point 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
4	70	0.40	1.2	991.36	303	249	251	59	85	81	4	8.7		Vi ~~994.30~~ Vf ~~994.85~~ ΔV 0.15
5	75	0.47	1.4	994.70	303	249	250	58	85	81	4	9.2		
1-1	80	0.37	1.1	997.68	302	248	253	66	83	81	4	9.0		
2	85	0.42	1.2	1000.89	305	250	252	63	85	81	4	8.7		
3	90	0.48	1.4	1004.26	306	250	252	62	86	81	5	8.5		
4	95	0.52	1.5	1007.69	305	250	249	62	86	81	5	8.4		
5	100	0.42	1.2	1010.86	304	250	251	64	86	81	5	8.1		Vi 10.86 Vf 11.04 ΔV 0.18
2-1	105	0.42	1.2	1013.94	302	249	247	65	84	81	5	8.9		
2	110	0.38	1.1	1016.69	305	250	251	62	85	82	5	9.2		
3	115	0.40	1.2	1019.83	305	251	250	63	86	82	5	8.2		
4	120	0.49	1.4	1023.22	305	250	250	62	86	82	5	9.6		
5	125	0.52	1.5	1026.665	305	250	249	64	86	82	5	9.1		
	Total	*												
	Average													

* Sum of square roots. Circle correct bracketed units on data sheet.

ΔV total - 0.70

ΔP	ΔH	St	t_i	t_o
8.5887	16.57	7957	1100	1064 976

QA/QC KS
Date [redacted]/12

CleanAir ENGINEERING

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location Unit 1 FF Outlet
Plant	Job No. 11414	Method 5/29

Balance Calibration Check			
Balance ID		Reference Weight Mass	
Reference Weight ID		Reference Weight Reading	

Check must be performed at least Once per Method per Job

Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No. 1	Filter Type Quartz		Sample Box No. M3
Date 3/20/12	Lot No. NA		pH NA
Analyst D. Lockhart	Filter No. e28-08		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	762.5	462.1	300.4	
Impinger 2	100 ml 5% HNO_3/10% H_2O_2	671.3	542.5	128.8	QA/QC JB
Impinger 3	100 ml 5% HNO_3/10% H_2O_2	570.5	540.9	29.6	Date 3/20
Impinger 4	Empty	440.7	434.4	6.3	
Impinger 5	100 ml 4% $KMnO_4$/10% H_2SO_4	538.8	535.4	3.4	Total Weight (gm)
Impinger 6	100 ml 4% $KMnO_4$/10% H_2SO_4	515.8	515.7	0.1	468.6
Impinger 7	≈ 250 g Silica Gel	802.8	785.6	17.2	485.8

Run No. 2	Filter Type Quartz		Sample Box No. M11
Date 3/20/12	Lot No. NA		pH NA
Analyst R. Vicler	Filter No. e28-09		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	731.3	416.2	315.1	
Impinger 2	100 ml 5% HNO_3/10% H_2O_2	654.7	546.1	108.6	QA/QC JB
Impinger 3	100 ml 5% HNO_3/10% H_2O_2	553.3	530.0	23.3	Date 3/20
Impinger 4	Empty	424.4	421.7	2.7	
Impinger 5	100 ml 4% $KMnO_4$/10% H_2SO_4	528.4	527.5	0.9	Total Weight (gm)
Impinger 6	100 ml 4% $KMnO_4$/10% H_2SO_4	539.2	539.4	-0.2	450.4
Impinger 7	≈ 250 g Silica Gel	749.5	732.8	16.7	467.1

Run No. 3	Filter Type Quartz		Sample Box No. M10
Date 3/20/12	Lot No.		pH NA
Analyst D. Lockhart	Filter No. e28-11		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	790.9	469.4	321.5	
Impinger 2	100 ml 5% HNO_3/10% H_2O_2	643.6	543.4	100.2	QA/QC JB
Impinger 3	100 ml 5% HNO_3/10% H_2O_2	558.5	540.4	18.1	Date 3/20
Impinger 4	Empty	469.6	466.7	2.9	
Impinger 5	100 ml 4% $KMnO_4$/10% H_2SO_4	562.8	558.6	4.2	Total Weight (gm)
Impinger 6	100 ml 4% $KMnO_4$/10% H_2SO_4	540.9	541.5	-0.6	446.3
Impinger 7	≈ 250 g Silica Gel	743.9	726.5	17.4	463.7

QA/QC JB
Date 3/20

CleanAir ENGINEERING

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location	Unit 1 FF Outlet
Plant South Broward	Job No. 11414	Method	29

Balance Calibration Check			
Balance ID		Reference Weight Mass	
Reference Weight ID		Reference Weight Reading	

Check must be performed at least Once per Method per Job

Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No.	4	Filter Type Quartz		Sample Box No. M 3
Date	3/21/12	Lot No.		pH NA
Analyst	R. Vicere	Filter No. e28-14		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	794.1	456.6 ~~463.5~~ DC	337.5	
Impinger 2	100 ml 5%HNO_3/10%H_2O_2	650.9	544.3	106.6	QA/QC 3/21
Impinger 3	100 ml 5%HNO_3/10%H_2O_2	559.4	542.7	16.7	Date SB
Impinger 4	Empty	437.5	435.4	2.1	
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4	538.0	537.5	0.5	Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4	518.2	518.7	-0.5	4629
Impinger 7	≈ 250 g Silica Gel	817.2	802.4	14.8	477.7

Run No.	5	Filter Type Quartz		Sample Box No.
Date		Lot No.		pH NA
Analyst		Filter No.		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty				
Impinger 2	100 ml 5%HNO_3/10%H_2O_2				QA/QC
Impinger 3	100 ml 5%HNO_3/10%H_2O_2				Date
Impinger 4	Empty				
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4				Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4				
Impinger 7	≈ 250 g Silica Gel				

Run No.	6	Filter Type Quartz		Sample Box No.
Date		Lot No.		pH NA
Analyst		Filter No.		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty				
Impinger 2	100 ml 5%HNO_3/10%H_2O_2				QA/QC
Impinger 3	100 ml 5%HNO_3/10%H_2O_2				Date
Impinger 4	Empty				
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4				Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4				
Impinger 7	≈ 250 g Silica Gel				

QA/QC 3/21
Date SB

CleanAir ENGINEERING

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location	Unit 1 FF Outlet
Plant South Broward	Job No. 11414	Method	23

Balance Calibration Check

Balance ID	SW 8028301069	Reference Weight Mass	500
Reference Weight ID	22549	Reference Weight Reading	499.5

Check must be performed at least Once per Method per Job

Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No. 1	Filter Type Rinsed Glass Fiber		Sample Box No. D8
Date 3/20/12	Lot No. NA		pH NA
Analyst R. Vicere	Filter No. NA		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	1417.5	625.2	792.3	
Impinger 2	100 ml HPLC Water	547.9	537.0	6.3	QA/QC 3/20
Impinger 3	100 ml HPLC Water	536.9	541.6	-0.1	Date SB
Impinger 4	Empty T1308-002	438.2	435.1	3.1	
Impinger 5	Trap # T1308-~~001~~ RV	342.4	~~358.0~~ RV 321.5	20.9	Total Weight (gm)
Impinger 6	Silica Gel	762.2	705.1	57.1	822.5
Impinger 7					879.6

Run No. 2	Filter Type Rinsed Glass Fiber		Sample Box No. D6
Date 3/21/12	Lot No. NA		pH NA
Analyst R. Vicere	Filter No. NA		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	1371.4	629.0	742.4	
Impinger 2	100 ml HPLC Water	543.1	539.6	3.5	QA/QC SB
Impinger 3	100 ml HPLC Water	541.0	539.7	1.3	Date 3/21
Impinger 4	Empty	432.6	~~432.5~~ RV 428.8	3.8	
Impinger 5	Trap # T1308-004	408.3	386.3	22.0	Total Weight (gm)
Impinger 6	Silica Gel	803.1	746.2	56.9	773
Impinger 7					829.9

Run No. 3	Filter Type Rinsed Glass Fiber		Sample Box No. D8
Date 3/21/12	Lot No.		pH NA
Analyst R. Vicere	Filter No. NA		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	1438.3	629.8	808.5	
Impinger 2	100 ml HPLC Water	552.6	541.9	10.7	QA/QC SB
Impinger 3	100 ml HPLC Water	539.7	538.9	0.8	Date 3/21
Impinger 4	Empty	439.8	437.1	2.7	
Impinger 5	Trap # T1308-003	434.5	412.7	21.8	Total Weight (gm)
Impinger 6	Silica Gel	768.8	713.6	55.2	844.5
Impinger 7					899.7

QA/QC SB
Date 3/21

CleanAir ENGINEERING

TEST LOCATION: INLET HCl **TESTING** **METHOD:** 26A **PAGE** 1 **OF** 1

UNIT: 1 **RUN:** 1

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3-22-12
Meter Operator	B-ARNOLD		
Probe Operator	—		

Meter Box	66-20	Sample Box No.	B 12
Meter Y_d	1.0059	Meter $\Delta H_@$	1.8082
K-Factor	—	Pitot C_p	0.831
Leak Rate Before	0.002 [cfm] [Lpm]	@	15 (in. Hg)
Leak Rate After	0.003 [cfm] [Lpm]	@	22 (in. Hg)
Pitot Leak Check Before: ☒	After: Good ☐ Bad ☐		

Cross-Section of Test Location

[N] [UP]

1 2

Duct Dimensions (in.)	105		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-1.4	14		

Amb. Temp. (°F)	78	Bar. Press.	30.10 [in. Hg] [mbar]
Probe I.D. No.	66-4-7		
Liner Material	GLASS		

Filter No.	—	
Thimble No.	—	
Nozzle Diameter		Nozzle I.D.

Start Time:	7:44	Stop Time:	8:44

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m [ft³] [L] Init. Vol. 850.890	Stack Temp. Ts (°F)	Probe T_p (°F) Set Point 355	Filter T_f (°F) Set Point 355	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
2-1	5	N/A	1.2	853.82	471	352	358	64	80	79	4.5	4.2		
	10		1.2	856.73	473	359	357	57	81	79	6.0	4.7		
	15		1.2	859.66	473	358	355	54	83	80	8.5	5.8		
	20		1.2	862.60	474	356	355	54	84	80	11.0	5.6		
	25		1.2	865.52	472	358	355	57	85	81	13.0	7.2		
	30		1.2	868.48	472	355	355	60	86	82	14.5	7.4		
	35		1.2	871.44	472	355	354	63	87	82	16.5	7.4		
	40		1.2	874.39	472	355	355	64	87	82	18.0	5.6		
	45		1.2	877.35	472	355	359	62	88	83	19.0	7.7		
	50		1.2	880.31	468	354	355	61	88	84	20.0	7.9		
	55		1.1	883.18	470	355	354	61	87	83	21.5	9.3		
	60		1.1	885.975	464	355	358	61	87	83	21.5	9.4		
	Total	*		35.0950										
	Average		1.1833		471.2500				83.3750					

* Sum of square roots. Circle correct bracketed units on data sheet.

QA/QC BK
Date 3-22-12

CleanAir ENGINEERING

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TEST LOCATION: INLET HCl **TESTING** **METHOD:** 26A **PAGE** 1 **OF** 1

UNIT: 1 **RUN:** 2

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Browns	Date	3-22-12
Meter Operator	B. ARNOLD		
Probe Operator	—		

Meter Box	66-20	Sample Box No.	B22
Meter Y_d	1.0059	Meter $\Delta H_@$	1.8082
K Factor	—	Pitot C_p	0.831
Leak Rate Before	0.002 [cfm] [Lpm]	@ 15 (in. Hg)	
Leak Rate After	0.003 [cfm] [Lpm]	@ 22 (in. Hg)	
Pitot Leak Check Before:		After: Good ☑ Bad ☐	

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.) 105

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-1.4	~~0404~~	Out	In

Amb. Temp. (°F)	78	Bar. Press.	30.10 [in. Hg] [mbar]
Probe I.D. No.	66-4-7		
Liner Material	GLASS		

Filter No.	—		
Thimble No.	—		
Nozzle Diameter		Nozzle I.D.	

Start Time:	9:07	Stop Time:	10:07

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 886.015	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 355	Filter T_f (°F) Set Points 355	Cond. Temp. T_c (°F)	DGM Inlet $T_{m,in}$ (°F)	DGM Outlet $T_{m,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
	5	N/A	1.2	888.97	472	355	357	66	86	84	4.0	7.9		
	10		1.2	891.89	473	356	355	49	87	84	5.0	7.7		
	15		1.2	894.84	475	356	352	46	88	84	6.0	9.0		
	20		1.2	897.74	477	355	354	46	89	84	7.5	7.1		
	25		1.2	900.70	477	355	357	51	91	85	9.5	7.4		
	30		1.2	903.64	479	355	354	55	92	86	11.5	7.4		
	35		1.2	906.61	477	355	358	58	93	86	13.0	7.8		
	40		1.2	909.60	481	355	355	62	93	86	15.5	5.9		
	45		1.2	912.59	479	355	355	60	93	87	16.5	7.8		
	50		1.2	915.59	478	355	340	60	92	88	18.5	9.0		
	55		1.2	918.57	477	355	355	61	92	88	20.0	9.1		
	60		1.1	921.445	476	355	355	61	93	88	21.5	9.3		
	Total	*		35.4300										
	Average		1.1917		476.7500				88.2917					

* Sum of square roots.

~~Circle~~ correct bracketed units on data sheet.

QA/QC BA
Date 3-22-12

new general datasheet, December 2008

CleanAir ENGINEERING

TEST LOCATION: INLET HCl **TESTING** **METHOD:** 26A **PAGE** 1 **OF** 1

UNIT: 11 **RUN:** 3 **FIELD DATA SHEET**

Client	Wheelabrator	Project No.	1414
Plant	S Broward	Date	3-22-12
Meter Operator	B. Alfred		
Probe Operator	—		

Cross-Section of Test Location

[N] [UP]

1

2

Meter Box	66-20	Sample Box No.	81
Meter Y_d	1.0059	Meter $\Delta H_@$	1.8082
K Factor	—	Pitot C_p	0.831
Leak Rate Before	0.002 [cfm] [Lpm] @ 18 (in. Hg)		
Leak Rate After	0.002 [cfm] [Lpm] @ 18 (in. Hg)		
Pitot Leak Check Before:		After: Good [X] Bad [ ]	

Duct Dimensions (in.) 108

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-1.3	14	Out	In

Amb. Temp. (°F)	84	Bar. Press.	30.10 [in. Hg] [mbar]
Probe I.D. No.	66-4-7		
Liner Material	GLASS		

Filter No.	—		
Thimble No.	—		
Nozzle Diameter		Nozzle I.D.	

Start Time: 10:32 Stop Time: 11:32

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol [ft³] [L] 921.455	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 355	Filter T_f (°F) Set Points 355	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator, approx (%,dv)	[ ] Amb Filter [ ] Dioxin Trap [ ]	Notes
2-1	5	N/A	1.2	924.43	481	354	353	66	88	87	5.0	7.8		
	10		1.2	927.38	480	355	352	62	89	87	5.5	7.9		
	15		1.2	930.37	481	355	353	59	90	87	7.0	9.9		
	20		1.2	933.22	480	355	354	59	92	87	8.5	9.4		
	25		1.2	936.26	480	355	359	60	93	87	9.5	9.2		
	30		1.2	939.26	486	354	355	51	94	88	11.0	7.7		
	35		1.2	942.34	484	356	351	50	94	88	12.0	9.1		
	40		1.2	945.26	487	355	357	51	94	89	13.5	9.6		
	45		1.2	948.28	483	355	351	52	93	89	14.5	9.4		
	50		1.2	951.29	481	355	355	55	93	89	15.5	9.3		
	55		1.2	954.33	483	354	351	58	93	89	16.5	9.0		
	60		1.2	957.345	482	355	357	60	93	89	17.0	7.8		
	Total	*		35.8900										
	Average		1.200		482.3333				90.0833					

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC BA
Date 3-27-12

CleanAir ENGINEERING

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location	Unit 1 SDA Inlet
Plant South Broward	Job No. 11414	Method	Modified 26A

Balance Calibration Check			
Balance ID		Reference Weight Mass	
Reference Weight ID		Reference Weight Reading	

Check must be performed at least Once per Method per Job

Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No. 1	Filter Type Quartz	Sample Box No. B12
Date 3/22	Lot No. NA	pH NA
Analyst D. Luckhard	Filter No. NA	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	545.1	474.6	70.5	
Impinger 2	100 mL 01.N H2SO4	645.6	555.3	90.3	QA/QC JB
Impinger 3	100 mL 01.N H2SO4	559.9	540.4	19.5	Date 3/22
Impinger 4	Empty	451.8	~~439.9~~ 448.2	3.6	
Impinger 5	Silica Gel	759.6	746.4	13.2	Total Weight (gm)
Impinger 6					183.9
Impinger 7					197.1

Run No. 2	Filter Type Quartz	Sample Box No. B22
Date 3/22/12	Lot No. NA	pH NA
Analyst R. Vicere	Filter No. NA	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	571.6	460.9	110.7	
Impinger 2	100 mL 01.N H2SO4	637.4	564.5	72.9	QA/QC JB
Impinger 3	100 mL 01.N H2SO4	557.4	541.6	15.8	Date 3/22
Impinger 4	Empty	437.5	435.8	1.7	
Impinger 5	Silica Gel	788.1	776.4	11.7	Total Weight (gm)
Impinger 6					201.1
Impinger 7					212.8

Run No. 3	Filter Type Quartz	Sample Box No. B1
Date 3/22/12	Lot No. NA	pH NA
Analyst R. Vicere	Filter No. NA	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	527.3	470.8	56.5	
Impinger 2	100 mL 01.N H2SO4	638.4	544.0	94.4	QA/QC SB
Impinger 3	100 mL 01.N H2SO4	573.4	546.6	26.8	Date 3/22
Impinger 4	Empty	465.8	461.8	4.0	
Impinger 5	Silica Gel	755.6	741.1	14.5	Total Weight (gm)
Impinger 6					181.7
Impinger 7					196.2

QA/QC SB
Date 3/22

CleanAir ENGINEERING

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TEST LOCATION: FF out HCl **TESTING** **METHOD:** 26A **PAGE** 1 **OF** 1

UNIT: 1 **RUN:** 1

FIELD DATA SHEET

Client	wheel.	Project No.	11424
Plant	S Broward	Date	3/22/12
Meter Operator	K Sullivan		
Probe Operator	K Sullivan		

Meter Box	55-3	Sample Box No.	36
Meter Y_d	0.9925	Meter $\Delta H_@$	1.7792
K Factor	/	Pitot C_p	/
Leak Rate Before	0.004 [cfm] [Lpm] @ 15 (in. Hg)		
Leak Rate After	0.002 [cfm] [Lpm] @ 5 (in. Hg)		
Pitot Leak Check Before:		After: Good ☑ Bad ☐	

Cross-Section of Test Location

[N] [UP]

1, 2, 3, 4, 5, CEMS

Duct Dimensions (in.)	16		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-10.5	10		

Amb. Temp. (°F)	75	Bar. Press.	30.10 [in Hg] [mbar]
Probe I.D. No.	62-4-1		
Liner Material	Pyrex		

Filter No.	/		
Thimble No.	/		
Nozzle Diameter	/	Nozzle I.D.	/

Start Time	7:44	Stop Time	8:44

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 27.300	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 300	Filter T_f (°F) Set Points 300	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3-3	5	N/A	1.5	30.67	301	299	300	65	76	75	3	8.3		
	10		1.5	34.03	301	297	301	65	77	75	3	8.4		
	15		1.5	37.46	301	298	300	63	80	75	4	8.7		
	20		1.5	40.87	301	299	300	59	81	76	4	8.6		
	25		1.5	44.27	301	299	301	57	82	76	4	8.8		
	30		1.5	47.70	301	297	299	57	83	77	4	8.7		
	35		1.5	51.06	301	299	301	56	83	77	4	8.4		
	40		1.5	54.45	301	298	300	58	83	77	4	8.5		
	45		1.5	57.89	301	300	300	61	84	78	4	8.8		
	50		1.5	61.33	301	299	300	61	84	78	4	8.4		
	55		1.5	64.80	301	298	300	63	84	78	4	8.5		
	60		1.5	68.235	301	300	300	65	84	78	4	8.4		
	Total	*	18.0	40.935	3612				983	920				
	Average		1.5000		301.0000				79.2917					

* Sum of square roots. Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC KS

Date 3/22/12

TEST LOCATION: FF outlet HCl **TESTING METHOD:** 26A **PAGE** 1 **OF** 1

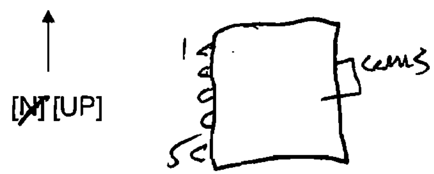
UNIT: 1 **RUN:** 2

FIELD DATA SHEET

Client	wheel	Project No.	11414
Plant	S Brevard	Date	3/22/12
Meter Operator	K Sullivan		
Probe Operator	K Sullivan		

Meter Box	85-3	Sample Box No.	33
Meter Y_d	0.9925	Meter $\Delta H_@$	1.7792
K Factor	—	Pitot C_p	—
Leak Rate Before	0.006 [cfm] [Lpm] @ 15 (in. Hg)		
Leak Rate After	0.002 [cfm] [Lpm] @ 5 (in. Hg)		
Pitot Leak Check Before: ☒	After: Good ☒ Bad ☐		

Cross-Section of Test Location



Duct Dimensions (in.): 96			
Static Pres (in H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-10.8	10		

Amb. Temp. (°F)	80	Bar. Press.	30.10 [in Hg] [mbar]
Probe I.D. No.	67-4-1		
Liner Material	Pyrex		

Filter No.	/		
Thimble No.	/		
Nozzle Diameter	/	Nozzle I.D.	/

Start Time:	9:07	Stop Time:	10:07

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 68.980	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points 300	Filter T_f (°F) Set Points 300	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3-3	5	N/A	1.5	72.43	302	296	300	64	79	78	4	8.9		
	10		1.5	75.84	302	298	301	64	79	78	4	8.6		
	15		1.5	79.18	302	302	301	63	83	78	4	8.7		
	20		1.5	82.55	302	301	301	62	84	79	4	8.3		
	25		1.5	86.11	302	300	301	64	85	80	4	8.5		
	30		1.5	89.45	302	300	300	64	86	80	4	8.5		
	35		1.5	92.91	302	299	301	62	87	81	4	8.1		
	40		1.5	96.36	302	299	300	65	87	81	4	8.2		
	45		1.5	99.82	303	299	300	65	87	81	4	8.4		
	50		1.5	103.27	303	299	301	65	87	81	4	8.8		
	55		1.5	106.69	303	298	300	66	88	82	4	8.9		
	60		1.5	110.120	303	300	301	66	88	82	4	8.7		
	Total	*	18.0	41.220	3628				1020	961				
	Average		1.5000		302.3333				82.5417					

* Sum of square roots.

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC KS
Date 3/22/12

TEST LOCATION: FF outlet HCl **TESTING METHOD:** 26A **PAGE** 1 **OF** 1

UNIT: 1 **RUN:** 3

FIELD DATA SHEET

Client	Wheel.	Project No	1414
Plant	S Broward	Date	3/22/12
Meter Operator	K Sullivan		
Probe Operator	K Sullivan		
Meter Box	85-3	Sample Box No	N/A
Meter Y_d	0.9925	Meter $\Delta H_@$	1.7792
K Factor	/	Pitot C_p	/
Leak Rate Before	0.005 [cfm] [Lpm]	@	15 (in. Hg)
Leak Rate After	0.002 [cfm] [Lpm]	@	8 (in. Hg)
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐		

Cross-Section of Test Location

[X] [UP]

Duct Dimensions (in.) 96

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-10.7	10	Out	In

Amb. Temp. (°F)	80	Bar. Press.	30.10 [in. Hg] [mbar]
Probe I.D. No	67-4-1		
Liner Material	Pyrex		
Filter No	/		
Thimble No	/		
Nozzle Diameter	/	Nozzle I.D.	/
Start Time	10:32	Stop Time	11:32

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol [ft³] [L] 110.965	Stack Temp. Ts (°F)	Probe T_p (°F) Set Point 300	Filter T_f (°F) Set Point 300	Cond. Temp. T_c (°F)	DGM Inlet $T_{m,in}$ (°F)	DGM Outlet $T_{m,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator approx. (% dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3-3	5	N/A	1.5	114.38	302	297	299	65	84	83	7	9.2		
	10		1.5	117.81	302	296	300	64	86	82	7	9.3		
	15		1.5	121.22	302	295	301	64	86	83	7	9.0		
	20		1.5	124.65	302	292	300	64	87	83	7	9.6		
	25		1.5	128.11	302	300	299	63	87	83	7	9.4		
	30		1.5	131.61	302	301	301	62	87	83	7	8.8		
	35		1.5	135.21	303	297	301	55	88	84	7	9.5		
	40		1.5	138.58	303	298	300	52	88	84	7	9.7		
	45		1.5	142.10	303	300	301	47	89	85	7	9.3		
	50		1.5	145.60	303	302	300	48	89	85	7	9.3		
	55		1.5	149.10	303	303	300	52	89	85	7	9.3		
	60		1.5	152.610	303	303	301	53	89	85	7	9.2		
	Total	*	18.0	41.645	3630				1049	1005				
	Average		1.5000		302.5000				85.5833					

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC KS
Date 3/22/12

CleanAir ENGINEERING

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location Unit 1 FF Outlet
Plant South Broward	Job No. 11414	Method Modified M26A

Balance Calibration Check			
Balance ID		Reference Weight Mass	
Reference Weight ID		Reference Weight Reading	

Check must be performed at least Once per Method per Job

Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No. 1	Filter Type Teflon Mat	Sample Box No. B6
Date 3/22/12	Lot No. NA	pH NA
Analyst R. Vicere	Filter No. NA	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	632.2	552.2	80.0	
Impinger 2	100 mL 01.N H2SO4	752.3	628.1	124.2	QA/QC SB
Impinger 3	100 mL 01.N H2SO4	567.8	535.9	31.9	Date 3/22
Impinger 4	Empty	479.7	475.0	4.7	
Impinger 5	Silica Gel	759.4	749.7	9.7	Total Weight (gm)
Impinger 6					240.8
Impinger 7					250.5

Run No. 2	Filter Type Teflon Mat	Sample Box No. B3
Date 3/22/12	Lot No. NA	pH NA
Analyst R. Vicere	Filter No. NA	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	568.0	458.2	109.8	
Impinger 2	100 mL 01.N H2SO4	654.7	541.3	113.4	QA/QC SB
Impinger 3	100 mL 01.N H2SO4	655.3	634.9	20.4	Date 3/22
Impinger 4	Empty	443.9	439.0	4.9	
Impinger 5	Silica Gel	719.9	707.6	12.3	Total Weight (gm)
Impinger 6					248.5
Impinger 7					260.8

Run No. 3	Filter Type Teflon Mat	Sample Box No. Black
Date 3/22/12	Lot No. NA	pH NA
Analyst R. Vicere	Filter No. NA	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	545.9	459.0	86.9	
Impinger 2	100 mL 01.N H2SO4	669.1	554.0	115.1	QA/QC SB
Impinger 3	100 mL 01.N H2SO4	567.7	544.8	22.9	Date 3/22
Impinger 4	Empty	443.9	438.6	5.3	
Impinger 5	Silica Gel	785.0	769.2	15.8	Total Weight (gm)
Impinger 6					230.2
Impinger 7					246.0

QA/QC SB
Date 3/22

CleanAir ENGINEERING

TEST LOCATION: ff outlet Particulate/metals **TESTING** **METHOD:** 5/29 **PAGE** 1 **OF** 2

UNIT: 3 **RUN:** 1

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3-20-12
Meter Operator	A. Obuchowski		
Probe Operator	"		

Meter Box	66-21	Sample Box No.	mg
Meter Y_d	0.9888	Meter $\Delta H_@$	1.8162
K Factor	2.88	Pitot C_p	0.835
Leak Rate Before	0.006 [cfm] [Lpm] @ 15 (in. Hg)		
Leak Rate After	0.001 [cfm] [Lpm] @ 9 (in. Hg)		
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐		

Cross-Section of Test Location

[N] [UP]

5

Duct Dimensions (in.)	96 x 96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-12.1	10		

Amb. Temp. (°F)	76	Bar. Press	30.05 [in. Hg] [mbar]
Probe I.D. No.	67-8-19		
Liner Material	glass		

Filter No.	828-10		
Thimble No.	—		
Nozzle Diameter	0.277	Nozzle I.D.	277-1

Start Time	07:54	Stop Time	10:11

Traverse Point Number	Min/pt 5 / Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 427.210	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
														port change
1-1	5	0.44	1.3 ~~1.56~~	429.96	295	255	250	67	74	74	4	9.4		
-2	10	0.43 ~~0.47~~	1.2 ~~1.20~~	432.80	294	256	249	65	74	74	4	9.6		
-3	15	0.42	1.2 ~~1.26~~	435.28	294	251	251	61	78	74	4	9.8		
-4	20	0.51	1.5	438.69	295	250	249	59	80	74	5	9.7		
-5	25	0.41	1.1	441.780	296	249	251	60	83	75	5	9.0		442.00
2-1	30	0.50	1.4	445.21	295	250	251	63	83	76	5	9.5		-0.22
-2	35	0.48	1.4	448.58	295	253	251	63	85	76	5	9.3		
-3	40	0.43	1.2	451.73	295	251	250	64	87	77	5	8.8		
-4	45	0.39	1.1	454.72	294	250	250	58	88	79	4	9.1		
-5	50	0.39	1.1	457.740	295	249	250	53	88	79	4	9.4		457.935
3-1	55	0.46	1.3	461.19	295	250	250	54	86	80	4	9.6		-0.195
-2	60	0.51	1.5	464.62	295	251	249	51	89	80	5	9.8		
-3														
@ 3-20-12	Total	16.3451	30.80	77.3350	7361.0				2128	1982				
	Average	0.6538	1.2320		294.440				82.20					

Sum of square roots. Circle correct bracketed units on data sheet.

3538 995 918

15.3 75,300

QA/QC _ Date _

CleanAir ENGINEERING

G - 23

TEST LOCATION: FF outlet Particulate/metals **TESTING** **METHOD:** 5/29 **PAGE** 2 **OF** 2

UNIT: 3 **RUN:** 1

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3-20-12
Meter Operator	A. Obuchowski		
Probe Operator	"		

Meter Box		Sample Box No.	
Meter Y_d		Meter $\Delta H_@$	
K Factor		Pitot C_p	
Leak Rate Before	[cfm] [Lpm] @ (in. Hg)		
Leak Rate After	[cfm] [Lpm] @ (in. Hg)		
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐		

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)			
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)		Bar. Press.	[in. Hg] [mbar]
Probe I.D. No.			
Liner Material			

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	
Start Time	Stop Time	

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m,in}$ (°F)	DGM Outlet $T_{m,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3-3	65	0.46	1.3	467.85	296	250	250	51	91	81	4	9.7		
-4	70	0.40	1.2	470.92	295	249	250	52	87	81	4	9.8		
-5	75	0.44	1.3	474.160	295	249	251	53	86	81	4	9.6		474.366
4-1	80	0.55	1.6	478.00	295	249	250	57	83	80	5	9.7		-0.20
-2	85	0.48	1.4	481.28	295	251	250	58	85	80	5	9.5		
-3	90	0.42	1.2	484.40	294	250	249	58	85	80	4	9.6		
-4	95	0.38	1.1	487.30	295	250	249	59	86	81	4	9.8		
-5	100	0.36	1.0	490.160	295	249	249	61	87	81	4	9.3		K_f = 2.9
5-1	105	0.37	1.1	493.40	291	248	250	62	86	82	4	9.3		490.345
-2	110	0.31	0.90	496.12	290	250	249	62	88	83	4	9.7		-0.185
-3	115	0.36	1.0	499.01	294	250	250	63	89	84	4	9.4		
-4	120	0.42	1.2	502.17	294	251	250	63	90	85	5	8.9		
-5	125	0.41	1.2	505.345	294	250	250	63	90	85	5	9.2		
	Total	*												
	Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC______

Date______

TEST LOCATION: FF-Outlet Part/Metals **TESTING** **METHOD:** 5/29 **PAGE** 1 **OF** 2

UNIT: 3 **RUN:** 2

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/22/12
Meter Operator	P. Bihun		
Probe Operator	P. Bihun		

Meter Box	66-4	Sample Box No.	M9
Meter Y_d	0.9953	Meter $\Delta H_@$	1.7374
K Factor	2.84	Pitot C_p	0.843
Leak Rate Before	good [cfm] [Lpm]	@ 15	(in. Hg)
Leak Rate After	0.002 [cfm] [Lpm]	@ 10	(in. Hg)
Pitot Leak Check Before: ✓		After: Good ✓ Bad ☐	

Cross-Section of Test Location

[N] [UP]

1 5

Duct Dimensions (in.)	96x96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-10.0	10.0		

Amb. Temp. (°F)	74	Bar. Press	30.10 [in. Hg] [mbar]
Probe I.D. No.	67-8-21		
Liner Material	Glass		

Filter No.	e28-21		
Thimble No.	N/A		
Nozzle Diameter	0.277	Nozzle I.D.	277-2

Start Time	7:37	Stop Time	9:50

Traverse Point Number	Min/pt 5 / Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F)	Filter T_f (°F)	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator approx (%,dv)	☐ Amb/Filter ☐ Dioxin Trap ☐	Notes
				71.565		Set Points 280	250							
1-1	5	0.50	1.4	74.90	297	255	250	66	76	75	3.0	10.4	N/A	
2	10	0.47	1.3	78.14	297	253	253	64	77	75	3.0	9.7		
3	15	0.46	1.3	81.37	297	252	255	61	79	75	3.0	10.0		
4	20	0.44	1.3	84.63	297	250	257	60	81	76	3.0	10.1		87.825
5	25	0.42	1.2	87.765	297	250	249	60	81	76	3.0	10.3		-0.06
2-1	30	0.56	1.6	91.43	294	248	250	63	81	76	3.5	10.0		
2	35	0.48	1.4	94.82	297	251	250	64	83	77	3.5	10.4		
3	40	0.46	1.3	98.05	297	250	249	55	84	77	3.0	10.4		
4	45	0.40	1.1	100.94	297	250	254	50	84	78	3.0	11.0		
5	50	0.40	1.1	103.925	298	250	250	48	84	78	3.0	10.5		104.00
3-1	55	0.53	1.5	107.44	296	248	252	52	83	79	3.5	10.5		-0.025
2	60	0.57	1.5	110.92	297	250	249	57	83	79	3.5	10.8		
	Total	16.2412		80.115										
	Average	0.6896	1.2752		296.6400				80.6000					

Sum of square roots 16.0 3561 1899

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC PB

Date 3/22/12

new general datasheet, December 2006

TEST LOCATION: FF Outlet Part / Metals **TESTING** **METHOD:** 5/29 **PAGE** 2 **OF** 2

UNIT: 3 **RUN:** 2

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/22/12
Meter Operator	P. Bihun		
Probe Operator	P. Bihun		

Meter Box		Sample Box No.	
Meter Y_d		Meter $\Delta H_@$	
K Factor		Pitot C_p	
Leak Rate Before	[cfm] [Lpm]	@	(in. Hg)
Leak Rate After	[cfm] [Lpm]	@	(in. Hg)
Pitot Leak Check Before: ☐	After: Good ☐	Bad ☐	

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)			
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)		Bar. Press	[in. Hg] [mbar]
Probe I.D. No.			
Liner Material			

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	

Start Time:	Stop Time:

Traverse Point Number	Min/pt. 5 / Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp Ts (°F)	Probe T_p (°F)	Filter T_f (°F)	Cond Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator, approx (%, dv)	☐ Amb. Filter ☐ Dioxin Trap ☐	Notes
					Set Points	250	250							
3	65	0.40	1.1	113.87	298	251	257	52	84	79	3.0	11.0	N/A	
4	70	0.43	1.2	116.98	298	250	250	52	84	79	3.5	10.7		
5	75	0.45	1.3	120.285	298	250	257	54	84	79	3.5	10.6		120.320
4-1	80	0.49	1.4	123.75	298	248	250	60	83	79	3.5	10.1		-0.065
2	85	0.48	1.4	127.13	296	250	249	59	84	79	3.5	11.1		
3	90	0.47	1.3	130.32	297	251	249	58	85	79	3.5	11.0		
4	95	0.46	1.1	133.27	297	250	248	59	85	79	3.0	10.8		
5	100	0.43	1.2	136.405	297	249	254	60	84	80	3.5	10.4		136.450
5-1	105	0.50	1.4	139.84	295	248	249	62	83	80	3.5	10.3		-0.045
2	110	0.45	1.3	143.04	295	257	248	62	85	80	3.5	10.7		
3	115	0.31	0.88	145.73	296	250	248	67	86	81	3.0	10.3		
4	120	0.38	1.1	148.75	295	250	249	63	88	81	3.5	10.5		
5	125	0.43	1.2	151.925	295	250	250	63	88	81	3.5	11.1		
	Total													
	Average*													

*Sum of square roots.

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC PB
Date 3/22/12

G - 25

TEST LOCATION: FF Outlet Part/Metals **TESTING** **METHOD:** 5/29 **PAGE** 1 **OF** 2

UNIT: 3 **RUN:** 3 **FIELD DATA SHEET**

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/22/12
Meter Operator	P. Bihun		
Probe Operator	P. Bihun		

Meter Box	66-4	Sample Box No.	M11
Meter Y_d	0.9953	Meter $\Delta H_@$	1.7374
K Factor	2.85	Pitot C_p	0.843
Leak Rate Before	0.003 [cfm] [Lpm] @ 15 (in. Hg)		
Leak Rate After	0.003 [cfm] [Lpm] @ 10 (in. Hg)		
Pitot Leak Check Before: ☒	After: Good ☒ Bad ☐		

Cross-Section of Test Location

[N] [UP]

5

Duct Dimensions (in.)	96x96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-1.3	10.0	Out	In

Amb. Temp. (°F)	78	Bar. Press.	30.10 [in. Hg] [mbar]
Probe I.D. No.	67-8-21		
Liner Material	Glass		

Filter No.	028-26		
Thimble No.	N/A		
Nozzle Diameter	0.277	Nozzle I.D.	277-2

Start Time	10:11	Stop Time	12:23

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points	Filter T_f (°F) Set Points	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
				152.275		250	250							
1-1	5	0.48	1.4	155.64	296	249	257	66	81	81	4.0	10.6	N/A	
2	10	0.49	1.4	159.02	297	255	253	66	84	82	4.0	10.8		
3	15	0.48	1.4	162.37	295	251	254	65	86	83	4.0	11.2		
4	20	0.47	1.3	165.63	298	252	252	64	88	84	4.0	10.8		168.910
5	25	0.45	1.3	168.900	297	249	248	62	88	84	4.0	10.6		-0.05
2-1	30	0.52	1.5	172.38	297	248	250	62	87	84	4.5	10.6		
2	35	0.52	1.5	175.83	298	251	249	61	87	84	4.5	11.0		
3	40	0.47	1.3	179.13	297	251	249	62	87	84	4.0	10.3		
4	45	0.41	1.2	182.27	297	250	254	63	87	84	4.0	10.4		
5	50	0.45	1.3	185.540	296	250	249	64	87	84	4.5	10.3		~~185.600~~
3-1	55	0.37	1.1	188.57	296	248	248	65	86	84	4.0	10.6		-0.06
2	60	0.40	1.1	191.57	296	251	250	65	87	84	4.0	9.8		
	Total	* 16.6016		39.915										
	Average	0.6641	1.2680		296.0400					85.1000				

* Sum of square roots.

Circle correct bracketed units on data sheet.

0.6623 ~~33~~ 15.8

3560

7037

QA/QC PB

Date 3/22/12

CleanAir ENGINEERING

TEST LOCATION: PF Outlet Metals (Part **TESTING** **METHOD:** 5/29 **PAGE** 2 **OF** 2

UNIT: 3 **RUN:** 3

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/22/12
Meter Operator	P. Bihun		
Probe Operator	P. Bihun		

Meter Box		Sample Box No.	
Meter Y_d		Meter $\Delta H_@$	
K Factor		Pitot C_p	
Leak Rate Before	[cfm] [Lpm]	@	(in. Hg)
Leak Rate After	[cfm] [Lpm]	@	(in. Hg)
Pitot Leak Check Before: ☐	After: Good ☐	Bad ☐	

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)			
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)		Bar. Press.	[in. Hg] [mbar]
Probe I.D. No.			
Liner Material			

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	

Start Time:	Stop Time:

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐ ___	Notes
3	65	0.40	1.1	194.55	296	250	249	64	88	85	4.0	10.4	N/A	
4	70	0.40	1.1	197.52	298	251	248	63	87	85	4.0	10.6		200.545
5	75	0.37	1.1	200.480	295	250	250	62	87	85	4.0	10.3		-0.065
4-1	80	0.55	1.6	204.14	295	248	253	63	86	88	4.5	10.4		
2	85	0.50	1.4	207.53	295	251	250	63	86	84	4.5	10.2		
3	90	0.48	1.4	210.87	296	251	251	64	86	84	4.5	10.6		
4	95	0.50	1.4	214.25	295	250	253	64	86	83	4.5	11.0		217.305
5	100	0.37	1.1	217.285	297	250	250	64	86	83	4.0	10.8		-0.05
5-1	105	0.35	1.0	220.16	293	249	253	56	86	84	4.0	10.7		
2	110	0.38	1.1	223.14	293	249	255	56	86	84	4.0	11.2		
3	115	0.48	1.4	226.48	294	250	252	57	86	84	4.5	11.3		
4	120	0.40	1.1	229.42	297	250	250	57	87	84	4.0	10.8		
5	125	0.38	1.1	232.415	297	250	251	57	87	84	4.0	10.8		
	Total	*												
	Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC PB
Date 3/22/12

TEST LOCATION: FF Outlet Metals **TESTING METHOD:** 29 **PAGE** 1 **OF** 2

UNIT: 3 **RUN:** 4

FIELD DATA SHEET

Client	Wheelabrator
Project No.	11414
Plant	S. Broward
Date	3/22/12
Meter Operator	P. Bihun
Probe Operator	P. Bihun
Meter Box	66-4
Sample Box No.	M10
Meter Y_d	0.9953
Meter $\Delta H_@$	1.7374
K Factor	2.85
Pitot C_p	0.843
Leak Rate Before	0.004 [cfm] [Lpm] @ 15 (in. Hg)
Leak Rate After	0.004 [cfm] [Lpm] @ 10 (in. Hg)
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐

Cross-Section of Test Location

[N] [UP]

1 5

Duct Dimensions (in.)	96 x 86
Static Pres (in. H_2O)	-11.6
Port Len. (in.)	10.0
Gas Flow [In] [Out] of page	Out
First point all the way [In] [Out]	In

Amb. Temp. (°F)	83
Bar. Press.	30.10 [in. Hg] [mbar]
Probe I.D. No.	47-8-21
Liner Material	Glass
Filter No.	028-24
Thimble No.	N/A
Nozzle Diameter	0.277
Nozzle I.D.	277-2
Start Time	12:52
Stop Time	15:01

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
				232.815										
1-1	5	0.42	1.2	235.98	294	243	253	66	83	82	3.5	10.7	N/A	
2	10	0.52	1.5	239.43	296	258	259	66	83	82	4.0	10.7		
3	15	0.51	1.5	242.92	296	257	256	66	86	83	4.0	10.4		
4	20	0.54	1.5	246.43	297	252	251	65	87	83	4.5	10.3		249.485
5	25	0.40	1.1	249.410	296	249	248	63	87	83	3.5	10.7		-0.075
2-1	30	0.43	1.2	252.52	297	248	249	62	86	84	3.5	10.5		
2	35	0.48	1.4	255.90	295	250	252	62	87	84	4.0	10.6		
3	40	0.45	1.3	259.20	296	251	256	61	88	84	4.0	11.1		
4	45	0.47	1.3	262.50	297	250	248	62	88	84	4.0	11.2		265.730
5	50	0.43	1.2	265.645	297	249	252	63	87	84	4.0	11.0		-0.085
3-1	55	0.58	1.6	269.35	297	248	251	65	86	84	4.5	11.3		
2	60	0.60	1.7	273.05	298	251	251	65	87	83	5.0	11.2		
	Total	12.6596		85.120										
	Average	0.7024	1.4320		296.4800				84.7800					

Sum of square roots. 1665 Circle correct bracketed units on data sheet. 3558 2035

QA/QC RB

Date 3/22/12

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CleanAir ENGINEERING

G - 29

TEST LOCATION: RR Outlet Metals **TESTING METHOD:** 29 **PAGE** 2 **OF** 2

UNIT: 3 **RUN:** 4

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/22/12
Meter Operator	P. Bihun		
Probe Operator	P. Bihun		

Meter Box		Sample Box No.	
Meter Y_d		Meter $\Delta H_@$	
K Factor		Pitot C_p	
Leak Rate Before	[cfm] [Lpm] @	(in. Hg)	
Leak Rate After	[cfm] [Lpm] @	(in. Hg)	
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐		

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)

Static Pres ($in. H_2O$)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)		Bar. Press.	[in. Hg] [mbar]
Probe I.D. No.			
Liner Material			

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	
Start Time	Stop Time	

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP ($in. H_2O$)	Orifice Setting ΔH ($in. H_2O$)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator approx (%dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3	65	0.56	1.6	276.64	294	251	248	66	87	83	4.5	11.3	N/A	
4	70	0.55	1.6	280.29	301	250	250	65	87	83	4.5	11.1		283.670
5	75	0.46	1.3	283.600	295	250	248	61	86	83	4.0	10.2		-0.07
4-1	80	0.67	1.9	287.55	297	248	253	58	86	82	5.0	10.8		
2	85	0.62	1.8	291.41	296	250	249	55	86	82	5.0	10.9		
3	90	0.59	1.7	295.17	298	251	254	54	87	83	5.0	11.0		
4	95	0.48	1.4	298.53	297	252	250	56	87	82	4.5	10.7		
5	100	0.43	1.2	301.685	302	249	251	58	87	83	4.0	10.6		301.770
5-1	105	0.38	1.1	304.70	293	248	254	60	86	83	4.0	10.8		-0.085
2	110	0.42	1.2	307.80	293	250	246	59	86	83	4.0	10.5		
3	115	0.50	1.4	311.13	296	251	250	59	87	83	4.1	10.2		
4	120	0.53	1.5	314.65	296	250	249	59	88	83	5.0	10.9		
5	125	0.55	1.6	318.250	296	250	251	60	88	83	5.0	11.0		
	Total	*												
	Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC PB
Date 3/22/12

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location	Unit 3 FF Outlet
Plant	Job No. 11414	Method	5/29

Balance Calibration Check			
Balance ID		Reference Weight Mass	
Reference Weight ID		Reference Weight Reading	

Check must be performed at least Once per Method per Job

Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No.	1	Filter Type Quartz		Sample Box No.	M9
Date	3/20/12	Lot No.	MA	pH	NA
Analyst	R. Vicere	Filter No.	e28-10	Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	742.5	477.3	265.2	
Impinger 2	100 ml 5%HNO_3/10%H_2O_2	695.5	562.7	132.8	QA/QC
Impinger 3	100 ml 5%HNO_3/10%H_2O_2	594.5	560.4	34.1	Date
Impinger 4	Empty	440.0	428.5	11.5	
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4	549.2	~~547.5~~ 546.2	3.0	Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4	549.3	~~543.2~~ 544.2	5.1	451.7
Impinger 7	≈ 250 g Silica Gel	775.9	757.3	18.6	470.3

Run No.	2	Filter Type Quartz		Sample Box No.	M9
Date	3/22/12	Lot No.	MA	pH	NA
Analyst	R. Vicere	Filter No.	e28-21	Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	803.3	479.2	324.1	
Impinger 2	100 ml 5%HNO_3/10%H_2O_2	692.3	568.1	124.2	QA/QC
Impinger 3	100 ml 5%HNO_3/10%H_2O_2	587.5	564.0	23.5	Date
Impinger 4	Empty	433.1	430.1	3.0	
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4	551.7	550.4	1.3	Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4	547.6	547.3	0.3	476.4
Impinger 7	≈ 250 g Silica Gel	769.7	752.2	17.5	493.9

Run No.	3	Filter Type Quartz		Sample Box No.	M11
Date	3/22/12	Lot No.	MA	pH	NA
Analyst	R. Vicere	Filter No.	e28-26	Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	734.0	419.6	314.4	
Impinger 2	100 ml 5%HNO_3/10%H_2O_2	667.2	548.3	118.9	QA/QC
Impinger 3	100 ml 5%HNO_3/10%H_2O_2	557.7	532.4	25.3	Date
Impinger 4	Empty	426.7	424.0	2.7	
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4	532.9	532.1	0.8	Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4	547.9	547.1	0.8	462.9
Impinger 7	≈ 250 g Silica Gel	779.5	763.4	16.1	479.0

QA/QC________

Date________

CleanAir ENGINEERING

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location	Unit 3 FF Outlet
Plant South Broward	Job No. 11414	Method	29

Balance Calibration Check			
Balance ID		Reference Weight Mass	
Reference Weight ID		Reference Weight Reading	

Check must be performed at least Once per Method per Job

Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No.	4	Filter Type Quartz		Sample Box No.	~~M4~~ M10
Date		Lot No.		pH	NA
Analyst		Filter No.	e28-24	Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	809.9 473.4	DC ~~477.3~~	336.5	
Impinger 2	100 ml 5%HNO_3/10%H_2O_2	672.7 547.2	DC ~~562.7~~	125.5	QA/QC
Impinger 3	100 ml 5%HNO_3/10%H_2O_2	569.6 545.2	DC ~~560.4~~	24.4	Date
Impinger 4	Empty	473.7 468.6	~~428.5~~ DC	5.1	
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4	566.1	563.6	2.5	Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4	545.4	544.9	0.5	494.5
Impinger 7	≈ 250 g Silica Gel	774.4 758.1	~~757.3~~ DC	16.3	510.8

Run No.	5	Filter Type Quartz		Sample Box No.	
Date		Lot No.		pH	NA
Analyst		Filter No.		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty				
Impinger 2	100 ml 5%HNO_3/10%H_2O_2				QA/QC
Impinger 3	100 ml 5%HNO_3/10%H_2O_2				Date
Impinger 4	Empty				
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4				Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4				
Impinger 7	≈ 250 g Silica Gel				

Run No.	6	Filter Type Quartz		Sample Box No.	
Date		Lot No.		pH	NA
Analyst		Filter No.		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty				
Impinger 2	100 ml 5%HNO_3/10%H_2O_2				QA/QC
Impinger 3	100 ml 5%HNO_3/10%H_2O_2				Date
Impinger 4	Empty				
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4				Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4				
Impinger 7	≈ 250 g Silica Gel				

QA/QC______

Date______

CleanAir ENGINEERING

TEST LOCATION: INLET HCl **TESTING** **METHOD:** 26A **PAGE** 1 **OF** 1

UNIT: 3 **RUN:** 2

FIELD DATA SHEET

Client	wheelabrator	Project No.	11414
Plant	S. Broward	Date	3-21-12
Meter Operator	B. Arnold		
Probe Operator	—		

Meter Box	W-20	Sample Box No.	B.22
Meter Y_d	1.0059	Meter $\Delta H_@$	1.8002
K Factor	—	Pitot C_p	.0831
Leak Rate Before	0.002 [cfm] [Lpm] @ 15 (in. Hg)		
Leak Rate After	0.002 [cfm] [Lpm] @ 18 (in. Hg)		
Pitot Leak Check Before: ☐	After: Good ☒ Bad ☐		

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)	105		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-1.5	14	Out	In

Amb. Temp. (°F)	80	Bar. Press.	30.10 [in. Hg] [mbar]
Probe I.D. No.	6-4-7		
Liner Material	GLASS		

Filter No.	—		
Thimble No.	—		
Nozzle Diameter		Nozzle I.D.	

Start Time:	10:04	Stop Time:	11:04

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 778.985	Stack Temp. Ts (°F)	Probe T_p (°F) Set Point 355	Filter T (°F) Set Point 355	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
2-1	5	N/A	1.2	781.98	490	354	355	66	87	85	3.5	9.8		
	10		1.2	784.97	485	357	356	57	88	85	4.0	10.4		
	15		1.2	787.93	482	356	353	56	90	85	5.5	9.8		
	20		1.2	790.92	485	356	354	56	91	85	6.5	9.7		
	25		1.2	793.88	486	355	359	58	92	86	8.0	9.9		
	30		1.2	796.85	490	356	355	61	93	86	9.5	9.6		
	35		1.2	799.84	489	355	355	53	95	87	11.0	9.0		
	40		1.2	802.78	494	355	355	51	95	87	12.5	9.5		
	45		1.2	805.73	488	355	359	51	95	88	13.5	9.1		
	50		1.2	808.70	488	354	353	52	95	88	15.0	9.5		
	55		1.2	811.67	487	355	354	51	95	88	16.5	10.3		
	60		1.2	814.630	492	354	354	51	95	88	17.5	10.5		
	Total	*		35.6450										
	Average		1.2000		488.000				89.5417					

* Sum of square roots. Circle correct bracketed units on data sheet.

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QA/QC BA
Date 3-21-12

CleanAir ENGINEERING

TEST LOCATION: INLET HCl **TESTING METHOD:** 26A **PAGE** 1 **OF** 1

UNIT: 3 **RUN:** 3

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3-21-12
Meter Operator	B. Arnold		
Probe Operator	—		

Meter Box	66-20	Sample Box No.	B1
Meter Y_d	1.0059	Meter $\Delta H_@$	1.8082
K Factor	—	Pitot C_p	0.831
Leak Rate Before	0.003 [cfm] [Lpm]	@ 15 (in. Hg)	
Leak Rate After	0.003 [cfm] [Lpm]	@ 18 (in. Hg)	
Pitot Leak Check Before: ☑		After: Good ☒ Bad ☐	

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)	105		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-1.4	14		

Amb. Temp. (°F)	80	Bar. Press.	30.10 [in. Hg] [mbar]
Probe I.D. No.	66-4-7		
Liner Material	GLASS		

Filter No.	—		
Thimble No.	—		
Nozzle Diameter		Nozzle I.D.	
Start Time:	11:30	Stop Time:	12:30

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 815.060	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 355	Filter T (°F) Set Points 355	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
2-1	~~0~~ 105	N/A	1.2	818.04	494	354	354	65	89	88	3.5	9.9		
	10		1.2	821.02	497	356	358	62	92	89	4.0	9.9		
	15		1.2	824.00	499	356	382	57	94	89	5.5	7.8		
	20		1.2	826.98	497	356	358	54	95	89	6.5	9.0		
	25		1.2	829.93	495	355	362	53	96	89	8.0	9.7		
	30		1.2	832.90	495	355	356	53	96	89	9.5	9.7		
	35		1.2	835.88	493	355	361	55	94	90	~~11~~ 11.0	9.0		
	40		1.2	838.86	491	355	351	59	96	90	12.0	9.6		
	45		1.2	841.83	489	355	359	62	97	91	13.0	10.2		
	50		1.2	844.82	486	355	355	62	96	90	14.0	10.0		
	55		1.2	847.83	485	355	356	64	97	90	15.0	10.6		
	60		1.2	850.845	487	356	358	66	97	91	16.5	9.4		
				SB										
	Total	*		~~35.7950~~										
	Average		1.2000		~~492.467~~ SB				92.3333					

* Sum of square roots. 35.785 492.333

Circle correct bracketed units on data sheet.

QA/QC BA
Date 3-21-12

CleanAir ENGINEERING

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Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location	Unit 3 SDA Inlet
Plant South Broward	Job No. 11414	Method	Modified 26A

Balance Calibration Check			
Balance ID		Reference Weight Mass	
Reference Weight ID		Reference Weight Reading	

Check must be performed at least Once per Method per Job

Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No. 1	Filter Type Quartz		Sample Box No. B12
Date	Lot No.		pH NA
Analyst	Filter No. NA		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	544.2	475.9	68.3	
Impinger 2	100 mL 01.N H2SO4	619.4	552.3	67.1	QA/QC SB
Impinger 3	100 mL 01.N H2SO4	552.4	540.2	12.2	Date 3/21
Impinger 4	Empty	442.7	440.2	2.5	
Impinger 5	Silica Gel	746.4	735.8	10.6	Total Weight (gm)
Impinger 6					150.1
Impinger 7					160.7

Run No. 2	Filter Type Quartz		Sample Box No. B22
Date 3/21/12	Lot No.		pH NA
Analyst DL	Filter No. NA		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	523.4	460.6	62.8	
Impinger 2	100 mL 01.N H2SO4	639.2	565.5	73.7	QA/QC SB
Impinger 3	100 mL 01.N H2SO4	556.9	541.3	15.6	Date 3/21
Impinger 4	Empty	438.4	436.1	2.3	
Impinger 5	Silica Gel	776.5	765.3	11.2	Total Weight (gm)
Impinger 6					154.4
Impinger 7					165.6

Run No. 3	Filter Type Quartz		Sample Box No. B1
Date 3/21/12	Lot No.		pH NA
Analyst DL	Filter No. NA		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	510.2	471.7	38.5	
Impinger 2	100 mL 01.N H2SO4	629.0	545.1	83.9	QA/QC SB
Impinger 3	100 mL 01.N H2SO4	579.7	548.2	31.5	Date 3/21
Impinger 4	Empty	468.5	462.2	6.3	
Impinger 5	Silica Gel	784.5	771.5	13.0	Total Weight (gm)
Impinger 6					160.2
Impinger 7					173.2

QA/QC SB
Date 3/21

CleanAir ENGINEERING

TEST LOCATION: FF outlet HCl **TESTING** **METHOD:** 26A **PAGE** 1 **OF** 1

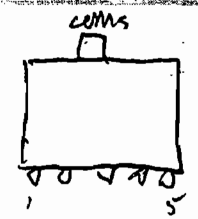
UNIT: 3 **RUN:** 1

FIELD DATA SHEET

Client	Wheel.	Project No.	11414
Plant	S Broward	Date	3/21/12
Meter Operator	K sullivan		
Probe Operator	K sullivan		

Meter Box	66-4	Sample Box No.	86
Meter Y_d	0.9953	Meter $\Delta H_@$	1.7324
K-Factor	N/A	Pitot C_p	N/A
Leak Rate Before	0.004 [~~cfm~~] [Lpm]	@	15 (in. Hg)
Leak Rate After	0.002 [~~cfm~~] [Lpm]	@	5 (in. Hg)
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐		

Cross-Section of Test Location



[~~N~~] [UP]

Duct Dimensions (in.): 96

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [~~Out~~] of page	First point all the way [~~In~~] [Out]
-12.7	10		

Amb. Temp. (°F)	80	Bar. Press.	30.05 [in Hg] [mbar]
Probe I.D. No.	67-4-1		
Liner Material	Pyrex		

Filter No.	N/A		
Thimble No.	N/A		
Nozzle Diameter	N/A	Nozzle I.D.	N/A

Start Time:	7:54	Stop Time:	9:40

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [~~ft³~~] [L] 944.445	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 300	Filter T_f (°F) Set Points 300	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator approx. (% dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3-3	5	N/A	1.5	947.92	289	300	303	67	78	76	3	10.4		
	10		1.5	951.36	297	297	301	65	78	76	3	10.3		
	15		1.5	954.66	294	303	302	65	81	77	3	11.3		
	20		1.5	958.13	296	300	296	65	81	78	3	11.5		
	25		1.5	961.60	297	310	297	66	81	79	3	11.2		
	30		1.5	965.12	297	297	299	65	83	80	3	11.0		
	35		1.5	968.64	295	300	303	50	83	80	3	11.8		
	40		1.5	972.13	295	301	302	50	84	80	3	11.5		
	45		1.5	975.75	296	298	299	54	84	80	3	11.8		
	50		1.5	979.04	296	299	300	55	84	80	3	11.2		
	55		1.5	982.46	296	300	300	56	85	81	3	11.8		
	60		1.5	985.910	296	299	300	57	85	81	3	11.6		
	Total	*	18.0	41.465	3544				987	948				
	Average		1.5000		295.3333				80.6250					

* Sum of square roots.

Circle correct bracketed units on data sheet.

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CleanAir ENGINEERING

QA/QC KS
Date 3/21/12

TEST LOCATION: FF out HCl TESTING METHOD: 26A PAGE 1 OF 1

UNIT: 3 RUN: 2

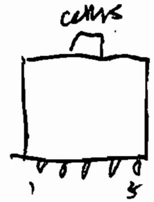
FIELD DATA SHEET

Client	wheel.	Project No.	11414
Plant	S Broward	Date	
Meter Operator	K Sullivan		
Probe Operator	K Sullivan		

Meter Box	66-4	Sample Box No.	B3
Meter Y_d	0.9953	Meter $\Delta H_@$	1.7374
K Factor	N/A	Pitot C_p	N/A
Leak Rate Before	.004 [cfm] [Lpm]	@	15 (in. Hg)
Leak Rate After	.002 [cfm] [Lpm]	@	5 (in. Hg)
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐		

Cross-Section of Test Location

[N] [UP]



Duct Dimensions (in.)	96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-12.7	10		

Amb. Temp (°F)	80	Bar. Press.	30.05 [in. Hg] [mbar]
Probe I.D. No.	62-4-1		
Liner Material	Pyrex		

Filter No.	N/A		
Thimble No.	N/A		
Nozzle Diameter	N/A	Nozzle I.D.	N/A

Start Time:	10:04	Stop Time:	11:04

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 986.745	Stack Temp. Ts (°F)	Probe T_p (°F) Set Point 300	Filter T_f (°F) Set Point 300	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator, approx. (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3-9	5	N/A	1.5	990.30	296	304	300	66	82	81	4	11.4		
	10		1.5	993.93	296	305	300	65	82	81	4	11.0		
	15		1.5	997.30	296	301	301	55	86	82	4	10.9		
	20		1.5	1000.73	296	300	300	58	87	82	4	10.8		
	25		1.5	1004.16	295	300	300	63	88	83	4	11.0		
	30		1.5	1007.60	295	300	300	64	88	83	4	11.1		
	35		1.5	1011.01	295	300	299	60	88	84	4	11.3		
	40		1.5	1014.43	297	300	300	58	89	84	4	10.8		
	45		1.5	1018.00	296	300	300	56	88	84	4	11.0		
	50		1.5	1021.54	296	300	300	55	88	84	4	11.1		
	55		1.5	1025.08	296	298	300	56	89	85	4	10.9		
	60		1.5	1028.580	296	300	300	57	89	85	4	11.0		
	Total	*	18.0	41.835	3550				1044	998				
	Average		1.5000		295.9333				85.0833					

* Sum of square roots.

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC KS

Date 3/ /12

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TEST LOCATION: FF out HCl **TESTING METHOD:** 26A **PAGE** 1 **OF** 1

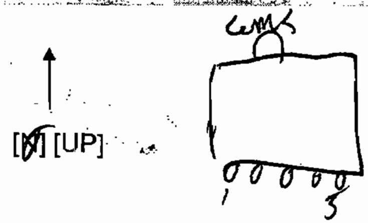
UNIT: 3 **RUN:** 3

FIELD DATA SHEET

Client	Wheel.	Project No.	11414
Plant	S Broward	Date	3/21/12
Meter Operator	K Sullivan		
Probe Operator	K Sullivan		

Meter Box	66-4	Sample Box No.	
Meter Y_d	0.9953	Meter $\Delta H_@$	1.7374
K Factor	/	Pitot C_p	/
Leak Rate Before 0.004 [cfm] [Lpm]	@ 15 (in. Hg)		
Leak Rate After 0.002 [cfm] [Lpm]	@ 9 (in. Hg)		
Pitot Leak Check Before ☑	After: Good ☐ Bad ☐		

Cross-Section of Test Location



Duct Dimensions (in.)	26		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-10.7	10		

Amb. Temp. (°F)	85	Bar. Press.	30.05 [in. Hg] [mbar]
Probe I.D. No.	67-4-1		
Liner Material	Pyrex		

Filter No.	/		
Thimble No.	/		
Nozzle Diameter	/	Nozzle I.D.	/

Start Time:	11:30	Stop Time:	12:30

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)*	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 29.295	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 300	Filter T_f (°F) Set Points 300	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3-3	5	N/A	1.5	32.74	296	299	306	65	85	85	6	11.1		
	10		1.5	36.02	296	304	300	65	86	86	6	11.0		
	15		1.5	39.23	296	302	300	63	87	85	6	10.8		
	20		1.5	42.80	297	300	301	62	88	85	8	10.9		
	25		1.5	46.42	299	300	299	65	88	85	8	11.0		
	30		1.5	50.04	293	300	300	60	88	85	8	10.3		
	35		1.5	53.52	295	300	300	60	88	85	8	10.4		
	40		1.5	57.00	295	300	300	61	88	85	8	11.0		
	45		1.5	60.49	295	300	300	58	88	85	8	11.1		
	50		1.5	64.00	294	299	298	57	88	85	8	11.6		
	55		1.5	67.53	294	299	299	57	88	85	8	11.0		
	60		1.5	71.040	294	300	300	58	88	85	8	12.0		
	Total		18.0	41.745	3544				1050	1021				
	Average		1.5000		295.3333				86.2917					

* Sum of square roots. Circle correct bracketed units on data sheet.

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CleanAir ENGINEERING

QA/QC KS
Date 3/21/12

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location	Unit 3 FF Outlet
Plant South Broward	Job No. 11414	Method	Modified M26A

Balance Calibration Check			
Balance ID	SN# 8028301069	Reference Weight Mass	500
Reference Weight ID	22513	Reference Weight Reading	499.5

Check must be performed at least Once per Method per Job

Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No. 1	Filter Type Teflon Mat	Sample Box No. B6
Date 3/21/12	Lot No. NA	pH NA
Analyst R. Vicer	Filter No. NA	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	631.0	552.3	78.7	
Impinger 2	100 mL 01.N H2SO4	749.7	629.1	120.6	QA/QC RV
Impinger 3	100 mL 01.N H2SO4	564.2	536.5	27.7	Date 3/21/12
Impinger 4	Empty	478.2	474.6	3.6	
Impinger 5	Silica Gel	749.8	741.0	8.8	Total Weight (gm)
Impinger 6					230.6
Impinger 7					239.4

Run No. 2	Filter Type Teflon Mat	Sample Box No. B3
Date 3/21/12	Lot No. NA	pH NA
Analyst R. Vicer	Filter No. NA	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	534.4	460.0	74.4	
Impinger 2	100 mL 01.N H2SO4	655.6	539.4	116.2	QA/QC RV
Impinger 3	100 mL 01.N H2SO4	666.1	632.1	34.0	Date 3/21/12
Impinger 4	Empty	445.9	438.7	7.2	
Impinger 5	Silica Gel	741.7	730.1	11.6	Total Weight (gm)
Impinger 6					231.8
Impinger 7					243.4

Run No. 3	Filter Type Teflon Mat	Sample Box No. Black
Date 3/21/12	Lot No. NA	pH NA
Analyst R. Vicer	Filter No. NA	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	511.5	459.1	52.4	
Impinger 2	100 mL 01.N H2SO4	677.3	552.3	125.0	QA/QC RV
Impinger 3	100 mL 01.N H2SO4	587.2	546.2	41.0	Date 3/21/12
Impinger 4	Empty	448.6	438.1	10.5	
Impinger 5	Silica Gel	760.1	744.5	15.6	Total Weight (gm)
Impinger 6					228.9
Impinger 7					244.5

QA/QC RV
Date 3/21/12

CleanAir
ENGINEERING

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TEST LOCATION: FF Outlet Pratt Metals **TESTING** **METHOD:** 5/29 **PAGE** 1 **OF** 2

UNIT: 2 **RUN:** 1

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/21/12
Meter Operator	P. Behun		
Probe Operator	P. Behun		

Meter Box	CAE-1	Sample Box No.	M9
Meter Y_d	0.9915	Meter $\Delta H_@$	1.8118
K Factor	2.98	Pitot C_p	0.831
Leak Rate Before	0.005 (cfm) [Lpm]	@	15 (in. Hg)
Leak Rate After	0.002 (cfm) [Lpm]	@	7 (in. Hg)
Pitot Leak Check Before: ☒		After: Good ☒ Bad ☐	

Cross-Section of Test Location

[N] (UP)

1 5

Duct Dimensions (in.)		96 x 96	
Static Pres (in. H_2O)	Port Len (in.)	Gas Flow [In] (Out) of page	First point all the way (In) [Out]
-14.5	10.0		

Amb. Temp. (°F)	74	Bar. Press.	30.10 (in. Hg) [mbar]
Probe I.D. No.	67-8-19		
Liner Material	Glass		

Filter No.	~~C-28-12~~ C-28-18	AB * 3/21/12
Thimble No.	N/A	
Nozzle Diameter	0.277	Nozzle I.D. 277-1

Start Time:	8:16	Stop Time:	10:28

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. (ft³) [L] 402.350	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator approx (% dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
1-1	5	0.35	1.0	405.13	296	245	247	66	82	79	3.0	10.0	N/A	
2	10	0.38	1.1	408.01	296	243	244	62	84	79	3.5	10.3		
3	15	0.45	1.3	411.22	297	248	248	58	87	80	3.5	9.4		
4	20	0.38	1.1	414.13	300	250	247	58	89	81	3.5	9.0		417.285
5	25	0.40	1.2	417.230	302	251	248	59	89	81	3.5	9.0		-0.055
2-1	30	0.38	1.1	420.24	310	249	251	64	88	82	3.5	9.5		
2	35	0.35	1.0	423.04	304	251	245	64	89	82	3.5	9.7		
3	40	0.37	1.1	425.99	299	252	247	64	89	82	3.5	9.8		
4	45	0.35	1.0	428.85	298	250	248	62	91	84	3.5	9.7		432.225
5	50	0.46	1.4	432.130	300	249	248	62	92	85	4.0	9.9		-0.025
3-1	55	0.38	1.1	435.13	297	249	251	64	91	85	3.5	9.7		
2	60	0.37	1.1	438.03	295	251	248	64	93	86	3.5	9.4		
	Total	*15.5731		75.260										
	Average	0.6229	1.1540		299.000				84.220					

Sum of square roots

13.5 3594 2050

Circle correct bracketed units on data sheet.

* 3/21/12

QA/QC AB

Date 3/26/12

CleanAir ENGINEERING

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TEST LOCATION: FF-Outlet Part / Metals **TESTING** **METHOD:** 5/29 **PAGE** 2 **OF** 2

UNIT: 2 **RUN:** 1

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/21/12
Meter Operator	P. Bihun		
Probe Operator	P. Bihun		

Meter Box		Sample Box No.			
Meter Y_d		Meter $\Delta H_@$			
K Factor		Pitot C_p			
Leak Rate Before	[cfm] [Lpm]	@	(in. Hg)		
Leak Rate After	[cfm] [Lpm]	@	(in. Hg)		
Pitot Leak Check Before ☐	After: Good ☐	Bad ☐			

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)			
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)		Bar. Press.	[in. Hg] [mbar]
Probe I.D. No.			
Liner Material			

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	

Start Time:	Stop Time:

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points	Filter T_f (°F) Set Points	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator approx (%,dv)	☐ Amb. Filter ☐ Dioxin Trap ☐	Notes
				441.16		250	250							
3	65	0.40	1.2	~~438.05~~ PB	299	251	249	64	92	86	4.0	9.9	N/A	
4	70	0.44	1.3	444.43	296	250	249	64	93	86	4.0	9.3		444.075
5	75	0.50	1.5	447.960	298	250	250	65	94	87	4.0	9.5		-0.115
4-1	80	0.40	1.2	451.17	294	249	247	65	95	89	3.5	9.5		
2	85	0.37	1.1	454.08	297	250	248	65	96	90	3.5	9.5		
3	90	0.39	1.2	457.11	297	250	249	64	96	91	3.5	9.4		
4	95	0.47	1.4	460.45	298	250	250	65	96	91	4.0	9.2		463.885
5	100	0.46	1.4	463.785	297	250	250	62	97	92	4.0	9.9		-0.10
5-1	105	0.30	0.89	466.57	297	249	249	60	96	92	3.1	9.6		
2	110	0.32	0.95	469.25	309	250	249	59	96	92	3.5	9.4		
3	115	0.33	0.98	472.01	302	250	250	59	96	92	3.5	9.1		
4	120	0.28	0.83	474.59	297	250	250	58	96	92	3.5	9.5		
5	125	0.47	1.4	477.925	300	250	250	58	96	92	4.0	10.0		
	Total	*												
	Average													

* Sum of square roots. Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC PB
Date 3/21/12

TEST LOCATION: FF Outlet   Part / Metals **TESTING** **METHOD:** 5/29   **PAGE** 1 **OF** 2

UNIT: 2   **RUN:** 2

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/21/12
Meter Operator	P. Blaha		
Probe Operator	P. Blaha		

Meter Box	66-11	Sample Box No.	M11
Meter Y_d	0.9915	Meter $\Delta H_@$	1.8118
K Factor	2.94	Pitot C_p	0.835
Leak Rate Before 0.003 [cfm] [Lpm]	@ 15 (in. Hg)		
Leak Rate After 0.002 [cfm] [Lpm]	@ 8 (in. Hg)		
Pitot Leak Check Before ☒	After: Good ☒ Bad ☐		

Cross-Section of Test Location

[N] [UP]

0,0002

Duct Dimensions (in.): 96x96

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-13.5	10.0	Out	In

Amb. Temp. (°F)	77	Bar. Press	30.10 [in. Hg] [mbar]
Probe I.D. No.	67-5-15		
Liner Material	Glass		

Filter No.	e28-13		
Thimble No.	N/A		
Nozzle Diameter	0.277	Nozzle I.D.	277-1

Start Time:	10:52	Stop Time:	13:07

Traverse Point Number	Min/pt 5 / Elapsed Time	Velocity Head ΔP (in H_2O)	Orifice Setting ΔH (in H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F)	Filter T_f (°F)	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in Hg)	Oxygen Indicator, approx (% dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
						Set Points								
				478.385		250	250							
1-1	5	0.35	1.0	481.18	297	245	249	66	91	91	3.5	9.4	N/A	
2	10	0.32	0.94	483.87	296	246	247	66	92	91	3.5	9.5		
3	15	0.31	0.91	486.57	297	252	246	62	93	91	4.0	9.6		
4	20	0.42	1.2	489.68	299	250	249	62	93	90	4.5	9.3		492.685
5	25	0.36	1.1	492.620	303	250	250	62	93	90	4.5	8.7		-0.065
2-1	30	0.37	1.1	495.64	296	250	249	64	91	89	4.5	9.5		
2	35	0.40	1.2	498.75	298	252	249	64	92	89	4.5	9.3		
3	40	0.41	1.2	501.87	294	252	248	62	92	88	4.5	9.7		
4	45	0.45	1.3	505.08	298	251	249	55	92	88	5.0	9.3		
5	50	0.51	1.5	508.530	295	249	251	53	93	88	5.0	9.6		508.615
3-1	55	0.42	1.2	511.63	292	249	250	57	92	88	4.5	9.6		-0.085
2	60	0.36	1.1	514.58	296	251	250	57	92	87	4.5	9.9		
	Total	* 16.0797		37.225										
	Average	0.6432	1.2208		295.6800				89.8600					

Sum of square roots 13.25

Circle correct bracketed units on data sheet.

3561   2176

QA/QC PB
Date 3/21/12

CleanAir ENGINEERING

TEST LOCATION: FF Outlet Part/Metals **TESTING** **METHOD:** 5/29 **PAGE** 2 **OF** 2

UNIT: 2 **RUN:** 2

FIELD DATA SHEET

Client	Wheelabrator	Project No	11414
Plant	S. Broward	Date	3/21/12
Meter Operator	P. Bihun		
Probe Operator	P. Bihun		

Meter Box		Sample Box No	
Meter Y_d		Meter $\Delta H_@$	
K Factor		Pitot C_p	
Leak Rate Before	[cfm] [Lpm] @		(in. Hg)
Leak Rate After	[cfm] [Lpm] @		(in. Hg)
Pitot Leak Check Before ☐	After: Good ☐ Bad ☐		

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)			
Static Pres (in. H_2O)	Port Len (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)		Bar. Press.	[in. Hg] [mbar]
Probe I.D. No.			
Liner Material			

Filter No.			
Thimble No.			
Nozzle Diameter		Nozzle I.D.	
Start Time:		Stop Time:	

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3	65	0.38	1.1	517.53	294	251	249	58	92	87	4.5	10.0	N/A	
4	70	0.46	1.4	520.80	295	251	250	59	92	87	5.0	10.1		524.230
5	75	0.47	1.4	524.130	295	250	250	59	93	87	5.0	9.1		-0.100
4-1	80	0.37	1.1	527.13	294	249	251	62	92	87	4.5	9.8		
2	85	0.38	1.1	530.02	294	251	250	64	92	87	4.5	9.6		
3	90	0.38	1.1	532.93	295	251	250	64	92	86	4.5	10.1		
4	95	0.50	1.5	536.33	295	250	250	65	91	86	5.0	9.4		
5	100	0.55	1.6	539.860	295	250	250	65	92	86	5.5	10.6		540.135
5-1	105	0.33	0.97	542.98	294	250	250	65	91	86	4.5	10.3		-0.225
2	110	0.42	1.2	546.02	295	251	250	62	91	86	5.0	10.4		
3	115	0.42	1.2	549.12	294	252	250	60	92	86	5.0	10.7		
4	120	0.52	1.5	552.57	295	251	251	60	92	86	5.5	10.1		
5	125	0.55	1.6	556.135	296	250	250	60	92	86	6.0	10.0		
	Total	*												
	Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

38.31

QA/QC PB

Date 3/21/12

CleanAir ENGINEERING

TEST LOCATION: PF Outlet Part/Metals **TESTING** **METHOD:** 5/29 **PAGE** 1 **OF** 2

UNIT: 2 **RUN:** 3

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3/21/12
Meter Operator	R. Bihun		
Probe Operator	R. Bihun		

Meter Box	66-11	Sample Box No.	M18
Meter Y_d	0.9915	Meter $\Delta H_@$	1.818
K Factor	2.95	Pitot C_p	0.835
Leak Rate Before	0.006 [cfm] [Lpm]	@	15 (in. Hg)
Leak Rate After	0.004 [cfm] [Lpm]	@	10 (in. Hg)
Pitot Leak Check Before ☒		After: Good ☒ Bad ☐	

Cross-Section of Test Location

[N] [UP]

1 5

Duct Dimensions (in.)	96x96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-13.3	10.0		

Amb. Temp. (°F)	80	Bar. Press	30.10 [in. Hg] [mbar]
Probe I.D. No.	67-8-19		
Liner Material	Glass		

Filter No.	E31-05		
Thimble No.	N/A		
Nozzle Diameter	0.277	Nozzle I.D.	277-1

Start Time	13:29	Stop Time	15:41

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. T_s (°F)	Probe T_p (°F)	Filter T_f (°F)	Cond. Temp. T_c (°F)	DGM Inlet $T_{m,in}$ (°F)	DGM Outlet $T_{m,out}$ (°F)	Pump Vacuum (in Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
						Set Points								
				556.525		250	250							
1-1	5	0.34	1.0	559.29	294	242	247	66	87	86	3.5	9.7	N/A	
2	10	0.43	1.3	562.47	293	244	246	65	89	87	4.0	9.9		
3	15	0.48	1.3	565.67	296	252	248	62	91	87	4.0	10.7		
4	20	0.52	1.5	569.18	295	251	248	62	92	87	4.5	10.6		572.765
5	25	0.52	1.5	572.685	296	250	248	62	93	87	4.5	10.5		-0.08
2-1	30	0.38	1.1	575.74	293	249	249	64	93	88	4.0	10.3		
2	35	0.36	1.1	578.72	294	251	248	64	94	88	4.0	9.2		
3	40	0.40	1.2	581.78	295	251	249	63	93	89	4.0	10.3		
4	45	0.45	1.3	585.04	297	250	249	63	94	89	4.5	9.0		588.220
5	50	0.40	1.2	588.150	295	250	250	63	94	89	4.0	9.5		-0.07
3-1	55	0.37	1.1	591.12	299	250	250	64	93	89	4.0	9.4		
2	60	0.38	1.1	594.02	299	251	250	65	95	90	4.0	9.6		
	Total	15.962		76.835										
	Average	0.6387	1.2108		293.9200				91.3400					

Sum of square roots. 14.7 3546 2164

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC PB
Date 3/21/12

TEST LOCATION: PF Outlet Part/Metals **TESTING** **METHOD:** 5/29 **PAGE** 2 **OF** 2

UNIT: 2 **RUN:** 3

FIELD DATA SHEET

Client	Wheelabrator	Project No	1414
Plant	S. Broward	Date	3/21/12
Meter Operator	P. Bihun		
Probe Operator	P. Bihun		

Meter Box		Sample Box No	
Meter Y_d		Meter $\Delta H_@$	
K Factor		Pitot C_p	
Leak Rate Before	[cfm] [Lpm]	@	(in. Hg)
Leak Rate After	[cfm] [Lpm]	@	(in. Hg)
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐		

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)			
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)		Bar. Press	[in. Hg] [mbar]
Probe I.D. No			
Liner Material			

Filter No		
Thimble No		
Nozzle Diameter	Nozzle I.D.	
Start Time:	Stop Time:	

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 252	Filter T_F (°F) Set Points 252	Cond Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator approx (%dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3	65	0.36	1.1	596.96	291	252	250	65	95	90	4.0	10.0	N/A	603.100
4	70	0.37	1.1	599.85	293	250	249	65	95	90	4.0	10.0		-0.09
5	75	0.41	1.3	603.010	292	250	249	64	95	90	4.5	9.3		
4-1	80	0.38	1.1	605.97	292	250	250	63	95	90	4.0	10.0		
2	85	0.33	0.97	608.76	293	250	250	63	94	90	4.0	10.0		
3	90	0.43	1.3	611.97	294	250	249	62	94	90	4.5	9.5		
4	95	0.48	1.4	615.35	293	251	249	63	95	90	4.5	9.6		
5	100	0.47	1.4	618.630	292	250	251	64	95	90	4.5	9.6		618.75
5-1	105	0.34	1.0	621.52	291	249	249	64	95	90	4.0	10.1		-0.085
2	110	0.39	1.2	624.63	293	250	250	63	95	90	4.5	9.2		
3	115	0.38	1.1	627.50	292	250	249	58	95	90	4.0	10.2		
4	120	0.39	1.2	630.37	293	250	249	57	95	90	4.5	9.7		
5	125	0.47	1.4	633.688	293	251	252	57	95	90	5.0	10.3		
	Total	*								1170				
	Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

G - 44

QA/QC PB

Date ?/?/12

CleanAir ENGINEERING

TEST LOCATION: FF outlet   ~~Particulate/Metals~~ Mercury 3B **TESTING** **METHOD:** 5/29 3B   **PAGE** 1 **OF** 2

UNIT: 2   **RUN:** 4

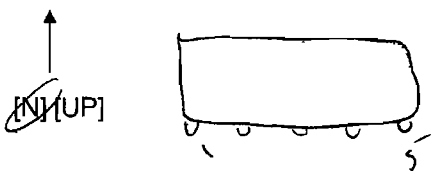
FIELD DATA SHEET

Client: wheelabrator	Project No.: 11414
Plant: S. Broward	Date: 3-22-12
Meter Operator: A. Obuchowski	
Probe Operator: "	

Meter Box: 66-11	Sample Box No.: m3
Meter Y_d: 0.9915	Meter $\Delta H_@$: 1.818
K Factor: 2.87	Pitot C_p: 0.835
Leak Rate Before: 0.004 [cfm] [Lpm]	@ 15 (in. Hg)
Leak Rate After: 0.001 [cfm] [Lpm]	@ 9 (in. Hg)
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐

Cross-Section of Test Location

[N] [UP]



Duct Dimensions (in.)	96 x 96		
Static Pres. (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-13.3	10		

Amb. Temp. (°F): 75	Bar. Press: 30.1 [in. Hg] [mbar]
Probe I.D. No.: 67-8-19	
Liner Material: glass	

Filter No.: e28-25		
Thimble No.:		
Nozzle Diameter: 0.276	Nozzle I.D.: 276-1	

Start Time: 7:43	Stop Time: 9:56

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol: [ft³] [L] 634.725	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m,in}$ (°F)	DGM Outlet $T_{m,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb/Filter ☐ Dioxin Trap ☐	Notes Port checks
1-1	5	0.37	1.1	637.59	294	249	247	65	78	75	3.5	10.1		
-2	10	0.39	1.1	640.46	295	254	248	64	80	76	3.5	8.9		
-3	15	0.33	0.95	643.19	292	252	247	62	83	77	3	9.5		
-4	20	0.45	1.3	646.36	295	250	248	62	85	78	4	9.7		
-5	25	0.41	1.2	649.420	293	250	249	60	86	79	4	10.5		649.680
2-1	30	0.34	0.98	652.35	291	250	250	61	88	81	3	10.4		(-0.260)
-2	35	0.39	1.1	655.28	295	251	250	61	90	82	4	8.8		
-3	40	0.42	1.2	658.33	295	251	250	60	91	83	4	9.1		
-4	45	0.40	1.1	661.25	295	250	250	61	92	85	4	8.8		
-5	50	0.40	1.1	664.170	294	250	250	63	92	86	4	8.7		664.520
3-1	55	0.32	0.92	667.36	291	248	249	65	91	86	3	9.5		(-0.35)
-2	60	0.33	0.95	669.95	294	251	249	63	92	87	3.5	9.0		
	Total	15.0499	25.930	70.6450	7329				2273	2135				
	Average	0.6620	1.0372						88.160					

Sum of square roots.   Circle correct bracketed units on data sheet.

13.0   3524   1048   975

QA/QC [signature]
Date 3-22-12

G-45

CleanAir ENGINEERING

TEST LOCATION: FF outlet Mercury ~~particulate/metals~~ **TESTING METHOD:** 5/29 **PAGE** 2 **OF** 2

UNIT: 2 **RUN:** 4

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3-22-12
Meter Operator	A. Obuchowski		
Probe Operator	"		

Meter Box		Sample Box No.	
Meter Y_d		Meter $\Delta H_@$	
K Factor		Pitot C_p	
Leak Rate Before	[cfm] [Lpm] @		(in. Hg)
Leak Rate After	[cfm] [Lpm] @		(in. Hg)
Pitot Leak Check Before: ☐	After: Good ☐ Bad ☐		

Cross Section of Test Location

[N] [UP]

Duct Dimensions (in.)

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)		Bar. Press.	[in. Hg] [mbar]
Probe I.D. No.			
Liner Material			

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	

Start Time:	Stop Time:

Traverse Point Number	Min/pt: 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L]	Stack Temp. Ts (°F)	Probe T_p (°F) Set Point 250	Filter T_f (°F) Set Point 250	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator, approx. (%dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
3-3	65	0.33	0.95	672.62	294	251	250	60	92	87	3.5	8.4		
-4	70	0.38	1.1	675.51	293	250	250	56	93	88	4	9.2		
-5	75	0.38	1.1	678.410	294	250	249	55	94	88	4	8.6		678.80
4-1	80	0.33	0.95	681.50	292	250	249	57	93	88	3.5	10.0		-0.39
-2	85	0.30	0.86	684.18	292	251	250	58	93	88	3	9.2		
-3	90	0.35	1.6	686.90	294	250	250	59	92	87	4	9.1		
-4	95	0.36	1.0	689.67	294	250	250	59	93	88	4	9.7		
-5	100	0.40	1.1	692.620	292	250	250	59	94	88	4	9.4		692.83
5-1	105	0.30	0.86	695.37	~~294~~ 292 3-22-12	249	250	61	94	90	3	10.0		-0.210
-2	110	0.30	0.86	698.00	292	250	250	61	95	90	3	9.5		
-3	115	0.35	1.0	700.75	290	250	250	62	97	92	4	9.7		
-4	120	0.33	0.95	703.52	293	250	250	63	98	93	3.5	9.4		
-5	125	0.43	1.2	706.630	293	249	249	63	97	93	4.5	9.7		
	Total	*												
	Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC_______
Date_______

CleanAir ENGINEERING

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location	Unit 2 FF Outlet
Plant	Job No. 11414	Method	5/29

Balance Calibration Check			
Balance ID		Reference Weight Mass	
Reference Weight ID		Reference Weight Reading	

Check must be performed at least Once per Method per Job — Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No. 1	Filter Type Quartz		Sample Box No. M9
Date 3/21/12	Lot No. NA	e28-18	pH NA
Analyst R. Vicere	Filter No.	~~e28-13~~ RV	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	733.8	480.7	253.1	
Impinger 2	100 ml 5%HNO_3/10%H_2O_2	678.9	567.0	111.9	QA/QC 3/21
Impinger 3	100 ml 5%HNO_3/10%H_2O_2	586.9	563.9	23.0	Date SB
Impinger 4	Empty	435.1	431.3	3.8	
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4	553.5	551.0	2.5	Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4	548.3	546.7	1.6	395.9
Impinger 7	≈ 250 g Silica Gel	791.6	775.6	16.0	411.9

Run No. 2	Filter Type Quartz		Sample Box No. M11
Date 3/21/12	Lot No. NA RV		pH NA
Analyst D. Lockard	Filter No. ~~e28-18~~ RV	e28-13	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	705.5	420.7	284.8	
Impinger 2	100 ml 5%HNO_3/10%H_2O_2	649.7	547.6	102.1	QA/QC 3/21
Impinger 3	100 ml 5%HNO_3/10%H_2O_2	552.6	532.0	20.6	Date SB
Impinger 4	Empty	428.7	425.1	3.6	
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4	534.4	530.7	3.7	Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4	545.2	544.8	0.4	415.2
Impinger 7	≈ 250 g Silica Gel	763.6	749.3	14.3	429.5

Run No. 3	Filter Type Quartz		Sample Box No. M10
Date 3/21/12	Lot No.	e31-05	pH NA
Analyst DL	Filter No. ~~e28-20~~ RV	~~[illegible]~~	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	749.6	472.3	277.3	
Impinger 2	100 ml 5%HNO_3/10%H_2O_2	645.2	546.2	99.0	QA/QC SB
Impinger 3	100 ml 5%HNO_3/10%H_2O_2	560.6	544.2	16.4	Date 3/21
Impinger 4	Empty	472.5	468.8	3.7	
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4	566.9	563.7	3.2	Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4	547.8	547.4	0.4	400
Impinger 7	≈ 250 g Silica Gel	758.5	743.6	14.9	414.9

QA/QC SB
Date 3/21

CleanAir ENGINEERING

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location	Unit 2 FF Outlet
Plant South Broward	Job No. 11414	Method	29

Balance Calibration Check			
Balance ID		Reference Weight Mass	
Reference Weight ID		Reference Weight Reading	

Check must be performed at least Once per Method per Job

Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No. 4	Filter Type Quartz		Sample Box No.	113
Date 3/22/12	Lot No.		pH	NA
Analyst JC	Filter No.	e28-25	Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	700.6	460.0	240.6	
Impinger 2	100 ml 5%HNO_3/10%H_2O_2	645.3	545.5	99.8	QA/QC SB
Impinger 3	100 ml 5%HNO_3/10%H_2O_2	565.7	545.2	20.5	Date 3/22
Impinger 4	Empty	441.0	437.1	3.9	
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4	541.2	539.1	2.1	Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4	518.9	517.9	1.0	367.9
Impinger 7	≈250 g Silica Gel	756.0	740.5	15.5	383.4

Run No. 5	Filter Type Quartz		Sample Box No.	
Date	Lot No.		pH	NA
Analyst	Filter No.		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty				
Impinger 2	100 ml 5%HNO_3/10%H_2O_2				QA/QC
Impinger 3	100 ml 5%HNO_3/10%H_2O_2				Date
Impinger 4	Empty				
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4				Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4				
Impinger 7	≈250 g Silica Gel				

Run No. 6	Filter Type Quartz		Sample Box No.	
Date	Lot No.		pH	NA
Analyst	Filter No.		Rinse	NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty				
Impinger 2	100 ml 5%HNO_3/10%H_2O_2				QA/QC
Impinger 3	100 ml 5%HNO_3/10%H_2O_2				Date
Impinger 4	Empty				
Impinger 5	100 ml 4%$KMnO_4$/10%H_2SO_4				Total Weight (gm)
Impinger 6	100 ml 4%$KMnO_4$/10%H_2SO_4				
Impinger 7	≈250 g Silica Gel				

QA/QC SB
Date 3/22

CleanAir ENGINEERING

752.45

TEST LOCATION: INLET HCl **TESTING** **METHOD:** 26A **PAGE** 1 **OF** 1

UNIT: 3 **RUN:** 1

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3-21-12
Meter Operator	B. ARNOLD		
Probe Operator	—		

Meter Box	66-7	Sample Box No.	B12
Meter Y_d	~~1.73~~ 0.9994	Meter $\Delta H_@$	1.7394
K Factor	—	Pitot C_p	0.831
Leak Rate Before	0.003 [cfm] [Lpm]	@	15 (in. Hg)
Leak Rate After	0.004 [cfm] [Lpm]	@	22 (in. Hg)
Pitot Leak Check Before: ✓	After: Good ☒ Bad ☐		

Cross-Section of Test Location

[N] [UP]

22

Duct Dimensions (in.) 105

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-1.4	14		

Amb. Temp. (°F)	75	Bar. Press.	30.10 [in. Hg] [mbar]
Probe I.D. No.	66-4-7		
Liner Material	GLASS		

Filter No.	—	
Thimble No.	—	
Nozzle Diameter		Nozzle I.D.

Start Time:	7:54	Stop Time:	9:39

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] ~~430~~ 429.985	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 355	Filter T_f (°F) Set Points 355	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
2-1	5	N/P	1.2	433.08	490	357	360	63	81	79	3.5	9.4		Stop @ 11:10 AM
	10		1.2	436.14	499	357	354	52	81	79	4.5	9.2		For Temp ✓
	15		1.2	439.22	494	359	357	56	83	80	6.5	8.8		Stop @ 16:02
	20		1.2	* 755.58	489	359	357	63	80	79	9.0	9.6		* 752.33 New
	25		1.2	758.58	486	342	357	61	80	79	9.5	9.1		Start
	30		1.2	761.58	485	362	358	61	82	80	~~9.4~~ 10	9.4		
	35		1.2	764.57	482	357	356	61	84	81	12.5	10.5		+9.2350
	40		1.2	767.58	487	355	356	62	86	81	15.0	9.7		
	45		1.2	770.60	490	356	356	57	87	82	17.0	9.8		
	50		1.2	773.63	491	355	357	53	87	82	19.0	10.5		
	55		1.2	776.60	487	355	354	53	87	82	20.5	10.8		
	60		1.1	778.900	496	355	352	54	88	82	22.0	9.0		
	Total	*		~~32.5550~~ 58										
	Average		1.1917		489.6667				82.1667					

* Sum of square roots. 35.405

Circle correct bracketed units on data sheet.

QA/QC BA
Date 3-21-12

43:58

CleanAir ENGINEERING

TEST LOCATION: INLET HCl **TESTING** **METHOD:** 26A **PAGE** 1 **OF** 1

UNIT: 2 **RUN:** 1

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3-20-12
Meter Operator	BARNARD		
Probe Operator	—		

Meter Box	66-7	Sample Box No.	R 12
Meter Y_d	0.9994	Meter $\Delta H_@$	1.7396
K Factor	~~2~~ BA	Pitot C_p	0.831
Leak Rate Before	.2003 [cfm] [Lpm] @ 15 (in. Hg)		
Leak Rate After	0.004 [cfm] [Lpm] @ 20 (in. Hg)		
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐		

Cross-Section of Test Location

[N] [UP]

1

2

Duct Dimensions (in.)	165"		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-4.5	14		

Amb. Temp. (°F)	77	Bar. Press.	[in. Hg] [mbar]
Probe I.D. No.	66-4-7		
Liner Material	GLASS		

Filter No.	—		
Thimble No.	—		
Nozzle Diameter		Nozzle I.D.	

Start Time:	8:08	Stop Time:	9:08

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 317.790	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 355	Filter T_f (°F) Set Points 355	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator, approx (%dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
2-1	5	NA ~~1.2~~ BA	1.2	320.91	474	355	357	63	80	79	3.0	8.7		~~5~~ BA
	10		1.2	323.98	477	356	358	52	81	80	3.5	8.9		
	15		1.2	327.09	474	356	355	50	83	80	4.5	8.9		
	20		1.2	330.17	476	355	358	48	84	81	5.5	8.7		
	25		1.2	333.24	475	354	355	49	85	80	6.5	8.5		
	30		1.2	336.32	478	355	357	49	86	80	7.5	8.4		
	35		1.2	339.39	478	355	356	51	86	80	8.5	8.6		
	40		1.2	342.47	481	355	355	52	87	81	9.5 ~~7.8~~ BA	7.8		
	45		1.2	345.58	482	355	356	54	88	81	10.5	7.9		
	50		1.2	348.68	480	356	357	55	88	81	11.5	8.7		
	55		1.2	351.78	481	356	355	57	89	82	13.0	7.8		
	60		1.2	354.895	479	355	355	58	90	82	14.0	7.7		
	Total	*		37.1050										
	Average		1.2000		477.9167				86.4167					

83.083

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC BP

Date 3-?-12

G - 50

CleanAir ENGINEERING

TEST LOCATION: INLET HCl **TESTING** **METHOD:** 26A **PAGE** 1 **OF** 4

UNIT: 2 **RUN:** 2

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. Broward	Date	3-20-12
Meter Operator	B. Arnold		
Probe Operator	—		
Meter Box	66-7	Sample Box No.	B22
Meter Y_d	0.9994	Meter $\Delta H_@$	1.7396
K Factor	—	Pitot C_p	0.831
Leak Rate Before	0.002 [cfm] [Lpm]	@	15 (in. Hg)
Leak Rate After	[cfm] [Lpm]	@	(in. Hg)
Pitot Leak Check Before ☒		After: Good ☐ Bad ☐	

Cross-Section of Test Location

[N] [UP]

2

Duct Dimensions (in.) ~~60.132~~ 105

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-4.5	14	Out	In

Amb. Temp. (°F)	81	Bar. Press.	30.05	[in. Hg] [mbar]
Probe I.D. No.	66-4-7			
Liner Material	GLASS			

Filter No.	—		
Thimble No.	—		
Nozzle Diameter		Nozzle I.D.	

Start Time: 9:49 Stop Time: 10:49

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 355.085	Stack Temp. Ts (°F)	Probe T_p (°F) Set Point 355	Filter T_f (°F) Set Point 355	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator, approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
2-1	5	N/A	1.2	358.22	479	355	355	66	85	83	3.0	8.3		
	10		1.2	~~361~~ 361.34	480	356	353	54	86	84	4.0	8.4		
	15		1.2	364.45	476	356	353	53	88	83	5.5	8.8		
	20		1.2	367.52	474	356	356	52	89	83	7.0	8.6		
	25		1.2	370.62	476	356	356	54	90	82	8.5	7.8		
	30		1.2	373.71	478	355	358	58	89	83	10.0	8.6		
	35		1.2	376.83	479	355	355	59	89	83	11.5	7.5		
	40		1.2	379.94	477	355	354	61	88	83	13.0	8.9		
	45		1.2	383.03	477	355	355	52	87	83	15.0	8.4		
	50		1.2	386.13	478	355	354	50	88	83	16.5	8.2		
	55		1.2	389.22	479	354	355	52	87	84	19.0	8.7		
	60		1.2	392.265	477	354	353	52	88	84	21.5	8.8		
	Total	*		37.1800										
	Average		1.2000		477.5000				85.5000					

* Sum of square roots.

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC BR

Date 3-20-12

TEST LOCATION: INLET HCl **TESTING** **METHOD:** 26A **PAGE** ~~4~~ ~~88~~ 1 **OF** ~~4~~ ~~88~~ 1

UNIT: 2 **RUN:** 3

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S. BROWARD	Date	3-20-12
Meter Operator	B. ARNOLD		
Probe Operator	—		

Meter Box	66-7	Sample Box No.	B1
Meter Y_d	0.9994	Meter $\Delta H_@$	1.7396
K Factor	—	Pitot C_p	0.831
Leak Rate Before 0.002 [cfm] [Lpm] @ 15 (in. Hg)			
Leak Rate After [cfm] [Lpm] @ (in. Hg)			
Pitot Leak Check Before: ☒		After: Good ☐ Bad ☐	

Cross-Section of Test Location

[N] [UP]

1

2

Duct Dimensions (in.): 105

Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-4.5	14		

Amb. Temp. (°F)	81	Bar. Press.	30.05 [in Hg] [mbar]
Probe I.D. No.	66-4-7		
Liner Material	GLASS		

Filter No.	—		
Thimble No.	—		
Nozzle Diameter		Nozzle I.D.	

Start Time: 12:22 Stop Time: 13:22

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 392.590	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 355	Filter T_f (°F) Set Points 355	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in Hg)	Oxygen Indicator approx (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐	Notes
2-1	~~10~~ 5	N/A	1.2	395.73	475	355	354	65	87	84	3.5	8.4		
	~~15~~ 10		1.2	398.84	477	355	359	62	86	84	4.5	8.0		
	15		1.2	401.95	480	356	357	52	88	84	5.5	7.7		
	20		1.2	~~404~~ 405.06	480	355	362	44	89	83	6.5	7.8		
	25		1.2	408.13	478	355	354	44	90	84	7.5	8.9		
	30		1.2	411.22	475	355	355	46	91	85	9.0	8.9		
	35		1.2	414.34	474	355	354	50	89	84	10.0	8.2		
	40		1.2	~~416~~ 417.45	472	355	356	52	90	84	12.0	8.9		
	45		1.2	420.54	475	355	352	56	90	84	14.0	7.7		
	50		1.2	423.65	476	355	356	60	90	84	16.0	7.9		
	55		1.2	426.74	474	355	355	61	88	83	18.0	8.1		
	60		1.2	429.825	475	355	354	63	88	83	20.0	8.2		
	Total	*		37.2350										
	Average		1.2000		475.9167				~~86.8333~~ 86.8333					

*Sum of square roots.

Circle correct bracketed units on data sheet.

86.333

QA/QC [initials]
Date 3-26-12

CleanAir ENGINEERING

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location	Unit 2 SDA Inlet
Plant South Broward	Job No. 11414	Method	Modified 26A

Balance Calibration Check

Balance ID	8028301070	Reference Weight Mass	500.0g
Reference Weight ID	22548	Reference Weight Reading	499.5g

Check must be performed at least Once per Method per Job — Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No. 1	Filter Type Quartz		Sample Box No. B12
Date 3/26/12	Lot No.		pH NA
Analyst DL	Filter No. NA		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	531.4	469.7	61.7	
Impinger 2	100 mL 01.N H2SO4	627.5	548.9	78.6	QA/QC SB
Impinger 3	100 mL 01.N H2SO4	555.8	537.9	17.9	Date 3/20
Impinger 4	Empty	438.5	436.2	2.3	
Impinger 5	Silica Gel	735.9	724.5	11.4	Total Weight (gm)
Impinger 6					160.5
Impinger 7					171.9

Run No. 2	Filter Type Quartz		Sample Box No. B22
Date 3/20/12	Lot No.		pH NA
Analyst DL	Filter No. NA		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	521.5	457.0	64.5	
Impinger 2	100 mL 01.N H2SO4	628.6	559.2	69.4	QA/QC SB
Impinger 3	100 mL 01.N H2SO4	554.9	537.8	17.1	Date 3/20
Impinger 4	Empty	437.8	433.5	4.3	
Impinger 5	Silica Gel	765.4	751.9	13.5	Total Weight (gm)
Impinger 6					155.3
Impinger 7					168.8

Run No. 3	Filter Type Quartz		Sample Box No. B1
Date 3/20/12	Lot No.		pH NA
Analyst DL	Filter No. NA		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	502.1	467.4		
Impinger 2	100 mL 01.N H2SO4	605.8	542.5		QA/QC SB
Impinger 3	100 mL 01.N H2SO4	571.8	540.9		Date 3/20
Impinger 4	Empty	470.8	458.4		
Impinger 5	Silica Gel	771.6	751.6		Total Weight (gm)
Impinger 6					
Impinger 7					

QA/QC SB
Date 3/20

CleanAir ENGINEERING

TEST LOCATION: FF outlet HCl **TESTING** **METHOD:** 26A **PAGE** 1 **OF** 1

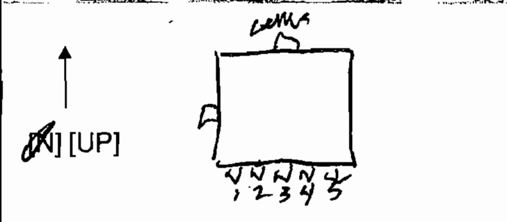
UNIT: 2 **RUN:** 1

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S Broward	Date	3/20
Meter Operator	K Sullivan		
Probe Operator	K Sullivan		

Meter Box	66-11	Sample Box No.	86
Meter Y_d	0.9915	Meter $\Delta H_@$	1.8118
K Factor	N/A	Pitot C_p	N/A
Leak Rate Before	0.005 [cfm] [Lpm] @ 15 (in. Hg)		
Leak Rate After	0.006 [cfm] [Lpm] @ 5 (in. Hg)		
Pitot Leak Check Before: ☑	After: Good ☑ Bad ☐		

Cross-Section of Test Location



Duct Dimensions (in.)	96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-14.7	4		

Amb. Temp. (°F)	85	Bar. Press	30.05 [in Hg] [mbar]
Probe I.D. No.	67-4-1		
Liner Material	Pyrex		

Filter No.	N/A		
Thimble No.	N/A		
Nozzle Diameter	N/A	Nozzle I.D.	N/A
Start Time:	8:08	Stop Time:	9:08

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. 271.910 [ft³] [L] ~~271.620~~ KS	Stack Temp. Ts (°F)	Probe T_p (°F) Set Points 300	Filter T_f (°F) Set Points 300	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in.Hg)	Oxygen Indicator, approx. (%,dv)	☐ Amb Filter ☐ Dioxin Trap ☐ N/A	Notes
3-3	5	N/A	1.5	275.39	292	301	298	65	80	77	4	9.6		
	10		1.5	278.84	293	302	298	58	82	77	4	10.3		
	15		1.5	282.25	293	301	299	51	84	78	4	9.8		
	20		1.5	285.66	293	300	299	51	87	79	4	10.4		
	25		1.5	289.08	292	299	298	51	90	81	4	10.4		
	30		1.5	292.47	292	299	299	49	92	83	4	10.3		
	35		1.5	295.88	292	300	299	51	94	84	4	10.8		
	40		1.5	299.30	293	301	300	53	95	86	5	9.8		
	45		1.5	302.75	292	300	299	54	96	87	5	10.3		
	50		1.5	306.28	292	301	300	55	97	89	5	10.6		
	55		1.5	309.62	292	300	299	57	98	90	5	10.0		
	60		1.5	313.180	292	300	298	58	99	91	5	10.2		
	Total	N/A	18.0	41.270	3508				1094	1002				
	Average	N/A	1.5000		292.3333				87.3333					

* Sum of square roots. Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

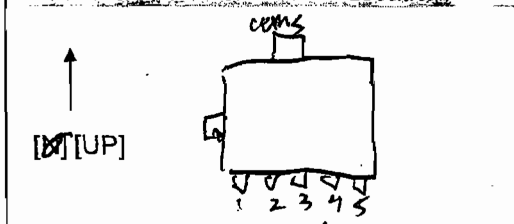
QA/QC KS
Date 3/ /12

TEST LOCATION:	FF out	HCl	TESTING
METHOD:	26A	PAGE 1	OF 2
UNIT:	2	RUN:	2

FIELD DATA SHEET

Client	Wheelabrator	Project No.	11414
Plant	S Broward	Date	3/20/12
Meter Operator	K Sullivan		
Probe Operator	K Sullivan		
Meter Box	66-11	Sample Box No.	83
Meter Y_d	0.9915	Meter $\Delta H_@$	1.8118
K Factor	N/A	Pitot C_p	N/A
Leak Rate Before 0.008 [cfm] [Lpm]	@ 15 (in. Hg)		
Leak Rate After 0.002 [cfm] [Lpm]	@ 6 (in. Hg)		
Pitot Leak Check Before:	After: Good	Bad	

Cross-Section of Test Location



Duct Dimensions (in.)	96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-16.0	18		

Amb. Temp. (°F)	85	Bar. Press.	30.05 [in Hg] [mbar]
Probe I.D. No.	62-4-1		
Liner Material	Pyrex		
Filter No.	N/A		
Thimble No.	N/A		
Nozzle Diameter	N/A	Nozzle I.D.	N/A
Start Time:	9:49	Stop Time:	10:49

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m Init. Vol. [ft³] [L] 313.755	Stack Temp T_s (°F)	Probe T_p (°F) Set Points 300	Filter T_f (°F) Set Points 300	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in. Hg)	Oxygen Indicator approx (%,dv)	Amb Filter / Dioxin Trap	Notes
3-3	5	N/A	1.5	317.22	295	295	295	66	98	97	4	10.0		
	10		1.5	320.70	294	297	298	67	100	98	4	9.8		
	15		1.5	324.17	294	300	298	66	102	98	4	10.3		
	20		1.5	327.66	294	298	298	61	~~99~~ 102	99	4	10.5		
	25		1.5	331.13	296	300	297	58	102	99	4	10.6		
	30		1.5	334.62	295	300	299	59	102	98	4	10.3		
	35		1.5	338.09	~~301~~ 295	299	299	61	100	98	4	10.6		
	40		1.5	341.70	294	299	299	62	100	98	5	10.5		
	45		1.5	345.27	294	299	299	63	100	98	5	10.2		
	50		1.5	348.55	295	299	299	63	100	98	5	10.5		
	55		1.5	352.02	295	300	299	63	100	97	5	10.3		
	60		1.5	355.510	295	300	300	63	100	97	5	10.2		
	Total	*	18.0	41.755	3536				1206	1175				
	Average		1.5000		294.6667				99.2083					

* Sum of square roots.

Circle correct bracketed units on data sheet.

CleanAir ENGINEERING

QA/QC KS
Date 3/26/12

TEST LOCATION: FF outlet HCl **TESTING METHOD:** 26A **PAGE** 1 **OF** 1

UNIT: 2 **RUN:** 3

FIELD DATA SHEET

Client	wheelabrator	Project No.	11414
Plant	S Broward	Date	3/20/12
Meter Operator	K Sullivan		
Probe Operator	K Sullivan		

Meter Box	66-11	Sample Box No.	N/A
Meter Y_d	0.9925	Meter $\Delta H_@$	1.6118
K Factor	N/A	Pitot C_p	N/A
Leak Rate Before 0.004 [cfm] [Lpm] @ 15 (in. Hg)			
Leak Rate After 0.002 [cfm] [Lpm] @ 7 (in. Hg)			
Pitot Leak Check Before		After: Good / Bad	

Cross-Section of Test Location

Duct Dimensions (in.)	96		
Static Pres (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-15.8	10		

Amb. Temp. (°F)	85	Bar. Press	30.05 [in Hg] [mbar]
Probe I.D. No.	67-4-1		
Liner Material	Pyrex		

Filter No.	N/A		
Thimble No.	N/A		
Nozzle Diameter	N/A	Nozzle I.D.	N/A

Start Time	12:22	Stop Time	13:22

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in H_2O)	Orifice Setting ΔH (in H_2O)	Gas Sample Volume V_m Init. Vol [ft³] [L] 358.385	Stack Temp. Ts (°F)	Probe T_p (°F) Set Point 300	Filter T_f (°F) Set Point 300	Cond. Temp. T_c (°F)	DGM Inlet $T_{m\,in}$ (°F)	DGM Outlet $T_{m\,out}$ (°F)	Pump Vacuum (in Hg)	Oxygen Indicator approx. (% dv)	Amb Filter / Dioxin Trap	Notes
3-3	5	N/A	1.5	362.25	295	299	297	65	88	86	5	10.3		
	10		1.5	365.63	294	299	297	62	89	89	5	10.2		
	15		1.5	369.18	293	297	297	60	89	84	6	10.4		
	20		1.5	372.50	292	297	296	55	91	85	6	10.6		
	25		1.5	375.95	293	300	297	56	92	85	6	10.8		
	30		1.5	379.40	293	304	297	56	93	86	6	10.8		
	35		1.5	382.88	295	310	298	58	94	86	6	10.7		
	40		1.5	386.33	294	299	298	59	93	86	6	10.7		
	45		1.5	389.78	294	299	298	60	94	86	6	10.5		
	50		1.5	393.25	293	297	299	62	97	88	6	10.5		
	55		1.5	396.69	292	300	298	60	94	87	6	10.7		
	60		1.5	400.150	292	300	297	60	94	87	6	10.6		
	Total	*	18.0	41.365	3520				1108	1035				
	Average		1.5000		293.3333				89.2917					

* Sum of square roots.

Circle correct bracketed units on data sheet.

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CleanAir ENGINEERING

QA/QC KS
Date 3/.../12

new general datasheet, December 2006

Impinger Weight Sheet

Client Wheelabrator		Unit Name / Location Unit 2 FF Outlet
Plant South Broward	Job No. 11414	Method Modified M26A

Balance Calibration Check			
Balance ID	S/N 8028301069	Reference Weight Mass	500
Reference Weight ID	22548	Reference Weight Reading	499.5

Check must be performed at least Once per Method per Job

Reference Weight Mass must agree with Reference Weight Reading to within ±0.5 g.

Run No. 1	1 Filter Type Teflon Mat		Sample Box No. B6
Date 3/20/12	Lot No. N/A		pH N/A
Analyst R. Vicere	Filter No. NA		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	602.0	550.1	51.9	
Impinger 2	100 mL 01.N H2SO4	730.5	625.3	105.2	QA/QC RV
Impinger 3	100 mL 01.N H2SO4	573.9	533.4	40.5	Date 3/20/12
Impinger 4	Empty	485.5	472.2	13.3	
Impinger 5	Silica Gel	740.9	725.0	15.9	Total Weight (gm)
Impinger 6					210.9
Impinger 7					226.8

Run No. 2	2 Filter Type Teflon Mat		Sample Box No. B3
Date 3/20/12	Lot No. N/A		pH N/A
Analyst R. Vicere	Filter No. NA	455.2	Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	517.3	RV 504.7 ~~455.2~~ RV	62.1	
Impinger 2	100 mL 01.N H2SO4	644.7	536.7	108.0	QA/QC RV
Impinger 3	100 mL 01.N H2SO4	659.5	628.5	31.0	Date 3/20/12
Impinger 4	Empty	442.4	434.9	7.5	
Impinger 5	Silica Gel	730.3	716.8	13.5	Total Weight (gm)
Impinger 6					208.6
Impinger 7					222.1

Run No. 3	3 Filter Type Teflon Mat		Sample Box No. Black
Date 3/20/12	Lot No. N/A		pH N/A
Analyst R. Vicere	Filter No. NA		Rinse NA

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	531.4	504.1 RV ~~475.7~~ RV	14.0	
Impinger 2	100 mL 01.N H2SO4	660.8	550.1	110.7	QA/QC RV
Impinger 3	100 mL 01.N H2SO4	561.3	539.4	21.9	Date 3/20/12
Impinger 4	Empty	439.6	436.3	3.3	
Impinger 5	Silica Gel	744.8	731.8	13.0	Total Weight (gm)
Impinger 6			457.4		209.9
Impinger 7					222.9

QA/QC RV
Date 3/20/12

CleanAir. ENGINEERING

1/

Visible Emissions Observation Form

CLIENT/OWNER	PROJECT NUMBER	OBSERVATION DATE	START TIME	END TIME
Wheelabrator	11414	3/21/12	828	1127

PLANT	UNIT	RUN
South Broward		1

PROCESS EQUIPMENT	OPERATING MODE
Silo	Continuous
CONTROL EQUIPMENT	**OPERATING MODE**
Baghouse	Continuous

DESCRIBE EMISSION POINT
top of silo vent outlet

HEIGHT ABOVE GROUND LEVEL	DISTANCE FROM OBSERVER
60 ft	180 ft.
HEIGHT RELATIVE TO OBSERVER	**DIRECTION FROM OBSERVER**
60 ft.	West

DESCRIBE EMISSIONS
clear plume

EMISSION COLOR	PLUME TYPE: CONTINUOUS ☒ FUGITIVE ☐ INTERMITTENT ☐
clear	
WATER DROPLETS PRESENT	**IF WATER DROPLET PLUME**
YES ☐ NO ☒	ATTACHED ☐ DETACHED ☐

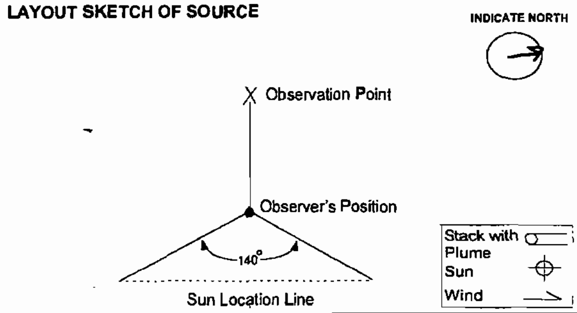
POINT IN PLUME AT WHICH EMISSIONS WERE DETERMINED
vent outlet

DESCRIBE BACKGROUND
sky

WIND SPEED	WIND DIRECTION
0-5 MPH	North
AMBIENT TEMPERATURE	**RELATIVE HUMIDITY**

MIN \ SEC	15	30	45	60	MIN \ SEC	15	30	45	60
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0

LAYOUT SKETCH OF SOURCE



RANGE OF OPACITY READINGS

MINIMUM	MAXIMUM
0	0

OBSERVER'S NAME (PRINT)
Daniel Luckhard

OBSERVER'S SIGNATURE	DATE
[signature]	3/21/12
CERTIFIED BY	**DATE**

COMMENTS

QA/QC_____
Date_______

CleanAir ENGINEERING

2/

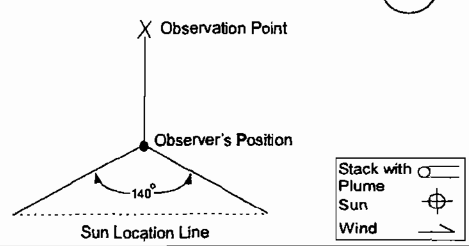
Visible Emissions Observation Form

CLIENT/OWNER: Wheelabrator	PROJECT NUMBER: 11414	OBSERVATION DATE: 3/21/17	START TIME: / END TIME:
PLANT: South Broward	UNIT:	RUN: 1	
PROCESS EQUIPMENT: Silo	OPERATING MODE: Continuous		
CONTROL EQUIPMENT: Baghouse	OPERATING MODE: Continuous		
DESCRIBE EMISSION POINT:			
HEIGHT ABOVE GROUND LEVEL:	DISTANCE FROM OBSERVER:		
HEIGHT RELATIVE TO OBSERVER:	DIRECTION FROM OBSERVER:		
DESCRIBE EMISSIONS:			
EMISSION COLOR:	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐		
WATER DROPLETS PRESENT: YES ☐ NO ☐	IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐		
POINT IN PLUME AT WHICH EMISSIONS WERE DETERMINED:			
DESCRIBE BACKGROUND:			
WIND SPEED:	WIND DIRECTION:		
AMBIENT TEMPERATURE:	RELATIVE HUMIDITY:		

MIN \ SEC	15	30	45	60	MIN \ SEC	15	30	45	60
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0

LAYOUT SKETCH OF SOURCE

INDICATE NORTH



RANGE OF OPACITY READINGS

MINIMUM: 0

MAXIMUM:

OBSERVER'S NAME (PRINT):

OBSERVER'S SIGNATURE: | DATE:

CERTIFIED BY: | DATE:

COMMENTS

QA/QC_____
Date_____

CleanAir Engineering

3/

Visible Emissions Observation Form

CLIENT/OWNER	PROJECT NUMBER	OBSERVATION DATE	START TIME	END TIME
Wheelabrator	11414	3/21/11		

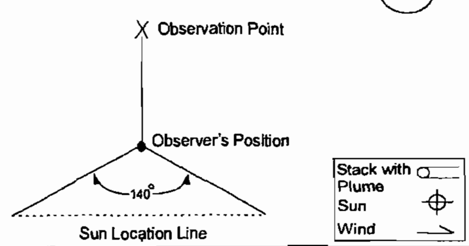
PLANT	UNIT	RUN
South Broward		1

MIN \ SEC	15	30	45	60	MIN \ SEC	15	30	45	60
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59				

PROCESS EQUIPMENT	OPERATING MODE
CONTROL EQUIPMENT	OPERATING MODE
DESCRIBE EMISSION POINT	
HEIGHT ABOVE GROUND LEVEL	DISTANCE FROM OBSERVER
HEIGHT RELATIVE TO OBSERVER	DIRECTION FROM OBSERVER
DESCRIBE EMISSIONS	
EMISSION COLOR	PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐
WATER DROPLETS PRESENT YES ☐ NO ☐	IF WATER DROPLET PLUME ATTACHED ☐ DETACHED ☐
POINT IN PLUME AT WHICH EMISSIONS WERE DETERMINED	
DESCRIBE BACKGROUND	
WIND SPEED	WIND DIRECTION
AMBIENT TEMPERATURE	RELATIVE HUMIDITY

LAYOUT SKETCH OF SOURCE

INDICATE NORTH



RANGE OF OPACITY READINGS

MINIMUM | MAXIMUM

OBSERVER'S NAME (PRINT)

OBSERVER'S SIGNATURE | DATE

CERTIFIED BY | DATE

COMMENTS

QA/QC______
Date______

CleanAir ENGINEERING

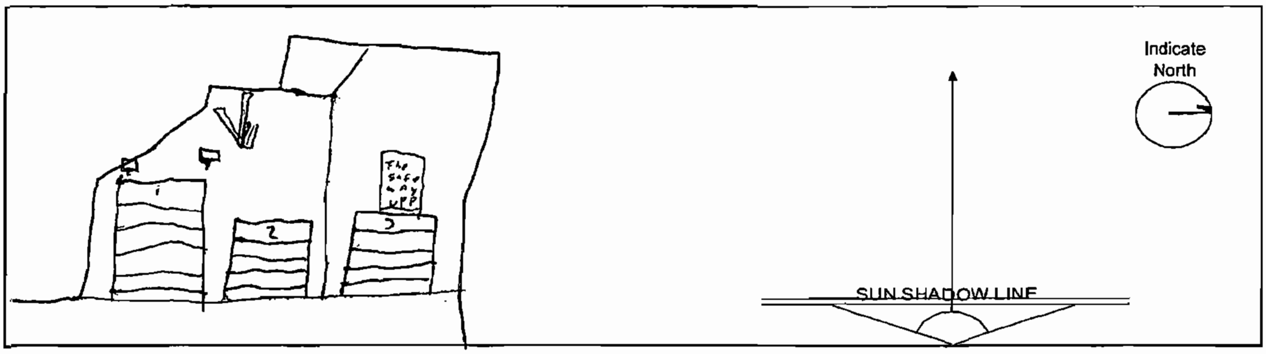
EPA METHOD 22
Fugitive or Smoke Emission Inspection
Outdoor Location

Job No.	11414	**Date**	3/22/12
Client	wheelabrator	**Observer**	D. Luckhard
Plant	South Broward	**Affiliation**	Clean Air Engineering

Industry	MSW	**Process Unit**	Ash handling system

Precipitation	0	**Wind Direction**	west
Sky Conditions	Cloudy	**Wind Speed**	0-5 MPH

Sketch process unit: Indicate observer position relative to source and sun.
Indicate potential emission points and/or actual emission points.



OBSERVATIONS

Comments	Clock Time	Observation Period Duration (min : sec)	Accumulated Emission Duration (min : sec)
door 2 opened at 10:12 and door closed at ~~11:58~~ DC 11.58	Start 10:53 Stop 11:13	20.00	0.0
doors 1+2 opened at 16:42	Start 11:18 Stop 11:38	20.00	0.00
door 2 closed at 19.19 door 2 opened at 37.06	Start 11:43 Stop 12:03	20.00	0.0
door 2 closed at start of 3rd 20min section door 1 closed at 43:28	Start 12:08 Stop 12:28	20:00	0:00
door 2 opend at 49 43 door 1 opened at 84:18 door 2 closed at 86 23	Start 12:33 Stop 12:43	20:00	0:00
	Start Stop		

Note: Rest breaks must be taken every 15 to 20 minutes for 5 to 10 minutes.

QA/QC DL
Date 3/22/12

CleanAir ENGINEERING

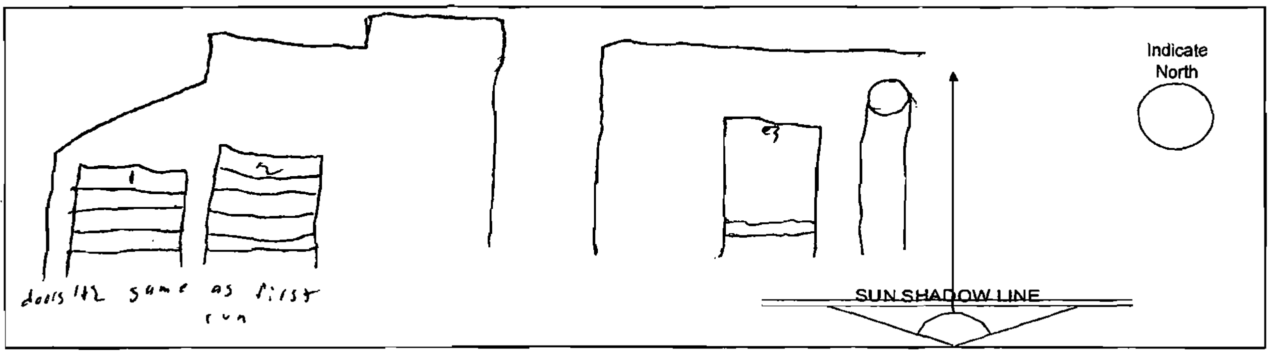
EPA METHOD 22
Fugitive or Smoke Emission Inspection
Outdoor Location

Job No.	11414	**Date**	3/22/12
Client	Wheelabrator	**Observer**	D. Luckhard
Plant	South Broward	**Affiliation**	Clean Air Engineering

Industry	MSW	**Process Unit**	Ash handling system

Precipitation	0	**Wind Direction**	west
Sky Conditions	Cloudy	**Wind Speed**	0-5 MPH

Sketch process unit: Indicate observer position relative to source and sun.
Indicate potential emission points and/or actual emission points.



OBSERVATIONS

Comments	Clock Time	Observation Period Duration (min : sec)	Accumulated Emission Duration (min : sec)
door 1 open at start door 3 opened at 1:43 and closed at 2:10	Start 1303 Stop 1323	20:00	0:00
door 1 closed at 3:02 door 3 opened at 857	Start 1328 Stop 1348	20:00	0:00
and closed at 937 door 2 opened at 937 and closed at 11:06	Start 1353 Stop 1413	20:00	0:00
door 2 opened at 20:09 and closed 2224	Start 1418 Stop 1438	20:00	0:00
door 1 opened at 14:20 door 2 open at 40:06 and closed at 49:33	Start 1443 Stop 1553	10:00 ~~20:00~~ DL	0:00
door 1 closes at 53:22 door 2 open at 60:00 and closes at 74:41	Start Stop		

Note: Rest breaks must be taken every 15 to 20 minutes for 5 to 10 minutes.

Sully opens door 3 at 8243
and closes at 8318
door 2 opens at 8700
and closes at 8932

QA/QC DL
Date 3/22/12

CleanAir Engineering

FIELD DATA PRINTOUTS

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I herby certify that all pages contained within this Appendix have been reviewed and, to the best of my ability, verified as accurate.

QA/QC Initials: WL

Date: 4/27/12

CleanAir

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Field Data Printout

Test Method: **USEPA Method 5/29**
Analyte: **Particulate/Metals**

Location: Unit 1 FF Outlet
Test Run: 1
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000

Meter Operator:	P. Bihun	505
Probe Operator:	P. Bihun	505

Test Date: 3/20/12
Start Time: 07:52
Stop Time: 10:05
Leak Rate Before: 0.005 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -10.0
O_2 (dry volume %): 8.12
CO_2 (dry volume %): 11.02
N_2+CO (dry volume %): 80.86

H_2O (condensate, ml or gm): 468.6
H_2O (silica, g): 17.2
Actual Moisture (%): 24.04

Nozzle ID No: 276-1
Nozzle Diameter (D_n): 0.276
Probe ID No: 67-8-21
Pitot C_p: 0.843
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 85-3
Meter ΔH@: 1.77920
Meter Y_d: 0.99250

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			714.680						
1-01	5.0	0.40	1.10	717.660	303	74	74	0.63	2.98	102.9
1-02	10.0	0.39	1.10	720.580	304	75	74	0.62	2.92	102.1
1-03	15.0	0.45	1.30	723.770	304	77	74	0.67	3.19	103.7
1-04	20.0	0.47	1.30	726.980	303	79	75	0.69	3.21	101.7
1-05	25.0	0.49	1.40	730.320	304	80	75	0.70	3.34	103.6
LEAK CHECK	25.0			730.385						
2-01	30.0	0.40	1.10	733.270	301	79	75	0.63	2.88	98.9
2-02	35.0	0.33	0.92	735.950	303	81	76	0.57	2.68	101.0
2-03	40.0	0.43	1.20	739.040	304	81	76	0.66	3.09	102.1
2-04	45.0	0.48	1.30	742.290	304	83	77	0.69	3.25	101.4
2-05	50.0	0.47	1.30	745.540	303	83	78	0.69	3.25	102.3
LEAK CHECK	50.0			745.595						
3-01	55.0	0.33	0.92	748.320	303	82	78	0.57	2.73	102.4
3-02	60.0	0.33	0.92	751.210	303	83	79	0.57	2.89	108.4
3-03	65.0	0.35	0.98	753.840	303	85	79	0.59	2.63	95.6
3-04	70.0	0.43	1.20	756.950	303	85	80	0.66	3.11	102.0
3-05	75.0	0.46	1.30	760.190	303	85	80	0.68	3.24	102.7
LEAK CHECK	75.0			760.250						
4-01	80.0	0.42	1.20	763.350	302	84	80	0.65	3.10	102.9
4-02	85.0	0.31	0.87	765.970	302	85	80	0.56	2.62	101.0
4-03	90.0	0.36	1.00	768.800	303	84	80	0.60	2.83	101.4
4-04	95.0	0.42	1.20	771.900	303	84	80	0.65	3.10	102.9
4-05	100.0	0.51	1.40	775.230	303	85	80	0.71	3.33	100.3
LEAK CHECK	100.0			775.290						
5-01	105.0	0.25	0.71	777.670	298	85	81	0.50	2.38	101.8
5-02	110.0	0.35	1.00	780.460	301	86	82	0.59	2.79	100.9
5-03	115.0	0.30	0.86	783.080	300	88	82	0.55	2.62	102.1
5-04	120.0	0.30	0.86	785.720	301	88	83	0.55	2.64	102.8
5-05	125.0	0.44	1.30	788.950	301	89	83	0.66	3.23	103.9
Final	125.0		1.10960	74.03000	302.48000	80.62000		0.62585	74.03000	

25 points sampled

	Sq.Rt.ΔP				
QC-Check: Field Averages	0.6259	1.1096	74.0300	302.4800	80.6200
	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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Prepared by Clean Air Engineering Proprietary Software
SS ISOKINETIC Version 2006-13e

Field Data Printout

Test Method: **USEPA Method 5/29**
Analyte: **Particulate/Metals**

Location:	Unit 1 FF Outlet
Test Run:	2
Client:	Wheelabrator South Broward, Inc.
Project No:	11414
Source Area (ft^2):	64.00000
Meter Operator:	P. Bihun 505
Probe Operator:	P. Bihun 505
Test Date:	3/20/12
Start Time:	10:29
Stop Time:	12:44
Leak Rate Before:	0.004 cfm @ 15 "Hg
Leak Rate After:	0.001 cfm @ 9 "Hg

Bar. Press. (in. Hg):	30.05
Static P:	-10.0
O_2 (dry volume %):	8.64
CO_2 (dry volume %):	10.58
N_2+CO (dry volume %):	80.78
H_2O (condensate, ml or gm):	450.4
H_2O (silica, g):	16.7
Actual Moisture (%):	22.75

Nozzle ID No:	276-1
Nozzle Diameter (D_n):	0.276
Probe ID No:	67-8-21
Pitot C_p:	0.843
Pitot Leak Check:	☑ Pass ☐ Fail
Meter Box ID. No:	85-3
Meter ΔH@:	1.77920
Meter Y_d:	0.99250

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter $T_{m\text{-}in}$ (°F)	Dry Gas Meter $T_{m\text{-}out}$ (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{\text{in. } H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			789.300						
1-01	5.0	0.35	1.00	792.180	302	82	82	0.59	2.88	103.1
1-02	10.0	0.40	1.10	795.060	303	84	82	0.63	2.88	96.4
1-03	15.0	0.44	1.30	798.325	304	85	82	0.66	3.27	104.2
1-04	20.0	0.48	1.40	801.690	303	86	83	0.69	3.37	102.6
1-05	25.0	0.45	1.30	804.955	303	87	83	0.67	3.26	102.7
LEAK CHECK	25.0			805.040						
2-01	30.0	0.40	1.10	807.960	301	86	83	0.63	2.92	97.3
2-02	35.0	0.35	1.00	810.790	303	86	83	0.59	2.83	100.9
2-03	40.0	0.40	1.10	813.700	303	87	84	0.63	2.91	96.9
2-04	45.0	0.49	1.40	817.070	304	88	84	0.70	3.37	101.4
2-05	50.0	0.52	1.50	820.540	303	89	85	0.72	3.47	101.2
LEAK CHECK	50.0			820.600						
3-01	55.0	0.45	1.30	823.830	302	88	85	0.67	3.23	101.2
3-02	60.0	0.37	1.10	826.780	303	88	85	0.61	2.95	102.0
3-03	65.0	0.40	1.10	829.710	304	90	86	0.63	2.93	97.2
3-04	70.0	0.49	1.40	833.070	304	90	86	0.70	3.36	100.8
3-05	75.0	0.47	1.30	836.310	303	90	86	0.69	3.24	99.1
LEAK CHECK	75.0			836.375						
4-01	80.0	0.45	1.30	839.620	302	89	86	0.67	3.25	101.5
4-02	85.0	0.36	1.00	842.490	304	90	86	0.60	2.87	100.3
4-03	90.0	0.36	1.00	845.360	303	90	86	0.60	2.87	100.3
4-04	95.0	0.44	1.20	848.470	303	92	87	0.66	3.11	98.1
4-05	100.0	0.55	1.50	851.905	304	92	87	0.74	3.43	97.0
LEAK CHECK	100.0			851.950						
5-01	105.0	0.41	1.10	854.910	300	92	88	0.64	2.96	96.4
5-02	110.0	0.47	1.30	858.110	303	92	88	0.69	3.20	97.6
5-03	115.0	0.33	0.91	860.830	300	93	88	0.57	2.72	98.6
5-04	120.0	0.37	1.00	863.680	301	93	88	0.61	2.85	97.6
5-05	125.0	0.47	1.30	866.945	303	93	88	0.69	3.27	99.4
Final	125.0		1.20040	77.39000	302.72000	87.06000		0.65183	77.39000	

25 points sampled

QC-Check: Field Averages	Sq.Rt.ΔP	ΔH	Metered	Stack	Dry Gas Meter
	0.6518	1.2004	77.3900	302.7200	87.0600
	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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Field Data Printout

Test Method:	USEPA Method 5/29
Analyte:	Particulate/Metals

Location:	Unit 1 FF Outlet		
Test Run:	3		
Client:	Wheelabrator South Broward, Inc.		
Project No:	11414		
Source Area (ft^2):	64.00000		
Meter Operator:		P. Bihun	505
Probe Operator:		P. Bihun	505
Test Date:	3/20/12		
Start Time:	13:04		
Stop Time:	15:20		
Leak Rate Before:	0.005	cfm	@ 15 "Hg
Leak Rate After:	0.001	cfm	@ 8 "Hg

Bar. Press. (in. Hg):	30.05
Static P:	-10.6
O_2 (dry volume %):	8.92
CO_2 (dry volume %):	10.51
N_2+CO (dry volume %):	80.57
H_2O (condensate, ml or gm):	446.3
H_2O (silica, g):	17.4
Actual Moisture (%):	22.46

Nozzle ID No:	276-1
Nozzle Diameter (D_n):	0.276
Probe ID No:	67-8-21
Pitot C_p:	0.843
Pitot Leak Check:	☑ Pass ☐ Fail
Meter Box ID. No:	85-3
Meter ΔH@:	1.77920
Meter Y_d:	0.99250

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter $T_{m\text{-}in}$ (°F)	Dry Gas Meter $T_{m\text{-}out}$ (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			867.395						
4-01	5.0	0.50	1.40	870.760	304	86	86	0.71	3.37	100.0
4-02	10.0	0.36	0.99	873.590	304	86	85	0.60	2.83	99.2
4-03	15.0	0.33	0.91	876.310	304	86	84	0.57	2.72	99.6
4-04	20.0	0.44	1.20	879.440	304	88	84	0.66	3.13	99.2
4-05	25.0	0.59	1.60	883.030	305	89	84	0.77	3.59	98.3
LEAK CHECK	25.0			883.160						
5-01	30.0	0.44	1.30	886.400	303	86	84	0.66	3.24	102.8
5-02	35.0	0.30	0.86	889.040	301	89	84	0.55	2.64	100.9
5-03	40.0	0.35	1.00	891.880	304	88	84	0.59	2.84	100.8
5-04	45.0	0.30	0.86	894.530	302	89	84	0.55	2.65	101.4
5-05	50.0	0.58	1.70	898.195	305	89	84	0.76	3.67	101.2
LEAK CHECK	50.0			898.380						
1-01	55.0	0.41	1.20	901.530	304	88	84	0.64	3.15	103.4
1-02	60.0	0.38	1.10	904.450	305	90	84	0.62	2.92	99.4
1-03	65.0	0.44	1.30	907.660	305	91	85	0.66	3.21	101.4
1-04	70.0	0.45	1.30	910.890	305	90	85	0.67	3.23	101.0
1-05	75.0	0.45	1.30	914.075	305	88	84	0.67	3.19	99.9
LEAK CHECK	75.0			914.150						
2-01	80.0	0.40	1.10	917.120	304	88	84	0.63	2.97	98.7
2-02	85.0	0.37	1.10	920.080	306	89	84	0.61	2.96	102.3
2-03	90.0	0.46	1.30	923.300	306	89	84	0.68	3.22	99.8
2-04	95.0	0.47	1.30	926.540	305	91	84	0.69	3.24	99.1
2-05	100.0	0.51	1.50	929.950	306	88	84	0.71	3.41	100.5
LEAK CHECK	100.0			930.095						
3-01	105.0	0.44	1.30	933.320	304	85	82	0.66	3.23	102.7
3-02	110.0	0.34	0.97	936.090	305	88	83	0.58	2.77	99.9
3-03	115.0	0.40	1.10	939.060	305	89	83	0.63	2.97	98.7
3-04	120.0	0.50	1.40	942.400	306	90	83	0.71	3.34	99.3
3-05	125.0	0.54	1.50	945.905	306	91	84	0.73	3.51	100.2
Final	125.0		1.22360	77.97500	304.52000	86.22000		0.65305	77.97500	
25 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages		0.6530	1.2236	77.9750	304.5200	86.2200				
		☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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USEPA Method 3 Laboratory Data

Test Method: **USEPA Method 5/29**
Analyte: **Particulate/Metals**

Location: Unit 1 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		11.02000		8.12000	80.86000	30.08800	1.15971	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.58000		8.64000	80.78000	30.03840	1.15879	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.51000		8.92000	80.57000	30.03840	1.13987	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis:
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Location:	Unit 1 FF Outlet	Test Method:	USEPA Method 5/29
Client:	Wheelabrator South Broward, Inc.	Analyte:	Particulate/Metals
Project No:	11414	Analyst:	D. Luckhard
		Analyst Emp No:	568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	762.5	462.1	300.4
Impinger 2	5%HNO3/10%H2O2	671.3	542.5	128.8
Impinger 3	5%HNO3/10%H2O2	570.5	540.9	29.6
Impinger 4	Empty	440.7	434.4	6.3
Impinger 5	4%KMnO4/10%H2SO4	538.8	535.4	3.4
Impinger 6	4%KMnO4/10%H2SO4	515.8	515.7	0.1
Impinger 7	Silica Gel	802.8	785.6	17.2
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
468.6	Liquid (gm)		
0.0	less rinse (gm)		
468.6	Net Liquid (gm)	468.6	☑ QA/QC OK
+ 17.2	Silica Gel (gm)	17.2	☑ QA/QC OK
485.8	Total Vlc (gm)	485.8	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	731.3	416.2	315.1
Impinger 2	5%HNO3/10%H2O2	654.7	546.1	108.6
Impinger 3	5%HNO3/10%H2O2	553.3	530.0	23.3
Impinger 4	Empty	424.4	421.7	2.7
Impinger 5	4%KMnO4/10%H2SO4	528.4	527.5	0.9
Impinger 6	4%KMnO4/10%H2SO4	539.2	539.4	-0.2
Impinger 7	Silica Gel	749.5	732.8	16.7
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
450.4	Liquid (gm)		
0.0	less rinse (gm)		
450.4	Net Liquid (gm)	450.4	☑ QA/QC OK
+ 16.7	Silica Gel (gm)	16.7	☑ QA/QC OK
467.1	Total Vlc (gm)	467.1	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	790.9	469.4	321.5
Impinger 2	5%HNO3/10%H2O2	643.6	543.4	100.2
Impinger 3	5%HNO3/10%H2O2	558.5	540.4	18.1
Impinger 4	Empty	469.6	466.7	2.9
Impinger 5	4%KMnO4/10%H2SO4	562.8	558.6	4.2
Impinger 6	4%KMnO4/10%H2SO4	540.9	541.5	-0.6
Impinger 7	Silica Gel	743.9	726.5	17.4
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
446.3	Liquid (gm)		
0.0	less rinse (gm)		
446.3	Net Liquid (gm)	446.3	☑ QA/QC OK
+ 17.4	Silica Gel (gm)	17.4	☑ QA/QC OK
463.7	Total Vlc (gm)	463.7	☑ QA/QC OK

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty			
Impinger 2	5%HNO3/10%H2O2			
Impinger 3	5%HNO3/10%H2O2			
Impinger 4	Empty			
Impinger 5	4%KMnO4/10%H2SO4			
Impinger 6	4%KMnO4/10%H2SO4			
Impinger 7	Silica Gel			
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
	Liquid (gm)		
	less rinse (gm)		
	Net Liquid (gm)		☐ QA/QC OK
	Silica Gel (gm)		☐ QA/QC OK
	Total Vlc (gm)		☐ QA/QC OK

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Field Data Printout

Test Method: **USEPA Method 29**
Analyte: **Mercury**

Location: Unit 1 FF Outlet
Test Run: 4
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: K. Sullivan 579
Probe Operator: A. Obuchowski 567
Test Date: 3/21/12
Start Time: 13:18
Stop Time: 15:38
Leak Rate Before: 0.005 cfm @ 15 "Hg
Leak Rate After: 0.009 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -9.9
O_2 (dry volume %): 8.94
CO_2 (dry volume %): 10.43
N_2+CO (dry volume %): 80.63

H_2O (condensate, ml or gm): 462.9
H_2O (silica, g): 14.8
Actual Moisture (%): 22.58

Nozzle ID No: 276-1
Nozzle Diameter (D_n): 0.276
Probe ID No: 67-8-21
Pitot C_p: 0.843
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 85-3
Meter ΔH@: 1.77920
Meter Y_d: 0.99250

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			946.600						
3-01	5.0	0.50	1.40	949.970	304	83	82	0.71	3.37	100.9
3-02	10.0	0.39	1.10	952.970	305	84	82	0.62	3.00	101.6
3-03	15.0	0.43	1.20	956.070	306	85	82	0.66	3.10	99.9
3-04	20.0	0.48	1.40	959.360	306	87	83	0.69	3.29	100.2
3-05	25.0	0.52	1.50	962.780	305	86	83	0.72	3.42	100.1
LEAK CHECK	25.0			962.900						
4-01	30.0	0.50	1.50	966.300	306	84	82	0.71	3.40	101.8
4-02	35.0	0.40	1.20	969.410	304	84	82	0.63	3.11	103.9
4-03	40.0	0.33	0.97	972.210	305	85	82	0.57	2.80	102.9
4-04	45.0	0.43	1.30	975.440	304	85	82	0.66	3.23	104.0
4-05	50.0	0.58	1.70	979.100	307	85	82	0.76	3.66	101.8
LEAK CHECK	50.0			979.350						
5-01	55.0	0.42	1.20	982.430	303	83	82	0.65	3.08	100.5
5-02	60.0	0.38	1.10	985.320	304	84	82	0.62	2.89	99.1
5-03	65.0	0.35	1.00	988.200	298	85	82	0.59	2.88	102.3
5-04	70.0	0.40	1.20	991.360	303	85	81	0.63	3.16	105.5
5-05	75.0	0.47	1.40	994.700	303	85	81	0.69	3.34	102.9
LEAK CHECK	75.0			994.850						
1-01	80.0	0.37	1.10	997.680	302	83	81	0.61	2.83	98.4
1-02	85.0	0.42	1.20	1000.890	305	85	81	0.65	3.21	104.7
1-03	90.0	0.48	1.40	1004.260	306	86	81	0.69	3.37	102.9
1-04	95.0	0.52	1.50	1007.690	305	86	81	0.72	3.43	100.6
1-05	100.0	0.42	1.20	1010.860	304	86	81	0.65	3.17	103.3
LEAK CHECK	100.0			1011.040						
2-01	105.0	0.42	1.20	1013.940	302	84	81	0.65	2.90	94.5
2-02	110.0	0.38	1.10	1016.690	305	85	82	0.62	2.75	94.2
2-03	115.0	0.40	1.20	1019.830	305	86	82	0.63	3.14	104.8
2-04	120.0	0.49	1.40	1023.220	305	86	82	0.70	3.39	102.3
2-05	125.0	0.52	1.50	1026.665	305	86	82	0.72	3.44	100.9
Final	125.0		1.27880	79.36500	304.28000	83.34000		0.66173	79.36500	

25 points sampled

	Sq.Rt.ΔP				
QC-Check: Field Averages	0.6617	1.2788	79.3650	304.2800	83.3400
	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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USEPA Method 3 Laboratory Data

Test Method: **USEPA Method 29**
Analyte: **Mercury**

Location: Unit 1 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		11.02000		8.12000	80.86000	30.08800	1.15971	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.58000		8.64000	80.78000	30.03840	1.15879	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.51000		8.92000	80.57000	30.03840	1.13987	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
4	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.43000		8.94000	80.63000	30.02640	1.14669	☑ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Location:	Unit 1 FF Outlet	Test Method:	USEPA Method 29
Client:	Wheelabrator South Broward, Inc.	Analyte:	Mercury
Project No:	11414	Analyst:	D. Luckhard
		Analyst Emp No:	568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty	762.5	462.1	300.4				
Impinger 2	5%HNO3/10%H2O2	671.3	542.5	128.8				
Impinger 3	5%HNO3/10%H2O2	570.5	540.9	29.6				
Impinger 4	Empty	440.7	434.4	6.3				
Impinger 5	4%KMnO4/10%H2SO4	538.8	535.4	3.4				
Impinger 6	4%KMnO4/10%H2SO4	515.8	515.7	0.1	468.6	Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel	802.8	785.6	17.2	0.0	less rinse (gm)		
Impinger 8					468.6	Net Liquid (gm)	468.6	☑ QA/QC OK
					+ 17.2	Silica Gel (gm)	17.2	☑ QA/QC OK
		Rinse:		(ml or gm)	485.8	Total Vlc (gm)	485.8	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty	731.3	416.2	315.1				
Impinger 2	5%HNO3/10%H2O2	654.7	546.1	108.6				
Impinger 3	5%HNO3/10%H2O2	553.3	530.0	23.3				
Impinger 4	Empty	424.4	421.7	2.7				
Impinger 5	4%KMnO4/10%H2SO4	528.4	527.5	0.9				
Impinger 6	4%KMnO4/10%H2SO4	539.2	539.4	-0.2	450.4	Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel	749.5	732.8	16.7	0.0	less rinse (gm)		
Impinger 8					450.4	Net Liquid (gm)	450.4	☑ QA/QC OK
					+ 16.7	Silica Gel (gm)	16.7	☑ QA/QC OK
		Rinse:		(ml or gm)	467.1	Total Vlc (gm)	467.1	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty	790.9	469.4	321.5				
Impinger 2	5%HNO3/10%H2O2	643.6	543.4	100.2				
Impinger 3	5%HNO3/10%H2O2	558.5	540.4	18.1				
Impinger 4	Empty	469.6	466.7	2.9				
Impinger 5	4%KMnO4/10%H2SO4	562.8	558.6	4.2				
Impinger 6	4%KMnO4/10%H2SO4	540.9	541.5	-0.6	446.3	Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel	743.9	726.5	17.4	0.0	less rinse (gm)		
Impinger 8					446.3	Net Liquid (gm)	446.3	☑ QA/QC OK
					+ 17.4	Silica Gel (gm)	17.4	☑ QA/QC OK
		Rinse:		(ml or gm)	463.7	Total Vlc (gm)	463.7	☑ QA/QC OK

Test Run: 4

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty	794.1	456.6	337.5				
Impinger 2	5%HNO3/10%H2O2	650.9	544.3	106.6				
Impinger 3	5%HNO3/10%H2O2	559.4	542.7	16.7				
Impinger 4	Empty	437.5	435.4	2.1				
Impinger 5	4%KMnO4/10%H2SO4	538.0	537.5	0.5				
Impinger 6	4%KMnO4/10%H2SO4	518.2	518.7	-0.5	462.9	Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel	817.2	802.4	14.8	0.0	less rinse (gm)		
Impinger 8					462.9	Net Liquid (gm)	462.9	☑ QA/QC OK
					+ 14.8	Silica Gel (gm)	14.8	☑ QA/QC OK
		Rinse:		(ml or gm)	477.7	Total Vlc (gm)	477.7	☑ QA/QC OK

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Test Location: FF Outlet
Unit: 1 Run: 1

PCDD/PCDF Testing
FIELD DATA SHEET

Method: USEPA Method 23
Start Time: 11:15 Stop Time: 15:43

Client: Wheelabrator South Broward
Plant: South Broward
Meter Operator: A. Obuchowski (567)
Probe Operator: A. Obuchowski (567)
Meter Box: 61-5 Sample Box: D8
Meter Yd: 0.9992 Meter ΔH@: 1.7185
K Factor: 2.57 Pitot Cp: 0.828
Initial Leak Rate: 0.005 cfm @ 15.0"Hg
Final Leak Rate: 0.002 cfm @ 15.0"Hg
Pitot Leak Check ☑ Initial Final ☑ Pass ☐ Fail

Project No: 11414
Date: 03/20/12

Stack/Duct Dimensions: 96.0 in. x 96.0 in.
Stack/Duct Area: 64 sq.ft.
O_2 (dry volume %): 8.77
CO_2 (dry volume %): 10.55
N_2+CO (dry volume %): 80.68
H_2O (condensate, ml or gm): 825
H_2O (silica, g): 57.1
Actual Measured Moisture (%): 22.24

Probe I.D. No: 67-[illegible] Meter Bar. Press. (in. Hg): 30.05
Liner Material: Pyrex Glass [illegible] Bar. Press. (in. Hg): 30.05
Pitot Cp: 0.828 Static Pressure (in. H2O): -10.0
Amb. Temp. (°F): 80

Nozzle ID No: 274-1
Nozzle Dia (in.): 0.274

Traverse Point Number	10.0 min/read Elapsed Time (min)	Velocity Head Δp (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m (ft^3)	Thermocouple Record Stack t_S (°F)	Cond. t_C (°F)	DGM In $t_{M in}$ (°F)	DGM Out $t_{M out}$ (°F)	Probe t_P (°F)	Filter t_F (°F)	XAD Trap (°F)	Pump Vacuum (in. Hg)	Observed Oxygen, approx. (%,dv)	Notes:	Stack Velocity V_s (ft/sec)	Isokinetic Variation I (%)
	0.0			944.400					250	250						
1-01	10.0	0.34	0.85	949.940	301	65	83	83	260	250	54	7	8.8	0.2 lpm	40.2	103.8
1-02	20.0	0.37	0.92	954.990	302	56	87	84	252	252	50	10	8.5	0.2 lpm	42.0	90.3
1-03	30.0	0.49	1.2	961.100	302	58	88	85	250	250	54	12	9.4	0.2lpm	48.3	94.9
1-04	40.0	0.56	1.5	968.130	301	61	87	84	250	250	59	14	9.1	0.2lpm	51.6	102.3
1-05	50.0	0.51	1.3	974.755	304	63	89	85	251	250	61	13	9.0	0.2lpm	49.3	100.9
Port Chng	50.0	New Initial Vm		974.830												
2-01	60.0	0.42	1.1	980.850	303	64	88	86	252	249	61	11.5	8.7	0.2lpm	44.7	100.9
2-02	70.0	0.39	0.98	986.580	302	63	88	85	253	250	50	10.5	8.7	0.2lpm	43.1	99.7
2-03	80.0	0.45	1.1	992.550	303	62	90	86	252	251	50	11.5	8.8	0.2lpm	46.3	96.5
2-04	90.0	0.52	1.3	999.250	303	63	89	84	254	250	55	13	8.7	0.2lpm	49.8	101.1
2-05	100.0	0.55	1.4	1,006.070	304	64	90	86	245	248	60	14	8.4	0.2lpm	51.2	99.9
Port Chng	100.0	New Initial Vm		1,006.150												
3-01	110.0	0.3	0.75	1,011.040	304	63	86	84	250	250	54	9.5	9.1	0.2lpm	37.8	97.3
3-02	120.0	0.37	0.93	1,016.600	303	62	85	83	250	251	54	10.5	9.2	0.2lpm	42.0	99.8
3-03	130.0	0.43	1.1	1,022.850	304	63	86	83	252	251	57	12	9.1	0.2lpm	45.3	104.1
3-04	140.0	0.47	1.2	1,029.100	304	63	88	83	251	250	52	12	9.0	0.2lpm	47.4	99.4
3-05	150.0	0.52	1.3	1,035.510	305	64	88	83	249	249	58	13	9.1	0.2lpm	49.8	97.0
Port Chng	150.0	New Initial Vm		1,035.650												
4-01	160.0	0.45	1.2	1,041.880	304	55	85	83	251	250	49	12	9.5	0.2lpm	46.3	101.5
4-02	170.0	0.33	0.85	1,047.220	304	50	87	83	252	250	47	10	9.0	0.2lpm	39.7	101.4
4-03	180.0	0.34	0.87	1,052.610	303	52	83	82	251	251	48	10	9.0	0.2lpm	40.3	101.2
4-04	190.0	0.47	1.2	1,059.310	304	60	85	82	250	250	52	12.5	9.3	0.2lpm	47.4	106.9
4-05	200.0	0.53	1.4	1,065.730	305	62	86	82	252	246	55	14	8.3	0.2lpm	50.3	96.5
Port Chng	200.0	New Initial Vm		1,065.870												
5-01	210.0	0.38	0.98	1,071.550	303	65	82	80	250	250	62	11	8.8	0.2lpm	42.6	101.2
5-02	220.0	0.36	0.93	1,077.090	303	64	83	81	252	250	50	10	8.8	0.2lpm	41.4	101.2
5-03	230.0	0.31	0.8	1,082.240	302	55	85	81	252	250	47	9.5	8.5	0.2lpm	38.4	101.1
5-04	240.0	0.36	0.93	1,087.780	303	54	86	82	251	251	47	10	8.9	0.2lpm	41.4	100.8
5-05	250.0	0.42	1.1	1,093.770	304	59	86	82	251	249	51	12	8.7	0.2lpm	44.8	101.0
Avg/Tot/Rng	250.0	0.64967	1.08760	148.935	303.2000	50-65	84.8400		245-260	246-252	47-62	14.0	8.9	042612-112745	44.8588	100.0

2RSD = 12.1%

Meter Operator AO Date 4-26-12

CleanAir

Test Location: FF Outlet
Unit: 1 Run: 2

PCDD/PCDF Testing
FIELD DATA SHEET

Method: USEPA Method 23
Start Time: 07:32 Stop Time: 12:08

Client: Wheelabrator South Broward
Plant: South Broward
Meter Operator: A. Obuchowski (567)
Probe Operator: A. Obuchowski (567)
Meter Box: 61-5 Sample Box: D6
Meter Yd: 0.9992 Meter ΔH@: 1.7185
K Factor: 2.56 Pitot Cp: 0.828
Initial Leak Rate: 0.003 cfm @ 15.0"Hg
Final Leak Rate: 0.003 cfm @ 15.0"Hg
Pitot Leak Check ☑ Initial Final ☑ Pass ☐ Fail

Project No: 11414
Date: 03/21/12

Stack/Duct Dimensions: 96.0 in. x 96.0 in.
Stack/Duct Area: 64 sq.ft.
O_2 (dry volume %): 9.47
CO_2 (dry volume %): 9.79
N_2+CO (dry volume %): 80.74
H_2O (condensate, ml or gm): 773
H_2O (silica, g): 56.9
Actual Measured Moisture (%): 21.19

Probe I.D. No: 67-8 Meter Bar. Press. (in. Hg): 30.10
Liner Material: Pyrex/Glass Local Bar. Press. (in. Hg): 30.10
Pitot Cp: 0.828 Static Pressure (in. H2O): -10.0
Amb. Temp. (°F): 75

Nozzle ID No: 274-1
Nozzle Dia (in.): 0.274

Traverse Point Number	10.0 min/read Elapsed Time (min)	Velocity Head Δp (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m (ft^3)	Thermocouple Record: Stack t_S (°F)	Cond. t_C (°F)	DGM In $t_{M in}$ (°F)	DGM Out $t_{M out}$ (°F)	Probe t_P (°F)	Filter t_F (°F)	XAD Trap (°F)	Pump Vacuum (in. Hg)	Observed Oxygen, approx. (%,dv)	Notes:	Stack Velocity V_s (ft/sec)	Isokinetic Variation I (%)
	0.0			94.400					250	250						
1-01	10.0	0.34	0.87	99.950	303	62	77	76	250	250	62	8	10.3	0.2lpm	40.2	104.1
1-02	20.0	0.41	1	105.585	303	59	82	76	250	250	64	9	10.0	0.2lpm	44.1	95.9
Leak Check	20.0	New Initial Vm		106.410												
1-03	30.0	0.47	1.2	112.870	305	62	82	78	251	255	63	9	9.1	0.2lpm	47.3	102.6
1-04	40.0	0.51	1.3	119.480	304	61	86	78	251	253	58	9.5	10.2	0.2lpm	49.2	100.4
1-05	50.0	0.5	1.3	126.110	306	60	88	80	251	249	61	9.5	9.0	0.2lpm	48.8	101.5
Port Chng	50.0	New Initial Vm		126.240												
2-01	60.0	0.37	0.95	131.850	302	62	81	78	250	247	62	7	9.5	0.2lpm	41.9	100.3
2-02	70.0	0.32	0.82	137.060	303	63	81	78	253	251	64	7	9.6	0.2lpm	39.0	100.2
2-03	80.0	0.37	0.95	142.520	303	64	82	79	250	248	64	8	9.6	0.2lpm	41.9	97.5
2-04	90.0	0.48	1.2	149.000	304	63	83	79	253	250	63	9	9.0	0.2lpm	47.8	101.6
2-05	100.0	0.48	1.2	155.410	303	61	82	78	251	249	62	9	9.6	0.2lpm	47.7	100.7
Port Chng	100.0	New Initial Vm		155.620												
3-01	110.0	0.4	1	161.370	303	62	83	80	249	250	63	8	9.5	0.2lpm	43.6	98.6
3-02	120.0	0.35	0.9	166.880	303	64	83	80	251	247	64	7.5	9.6	0.2lpm	40.8	101.0
3-03	130.0	0.44	1.1	172.980	310	61	83	80	252	251	61	9	9.9	0.2lpm	45.9	100.2
3-04	140.0	0.5	1.3	179.630	306	64	85	81	251	251	63	10	9.5	0.2lpm	48.8	102.0
3-05	150.0	0.53	1.4	186.470	306	63	86	81	250	250	63	10	9.3	0.2lpm	50.3	101.8
Port Chng	150.0	New Initial Vm		186.590												
4-01	160.0	0.43	1.1	192.650	304	62	85	81	250	252	63	8.5	9.4	0.2lpm	45.2	100.0
4-02	170.0	0.34	0.87	198.100	304	64	85	81	252	251	64	7	9.7	0.2lpm	40.2	101.1
4-03	180.0	0.33	0.84	203.380	303	60	84	81	251	253	57	7	9.7	0.2lpm	39.6	99.4
4-04	190.0	0.43	1.1	209.430	304	60	85	82	252	251	62	8.5	9.8	0.2lpm	45.2	99.8
4-05	200.0	0.54	1.4	216.270	305	63	85	82	252	249	63	10	9.5	0.2lpm	50.7	100.8
Port Chng	200.0	New Initial Vm		216.390												
5-01	210.0	0.39	1	222.210	302	65	84	82	250	246	65	8	9.9	0.2lpm	43.0	100.7
5-02	220.0	0.35	0.9	227.720	304	65	85	82	252	253	65	7.5	9.8	0.2lpm	40.8	100.7
5-03	230.0	0.3	0.77	232.820	304	64	86	83	251	249	64	7	10.0	0.2lpm	37.8	100.4
5-04	240.0	0.33	0.84	238.140	303	64	86	83	252	253	61	7	10.1	0.2lpm	39.6	99.8
5-05	250.0	0.38	0.97	243.820	303	62	85	83	252	249	60	7	10.2	0.2lpm	42.5	99.4
Avg/Tot/Rng	250.0	0.63917	1.05120	148.015	304.0000	59-65	81.9200		249-253	246-255	57-65	10.0	9.7	042712 092040 K	44.0784	100.4

2RSD = 11.3%

Meter Operator SB for AO Date 4/27/12

CleanAir.

Test Location: FF Outlet
Unit: 1 Run: 3

PCDD/PCDF Testing
FIELD DATA SHEET

Method: USEPA Method 23
Start Time: 12:31 Stop Time: 16:54

Client: Wheelabrator South Broward
Plant: South Broward
Meter Operator: A. Obuchowski (567)
Probe Operator: A. Obuchowski (567)
Meter Box: 61-5 Sample Box: D8
Meter Yd: 0.9992 Meter ΔH@: 1.7185
K Factor: 2.67 Pitot Cp: 0.828
Initial Leak Rate: 0.003 cfm @ 15.0"Hg
Final Leak Rate: 0.002 cfm @ 15.0"Hg
Pitot Leak Check ☑ Initial Final ☐ Pass ☐ Fail

Project No: 11414
Date: 03/21/12

Stack/Duct Dimensions: 96.0 in. x 96.0 in.
Stack/Duct Area: 64 sq.ft.
O_2 (dry volume %): 8.97
CO_2 (dry volume %): 10.52
N_2+CO (dry volume %): 80.51
H_2O (condensate, ml or gm): 844.5
H_2O (silica, g): 55.2
Actual Measured Moisture (%): 22.26

Probe I.D. No: 67-[illegible] Meter Bar. Press. (in. Hg): 30.10
Liner Material: [illegible] Port Bar. Press. (in. Hg): 30.10
Pitot Cp: 0.828 Static Pressure (in. H2O): -9.9
Amb. Temp. (°F): 80

Nozzle ID No: 274-1
Nozzle Dia (in.): 0.274

Traverse Point Number	10.0 min/read Elapsed Time (min)	Velocity Head Δp (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume V_m (ft^3)	Thermocouple Record: Stack t_S (°F)	Cond. t_C (°F)	DGM In $t_{M\,in}$ (°F)	DGM Out $t_{M\,out}$ (°F)	Probe t_P (°F)	Filter t_F (°F)	XAD Trap (°F)	Pump Vacuum (in. Hg)	Observed Oxygen, approx. (%,dv)	Notes:	Stack Velocity V_s (ft/sec)	Isokinetic Variation I (%)
	0.0			244.530					250	250						
1-01	10.0	0.36	0.93	249.910	303	63	84	83	258	254	51	6.5	9.3	0.2lpm	41.4	98.1
1-02	20.0	0.4	1	255.670	304	53	87	84	253	250	56	8.5	7.8	0.2lpm	43.7	99.3
1-03	30.0	0.48	1.2	262.020	304	56	88	84	252	251	59	9.5	8.8	0.2lpm	47.8	99.9
1-04	40.0	0.49	1.3	268.640	304	60	86	84	250	248	57	10	9.1	0.2lpm	48.3	103.3
1-05	50.0	0.44	1.1	275.000	305	63	85	82	250	250	61	9.5	8.5	0.2lpm	45.8	105.1
Port Chng	50.0	New Initial Vm		275.270												
2-01	60.0	0.4	1	280.850	307	65	83	82	250	250	65	9	8.7	0.2lpm	43.7	97.0
2-02	70.0	0.37	0.95	286.510	306	64	85	82	252	250	50	8	9.0	0.2lpm	42.0	102.0
2-03	80.0	0.45	1.2	292.560	305	59	85	81	251	250	50	10	9.1	0.2lpm	46.3	98.9
2-04	90.0	0.52	1.3	299.380	306	62	85	81	251	249	56	10	8.3	0.2lpm	49.8	103.8
2-05	100.0	0.54	1.4	306.300	307	64	84	81	251	251	60	11	8.7	0.2lpm	50.8	103.6
Port Chng	100.0	New Initial Vm		306.490												
3-01	110.0	0.4	1.1	312.520	307	65	83	81	250	247	55	9	8.7	0.2lpm	43.7	104.9
3-02	120.0	0.35	0.93	318.130	307	64	85	81	252	249	51	8	8.4	0.2lpm	40.9	104.1
3-03	130.0	0.4	1.1	324.220	304	64	84	81	252	251	52	9	9.2	0.2lpm	43.7	105.6
3-04	140.0	0.53	1.4	331.250	304	65	85	81	250	250	60	11	9.0	0.2lpm	50.2	105.9
3-05	150.0	0.51	1.4	338.230	306	62	84	81	250	246	55	11	8.7	0.2lpm	49.4	107.4
Port Chng	150.0	New Initial Vm		338.420												
4-01	160.0	0.4	1.1	344.480	305	64	83	81	250	251	50	9	10.0	0.2lpm	43.7	105.3
4-02	170.0	0.33	0.88	349.950	304	65	84	81	253	249	58	8	8.5	0.2lpm	39.6	104.4
4-03	180.0	0.32	0.85	355.250	303	62	84	81	251	251	53	8	10.5	0.2lpm	39.0	102.7
4-04	190.0	0.44	1.2	361.400	303	61	84	81	250	250	55	11	9.0	0.2lpm	45.8	101.7
4-05	200.0	0.47	1.3	368.080	305	63	84	81	250	250	58	12	10.5	0.2lpm	47.3	107.0
Port Chng	200.0	New Initial Vm		368.290												
5-01	210.0	0.4	1.1	374.330	303	65	83	81	250	250	59	9	9.0	0.2lpm	43.6	104.8
5-02	220.0	0.33	0.88	379.620	302	65	81	80	250	250	63	8	9.1	0.2lpm	39.6	101.2
5-03	230.0	0.3	0.8	384.750	300	63	82	80	251	249	51	7.5	9.1	0.2lpm	37.7	102.7
5-04	240.0	0.31	0.83	389.950	303	62	84	81	251	251	50	7.5	8.8	0.2lpm	38.4	102.3
5-05	250.0	0.45	1.2	396.290	305	63	85	80	250	250	50	10	8.5	0.2lpm	46.3	103.8
Avg/Tot/Rng	250.0	0.64234	1.09800	150.900	304.4800	53-65	82.8600		250-258	246-254	50-65	12.0	9.0	042612 112766 M	44.3482	103.0

H - 13

Meter Operator A.O. Date 4-26-12

CleanAir.

USEPA Method 4 Laboratory Data

Location:	Unit 1 FF Outlet	**Test Method:**	**USEPA Method 23**
Client:	Wheelabrator South Broward	**Analyte:**	**PCDD/PCDF**
		Analyst:	R. Vicere
Project No:	11414	Analyst Emp No:	563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	1417.5	625.2	792.3
Impinger 2	HPLC Water	547.9	541.6	6.3
Impinger 3	HPLC Water	536.9	537.0	-0.1
Impinger 4	Empty	438.2	435.1	3.1
Impinger 5	XAD Trap	342.4	321.5	20.9
Impinger 6	Silica Gel	762.2	705.1	57.1
	Rinse:		(ml or gm)	

		Field Data Check	
822.5	Liquid (gm)		
0.0	less rinse (gm)		
822.5	Net Liquid (gm)	822.5	☑ QA/QC OK
+ 57.1	Silica Gel (gm)	57.1	☑ QA/QC OK
879.6	Total Vlc (gm)	879.6	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	1371.4	629.0	742.4
Impinger 2	HPLC Water	543.1	539.6	3.5
Impinger 3	HPLC Water	541.0	539.7	1.3
Impinger 4	Empty	432.6	428.8	3.8
Impinger 5	XAD Trap	408.3	386.3	22.0
Impinger 6	Silica Gel	803.1	746.2	56.9
	Rinse:		(ml or gm)	

		Field Data Check	
773.0	Liquid (gm)		
0.0	less rinse (gm)		
773.0	Net Liquid (gm)	773.0	☑ QA/QC OK
+ 56.9	Silica Gel (gm)	56.9	☑ QA/QC OK
829.9	Total Vlc (gm)	829.9	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	1438.3	629.8	808.5
Impinger 2	HPLC Water	552.6	541.9	10.7
Impinger 3	HPLC Water	539.7	538.9	0.8
Impinger 4	Empty	439.8	437.1	2.7
Impinger 5	XAD Trap	434.5	412.7	21.8
Impinger 6	Silica Gel	768.8	713.6	55.2
	Rinse:		(ml or gm)	

		Field Data Check	
844.5	Liquid (gm)		
0.0	less rinse (gm)		
844.5	Net Liquid (gm)	844.5	☑ QA/QC OK
+ 55.2	Silica Gel (gm)	55.2	☑ QA/QC OK
899.7	Total Vlc (gm)	899.7	☑ QA/QC OK

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty			
Impinger 2	HPLC Water			
Impinger 3	HPLC Water			
Impinger 4	Empty			
Impinger 5	XAD Trap			
Impinger 6	Silica Gel			
	Rinse:		(ml or gm)	

		Field Data Check	
	Liquid (gm)		
	less rinse (gm)		
	Net Liquid (gm)		☐ QA/QC OK
	Silica Gel (gm)		☐ QA/QC OK
	Total Vlc (gm)		☐ QA/QC OK

042512 153248
LKM@

USEPA Method 3 Laboratory Data

Test Method:	USEPA Method 23
Analyte:	PCDD/PCDF

Location: Unit 1 FF Outlet
Client: Wheelabrator South Broward
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: 433
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.55000		8.77000	80.68000	30.03880	1.14976	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.79000		9.47000	80.74000	29.94520	1.16752	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.52000		8.97000	80.51000	30.04200	1.13403	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis:
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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LKM@

Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 1 SDA Inlet
Test Run: 1
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:
Test Date: 3/22/12
Start Time: 07:44
Stop Time: 08:44
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.003 cfm @ 22 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -1.4
O_2 (dry volume %): 6.98
CO_2 (dry volume %): 11.83
N_2+CO (dry volume %): 81.19

H_2O (condensate, ml or gm): 183.9
H_2O (silica, g): 13.2
Actual Moisture (%): 21.15

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 66-4-7
Pitot C_p: 0.831
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-20
Meter ΔH@: 1.80820
Meter Y_d: 1.00590

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample - ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			850.890						
2-01	5.0		1.20	853.820	471	80	79		2.93	
2-01	10.0		1.20	856.730	473	81	79		2.91	
2-01	15.0		1.20	859.660	473	83	80		2.93	
2-01	20.0		1.20	862.600	474	84	80		2.94	
2-01	25.0		1.20	865.520	472	85	81		2.92	
2-01	30.0		1.20	868.480	472	86	82		2.96	
2-01	35.0		1.20	871.440	472	87	82		2.96	
2-01	40.0		1.20	874.390	472	87	82		2.95	
2-01	45.0		1.20	877.350	472	88	83		2.96	
2-01	50.0		1.20	880.310	468	88	84		2.96	
2-01	55.0		1.10	883.180	470	87	83		2.87	
2-01	60.0		1.10	885.975	466	87	83		2.80	
Final	60.0		1.18333	35.08500	471.25000	83.37500		0.00000	35.08500	
2 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.1833	35.0850	471.2500	83.3750				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 1 SDA Inlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 60.13205
Meter Operator: B. Arnold | 770
Probe Operator:
Test Date: 3/22/12
Start Time: 09:07
Stop Time: 10:07
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.003 cfm @ 22 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -1.4
O_2 (dry volume %): 7.11
CO_2 (dry volume %): 11.82
N_2+CO (dry volume %): 81.07

H_2O (condensate, ml or gm): 201.1
H_2O (silica, g): 11.7
Actual Moisture (%): 22.44

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 66-4-7
Pitot C_p: 0.831
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-20
Meter ΔH@: 1.80820
Meter Y_d: 1.00590

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.\ H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			886.015						
2-01	5.0		1.20	888.970	472	86	84		2.96	
2-01	10.0		1.20	891.890	473	87	84		2.92	
2-01	15.0		1.20	894.840	475	88	84		2.95	
2-01	20.0		1.20	897.740	477	89	84		2.90	
2-01	25.0		1.20	900.700	477	91	85		2.96	
2-01	30.0		1.20	903.640	479	92	86		2.94	
2-01	35.0		1.20	906.610	477	93	86		2.97	
2-01	40.0		1.20	909.600	481	93	86		2.99	
2-01	45.0		1.20	912.590	479	93	87		2.99	
2-01	50.0		1.20	915.590	478	92	88		3.00	
2-01	55.0		1.20	918.570	477	92	88		2.98	
2-01	60.0		1.10	921.445	476	93	88		2.88	
Final	60.0		1.19167	35.43000	476.75000	88.29167		0.00000	35.43000	
2 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.1917	35.4300	476.7500	88.2917				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 1 SDA Inlet
Test Run: 3
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 60.13205
Meter Operator: | B. Arnold | 770
Probe Operator:
Test Date: 3/22/12
Start Time: 10:32
Stop Time: 11:32
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 18 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -1.3
O_2 (dry volume %): 7.85
CO_2 (dry volume %): 11.06
N_2+CO (dry volume %): 81.09

H_2O (condensate, ml or gm): 181.7
H_2O (silica, g): 14.5
Actual Moisture (%): 20.90

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 66-4-7
Pitot C_p: 0.831
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-20
Meter ΔH@: 1.80820
Meter Y_d: 1.00590

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{}$in. H_2O)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			921.455						
2-01	5.0		1.20	924.430	481	88	87		2.97	
2-01	10.0		1.20	927.380	480	89	87		2.95	
2-01	15.0		1.20	930.370	481	90	87		2.99	
2-01	20.0		1.20	933.220	480	92	87		2.85	
2-01	25.0		1.20	936.260	480	93	87		3.04	
2-01	30.0		1.20	939.260	486	94	88		3.00	
2-01	35.0		1.20	942.340	484	94	88		3.08	
2-01	40.0		1.20	945.260	487	94	89		2.92	
2-01	45.0		1.20	948.280	483	93	89		3.02	
2-01	50.0		1.20	951.290	481	93	89		3.01	
2-01	55.0		1.20	954.330	483	93	89		3.04	
2-01	60.0		1.20	957.345	482	93	89		3.01	
Final	60.0		1.20000	35.89000	482.33333	90.08333		0.00000	35.89000	
2 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.2000	35.9900	482.3333	90.0833				
		☐ Avg. OK	☑ Avg. OK	☐ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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USEPA Method 3 Laboratory Data

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 1 SDA Inlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		11.83000		6.98000	81.19000	30.17200	1.17667	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		11.82000		7.11000	81.07000	30.17560	1.16667	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		11.06000		7.85000	81.09000	30.08360	1.17993	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis:
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Location:	Unit 1 SDA Inlet	Test Method:	USEPA Method 26A
Client:	Wheelabrator South Broward, Inc.	Analyte:	HCl
Project No:	11414	Analyst:	D. Luckhard
		Analyst Emp No:	568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	545.1	474.6	70.5
Impinger 2	100 ml 0.1N H2SO4	645.6	555.3	90.3
Impinger 3	100 ml 0.1N H2SO4	559.9	540.4	19.5
Impinger 4	Empty	451.8	448.2	3.6
Impinger 5	Silica Gel	759.6	746.4	13.2
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
183.9	Liquid (gm)		
0.0	less rinse (gm)		
183.9	Net Liquid (gm)	183.9	☑ QA/QC OK
+ 13.2	Silica Gel (gm)	13.2	☑ QA/QC OK
197.1	Total Vlc (gm)	197.1	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	571.6	460.9	110.7
Impinger 2	100 ml 0.1N H2SO4	637.4	564.5	72.9
Impinger 3	100 ml 0.1N H2SO4	557.4	541.6	15.8
Impinger 4	Empty	437.5	435.8	1.7
Impinger 5	Silica Gel	788.1	776.4	11.7
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
201.1	Liquid (gm)		
0.0	less rinse (gm)		
201.1	Net Liquid (gm)	201.1	☑ QA/QC OK
+ 11.7	Silica Gel (gm)	11.7	☑ QA/QC OK
212.8	Total Vlc (gm)	212.8	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	527.3	470.8	56.5
Impinger 2	100 ml 0.1N H2SO4	638.4	544.0	94.4
Impinger 3	100 ml 0.1N H2SO4	573.4	546.6	26.8
Impinger 4	Empty	465.8	461.8	4.0
Impinger 5	Silica Gel	755.6	741.1	14.5
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
181.7	Liquid (gm)		
0.0	less rinse (gm)		
181.7	Net Liquid (gm)	181.7	☑ QA/QC OK
+ 14.5	Silica Gel (gm)	14.5	☑ QA/QC OK
196.2	Total Vlc (gm)	196.2	☑ QA/QC OK

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1				
Impinger 2				
Impinger 3				
Impinger 4				
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
	Liquid (gm)		
	less rinse (gm)		
	Net Liquid (gm)		☐ QA/QC OK
	Silica Gel (gm)		☐ QA/QC OK
	Total Vlc (gm)		☐ QA/QC OK

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Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 1 FF Outlet
Test Run: 1
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: K. Sullivan 579
Probe Operator: K. Sullivan 579
Test Date: 3/22/12
Start Time: 07:44
Stop Time: 08:44
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -10.5
O_2 (dry volume %): 9.15
CO_2 (dry volume %): 9.95
N_2+CO (dry volume %): 80.90
H_2O (condensate, ml or gm): 240.8
H_2O (silica, g): 9.7
Actual Moisture (%): 22.70

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☑ Pass ☐ Fail
Meter Box ID. No: 85-3
Meter ΔH@: 1.77920
Meter Y_d: 0.99250

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			27.300						
3-03	5.0		1.50	30.670	301	76	75		3.37	
3-03	10.0		1.50	34.030	301	79	75		3.36	
3-03	15.0		1.50	37.460	301	80	75		3.43	
3-03	20.0		1.50	40.870	301	81	76		3.41	
3-03	25.0		1.50	44.270	301	82	76		3.40	
3-03	30.0		1.50	47.700	301	83	77		3.43	
3-03	35.0		1.50	51.060	301	83	77		3.36	
3-03	40.0		1.50	54.450	301	83	77		3.39	
3-03	45.0		1.50	57.890	301	84	78		3.44	
3-03	50.0		1.50	61.330	301	84	78		3.44	
3-03	55.0		1.50	64.800	301	84	78		3.47	
3-03	60.0		1.50	68.235	301	84	78		3.44	
Final	60.0		1.50000	40.93500	301.00000	79.29167		0.00000	40.93500	
9 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.5000	40.9350	301.0000	79.2917				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 1 FF Outlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000

Meter Operator:	K. Sullivan	579
Probe Operator:	K. Sullivan	579

Test Date: 3/22/12
Start Time: 09:07
Stop Time: 10:07
Leak Rate Before: 0.006 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -10.8
O_2 (dry volume %): 8.68
CO_2 (dry volume %): 10.34
N_2+CO (dry volume %): 80.98

H_2O (condensate, ml or gm): 248.5
H_2O (silica, g): 12.3
Actual Moisture (%): 23.40

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 85-3
Meter ΔH@: 1.77920
Meter Y_d: 0.99250

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{\text{in. } H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			68.900						
3-03	5.0		1.50	72.430	302	79	78		3.53	
3-03	10.0		1.50	75.840	302	79	78		3.41	
3-03	15.0		1.50	79.180	302	83	78		3.34	
3-03	20.0		1.50	82.550	302	84	79		3.37	
3-03	25.0		1.50	86.110	302	85	80		3.56	
3-03	30.0		1.50	89.450	302	86	80		3.34	
3-03	35.0		1.50	92.910	302	87	81		3.46	
3-03	40.0		1.50	96.360	302	87	81		3.45	
3-03	45.0		1.50	99.820	303	87	81		3.46	
3-03	50.0		1.50	103.270	303	87	81		3.45	
3-03	55.0		1.50	106.690	303	88	82		3.42	
3-03	60.0		1.50	110.120	303	88	82		3.43	
Final	60.0		1.50000	41.22000	302.33333	82.54167		0.00000	41.22000	
9 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.5000	41.2200	302.3333	82.5417				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 1 FF Outlet
Test Run: 3
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: K. Sullivan 579
Probe Operator: K. Sullivan 579
Test Date: 3/22/12
Start Time: 10:32
Stop Time: 11:32
Leak Rate Before: 0.005 cfm @ 15 "Hg
Leak Rate After: 0.004 cfm @ 8 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -10.7
O_2 (dry volume %): 9.20
CO_2 (dry volume %): 9.79
N_2+CO (dry volume %): 81.01

H_2O (condensate, ml or gm): 230.2
H_2O (silica, g): 15.8
Actual Moisture (%): 22.28

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 85-3
Meter ΔH@: 1.77920
Meter Y_d: 0.99250

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{\text{in. } H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			110.965						
3-03	5.0		1.50	114.380	302	84	83		3.41	
3-03	10.0		1.50	117.810	302	86	82		3.43	
3-03	15.0		1.50	121.220	302	86	83		3.41	
3-03	20.0		1.50	124.650	302	87	83		3.43	
3-03	25.0		1.50	128.110	302	87	83		3.46	
3-03	30.0		1.50	131.610	302	87	83		3.50	
3-03	35.0		1.50	135.110	303	88	84		3.50	
3-03	40.0		1.50	138.500	303	88	84		3.39	
3-03	45.0		1.50	142.100	303	89	85		3.60	
3-03	50.0		1.50	145.600	303	89	85		3.50	
3-03	55.0		1.50	149.100	303	89	85		3.50	
3-03	60.0		1.50	152.610	303	89	85		3.51	
Final	60.0		1.50000	41.64500	302.50000	85.58333		0.00000	41.64500	
9 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.5000	41.6450	302.5000	85.5833				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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USEPA Method 3 Laboratory Data

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 1 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.95000		9.15000	80.90000	29.95800	1.18090	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.34000		8.68000	80.98000	30.00160	1.18182	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.79000		9.20000	81.01000	29.93440	1.19510	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis:
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Location:	Unit 1 FF Outlet	Test Method:	USEPA Method 26A
Client:	Wheelabrator South Broward, Inc.	Analyte:	HCl
Project No:	11414	Analyst:	R. Vicere
		Analyst Emp No:	563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	632.2	552.2	80.0
Impinger 2	100 ml 0.1N H2SO4	752.3	628.1	124.2
Impinger 3	100 ml 0.1N H2SO4	567.8	535.9	31.9
Impinger 4	Empty	479.7	475.0	4.7
Impinger 5	Silica Gel	759.4	749.7	9.7
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
240.8	Liquid (gm)		
0.0	less rinse (gm)		
240.8	Net Liquid (gm)	240.8	☑ QA/QC OK
+ 9.7	Silica Gel (gm)	9.7	☑ QA/QC OK
250.5	Total Vlc (gm)	250.5	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	568.0	458.2	109.8
Impinger 2	100 ml 0.1N H2SO4	654.7	541.3	113.4
Impinger 3	100 ml 0.1N H2SO4	655.3	634.9	20.4
Impinger 4	Empty	443.9	439.0	4.9
Impinger 5	Silica Gel	719.9	707.6	12.3
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
248.5	Liquid (gm)		
0.0	less rinse (gm)		
248.5	Net Liquid (gm)	248.5	☑ QA/QC OK
+ 12.3	Silica Gel (gm)	12.3	☑ QA/QC OK
260.8	Total Vlc (gm)	260.8	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	545.9	459.0	86.9
Impinger 2	100 ml 0.1N H2SO4	669.1	554.0	115.1
Impinger 3	100 ml 0.1N H2SO4	567.7	544.8	22.9
Impinger 4	Empty	443.9	438.6	5.3
Impinger 5	Silica Gel	785.0	769.2	15.8
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
230.2	Liquid (gm)		
0.0	less rinse (gm)		
230.2	Net Liquid (gm)	230.2	☑ QA/QC OK
+ 15.8	Silica Gel (gm)	15.8	☑ QA/QC OK
246.0	Total Vlc (gm)	246.0	☑ QA/QC OK

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1				
Impinger 2				
Impinger 3				
Impinger 4				
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
	Liquid (gm)		
	less rinse (gm)		
	Net Liquid (gm)		☐ QA/QC OK
	Silica Gel (gm)		☐ QA/QC OK
	Total Vlc (gm)		☐ QA/QC OK

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Field Data Printout

Test Method: **USEPA Method 5/29**
Analyte: **Particulate/Metals**

Location: Unit 2 FF Outlet
Test Run: 1
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505
Test Date: 3/21/12
Start Time: 08:16
Stop Time: 10:28
Leak Rate Before: 0.005 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 7 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -14.5
O_2 (dry volume %): 9.10
CO_2 (dry volume %): 10.03
N_2+CO (dry volume %): 80.87

H_2O (condensate, ml or gm): 395.9
H_2O (silica, g): 16.0
Actual Moisture (%): 21.13

Nozzle ID No: 277-1
Nozzle Diameter (D_n): 0.277
Probe ID No: 67-8-19
Pitot C_p: 0.835
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-11
Meter ΔH@: 1.81180
Meter Y_d: 0.99150

Traverse Point	Run Time (5.0 min/read)	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{}$in. H_2O)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			402.350						
1-01	5.0	0.35	1.00	405.130	296	82	79	0.59	2.78	98.4
1-02	10.0	0.38	1.10	408.010	296	84	79	0.62	2.88	97.7
1-03	15.0	0.45	1.30	411.220	297	87	80	0.67	3.21	99.8
1-04	20.0	0.38	1.10	414.130	300	89	81	0.62	2.91	98.3
1-05	25.0	0.40	1.20	417.230	302	89	81	0.63	3.10	102.2
LEAK CHECK	25.0			417.285						
2-01	30.0	0.38	1.10	420.240	310	88	82	0.62	2.95	100.5
2-02	35.0	0.35	1.00	423.040	304	89	82	0.59	2.80	98.7
2-03	40.0	0.37	1.10	425.990	299	89	82	0.61	2.95	100.8
2-04	45.0	0.35	1.00	428.850	298	91	84	0.59	2.86	100.0
2-05	50.0	0.46	1.40	432.130	300	92	85	0.68	3.28	100.1
LEAK CHECK	50.0			432.225						
3-01	55.0	0.38	1.10	435.130	297	91	85	0.62	2.90	97.4
3-02	60.0	0.37	1.10	438.030	295	93	86	0.61	2.90	98.1
3-03	65.0	0.40	1.20	441.160	299	92	86	0.63	3.13	102.3
3-04	70.0	0.44	1.30	444.430	296	93	86	0.66	3.27	101.6
3-05	75.0	0.50	1.50	447.960	298	94	87	0.71	3.53	102.9
LEAK CHECK	75.0			448.075						
4-01	80.0	0.40	1.20	451.170	294	95	89	0.63	3.10	100.2
4-02	85.0	0.37	1.10	454.080	297	96	90	0.61	2.91	98.0
4-03	90.0	0.39	1.20	457.110	297	96	91	0.62	3.03	99.3
4-04	95.0	0.47	1.40	460.450	298	96	91	0.69	3.34	99.8
4-05	100.0	0.46	1.40	463.785	297	97	92	0.68	3.34	100.5
LEAK CHECK	100.0			463.885						
5-01	105.0	0.30	0.89	466.510	297	96	92	0.55	2.63	97.9
5-02	110.0	0.32	0.95	469.250	309	96	92	0.57	2.74	99.8
5-03	115.0	0.33	0.98	472.010	302	96	92	0.57	2.76	98.5
5-04	120.0	0.28	0.83	474.590	297	96	92	0.53	2.58	99.6
5-05	125.0	0.47	1.40	477.975	300	96	92	0.69	3.39	101.2
Final	125.0		1.15400	75.26000	299.00000	89.22000		0.62293	75.26000	

25 points sampled

QC-Check: Field Averages	Sq.Rt.ΔP				
	0.6229	1.1540	75.2600	299.0000	89.2200
	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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Field Data Printout

Test Method: **USEPA Method 5/29**
Analyte: **Particulate/Metals**

Location: Unit 2 FF Outlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000

Meter Operator:	P. Bihun	505
Probe Operator:	P. Bihun	505

Test Date: 3/21/12
Start Time: 10:52
Stop Time: 13:07
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.003 cfm @ 8 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -13.5
O_2 (dry volume %): 9.54
CO_2 (dry volume %): 9.80
N_2+CO (dry volume %): 80.66

H_2O (condensate, ml or gm): 415.2
H_2O (silica, g): 14.3
Actual Moisture (%): 21.42

Nozzle ID No: 277-1
Nozzle Diameter (D_n): 0.277
Probe ID No: 67-8-19
Pitot C_p: 0.835
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-11
Meter ΔH@: 1.81180
Meter Y_d: 0.99150

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.\ H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			478.385						
1-01	5.0	0.35	1.00	481.180	297	91	91	0.59	2.80	97.2
1-02	10.0	0.32	0.94	483.870	296	92	91	0.57	2.69	97.7
1-03	15.0	0.31	0.91	486.570	297	93	91	0.56	2.70	99.6
1-04	20.0	0.42	1.20	489.680	299	93	90	0.65	3.11	98.9
1-05	25.0	0.36	1.10	492.620	303	93	90	0.60	2.94	101.2
LEAK CHECK	25.0			492.685						
2-01	30.0	0.37	1.10	495.640	296	91	89	0.61	2.95	100.1
2-02	35.0	0.40	1.20	498.750	298	92	89	0.63	3.11	101.4
2-03	40.0	0.41	1.20	501.870	294	92	88	0.64	3.12	100.3
2-04	45.0	0.45	1.30	505.080	298	92	88	0.67	3.21	98.8
2-05	50.0	0.51	1.50	508.530	295	93	88	0.71	3.45	99.5
LEAK CHECK	50.0			508.615						
3-01	55.0	0.42	1.20	511.630	292	92	88	0.65	3.01	95.6
3-02	60.0	0.36	1.10	514.580	296	92	87	0.60	2.95	101.4
3-03	65.0	0.38	1.10	517.530	294	92	87	0.62	2.95	98.6
3-04	70.0	0.46	1.40	520.800	295	92	87	0.68	3.27	99.5
3-05	75.0	0.47	1.40	524.130	295	93	87	0.69	3.33	100.1
LEAK CHECK	75.0			524.230						
4-01	80.0	0.37	1.10	527.130	294	92	87	0.61	2.90	98.2
4-02	85.0	0.38	1.10	530.020	294	92	87	0.62	2.89	96.6
4-03	90.0	0.38	1.10	532.930	295	92	86	0.62	2.91	97.4
4-04	95.0	0.50	1.50	536.330	295	91	86	0.71	3.40	99.4
4-05	100.0	0.55	1.60	539.860	295	92	86	0.74	3.53	98.3
LEAK CHECK	100.0			540.135						
5-01	105.0	0.33	0.97	542.980	294	91	86	0.57	2.85	102.2
5-02	110.0	0.42	1.20	546.020	295	91	86	0.65	3.04	96.9
5-03	115.0	0.42	1.20	549.120	294	92	86	0.65	3.10	98.7
5-04	120.0	0.52	1.50	552.570	295	92	86	0.72	3.45	98.8
5-05	125.0	0.55	1.60	556.135	296	92	86	0.74	3.56	99.4
Final	125.0		1.22080	77.22500	295.68000	89.86000		0.64319	77.22500	

25 points sampled

	Sq.Rt.ΔP				
QC-Check: Field Averages	0.6432	1.2208	77.2250	295.6800	89.8600
	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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Field Data Printout

Test Method: **USEPA Method 5/29**
Analyte: **Particulate/Metals**

Location: Unit 2 FF Outlet
Test Run: 3
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505
Test Date: 3/21/12
Start Time: 13:29
Stop Time: 15:41
Leak Rate Before: 0.006 cfm @ 15 "Hg
Leak Rate After: 0.004 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -13.3
O_2 (dry volume %): 9.66
CO_2 (dry volume %): 9.82
N_2+CO (dry volume %): 80.52
H_2O (condensate, ml or gm): 400.0
H_2O (silica, g): 14.9
Actual Moisture (%): 20.97

Nozzle ID No: 277-1
Nozzle Diameter (D_n): 0.277
Probe ID No: 67-8-19
Pitot C_p: 0.835
Pitot Leak Check: ☑Pass ☐Fail
Meter Box ID. No: 66-11
Meter ΔH@: 1.81180
Meter Y_d: 0.99150

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			556.525						
1-01	5.0	0.34	1.00	559.290	294	87	86	0.58	2.76	97.7
1-02	10.0	0.43	1.30	562.470	293	89	87	0.66	3.18	99.7
1-03	15.0	0.45	1.30	565.670	296	91	87	0.67	3.20	98.1
1-04	20.0	0.52	1.50	569.180	295	92	87	0.72	3.51	100.0
1-05	25.0	0.52	1.50	572.685	296	93	87	0.72	3.51	99.8
LEAK CHECK	25.0			572.765						
2-01	30.0	0.38	1.10	575.740	293	93	88	0.62	2.98	98.7
2-02	35.0	0.36	1.10	578.720	294	94	88	0.60	2.98	101.5
2-03	40.0	0.40	1.20	581.780	295	93	89	0.63	3.06	99.0
2-04	45.0	0.45	1.30	585.040	297	94	89	0.67	3.26	99.5
2-05	50.0	0.40	1.20	588.150	295	94	89	0.63	3.11	100.5
LEAK CHECK	50.0			588.220						
3-01	55.0	0.37	1.10	591.120	299	93	89	0.61	2.90	97.8
3-02	60.0	0.38	1.10	594.020	299	95	90	0.62	2.90	96.2
3-03	65.0	0.36	1.10	596.960	291	95	90	0.60	2.94	99.7
3-04	70.0	0.37	1.10	599.850	293	95	90	0.61	2.89	96.8
3-05	75.0	0.45	1.30	603.010	292	95	90	0.67	3.16	96.0
LEAK CHECK	75.0			603.100						
4-01	80.0	0.38	1.10	605.970	292	95	90	0.62	2.87	94.8
4-02	85.0	0.33	0.97	608.760	293	94	90	0.57	2.79	99.0
4-03	90.0	0.43	1.30	611.970	294	94	90	0.66	3.21	100.0
4-04	95.0	0.48	1.40	615.350	293	95	90	0.69	3.38	99.5
4-05	100.0	0.47	1.40	618.630	292	95	90	0.69	3.28	97.5
LEAK CHECK	100.0			618.715						
5-01	105.0	0.34	1.00	621.520	291	95	90	0.58	2.80	97.9
5-02	110.0	0.39	1.20	624.630	293	95	90	0.62	3.11	101.5
5-03	115.0	0.38	1.10	627.500	292	95	90	0.62	2.87	94.8
5-04	120.0	0.39	1.20	630.370	293	95	90	0.62	2.87	93.7
5-05	125.0	0.47	1.40	633.685	293	95	90	0.69	3.31	98.6
Final	125.0		1.21080	76.83500	293.92000	91.34000		0.63868	76.83500	

25 points sampled

	Sq.Rt.ΔP				
QC-Check: Field Averages	0.6387	1.2108	76.8350	293.9200	91.3400
	☑Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK

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USEPA Method 3 Laboratory Data

Test Method: USEPA Method 5/29
Analyte: Particulate/Metals

Location: Unit 2 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.03000		9.10000	80.87000	29.96880	1.17647	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.80000		9.54000	80.66000	29.94960	1.15918	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.82000		9.66000	80.52000	29.95760	1.14460	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Location:	Unit 2 FF Outlet	Test Method:	USEPA Method 5/29
Client:	Wheelabrator South Broward, Inc.	Analyte:	Particulate/Metals
		Analyst:	D. Luckhard
Project No:	11414	Analyst Emp No:	568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty	733.8	480.7	253.1				
Impinger 2	5%HNO3/10%H2O2	678.9	567.0	111.9				
Impinger 3	5%HNO3/10%H2O2	586.9	563.9	23.0				
Impinger 4	Empty	435.1	431.3	3.8				
Impinger 5	4%KMnO4/10%H2SO4	553.5	551.0	2.5				
Impinger 6	4%KMnO4/10%H2SO4	548.3	546.7	1.6	395.9	Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel	791.6	775.6	16.0	0.0	less rinse (gm)		
Impinger 8					395.9	Net Liquid (gm)	395.9	☑ QA/QC OK
					+ 16.0	Silica Gel (gm)	16.0	☑ QA/QC OK
		Rinse:		(ml or gm)	411.9	Total Vlc (gm)	411.9	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty	705.5	420.7	284.8				
Impinger 2	5%HNO3/10%H2O2	649.7	547.6	102.1				
Impinger 3	5%HNO3/10%H2O2	552.6	532.0	20.6				
Impinger 4	Empty	428.7	425.1	3.6				
Impinger 5	4%KMnO4/10%H2SO4	534.4	530.7	3.7				
Impinger 6	4%KMnO4/10%H2SO4	545.2	544.8	0.4	415.2	Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel	763.6	749.3	14.3	0.0	less rinse (gm)		
Impinger 8					415.2	Net Liquid (gm)	415.2	☑ QA/QC OK
					+ 14.3	Silica Gel (gm)	14.3	☑ QA/QC OK
		Rinse:		(ml or gm)	429.5	Total Vlc (gm)	429.5	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty	749.6	472.3	277.3				
Impinger 2	5%HNO3/10%H2O2	645.2	546.2	99.0				
Impinger 3	5%HNO3/10%H2O2	560.6	544.2	16.4				
Impinger 4	Empty	472.5	468.8	3.7				
Impinger 5	4%KMnO4/10%H2SO4	566.9	563.7	3.2				
Impinger 6	4%KMnO4/10%H2SO4	547.8	547.4	0.4	400.0	Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel	758.5	743.6	14.9	0.0	less rinse (gm)		
Impinger 8					400.0	Net Liquid (gm)	400.0	☑ QA/QC OK
					+ 14.9	Silica Gel (gm)	14.9	☑ QA/QC OK
		Rinse:		(ml or gm)	414.9	Total Vlc (gm)	414.9	☑ QA/QC OK

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty							
Impinger 2	5%HNO3/10%H2O2							
Impinger 3	5%HNO3/10%H2O2							
Impinger 4	Empty							
Impinger 5	4%KMnO4/10%H2SO4							
Impinger 6	4%KMnO4/10%H2SO4					Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel					less rinse (gm)		
Impinger 8						Net Liquid (gm)		☐ QA/QC OK
						Silica Gel (gm)		☐ QA/QC OK
		Rinse:		(ml or gm)		Total Vlc (gm)		☐ QA/QC OK

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Field Data Printout

Test Method: USEPA Method 29
Analyte: Mercury

Location: Unit 2 FF Outlet
Test Run: 4
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: A. Obuchowski 567
Probe Operator: A. Obuchowski 567
Test Date: 3/22/12
Start Time: 07:43
Stop Time: 09:56
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.001 cfm @ 9 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -13.3
O_2 (dry volume %): 9.17
CO_2 (dry volume %): 9.96
N_2+CO (dry volume %): 80.87

H_2O (condensate, ml or gm): 367.9
H_2O (silica, g): 15.5
Actual Moisture (%): 20.95

Nozzle ID No: 276-1
Nozzle Diameter (D_n): 0.276
Probe ID No: 67-8-19
Pitot C_p: 0.835
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-11
Meter ΔH@: 1.81180
Meter Y_d: 0.99150

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			634.725						
1-01	5.0	0.37	1.10	637.590	294	78	75	0.61	2.87	99.6
1-02	10.0	0.39	1.10	640.460	295	80	76	0.62	2.87	97.0
1-03	15.0	0.33	0.95	643.190	292	83	77	0.57	2.73	99.7
1-04	20.0	0.45	1.30	646.360	295	85	78	0.67	3.17	99.1
1-05	25.0	0.41	1.20	649.420	293	86	79	0.64	3.06	99.9
LEAK CHECK	25.0			649.680						
2-01	30.0	0.34	0.98	652.350	291	88	81	0.58	2.67	95.2
2-02	35.0	0.39	1.10	655.280	295	90	82	0.62	2.93	97.6
2-03	40.0	0.42	1.20	658.330	295	91	83	0.65	3.05	97.7
2-04	45.0	0.40	1.10	661.250	295	92	85	0.63	2.92	95.6
2-05	50.0	0.40	1.10	664.170	294	92	86	0.63	2.92	95.4
LEAK CHECK	50.0			664.520						
3-01	55.0	0.32	0.92	667.360	291	91	86	0.57	2.84	103.6
3-02	60.0	0.33	0.95	669.950	294	92	87	0.57	2.59	93.1
3-03	65.0	0.33	0.95	672.620	294	92	87	0.57	2.67	95.9
3-04	70.0	0.38	1.10	675.510	293	93	88	0.62	2.89	96.6
3-05	75.0	0.38	1.10	678.410	294	94	88	0.62	2.90	96.9
LEAK CHECK	75.0			678.800						
4-01	80.0	0.33	0.95	681.500	292	93	88	0.57	2.70	96.7
4-02	85.0	0.30	0.86	684.180	292	93	88	0.55	2.68	100.7
4-03	90.0	0.35	1.00	686.900	294	92	87	0.59	2.72	94.9
4-04	95.0	0.36	1.00	689.670	294	93	88	0.60	2.77	95.1
4-05	100.0	0.40	1.10	692.620	292	94	88	0.63	2.95	95.9
LEAK CHECK	100.0			692.830						
5-01	105.0	0.30	0.86	695.370	292	94	90	0.55	2.54	95.1
5-02	110.0	0.30	0.86	698.000	292	95	90	0.55	2.63	98.4
5-03	115.0	0.35	1.00	700.750	290	97	92	0.59	2.75	94.8
5-04	120.0	0.33	0.95	703.520	293	98	93	0.57	2.77	98.4
5-05	125.0	0.43	1.20	706.630	293	97	93	0.66	3.11	96.9
Final	125.0		1.03720	70.69500	293.16000	88.16000		0.60200	70.69500	

25 points sampled

QC-Check: Field Averages	Sq.Rt.ΔP 0.6020	1.0372	70.6950	293.1600	88.1600
	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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USEPA Method 3 Laboratory Data

Test Method: **USEPA Method 29**
Analyte: **Mercury**

Location: Unit 2 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1	1							
	2							
	3							
CEM or Other Avg:	Avg.	10.03000		9.10000	80.87000	29.96880	1.17647	☑ Fo value within expected range.
2	1							
	2							
	3							
CEM or Other Avg:	Avg.	9.80000		9.54000	80.66000	29.94960	1.15918	☑ Fo value within expected range.
3	1							
	2							
	3							
CEM or Other Avg:	Avg.	9.82000		9.66000	80.52000	29.95760	1.14460	☑ Fo value within expected range.
4	1							
	2							
	3							
CEM or Other Avg:	Avg.	9.96000		9.17000	80.87000	29.96040	1.17771	☑ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Location: Unit 2 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414

Test Method: **USEPA Method 29**
Analyte: **Mercury**
Analyst: D. Luckhard
Analyst Emp No: 568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	733.8	480.7	253.1
Impinger 2	5%HNO3/10%H2O2	678.9	567.0	111.9
Impinger 3	5%HNO3/10%H2O2	586.9	563.9	23.0
Impinger 4	Empty	435.1	431.3	3.8
Impinger 5	4%KMnO4/10%H2SO4	553.5	551.0	2.5
Impinger 6	4%KMnO4/10%H2SO4	548.3	546.7	1.6
Impinger 7	Silica Gel	791.6	775.6	16.0
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
395.9	Liquid (gm)		
0.0	less rinse (gm)		
395.9	Net Liquid (gm)	395.9	☑ QA/QC OK
+ 16.0	Silica Gel (gm)	16.0	☑ QA/QC OK
411.9	Total Vlc (gm)	411.9	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	705.5	420.7	284.8
Impinger 2	5%HNO3/10%H2O2	649.7	547.6	102.1
Impinger 3	5%HNO3/10%H2O2	552.6	532.0	20.6
Impinger 4	Empty	428.7	425.1	3.6
Impinger 5	4%KMnO4/10%H2SO4	534.4	530.7	3.7
Impinger 6	4%KMnO4/10%H2SO4	545.2	544.8	0.4
Impinger 7	Silica Gel	763.6	749.3	14.3
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
415.2	Liquid (gm)		
0.0	less rinse (gm)		
415.2	Net Liquid (gm)	415.2	☑ QA/QC OK
+ 14.3	Silica Gel (gm)	14.3	☑ QA/QC OK
429.5	Total Vlc (gm)	429.5	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	749.6	472.3	277.3
Impinger 2	5%HNO3/10%H2O2	645.2	546.2	99.0
Impinger 3	5%HNO3/10%H2O2	560.6	544.2	16.4
Impinger 4	Empty	472.5	468.8	3.7
Impinger 5	4%KMnO4/10%H2SO4	566.9	563.7	3.2
Impinger 6	4%KMnO4/10%H2SO4	547.8	547.4	0.4
Impinger 7	Silica Gel	758.5	743.6	14.9
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
400.0	Liquid (gm)		
0.0	less rinse (gm)		
400.0	Net Liquid (gm)	400.0	☑ QA/QC OK
+ 14.9	Silica Gel (gm)	14.9	☑ QA/QC OK
414.9	Total Vlc (gm)	414.9	☑ QA/QC OK

Test Run: 4

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	700.6	460.0	240.6
Impinger 2	5%HNO3/10%H2O2	645.3	545.5	99.8
Impinger 3	5%HNO3/10%H2O2	565.7	545.2	20.5
Impinger 4	Empty	441.0	437.1	3.9
Impinger 5	4%KMnO4/10%H2SO4	541.2	539.1	2.1
Impinger 6	4%KMnO4/10%H2SO4	518.9	517.9	1.0
Impinger 7	Silica Gel	756.0	740.5	15.5
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
367.9	Liquid (gm)		
0.0	less rinse (gm)		
367.9	Net Liquid (gm)	367.9	☑ QA/QC OK
+ 15.5	Silica Gel (gm)	15.5	☑ QA/QC OK
383.4	Total Vlc (gm)	383.4	☑ QA/QC OK

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Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: ***HCl***

Location:	Unit 2 SDA Inlet				
Test Run:	1				
Client:	Wheelabrator South Broward, Inc.	Bar. Press. (in. Hg):	30.05	Nozzle ID No:	NA
Project No:	11414	Static P:	-4.5	Nozzle Diameter (D_n):	NA
Source Area (ft^2):	60.13205	O_2 (dry volume %):	8.46	Probe ID No:	66-4-7
Meter Operator:	B. Arnold 770	CO_2 (dry volume %):	10.72	Pitot C_p:	0.831
Probe Operator:		N_2+CO (dry volume %):	80.82	Pitot Leak Check:	☑Pass ☐Fail
Test Date:	3/20/12				
Start Time:	08:08				
Stop Time:	09:08	H_2O (condensate, ml or gm):	160.5	Meter Box ID. No:	66-7
Leak Rate Before:	0.003 cfm @ 15 "Hg	H_2O (silica, g):	11.4	Meter ΔH@:	1.73960
Leak Rate After:	0.004 cfm @ 20 "Hg	Actual Moisture (%):	18.22	Meter Y_d:	0.99940

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter $T_{m\text{-}in}$ (°F)	Dry Gas Meter $T_{m\text{-}out}$ (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{\text{in. } H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			317.790						
2-01	5.0		1.20	320.910	474	80	79		3.12	
2-01	10.0		1.20	323.980	477	81	80		3.07	
2-01	15.0		1.20	327.090	474	83	80		3.11	
2-01	20.0		1.20	330.170	476	84	81		3.08	
2-01	25.0		1.20	333.240	475	85	80		3.07	
2-01	30.0		1.20	336.320	478	86	80		3.08	
2-01	35.0		1.20	339.369	478	86	80		3.05	
2-01	40.0		1.20	342.470	481	87	81		3.10	
2-01	45.0		1.20	345.580	482	88	81		3.11	
2-01	50.0		1.20	348.680	480	88	81		3.10	
2-01	55.0		1.20	351.780	481	89	82		3.10	
2-01	60.0		1.20	354.895	479	90	82		3.12	
Final	60.0		1.20000	37.10500	477.91667	83.08333		0.00000	37.10500	
2 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.2000	37.1050	477.9167	83.0830				
		☐Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK				

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Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 2 SDA Inlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 60.13205
Meter Operator: B. Arnold | 770
Probe Operator:
Test Date: 3/20/12
Start Time: 09:49
Stop Time: 10:49
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 15 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -4.5
O_2 (dry volume %): 8.17
CO_2 (dry volume %): 11.04
N_2+CO (dry volume %): 80.79

H_2O (condensate, ml or gm): 155.3
H_2O (silica, g): 13.5
Actual Moisture (%): 17.99

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 66-4-7
Pitot C_p: 0.831
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-7
Meter ΔH@: 1.73960
Meter Y_d: 0.99940

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.\ H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			355.085						
2-01	5.0		1.20	358.220	479	85	83		3.14	
2-01	10.0		1.20	361.340	480	86	84		3.12	
2-01	15.0		1.20	364.450	476	88	83		3.11	
2-01	20.0		1.20	367.520	474	89	83		3.07	
2-01	25.0		1.20	370.620	476	90	82		3.10	
2-01	30.0		1.20	373.710	478	89	83		3.09	
2-01	35.0		1.20	376.830	479	89	83		3.12	
2-01	40.0		1.20	379.940	477	88	83		3.11	
2-01	45.0		1.20	383.030	477	87	83		3.09	
2-01	50.0		1.20	386.130	478	88	83		3.10	
2-01	55.0		1.20	389.220	479	87	84		3.09	
2-01	60.0		1.20	392.265	477	88	84		3.04	
Final	60.0		1.20000	37.18000	477.50000	85.50000		0.00000	37.18000	

2 points sampled

QC-Check: Field Averages	Sq.Rt.ΔP	ΔH	Metered	Stack	Dry Gas Meter
		1.2000	37.1800	477.5000	85.5000
	☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 2 SDA Inlet
Test Run: 3
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:
Test Date: 3/20/12
Start Time: 12:22
Stop Time: 13:22
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 15 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -4.5
O_2 (dry volume %): 8.52
CO_2 (dry volume %): 10.79
N_2+CO (dry volume %): 80.69
H_2O (condensate, ml or gm): 141.3
H_2O (silica, g): 20.0
Actual Moisture (%): 17.33

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 66-4-7
Pitot C_p: 0.831
Pitot Leak Check: ☑ Pass ☐ Fail
Meter Box ID. No: 66-7
Meter ΔH@: 1.73960
Meter Y_d: 0.99940

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			392.590						
2-01	5.0		1.20	395.730	475	87	84		3.14	
2-01	10.0		1.20	398.840	477	86	84		3.11	
2-01	15.0		1.20	401.950	480	88	84		3.11	
2-01	20.0		1.20	405.060	480	89	83		3.11	
2-01	25.0		1.20	408.130	478	90	84		3.07	
2-01	30.0		1.20	411.220	475	91	85		3.09	
2-01	35.0		1.20	414.340	474	89	84		3.12	
2-01	40.0		1.20	417.450	472	90	84		3.11	
2-01	45.0		1.20	420.540	475	90	84		3.09	
2-01	50.0		1.20	423.650	476	90	84		3.11	
2-01	55.0		1.20	426.740	474	88	83		3.09	
2-01	60.0		1.20	429.825	475	88	83		3.08	
Final	60.0		1.20000	37.23500	475.91667	86.33333		0.00000	37.23500	
2 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.2000	37.2350	475.9167	86.3333				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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USEPA Method 3 Laboratory Data

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 2 SDA Inlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.72000		8.46000	80.82000	30.05360	1.16045	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		11.04000		8.17000	80.79000	30.09320	1.15308	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.79000		8.52000	80.69000	30.06720	1.14736	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis:
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Test Method:	USEPA Method 26A
Analyte:	HCl
Location:	Unit 2 SDA Inlet
Client:	Wheelabrator South Broward, Inc.
Analyst:	D. Luckhard
Project No:	11414
Analyst Emp No:	568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H_2SO_4	531.4	469.7	61.7
Impinger 2	100 ml 0.1N H_2SO_4	627.5	548.9	78.6
Impinger 3	100 ml 0.1N H_2SO_4	555.8	537.9	17.9
Impinger 4	Empty	438.5	436.2	2.3
Impinger 5	Silica Gel	735.9	724.5	11.4
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
160.5	Liquid (gm)		
0.0	less rinse (gm)		
160.5	Net Liquid (gm)	160.5	☑ QA/QC OK
+ 11.4	Silica Gel (gm)	11.4	☑ QA/QC OK
171.9	Total Vlc (gm)	171.9	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H_2SO_4	521.5	457.0	64.5
Impinger 2	100 ml 0.1N H_2SO_4	628.6	559.2	69.4
Impinger 3	100 ml 0.1N H_2SO_4	554.9	537.8	17.1
Impinger 4	Empty	437.8	433.5	4.3
Impinger 5	Silica Gel	765.4	751.9	13.5
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
155.3	Liquid (gm)		
0.0	less rinse (gm)		
155.3	Net Liquid (gm)	155.3	☑ QA/QC OK
+ 13.5	Silica Gel (gm)	13.5	☑ QA/QC OK
168.8	Total Vlc (gm)	168.8	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H_2SO_4	502.1	467.4	34.7
Impinger 2	100 ml 0.1N H_2SO_4	605.8	542.5	63.3
Impinger 3	100 ml 0.1N H_2SO_4	571.8	540.9	30.9
Impinger 4	Empty	470.8	458.4	12.4
Impinger 5	Silica Gel	771.6	751.6	20.0
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
141.3	Liquid (gm)		
0.0	less rinse (gm)		
141.3	Net Liquid (gm)	141.3	☑ QA/QC OK
+ 20.0	Silica Gel (gm)	20.0	☑ QA/QC OK
161.3	Total Vlc (gm)	161.3	☑ QA/QC OK

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1				
Impinger 2				
Impinger 3				
Impinger 4				
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
	Liquid (gm)		
	less rinse (gm)		
	Net Liquid (gm)		☐ QA/QC OK
	Silica Gel (gm)		☐ QA/QC OK
	Total Vlc (gm)		☐ QA/QC OK

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Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 2 FF Outlet
Test Run: 1
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: K. Sullivan 579
Probe Operator: K. Sullivan 579
Test Date: 3/20/12
Start Time: 08:08
Stop Time: 09:08
Leak Rate Before: 0.005 cfm @ 15 "Hg
Leak Rate After: 0.006 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -14.7
O_2 (dry volume %): 9.64
CO_2 (dry volume %): 9.52
N_2+CO (dry volume %): 80.84

H_2O (condensate, ml or gm): 210.9
H_2O (silica, g): 15.9
Actual Moisture (%): 21.16

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☑Pass ☐Fail

Meter Box ID. No: 66-11
Meter ΔH@: 1.81180
Meter Y_d: 0.99150

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{}$in. H_2O)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			271.910						
3-03	5.0		1.50	275.390	292	80	77		3.48	
3-03	10.0		1.50	278.840	293	82	77		3.45	
3-03	15.0		1.50	282.250	293	84	78		3.41	
3-03	20.0		1.50	285.660	293	87	79		3.41	
3-03	25.0		1.50	289.080	292	90	81		3.42	
3-03	30.0		1.50	292.470	292	92	83		3.39	
3-03	35.0		1.50	295.880	292	94	84		3.41	
3-03	40.0		1.50	299.300	293	95	86		3.42	
3-03	45.0		1.50	302.750	292	96	87		3.45	
3-03	50.0		1.50	306.280	292	97	89		3.53	
3-03	55.0		1.50	309.620	292	98	90		3.34	
3-03	60.0		1.50	313.180	292	99	91		3.56	
Final	60.0		1.50000	41.27000	292.33333	87.33333		0.00000	41.27000	

9 points sampled

QC-Check: Field Averages	Sq.Rt.ΔP				
		1.5000	41.2700	292.3333	87.3333
	☐Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK	☑Avg. OK

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Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 2 FF Outlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: K. Sullivan 579
Probe Operator: K. Sullivan 579
Test Date: 3/20/12
Start Time: 09:49
Stop Time: 10:49
Leak Rate Before: 0.008 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -16.0
O_2 (dry volume %): 9.69
CO_2 (dry volume %): 9.72
N_2+CO (dry volume %): 80.59

H_2O (condensate, ml or gm): 208.6
H_2O (silica, g): 13.5
Actual Moisture (%): 20.97

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-11
Meter ΔH@: 1.81180
Meter Y_d: 0.99150

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			313.755						
3-03	5.0		1.50	317.220	295	98	97		3.47	
3-03	10.0		1.50	320.700	294	100	98		3.48	
3-03	15.0		1.50	324.170	294	102	98		3.47	
3-03	20.0		1.50	327.660	294	102	99		3.49	
3-03	25.0		1.50	331.130	296	102	99		3.47	
3-03	30.0		1.50	334.620	295	102	98		3.49	
3-03	35.0		1.50	338.090	295	100	98		3.47	
3-03	40.0		1.50	341.700	294	100	98		3.61	
3-03	45.0		1.50	345.270	294	100	98		3.57	
3-03	50.0		1.50	348.550	295	100	98		3.28	
3-03	55.0		1.50	352.020	295	100	97		3.47	
3-03	60.0		1.50	355.510	295	100	97		3.49	
Final	60.0		1.50000	41.75500	294.66667	99.20833		0.00000	41.75500	
9 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.5000	41.7550	294.6667	99.2083				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location:	Unit 2 FF Outlet		
Test Run:	3		
Client:	Wheelabrator South Broward, Inc.		
Project No:	11414		
Source Area (ft^2):	64.00000		
Meter Operator:	K. Sullivan	579	
Probe Operator:	K. Sullivan	579	
Test Date:	3/20/12		
Start Time:	12:22		
Stop Time:	13:22		
Leak Rate Before:	0.004	cfm	@ 15 "Hg
Leak Rate After:	0.002	cfm	@ 7 "Hg

Bar. Press. (in. Hg):	30.05
Static P:	-15.8
O_2 (dry volume %):	9.60
CO_2 (dry volume %):	9.80
N_2+CO (dry volume %):	80.60
H_2O (condensate, ml or gm):	209.9
H_2O (silica, g):	13.0
Actual Moisture (%):	20.89

Nozzle ID No:	NA
Nozzle Diameter (D_n):	NA
Probe ID No:	67-4-1
Pitot C_p:	NA
Pitot Leak Check:	☑ Pass ☐ Fail
Meter Box ID. No:	66-11
Meter ΔH@:	1.81180
Meter Y_d:	0.99150

Traverse Point	Run Time (5.0 min/read)	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{}$in. H_2O)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			358.785						
3-03	5.0		1.50	362.250	295	88	86		3.46	
3-03	10.0		1.50	365.630	294	89	89		3.38	
3-03	15.0		1.50	369.180	293	89	84		3.55	
3-03	20.0		1.50	372.500	292	91	85		3.32	
3-03	25.0		1.50	375.950	293	92	85		3.45	
3-03	30.0		1.50	379.400	293	93	86		3.45	
3-03	35.0		1.50	382.880	295	94	86		3.48	
3-03	40.0		1.50	386.330	294	93	86		3.45	
3-03	45.0		1.50	389.780	294	94	86		3.45	
3-03	50.0		1.50	393.250	293	97	88		3.47	
3-03	55.0		1.50	396.690	292	94	87		3.44	
3-03	60.0		1.50	400.150	292	94	87		3.46	
Final	60.0		1.50000	41.36500	293.33333	89.29167		0.00000	41.36500	
9 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.5000	41.3650	293.3333	89.2917				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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USEPA Method 3 Laboratory Data

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 2 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.52000		9.64000	80.84000	29.90880	1.18277	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.72000		9.69000	80.59000	29.94280	1.15329	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.80000		9.60000	80.60000	29.95200	1.15306	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis:
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Location: Unit 2 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414

Test Method: **USEPA Method 26A**
Analyte: **HCl**
Analyst: R. Vicere
Analyst Emp No: 563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	602.0	550.1	51.9
Impinger 2	100 ml 0.1N H2SO4	730.5	625.3	105.2
Impinger 3	100 ml 0.1N H2SO4	573.9	533.4	40.5
Impinger 4	Empty	485.5	472.2	13.3
Impinger 5	Silica Gel	740.9	725.0	15.9
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
210.9	Liquid (gm)		
0.0	less rinse (gm)		
210.9	Net Liquid (gm)	210.9	☑ QA/QC OK
+ 15.9	Silica Gel (gm)	15.9	☑ QA/QC OK
226.8	Total Vlc (gm)	226.8	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	517.3	455.2	62.1
Impinger 2	100 ml 0.1N H2SO4	644.7	536.7	108.0
Impinger 3	100 ml 0.1N H2SO4	659.5	628.5	31.0
Impinger 4	Empty	442.4	434.9	7.5
Impinger 5	Silica Gel	730.3	716.8	13.5
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
208.6	Liquid (gm)		
0.0	less rinse (gm)		
208.6	Net Liquid (gm)	208.6	☑ QA/QC OK
+ 13.5	Silica Gel (gm)	13.5	☑ QA/QC OK
222.1	Total Vlc (gm)	222.1	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	531.4	457.4	74.0
Impinger 2	100 ml 0.1N H2SO4	660.8	550.1	110.7
Impinger 3	100 ml 0.1N H2SO4	561.3	539.4	21.9
Impinger 4	Empty	439.6	436.3	3.3
Impinger 5	Silica Gel	744.8	731.8	13.0
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
209.9	Liquid (gm)		
0.0	less rinse (gm)		
209.9	Net Liquid (gm)	209.9	☑ QA/QC OK
+ 13.0	Silica Gel (gm)	13.0	☑ QA/QC OK
222.9	Total Vlc (gm)	222.9	☑ QA/QC OK

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1				
Impinger 2				
Impinger 3				
Impinger 4				
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
	Liquid (gm)		
	less rinse (gm)		
	Net Liquid (gm)		☐ QA/QC OK
	Silica Gel (gm)		☐ QA/QC OK
	Total Vlc (gm)		☐ QA/QC OK

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Field Data Printout

Test Method: **USEPA Method 5/29**
Analyte: **Particulate/Metals**

Location: Unit 3 FF Outlet
Test Run: 1
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: A. Obuchowski 567
Probe Operator: A. Obuchowski 567
Test Date: 3/20/12
Start Time: 07:54
Stop Time: 10:11
Leak Rate Before: 0.006 cfm @ 15 "Hg
Leak Rate After: 0.001 cfm @ 9 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -12.1
O_2 (dry volume %): 9.48
CO_2 (dry volume %): 9.81
N_2+CO (dry volume %): 80.71

H_2O (condensate, ml or gm): 451.7
H_2O (silica, g): 18.6
Actual Moisture (%): 22.79

Nozzle ID No: 277-1
Nozzle Diameter (D_n): 0.277
Probe ID No: 67-8-19
Pitot C_p: 0.835
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-21
Meter ΔH@: 1.81620
Meter Y_d: 0.98880

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter $T_{m\text{-}in}$ (°F)	Dry Gas Meter $T_{m\text{-}out}$ (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{\text{in. } H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			427.210						
1-01	5.0	0.44	1.30	429.960	295	74	74	0.66	2.75	88.8*
1-02	10.0	0.43	1.20	432.800	294	74	74	0.66	2.84	92.7
1-03	15.0	0.42	1.20	435.280	294	78	74	0.65	2.48	81.6*
1-04	20.0	0.51	1.50	438.690	295	80	74	0.71	3.41	101.8
1-05	25.0	0.41	1.10	441.780	296	83	75	0.64	3.09	102.4
LEAK CHECK	25.0			442.000						
2-01	30.0	0.50	1.40	445.210	295	83	76	0.71	3.21	96.3
2-02	35.0	0.48	1.40	448.580	295	85	76	0.69	3.37	103.0
2-03	40.0	0.43	1.20	451.730	295	87	77	0.66	3.15	101.4
2-04	45.0	0.39	1.10	454.720	294	88	79	0.62	2.99	100.7
2-05	50.0	0.39	1.10	457.740	295	88	79	0.62	3.02	101.7
LEAK CHECK	50.0			457.935						
3-01	55.0	0.46	1.30	461.190	295	86	80	0.68	3.26	101.1
3-02	60.0	0.51	1.50	464.620	295	89	80	0.71	3.43	101.0
3-03	65.0	0.46	1.30	467.850	296	91	81	0.68	3.23	99.8
3-04	70.0	0.40	1.20	470.920	295	87	81	0.63	3.07	102.0
3-05	75.0	0.44	1.30	474.160	295	86	81	0.66	3.24	102.8
LEAK CHECK	75.0			474.360						
4-01	80.0	0.55	1.60	478.000	295	83	80	0.74	3.64	103.8
4-02	85.0	0.48	1.40	481.280	295	85	80	0.69	3.28	99.9
4-03	90.0	0.42	1.20	484.400	294	85	80	0.65	3.12	101.4
4-04	95.0	0.38	1.10	487.300	295	86	81	0.62	2.90	99.0
4-05	100.0	0.36	1.00	490.160	295	87	81	0.60	2.86	100.2
LEAK CHECK	100.0			490.345						
5-01	105.0	0.37	1.10	493.400	291	86	82	0.61	3.05	105.3
5-02	110.0	0.31	0.90	496.120	290	88	83	0.56	2.72	102.0
5-03	115.0	0.36	1.00	499.010	294	89	84	0.60	2.89	100.7
5-04	120.0	0.42	1.20	502.170	294	90	85	0.65	3.16	101.8
5-05	125.0	0.41	1.20	505.345	294	90	85	0.64	3.18	103.5
Final	125.0		1.23200	77.33500	294.44000	82.20000		0.65380	77.33500	

25 points sampled

	Sq.Rt.ΔP	ΔH	Metered	Stack	Dry Gas Meter
QC-Check: Field Averages	0.6538	1.2320	77.3350	294.4400	82.2000
	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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Field Data Printout

Test Method: **USEPA Method 5/29**
Analyte: **Particulate/Metals**

Location: Unit 3 FF Outlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000

Meter Operator:		P. Bihun	505
Probe Operator:		P. Bihun	505

Test Date:	3/22/12		
Start Time:	07:37		
Stop Time:	09:50		
Leak Rate Before:	0.006	cfm	@ 15 "Hg
Leak Rate After:	0.002	cfm	@ 10 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -10.0
O_2 (dry volume %): 8.85
CO_2 (dry volume %): 10.16
N_2+CO (dry volume %): 80.99

H_2O (condensate, ml or gm): 476.4
H_2O (silica, g): 17.5
Actual Moisture (%): 22.83

Nozzle ID No: 277-2
Nozzle Diameter (D_n): 0.277
Probe ID No: 67-8-28
Pitot C_p: 0.843
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-4
Meter ΔH@: 1.73740
Meter Y_d: 0.99530

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			71.565						
1-01	5.0	0.50	1.40	74.900	297	76	75	0.71	3.34	100.5
1-02	10.0	0.47	1.30	78.140	297	77	75	0.69	3.24	100.6
1-03	15.0	0.46	1.30	81.370	297	79	75	0.68	3.23	101.2
1-04	20.0	0.44	1.30	84.630	297	81	76	0.66	3.26	104.1
1-05	25.0	0.42	1.20	87.765	297	81	76	0.65	3.14	102.5
LEAK CHECK	25.0			87.825						
2-01	30.0	0.56	1.60	91.430	294	81	76	0.75	3.61	101.9
2-02	35.0	0.48	1.40	94.820	297	83	77	0.69	3.39	103.4
2-03	40.0	0.46	1.30	98.050	297	84	77	0.68	3.23	100.5
2-04	45.0	0.40	1.10	100.940	297	84	78	0.63	2.89	96.3
2-05	50.0	0.40	1.10	103.925	298	84	78	0.63	2.99	99.6
LEAK CHECK	50.0			104.000						
3-01	55.0	0.53	1.50	107.440	296	83	79	0.73	3.44	99.6
3-02	60.0	0.51	1.50	110.920	297	83	79	0.71	3.48	102.8
3-03	65.0	0.40	1.10	113.870	298	84	79	0.63	2.95	98.3
3-04	70.0	0.43	1.20	116.980	298	84	79	0.66	3.11	100.0
3-05	75.0	0.45	1.30	120.255	298	84	79	0.67	3.27	102.9
LEAK CHECK	75.0			120.320						
4-01	80.0	0.49	1.40	123.750	298	83	79	0.70	3.43	103.4
4-02	85.0	0.48	1.40	127.130	296	84	79	0.69	3.38	102.7
4-03	90.0	0.47	1.30	130.320	297	85	79	0.69	3.19	97.9
4-04	95.0	0.40	1.10	133.270	297	85	79	0.63	2.95	98.1
4-05	100.0	0.43	1.20	136.405	297	84	80	0.66	3.13	100.6
LEAK CHECK	100.0			136.450						
5-01	105.0	0.50	1.40	139.840	295	83	80	0.71	3.39	100.9
5-02	110.0	0.45	1.30	143.040	295	85	80	0.67	3.20	100.2
5-03	115.0	0.31	0.88	145.730	296	86	81	0.56	2.69	101.3
5-04	120.0	0.38	1.10	148.750	295	85	81	0.62	3.02	102.8
5-05	125.0	0.43	1.20	151.925	295	85	81	0.66	3.18	101.6
Final	125.0		1.27520	80.11500	296.64000	80.60000		0.66965	80.11500	
25 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages		0.6696	1.2752	80.1150	296.6400	80.6000				
		☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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Field Data Printout

Test Method: **USEPA Method 5/29**
Analyte: **Particulate/Metals**

Location: Unit 3 FF Outlet
Test Run: 3
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505
Test Date: 3/22/12
Start Time: 10:11
Stop Time: 12:23
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.003 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -12.3
O_2 (dry volume %): 9.23
CO_2 (dry volume %): 10.05
N_2+CO (dry volume %): 80.72
H_2O (condensate, ml or gm): 462.9
H_2O (silica, g): 16.1
Actual Moisture (%): 22.48

Nozzle ID No: 277-2
Nozzle Diameter (D_n): 0.277
Probe ID No: 67-8-21
Pitot C_p: 0.843
Pitot Leak Check: ☑ Pass ☐ Fail
Meter Box ID. No: 66-4
Meter ΔH@: 1.73740
Meter Y_d: 0.99530

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter $T_{m\text{-}in}$ (°F)	Dry Gas Meter $T_{m\text{-}out}$ (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.\ H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			152.275						
1-01	5.0	0.48	1.40	155.640	296	81	81	0.69	3.36	102.3
1-02	10.0	0.49	1.40	159.020	297	84	82	0.70	3.38	101.4
1-03	15.0	0.48	1.40	162.370	295	86	83	0.69	3.35	101.1
1-04	20.0	0.47	1.30	165.630	298	88	84	0.69	3.26	99.3
1-05	25.0	0.45	1.30	168.900	297	88	84	0.67	3.27	101.8
LEAK CHECK	25.0			168.950						
2-01	30.0	0.52	1.50	172.380	297	87	84	0.72	3.43	99.4
2-02	35.0	0.52	1.50	175.830	298	87	84	0.72	3.45	100.1
2-03	40.0	0.47	1.30	179.130	297	87	84	0.69	3.30	100.6
2-04	45.0	0.41	1.20	182.270	297	87	84	0.64	3.14	102.5
2-05	50.0	0.45	1.30	185.540	296	87	84	0.67	3.27	101.8
LEAK CHECK	50.0			185.600						
3-01	55.0	0.37	1.10	188.570	296	86	84	0.61	2.97	102.0
3-02	60.0	0.40	1.10	191.570	296	87	84	0.63	3.00	99.0
3-03	65.0	0.40	1.10	194.550	296	88	85	0.63	2.98	98.2
3-04	70.0	0.40	1.10	197.520	298	87	85	0.63	2.97	98.1
3-05	75.0	0.37	1.10	200.480	295	87	85	0.61	2.96	101.4
LEAK CHECK	75.0			200.545						
4-01	80.0	0.55	1.60	204.140	295	86	85	0.74	3.60	101.2
4-02	85.0	0.50	1.40	207.530	295	86	84	0.71	3.39	100.2
4-03	90.0	0.48	1.40	210.870	296	86	84	0.69	3.34	100.8
4-04	95.0	0.50	1.40	214.250	295	86	83	0.71	3.38	100.0
4-05	100.0	0.37	1.10	217.255	297	86	83	0.61	3.01	103.4
LEAK CHECK	100.0			217.305						
5-01	105.0	0.35	1.00	220.160	293	86	84	0.59	2.85	100.6
5-02	110.0	0.38	1.10	223.140	293	86	84	0.62	2.98	100.8
5-03	115.0	0.48	1.40	226.480	294	86	84	0.69	3.34	100.7
5-04	120.0	0.40	1.10	229.420	297	87	84	0.63	2.94	97.1
5-05	125.0	0.38	1.10	232.415	297	87	84	0.62	3.00	101.5
Final	125.0		1.26800	79.91500	296.04000	85.10000		0.66406	79.91500	

25 points sampled

	Sq.Rt.ΔP				
QC-Check: Field Averages	0.6641	1.2680	79.9150	296.0400	85.1000
	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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USEPA Method 3 Laboratory Data

Test Method: USEPA Method 5/29
Analyte: Particulate/Metals

Location: Unit 3 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.81000		9.48000	80.71000	29.94880	1.16412	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.16000		8.85000	80.99000	29.97960	1.18602	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.05000		9.23000	80.72000	29.97720	1.16119	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis:
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Test Method:	USEPA Method 5/29
Analyte:	Particulate/Metals
Analyst:	R. Vicere
Analyst Emp No:	563

Location: Unit 3 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	742.5	477.3	265.2
Impinger 2	5%HNO3/10%H2O2	695.5	562.7	132.8
Impinger 3	5%HNO3/10%H2O2	594.5	560.4	34.1
Impinger 4	Empty	440.0	428.5	11.5
Impinger 5	4%KMnO4/10%H2SO4	549.2	546.2	3.0
Impinger 6	4%KMnO4/10%H2SO4	549.3	544.2	5.1
Impinger 7	Silica Gel	775.9	757.3	18.6
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
451.7	Liquid (gm)		
0.0	less rinse (gm)		
451.7	Net Liquid (gm)	451.7	☑ QA/QC OK
+ 18.6	Silica Gel (gm)	18.6	☑ QA/QC OK
470.3	Total Vlc (gm)	470.3	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	803.3	479.2	324.1
Impinger 2	5%HNO3/10%H2O2	692.3	568.1	124.2
Impinger 3	5%HNO3/10%H2O2	587.5	564.0	23.5
Impinger 4	Empty	433.1	430.1	3.0
Impinger 5	4%KMnO4/10%H2SO4	551.7	550.4	1.3
Impinger 6	4%KMnO4/10%H2SO4	547.6	547.3	0.3
Impinger 7	Silica Gel	769.7	752.2	17.5
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
476.4	Liquid (gm)		
0.0	less rinse (gm)		
476.4	Net Liquid (gm)	476.4	☑ QA/QC OK
+ 17.5	Silica Gel (gm)	17.5	☑ QA/QC OK
493.9	Total Vlc (gm)	493.9	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	734.0	419.6	314.4
Impinger 2	5%HNO3/10%H2O2	667.2	548.3	118.9
Impinger 3	5%HNO3/10%H2O2	557.7	532.4	25.3
Impinger 4	Empty	426.7	424.0	2.7
Impinger 5	4%KMnO4/10%H2SO4	532.9	532.1	0.8
Impinger 6	4%KMnO4/10%H2SO4	547.9	547.1	0.8
Impinger 7	Silica Gel	779.5	763.4	16.1
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
462.9	Liquid (gm)		
0.0	less rinse (gm)		
462.9	Net Liquid (gm)	462.9	☑ QA/QC OK
+ 16.1	Silica Gel (gm)	16.1	☑ QA/QC OK
479.0	Total Vlc (gm)	479.0	☑ QA/QC OK

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty			
Impinger 2	5%HNO3/10%H2O2			
Impinger 3	5%HNO3/10%H2O2			
Impinger 4	Empty			
Impinger 5	4%KMnO4/10%H2SO4			
Impinger 6	4%KMnO4/10%H2SO4			
Impinger 7	Silica Gel			
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
	Liquid (gm)		
	less rinse (gm)		
	Net Liquid (gm)		☐ QA/QC OK
	Silica Gel (gm)		☐ QA/QC OK
	Total Vlc (gm)		☐ QA/QC OK

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Field Data Printout

Test Method: **USEPA Method 29**
Analyte: **Mercury**

Location: Unit 3 FF Outlet
Test Run: 4
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000

Meter Operator:	P. Bihun	505
Probe Operator:	P. Bihun	505

Test Date: 3/22/12
Start Time: 12:50
Stop Time: 15:01
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.004 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -11.6
O_2 (dry volume %): 9.24
CO_2 (dry volume %): 10.04
N_2+CO (dry volume %): 80.72

H_2O (condensate, ml or gm): 494.5
H_2O (silica, g): 16.3
Actual Moisture (%): 22.49

Nozzle ID No: 277-2
Nozzle Diameter (D_n): 0.277
Probe ID No: 67-8-21
Pitot C_p: 0.843
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-4
Meter ΔH@: 1.73740
Meter Y_d: 0.99530

Traverse Point	Run Time (5.0 min/read)	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{\text{in. } H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			232.815						
1-01	5.0	0.42	1.20	235.980	296	83	82	0.65	3.16	102.4
1-02	10.0	0.52	1.50	239.430	296	83	82	0.72	3.45	100.4
1-03	15.0	0.51	1.50	242.920	296	86	83	0.71	3.49	102.2
1-04	20.0	0.54	1.50	246.430	297	87	83	0.73	3.51	99.9
1-05	25.0	0.40	1.10	249.410	296	87	83	0.63	2.98	98.4
LEAK CHECK	25.0			249.485						
2-01	30.0	0.43	1.20	252.520	297	86	84	0.66	3.04	96.7
2-02	35.0	0.48	1.40	255.900	295	87	84	0.69	3.38	101.8
2-03	40.0	0.45	1.30	259.200	296	88	84	0.67	3.30	102.5
2-04	45.0	0.47	1.30	262.500	297	88	84	0.69	3.30	100.4
2-05	50.0	0.43	1.20	265.645	297	87	84	0.66	3.14	100.1
LEAK CHECK	50.0			265.730						
3-01	55.0	0.55	1.60	269.350	297	86	84	0.74	3.62	102.1
3-02	60.0	0.60	1.70	273.050	298	87	83	0.77	3.70	100.0
3-03	65.0	0.56	1.60	276.640	294	87	83	0.75	3.59	100.1
3-04	70.0	0.55	1.60	280.290	301	87	83	0.74	3.65	103.2
3-05	75.0	0.46	1.30	283.600	295	86	83	0.68	3.31	101.9
LEAK CHECK	75.0			283.670						
4-01	80.0	0.67	1.90	287.580	297	86	82	0.82	3.91	100.2
4-02	85.0	0.62	1.80	291.410	296	86	82	0.79	3.83	101.9
4-03	90.0	0.59	1.70	295.170	298	87	83	0.77	3.76	102.5
4-04	95.0	0.48	1.40	298.530	297	87	82	0.69	3.36	101.5
4-05	100.0	0.43	1.20	301.685	302	87	83	0.66	3.16	100.9
LEAK CHECK	100.0			301.770						
5-01	105.0	0.38	1.10	304.700	293	86	83	0.62	2.93	99.1
5-02	110.0	0.42	1.20	307.800	293	86	83	0.65	3.10	99.8
5-03	115.0	0.50	1.40	311.130	296	87	83	0.71	3.33	98.4
5-04	120.0	0.53	1.50	314.650	296	88	83	0.73	3.52	100.9
5-05	125.0	0.55	1.60	318.250	296	88	83	0.74	3.60	101.4
Final	125.0		1.43200	85.12000	296.48000	84.78000		0.70638	85.12000	

25 points sampled

	Sq.Rt.ΔP				
QC-Check: Field Averages	0.7064	1.4320	85.1200	296.4800	84.7800
	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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USEPA Method 3 Laboratory Data

Test Method: **USEPA Method 29**
Analyte: **Mercury**

Location: Unit 3 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.81000		9.48000	80.71000	29.94880	1.16412	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.16000		8.85000	80.99000	29.97960	1.18602	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.05000		9.23000	80.72000	29.97720	1.16119	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
4	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.04000		9.24000	80.72000	29.97600	1.16135	☑ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Test Method:	USEPA Method 29
Analyte:	Mercury
Analyst:	R. Vicere
Analyst Emp No:	563

Location: Unit 3 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty	742.5	477.3	265.2				
Impinger 2	5%HNO3/10%H2O2	695.5	562.7	132.8				
Impinger 3	5%HNO3/10%H2O2	594.5	560.4	34.1				
Impinger 4	Empty	440.0	428.5	11.5				
Impinger 5	4%KMnO4/10%H2SO4	549.2	546.2	3.0				
Impinger 6	4%KMnO4/10%H2SO4	549.3	544.2	5.1	451.7	Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel	775.9	757.3	18.6	0.0	less rinse (gm)		
Impinger 8					451.7	Net Liquid (gm)	451.7	☑ QA/QC OK
					+ 18.6	Silica Gel (gm)	18.6	☑ QA/QC OK
		Rinse:		(ml or gm)	470.3	Total Vlc (gm)	470.3	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty	803.3	479.2	324.1				
Impinger 2	5%HNO3/10%H2O2	692.3	568.1	124.2				
Impinger 3	5%HNO3/10%H2O2	587.5	564.0	23.5				
Impinger 4	Empty	433.1	430.1	3.0				
Impinger 5	4%KMnO4/10%H2SO4	551.7	550.4	1.3				
Impinger 6	4%KMnO4/10%H2SO4	547.6	547.3	0.3	476.4	Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel	769.7	752.2	17.5	0.0	less rinse (gm)		
Impinger 8					476.4	Net Liquid (gm)	476.4	☑ QA/QC OK
					+ 17.5	Silica Gel (gm)	17.5	☑ QA/QC OK
		Rinse:		(ml or gm)	493.9	Total Vlc (gm)	493.9	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty	734.0	419.6	314.4				
Impinger 2	5%HNO3/10%H2O2	667.2	548.3	118.9				
Impinger 3	5%HNO3/10%H2O2	557.7	532.4	25.3				
Impinger 4	Empty	426.7	424.0	2.7				
Impinger 5	4%KMnO4/10%H2SO4	532.9	532.1	0.8				
Impinger 6	4%KMnO4/10%H2SO4	547.9	547.1	0.8	462.9	Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel	779.5	763.4	16.1	0.0	less rinse (gm)		
Impinger 8					462.9	Net Liquid (gm)	462.9	☑ QA/QC OK
					+ 16.1	Silica Gel (gm)	16.1	☑ QA/QC OK
		Rinse:		(ml or gm)	479.0	Total Vlc (gm)	479.0	☑ QA/QC OK

Test Run: 4

	Contents	Gross (gm)	Tare (gm)	Net (gm)				
Impinger 1	Empty	809.9	473.4	336.5				
Impinger 2	5%HNO3/10%H2O2	672.7	547.2	125.5				
Impinger 3	5%HNO3/10%H2O2	569.6	545.2	24.4				
Impinger 4	Empty	473.7	468.6	5.1				
Impinger 5	4%KMnO4/10%H2SO4	566.1	563.6	2.5				
Impinger 6	4%KMnO4/10%H2SO4	545.4	544.9	0.5	494.5	Liquid (gm)	*Field Data Check*	
Impinger 7	Silica Gel	774.4	758.1	16.3	0.0	less rinse (gm)		
Impinger 8					494.5	Net Liquid (gm)	494.5	☑ QA/QC OK
					+ 16.3	Silica Gel (gm)	16.3	☑ QA/QC OK
		Rinse:		(ml or gm)	510.8	Total Vlc (gm)	510.8	☑ QA/QC OK

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SS ISOKINETIC Version 2006-13a

Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 3 SDA Inlet
Test Run: 1A
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 60.13205
Meter Operator: | B. Arnold | 770
Probe Operator:
Test Date: 3/21/12
Start Time: 07:54
Stop Time: 09:39
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.004 cfm @ 22 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -1.4
O_2 (dry volume %): 9.00
CO_2 (dry volume %): 10.35
N_2+CO (dry volume %): 80.65
H_2O (condensate, ml or gm): 150.1
H_2O (silica, g): 10.6
Actual Moisture (%): 17.21

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 66-4-7
Pitot C_p: 0.831
Pitot Leak Check: ☑ Pass ☐ Fail
Meter Box ID. No: 66-7
Meter ΔH@: 1.73960
Meter Y_d: 0.99940

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.\ H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			429.985						
2-01	5.0		1.20	433.080	490	81	79		3.09	
2-01	10.0		1.20	436.140	499	81	79		3.06	
2-01	15.0		1.20	439.220	494	83	80		3.08	
Final	15.0		1.20000	9.23500	494.33333	80.50000		0.00000	9.23500	

2 points sampled

QC-Check: Field Averages	Sq.Rt.ΔP				
		1.2000	9.2350	494.3330	80.5000
	☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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Q

Prepared by Clean Air Engineering Proprietary Software
SS ISOKINETIC Version 2006-13e

Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 3 SDA Inlet
Test Run: 1B
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:
Test Date: 3/21/12
Start Time: 07:54
Stop Time: 09:39
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.004 cfm @ 22 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -1.4
O_2 (dry volume %): 9.00
CO_2 (dry volume %): 10.35
N_2+CO (dry volume %): 80.65

H_2O (condensate, ml or gm): 150.1
H_2O (silica, g): 10.6
Actual Moisture (%): 18.01

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 66-4-7
Pitot C_p: 0.831
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-20
Meter ΔH@: 1.80820
Meter Y_d: 1.00590

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.\ H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			752.730						
2-01	5.0		1.20	755.580	489	80	79		2.85	
2-01	10.0		1.20	758.580	486	80	79		3.00	
2-01	15.0		1.20	761.580	485	82	80		3.00	
2-01	20.0		1.20	764.570	482	84	81		2.99	
2-01	25.0		1.20	767.580	487	86	81		3.01	
2-01	30.0		1.20	770.600	490	87	82		3.02	
2-01	35.0		1.20	773.630	491	87	82		3.03	
2-01	40.0		1.20	776.600	487	87	82		2.97	
2-01	45.0		1.10	778.900	496	88	82		2.30	
Final	45.0		1.18889	26.17000	488.11111	82.72222		0.00000	26.17000	
2 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.1889	26.1700	488.1111	82.7222				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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P

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SS ISOKINETIC Version 2008-13a

Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 3 SDA Inlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:
Test Date: 3/21/12
Start Time: 10:04
Stop Time: 11:04
Leak Rate Before: 0.002 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 18 "Hg

Bar. Press. (in. Hg): 30.10
Static P: -1.5
O_2 (dry volume %): 8.43
CO_2 (dry volume %): 10.75
N_2+CO (dry volume %): 80.82
H_2O (condensate, ml or gm): 154.4
H_2O (silica, g): 11.2
Actual Moisture (%): 18.32

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 66-4-7
Pitot C_p: 0.831
Pitot Leak Check: ☑ Pass ☐ Fail
Meter Box ID. No: 66-20
Meter ΔH@: 1.80820
Meter Y_d: 1.00590

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{\text{in. } H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			778.985						
2-01	5.0		1.20	781.980	490	87	85		3.00	
2-01	10.0		1.20	784.970	485	88	85		2.99	
2-01	15.0		1.20	787.930	482	90	85		2.96	
2-01	20.0		1.20	790.920	485	91	85		2.99	
2-01	25.0		1.20	793.080	486	92	86		2.16	
2-01	30.0		1.20	796.850	490	93	86		3.77	
2-01	35.0		1.20	799.840	489	95	87		2.99	
2-01	40.0		1.20	802.780	494	95	87		2.94	
2-01	45.0		1.20	805.730	488	95	88		2.95	
2-01	50.0		1.20	808.700	488	95	88		2.97	
2-01	55.0		1.20	811.670	487	95	88		2.97	
2-01	60.0		1.20	814.630	492	95	88		2.96	
Final	60.0		1.20000	35.64500	488.00000	89.54167		0.00000	35.64500	
2 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.2000	35.6450	488.0000	89.5417				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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P

USEPA Method 3 Laboratory Data

Test Method: USEPA Method 26A
Analyte: HCl

Location: Unit 3 SDA Inlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst:
Analyst Emp No:

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1A	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.35000		9.00000	80.65000	30.01600	1.14976	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
1B	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.35000		9.00000	80.65000	30.01600	1.14976	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.75000		8.43000	80.82000	30.05720	1.16000	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.59000		8.67000	80.74000	30.04120	1.15486	☑ Fo value within expected range.

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QPPS

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USEPA Method 4 Laboratory Data

Location:	Unit 3 SDA Inlet	Test Method:	USEPA Method 26A
Client:	Wheelabrator South Broward, Inc.	Analyte:	HCl
Project No:	11414	Analyst:	D. Luckhard
		Analyst Emp No:	568

Test Run: 1A

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	544.2	475.9	68.3
Impinger 2	100 ml 0.1N H2SO4	619.4	552.3	67.1
Impinger 3	100 ml 0.1N H2SO4	552.4	540.2	12.2
Impinger 4	Empty	442.7	440.2	2.5
Impinger 5	Silica Gel	746.4	735.8	10.6
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
150.1	Liquid (gm)		
0.0	less rinse (gm)		
150.1	Net Liquid (gm)	150.1	☑ QA/QC OK
+ 10.6	Silica Gel (gm)	10.6	☑ QA/QC OK
160.7	Total Vlc (gm)	160.7	☑ QA/QC OK

Test Run: 1B

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	544.2	475.9	68.3
Impinger 2	100 ml 0.1N H2SO4	619.4	552.3	67.1
Impinger 3	100 ml 0.1N H2SO4	552.4	540.2	12.2
Impinger 4	Empty	442.7	440.2	2.5
Impinger 5	Silica Gel	746.4	735.8	10.6
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
150.1	Liquid (gm)		
0.0	less rinse (gm)		
150.1	Net Liquid (gm)	150.1	☑ QA/QC OK
+ 10.6	Silica Gel (gm)	10.6	☑ QA/QC OK
160.7	Total Vlc (gm)	160.7	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	523.4	460.6	62.8
Impinger 2	100 ml 0.1N H2SO4	639.2	565.5	73.7
Impinger 3	100 ml 0.1N H2SO4	556.9	541.3	15.6
Impinger 4	Empty	438.4	436.1	2.3
Impinger 5	Silica Gel	776.5	765.3	11.2
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
154.4	Liquid (gm)		
0.0	less rinse (gm)		
154.4	Net Liquid (gm)	154.4	☑ QA/QC OK
+ 11.2	Silica Gel (gm)	11.2	☑ QA/QC OK
165.6	Total Vlc (gm)	165.6	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	510.2	471.7	38.5
Impinger 2	100 ml 0.1N H2SO4	629.0	545.1	83.9
Impinger 3	100 ml 0.1N H2SO4	579.7	548.2	31.5
Impinger 4	Empty	468.5	462.2	6.3
Impinger 5	Silica Gel	784.5	771.5	13.0
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
160.2	Liquid (gm)		
0.0	less rinse (gm)		
160.2	Net Liquid (gm)	160.2	☑ QA/QC OK
+ 13.0	Silica Gel (gm)	13.0	☑ QA/QC OK
173.2	Total Vlc (gm)	173.2	☑ QA/QC OK

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QPPS

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SS ISOKINETIC Version 2006-138

Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 3 FF Outlet
Test Run: 1
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: K. Sullivan 579
Probe Operator: K. Sullivan 579
Test Date: 3/21/12
Start Time: 07:54
Stop Time: 09:40
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -12.7
O_2 (dry volume %): 9.48
CO_2 (dry volume %): 9.77
N_2+CO (dry volume %): 80.75

H_2O (condensate, ml or gm): 230.6
H_2O (silica, g): 8.8
Actual Moisture (%): 21.72

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-4
Meter ΔH@: 1.73740
Meter Y_d: 0.99530

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			944.445						
3-03	5.0		1.50	947.920	289	78	76		3.47	
3-03	10.0		1.50	951.350	297	78	76		3.43	
3-03	15.0		1.50	954.660	294	81	77		3.31	
3-03	20.0		1.50	958.130	296	81	78		3.47	
3-03	25.0		1.50	961.600	297	81	79		3.47	
3-03	30.0		1.50	965.120	297	83	80		3.52	
3-03	35.0		1.50	968.640	295	83	80		3.52	
3-03	40.0		1.50	972.130	295	84	80		3.49	
3-03	45.0		1.50	975.750	296	84	80		3.62	
3-03	50.0		1.50	979.040	296	84	80		3.29	
3-03	55.0		1.50	982.460	296	85	81		3.42	
3-03	60.0		1.50	985.910	296	85	81		3.45	
Final	60.0		1.50000	41.46500	295.33333	80.62500		0.00000	41.46500	
9 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.5000	41.4650	295.3333	80.6250				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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M

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SS ISOKINETIC Version 2006-13a

Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 3 FF Outlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: K. Sullivan | 579
Probe Operator: K. Sullivan | 579
Test Date: 3/21/12
Start Time: 10:04
Stop Time: 11:04
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -12.7
O_2 (dry volume %): 9.22
CO_2 (dry volume %): 10.02
N_2+CO (dry volume %): 80.76

H_2O (condensate, ml or gm): 231.8
H_2O (silica, g): 11.6
Actual Moisture (%): 21.99

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-4
Meter ΔH@: 1.73740
Meter Y_d: 0.99530

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			986.745						
3-03	5.0		1.50	990.300	296	82	81		3.55	
3-03	10.0		1.50	993.830	296	82	81		3.53	
3-03	15.0		1.50	997.300	296	86	82		3.47	
3-03	20.0		1.50	1000.730	296	87	82		3.43	
3-03	25.0		1.50	1004.160	295	88	83		3.43	
3-03	30.0		1.50	1007.600	295	88	83		3.44	
3-03	35.0		1.50	1011.010	295	88	84		3.41	
3-03	40.0		1.50	1014.430	297	89	84		3.42	
3-03	45.0		1.50	1018.000	296	88	84		3.57	
3-03	50.0		1.50	1021.540	296	88	84		3.54	
3-03	55.0		1.50	1025.080	296	89	85		3.54	
3-03	60.0		1.50	1028.580	296	89	85		3.50	
Final	60.0		1.50000	41.83500	295.83333	85.08333		0.00000	41.83500	
9 points sampled		Sq.Rt.ΔP								
QC-Check: Field Averages			1.5000	41.8350	295.8333	85.0833				
		☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK				

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N

Prepared by Clean Air Engineering Proprietary Software
SS ISOKINETIC Version 2008-13e

Field Data Printout

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 3 FF Outlet
Test Run: 3
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Source Area (ft^2): 64.00000
Meter Operator: K. Sullivan 579
Probe Operator: K. Sullivan 579
Test Date: 3/21/12
Start Time: 11:30
Stop Time: 12:30
Leak Rate Before: 0.004 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 9 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -10.7
O_2 (dry volume %): 9.25
CO_2 (dry volume %): 10.06
N_2+CO (dry volume %): 80.69

H_2O (condensate, ml or gm): 228.9
H_2O (silica, g): 15.6
Actual Moisture (%): 22.14

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☑ Pass ☐ Fail

Meter Box ID. No: 66-4
Meter ΔH@: 1.73740
Meter Y_d: 0.99530

Traverse Point	Run Time 5.0 min/read	Pitot ΔP_s (in. H_2O)	Sample ΔH (in. H_2O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} (°F)	Dry Gas Meter T_{m-out} (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in. H_2O}$)	Volume (calculated) (ft^3)	Isokinetics (calculated) (%)
	0.0			29.295						
3-03	5.0		1.50	32.740	296	85	85		3.45	
3-03	10.0		1.50	36.020	296	86	86		3.28	
3-03	15.0		1.50	39.230	296	87	85		3.21	
3-03	20.0		1.50	42.800	297	88	85		3.57	
3-03	25.0		1.50	46.420	299	88	85		3.62	
3-03	30.0		1.50	50.040	293	88	85		3.62	
3-03	35.0		1.50	53.520	295	88	85		3.48	
3-03	40.0		1.50	57.000	295	88	85		3.48	
3-03	45.0		1.50	60.490	295	88	85		3.49	
3-03	50.0		1.50	64.000	294	88	85		3.51	
3-03	55.0		1.50	67.530	294	88	85		3.53	
3-03	60.0		1.50	71.040	294	88	85		3.51	
Final	60.0		1.50000	41.74500	295.33333	86.29167		0.00000	41.74500	

9 points sampled

QC-Check: Field Averages	Sq.Rt.ΔP	ΔH	Metered	Stack	Dry Gas Meter
		1.5000	41.7450	295.3330	86.2917
	☐ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK	☑ Avg. OK

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R

USEPA Method 3 Laboratory Data

Test Method: **USEPA Method 26A**
Analyte: **HCl**

Location: Unit 3 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414
Method: EPA Method 3A
Fuel Type: Municipal Waste
F_o for Fuel: 1.03 to 1.3

Analyst: S. Brown
Analyst Emp No: 433

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	
								Method of Analysis: CEM
1	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.77000		9.48000	80.75000	29.94240	1.16888	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	
								Method of Analysis: CEM
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.02000		9.22000	80.76000	29.97200	1.16567	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	
								Method of Analysis: CEM
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.06000		9.25000	80.69000	29.97960	1.15805	☑ Fo value within expected range.

Run Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Percent N_2	Dry Mol. Weight	F_o	
								Method of Analysis:
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Test Method:	USEPA Method 26A
Analyte:	HCl
Analyst:	R. Vicere
Analyst Emp No:	563

Location: Unit 3 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11414

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	631.0	552.3	78.7
Impinger 2	100 ml 0.1N H2SO4	749.7	629.1	120.6
Impinger 3	100 ml 0.1N H2SO4	564.2	536.5	27.7
Impinger 4	Empty	478.2	474.6	3.6
Impinger 5	Silica Gel	749.8	741.0	8.8
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
230.6	Liquid (gm)		
0.0	less rinse (gm)		
230.6	Net Liquid (gm)	230.6	☑ QA/QC OK
+ 8.8	Silica Gel (gm)	8.8	☑ QA/QC OK
239.4	Total Vlc (gm)	239.4	☑ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	534.4	460.0	74.4
Impinger 2	100 ml 0.1N H2SO4	655.6	539.4	116.2
Impinger 3	100 ml 0.1N H2SO4	666.1	632.1	34.0
Impinger 4	Empty	445.9	438.7	7.2
Impinger 5	Silica Gel	741.7	730.1	11.6
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
231.8	Liquid (gm)		
0.0	less rinse (gm)		
231.8	Net Liquid (gm)	231.8	☑ QA/QC OK
+ 11.6	Silica Gel (gm)	11.6	☑ QA/QC OK
243.4	Total Vlc (gm)	243.4	☑ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	511.5	459.1	52.4
Impinger 2	100 ml 0.1N H2SO4	677.3	552.3	125.0
Impinger 3	100 ml 0.1N H2SO4	587.2	546.2	41.0
Impinger 4	Empty	448.6	438.1	10.5
Impinger 5	Silica Gel	760.1	744.5	15.6
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
228.9	Liquid (gm)		
0.0	less rinse (gm)		
228.9	Net Liquid (gm)	228.9	☑ QA/QC OK
+ 15.6	Silica Gel (gm)	15.6	☑ QA/QC OK
244.5	Total Vlc (gm)	244.5	☑ QA/QC OK

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1				
Impinger 2				
Impinger 3				
Impinger 4				
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

Rinse: (ml or gm)

		Field Data Check	
	Liquid (gm)		
	less rinse (gm)		
	Net Liquid (gm)		☐ QA/QC OK
	Silica Gel (gm)		☐ QA/QC OK
	Total Vlc (gm)		☐ QA/QC OK

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MNR@

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Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 20, 2012
Start Time 10:24
Stop Time 10:44

IGS Bag Concentrations

		Channel 1	Channel 2	
		O2	CO2	
		FF Outlet %dv	FF Outlet %dv	
Calibration Checks				
C_{oi}	Initial zero	0.060	-0.034	
C_{ui}	Initial upscale	14.030	6.009	
C_{of}	Final zero	0.117	-0.020	
C_{uf}	Final upscale	14.070	6.027	
C_{ma}	Actual gas value	14.0	5.99	
C_{lin}	Linearity Gas Value	6.0	13.9	
Averages (concentrations)		**U1 R1 5/29**		**Fd**
C_{Avg}	Average conc.	8.188	11.094	
C_{Gas}	**Bias adjusted**	**8.12**	**11.02**	**1.16**
Averages (concentrations)		**U2 Inlet R1 26A**		
C_{Avg}	Average conc.	8.521	10.794	
C_{Gas}	**Bias adjusted**	**8.46**	**10.72**	**1.16**
Averages (concentrations)		**U2 R2 Inlet 26A**		
C_{Avg}	Average conc.	8.232	11.114	
C_{Gas}	**Bias adjusted**	**8.17**	**11.04**	**1.15**
Averages (concentrations)		**U2 R1 Outlet 26A**		
C_{Avg}	Average conc.	9.705	9.585	
C_{Gas}	**Bias adjusted**	**9.64**	**9.52**	**1.18**
Averages (concentrations)		**U2 R2 Outlet 26A**		
C_{Avg}	Average conc.	9.749	9.786	
C_{Gas}	**Bias adjusted**	**9.69**	**9.72**	**1.15**
Averages (concentrations)		**U3 R1 5/29**		
C_{Avg}	Average conc.	9.539	9.875	
C_{Gas}	**Bias adjusted**	**9.48**	**9.81**	**1.16**

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10:24:50	0.009	-0.033	
10:25:05	0.060	-0.034	
10:25:20	1.770	-0.027	
10:25:35	18.416	2.677	
10:25:50	14.854	6.050	
10:24:50	0.009	-0.033	
10:25:05	**0.060**	**-0.034**	**zero**
10:25:20	1.770	-0.027	
10:25:35	18.416	2.677	
10:25:50	14.854	6.050	
10:26:05	14.868	6.034	
10:26:20	14.458	6.021	
10:26:35	14.001	6.030	

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Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 20, 2012
Start Time 10:24
Stop Time 10:44

IGS Bag Concentrations

	Channel 1	Channel 2	
	O2	CO2	
	FF Outlet	FF Outlet	
	%dv	%dv	
10:26:50	13.926	6.041	
10:27:05	13.929	6.001	
10:27:20	13.950	5.972	
10:27:35	14.016	6.003	
10:27:50	**14.030**	**6.009**	**span**
10:28:05	14.034	6.016	
10:28:20	14.049	6.025	
10:28:35	14.049	6.026	
10:28:50	15.773	4.177	
10:29:05	12.114	9.063	
10:29:20	6.173	14.089	
10:29:35	6.145	14.084	
10:29:50	**6.151**	**14.113**	**linearity**
10:30:05	6.315	13.849	
10:30:20	19.737	0.687	
10:30:35	17.660	1.044	
10:30:50	8.360	11.050	
10:31:05	8.196	11.087	
10:31:20	**8.188**	**11.094**	**U1 R1 5/29**
10:31:35	8.187	11.099	
10:31:50	8.186	11.094	
10:32:05	8.184	11.102	
10:32:20	16.501	3.444	
10:32:35	19.521	1.659	
10:32:50	8.928	10.754	
10:33:05	8.564	10.831	
10:33:20	8.533	10.794	
10:33:35	**8.521**	**10.794**	**U2 Inlet R1 26A**
10:33:50	16.230	3.651	
10:34:05	14.258	6.455	
10:34:20	8.258	11.106	
10:34:35	8.246	11.121	
10:34:50	**8.232**	**11.114**	**U2 R2 Inlet 26A**
10:35:05	8.232	11.126	
10:35:20	12.484	7.035	
10:35:35	17.553	3.403	
10:35:50	10.246	9.154	
10:36:05	20.083	-1.508	
10:36:20	20.793	-0.049	
10:36:35	15.794	4.676	
10:36:50	9.392	9.592	
10:37:05	9.603	9.637	
10:37:20	9.156	9.555	
10:37:35	**9.705**	**9.585**	**U2 R1 Outlet 26A**
10:37:50	9.184	9.641	
10:38:05	16.313	3.303	
10:38:20	20.765	0.059	
10:38:35	12.715	7.770	
10:38:50	9.759	9.765	

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QA/QC__________
Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 20, 2012
Start Time 10:24
Stop Time 10:44

IGS Bag Concentrations

	Channel 1 O2 FF Outlet %dv	Channel 2 CO2 FF Outlet %dv	
10:39:05	9.756	9.779	
10:39:20	**9.749**	**9.786**	**U2 R2 Outlet 26A**
10:39:35	9.761	9.777	
10:39:50	13.417	6.219	
10:40:05	20.717	0.066	
10:40:20	20.832	0.044	
10:40:35	18.989	2.112	
10:40:50	9.768	9.809	
10:41:05	9.547	9.854	
10:41:20	9.544	9.867	
10:41:35	**9.539**	**9.875**	**U3 R1 5/29**
10:41:50	9.542	9.884	
10:42:05	11.719	7.735	
10:42:20	15.839	4.645	
10:42:35	14.059	6.021	
10:42:50	**14.070**	**6.027**	**span**
10:43:05	15.731	4.325	
10:43:20	13.621	0.038	
10:43:35	0.262	-0.011	
10:43:50	0.129	-0.018	
10:44:05	**0.117**	**-0.020**	**zero**
10:44:20	5.397	-0.013	

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Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 20, 2012
Start Time 16:01
Stop Time 16:17

IGS Bag Concentrations

		Channel 1	Channel 2	
		O2	CO2	
		FF Outlet	FF Outlet	
		%dv	%dv	
Calibration Checks				
C_{oi}	Initial zero	-0.025	-0.035	
C_{ui}	Initial upscale	13.979	5.963	
C_{of}	Final zero	-0.010	-0.024	
C_{uf}	Final upscale	13.951	5.897	
C_{ma}	Actual gas value	14.0	5.99	
C_{lin}	Linearity Gas Value	6.0	13.9	
Averages (concentrations)		**U1 R2 5/29**		**Fd**
C_{Avg}	Average conc.	8.615	10.492	
C_{Gas}	**Bias adjusted**	**8.64**	**10.58**	**1.16**
Averages (concentrations)		**U1 R3 5/29**		
C_{Avg}	Average conc.	8.889	10.428	
C_{Gas}	**Bias adjusted**	**8.92**	**10.51**	**1.14**
Averages (concentrations)		**U2 R3 In 26A**		
C_{Avg}	Average conc.	8.488	10.709	
C_{Gas}	**Bias adjusted**	**8.52**	**10.79**	**1.15**
Averages (concentrations)		**U2 R3 Out 26A**		
C_{Avg}	Average conc.	9.570	9.720	
C_{Gas}	**Bias adjusted**	**9.60**	**9.80**	**1.15**
Averages (concentrations)		**U1 R1 M23**		
C_{Avg}	Average conc.	8.744	10.470	
C_{Gas}	**Bias adjusted**	**8.77**	**10.55**	**1.15**

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16:01:40	0.162	-0.031	
16:01:55	-0.005	-0.033	
16:01:40	0.162	-0.031	
16:01:55	-0.005	-0.033	
16:02:10	**-0.025**	**-0.035**	**zero**
16:02:25	6.237	-0.020	
16:02:40	15.497	4.621	
16:02:55	13.734	5.756	
16:03:10	13.854	5.950	
16:03:25	13.857	5.959	
16:03:40	13.858	5.956	
16:03:55	13.937	5.944	
16:04:10	**13.979**	**5.963**	**span**
16:04:25	16.160	3.791	
16:04:40	16.011	5.219	
16:04:55	6.088	13.875	
16:05:10	5.974	13.873	
16:05:25	**5.961**	**13.856**	**linearity**

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QA/QC__________
Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 20, 2012
Start Time 16:01
Stop Time 16:17

IGS Bag Concentrations

	Channel 1 O2 FF Outlet %dv	Channel 2 CO2 FF Outlet %dv	
16:05:40	10.004	9.539	
16:05:55	20.585	0.093	
16:06:10	20.760	0.040	
16:06:25	18.217	2.778	
16:06:40	8.845	10.441	
16:06:55	8.663	10.519	
16:07:10	8.638	10.494	
16:07:25	**8.615**	**10.492**	**U1 R2 5/29**
16:07:40	9.576	9.464	
16:07:55	20.347	0.190	
16:08:10	19.147	1.895	
16:08:25	9.166	10.308	
16:08:40	8.896	10.373	
16:08:55	**8.889**	**10.428**	**U1 R3 5/29**
16:09:10	8.872	10.429	
16:09:25	15.288	4.448	
16:09:40	20.737	0.048	
16:09:55	20.744	0.034	
16:10:10	20.740	0.038	
16:10:25	14.460	6.211	
16:10:40	8.523	10.685	
16:10:55	**8.488**	**10.709**	**U2 R3 In 26A**
16:11:10	8.492	10.726	
16:11:25	11.977	7.356	
16:11:40	20.589	0.082	
16:11:55	20.709	0.045	
16:12:10	17.047	3.801	
16:12:25	9.628	9.669	
16:12:40	**9.570**	**9.720**	**U2 R3 Out 26A**
16:12:55	9.563	9.730	
16:13:10	17.511	2.067	
16:13:25	19.278	1.783	
16:13:40	9.051	10.395	
16:13:55	8.762	10.468	
16:14:10	**8.744**	**10.470**	**U1 R1 M23**
16:14:25	8.734	10.475	
16:14:40	18.475	1.521	
16:14:55	20.644	0.039	
16:15:10	18.542	2.240	
16:15:25	**13.951**	**5.897**	**span**
16:15:40	14.196	5.556	
16:15:55	12.462	0.161	
16:16:10	0.066	-0.013	
16:16:25	-0.019	-0.018	
16:16:40	**-0.010**	**-0.024**	**zero**
16:16:55	-0.020	-0.024	
16:17:10	0.960	-0.029	
16:17:25	19.604	0.018	

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Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 21, 2012
Start Time 12:47
Stop Time 13:10

IGS Bag Concentrations

		Channel 1	Channel 2	
		O2	CO2	
		FF Outlet %dv	FF Outlet %dv	
Calibration Checks				
C_{oi}	Initial zero	-0.023	-0.024	
C_{ui}	Initial upscale	13.979	5.981	
C_{of}	Final zero	0.045	-0.017	
C_{uf}	Final upscale	14.033	5.998	
C_{ma}	Actual gas value	14.0	5.99	
C_{lin}	Linearity Gas Value	6.0	13.9	
Averages (concentrations)		**U3 R1 Inlet 26A**		**Fd**
C_{Avg}	Average conc.	9.004	10.364	
C_{Gas}	**Bias adjusted**	**9.00**	**10.35**	**1.15**
Averages (concentrations)		**U3 R2 In 26A**		
C_{Avg}	Average conc.	8.434	10.770	
C_{Gas}	**Bias adjusted**	**8.43**	**10.75**	**1.16**
Averages (concentrations)		**U3 R3 In 26A**		
C_{Avg}	Average conc.	8.679	10.608	
C_{Gas}	**Bias adjusted**	**8.67**	**10.59**	**1.15**
Averages (concentrations)		**U3 R1 Out 26A**		
C_{Avg}	Average conc.	9.483	9.785	
C_{Gas}	**Bias adjusted**	**9.48**	**9.77**	**1.17**
Averages (concentrations)		**U3 R2 Out 26A**		
C_{Avg}	Average conc.	9.224	10.036	
C_{Gas}	**Bias adjusted**	**9.22**	**10.02**	**1.17**
Averages (concentrations)		**U3 R3 Out 26A**		
C_{Avg}	Average conc.	9.260	10.068	
C_{Gas}	**Bias adjusted**	**9.25**	**10.06**	**1.16**
Averages (concentrations)		**U2 R1 5/29**		
C_{Avg}	Average conc.	9.104	10.047	
C_{Gas}	**Bias adjusted**	**9.10**	**10.03**	**1.18**
Averages (concentrations)		**U1 R2 M23**		
C_{Avg}	Average conc.	9.476	9.804	
C_{Gas}	**Bias adjusted**	**9.47**	**9.79**	**1.17**

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12:47:51	0.101	-0.025
12:48:06	0.096	-0.025
12:48:21	0.011	-0.024

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QA/QC__________
Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 21, 2012
Start Time 12:47
Stop Time 13:10

IGS Bag Concentrations

	Channel 1 O2 FF Outlet %dv	Channel 2 CO2 FF Outlet %dv	
12:47:51	0.101	-0.025	
12:48:06	0.096	-0.025	
12:48:21	0.011	-0.024	
12:48:36	-0.035	-0.024	
12:48:51	**-0.023**	**-0.024**	**zero**
12:49:06	5.754	-0.022	
12:49:21	16.902	3.372	
12:49:36	13.841	5.912	
12:49:51	13.987	5.973	
12:50:06	**13.979**	**5.981**	**span**
12:50:21	13.739	5.573	
12:50:36	13.869	5.824	
12:50:51	13.991	6.005	
12:51:06	14.040	5.863	
12:51:21	19.274	1.310	
12:51:36	9.493	11.556	
12:51:51	5.917	14.182	
12:52:06	**5.882**	**14.187**	**linearity**
12:52:21	5.901	14.194	
12:52:36	11.785	8.121	
12:52:51	20.607	0.138	
12:53:06	11.433	8.897	
12:53:21	9.009	10.337	
12:53:36	**9.004**	**10.364**	**U3 R1 Inlet 26A**
12:53:51	9.819	9.546	
12:54:06	20.429	0.136	
12:54:21	20.502	-6.638	
12:54:36	20.717	-4.996	
12:54:51	20.474	-5.531	
12:55:06	20.569	-0.091	
12:55:21	20.729	-1.855	
12:55:36	20.939	0.008	
12:55:51	14.949	5.888	
12:56:06	8.496	10.739	
12:56:21	8.451	10.770	
12:56:36	**8.434**	**10.770**	**U3 R2 In 26A**
12:56:51	8.438	10.760	
12:57:06	18.961	1.267	
12:57:21	20.872	0.071	
12:57:36	16.980	3.814	
12:57:51	8.685	10.488	
12:58:06	8.680	10.609	
12:58:21	**8.679**	**10.608**	**U3 R3 In 26A**
12:58:36	9.521	9.702	
12:58:51	20.405	0.226	
12:59:06	19.766	1.306	
12:59:21	9.904	9.574	
12:59:36	9.495	9.781	
12:59:51	**9.483**	**9.785**	**U3 R1 Out 26A**

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SS CEM Version 06-2004a

QA/QC__________
Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 21, 2012
Start Time 12:47
Stop Time 13:10

IGS Bag Concentrations

	Channel 1 O2 FF Outlet %dv	Channel 2 CO2 FF Outlet %dv	
13:00:06	13.513	6.029	
13:00:21	20.781	0.097	
13:00:36	14.687	5.927	
13:00:51	9.236	9.968	
13:01:06	9.222	10.026	
13:01:21	**9.224**	**10.036**	**U3 R2 Out 26A**
13:01:36	9.322	9.920	
13:01:51	19.883	0.634	
13:02:06	15.503	5.343	
13:02:21	9.298	10.054	
13:02:36	**9.260**	**10.068**	**U3 R3 Out 26A**
13:02:51	9.254	10.069	
13:03:06	12.580	6.873	
13:03:21	20.733	0.113	
13:03:36	14.219	6.326	
13:03:51	9.143	10.026	
13:04:06	**9.104**	**10.047**	**U2 R1 5/29**
13:04:21	11.960	7.296	
13:04:36	20.729	0.117	
13:04:51	18.108	2.959	
13:05:06	9.600	9.757	
13:05:21	9.455	9.789	
13:05:36	**9.476**	**9.804**	**U1 R2 M23**
13:05:51	9.662	9.611	
13:06:06	19.320	1.436	
13:06:21	14.215	5.981	
13:06:36	14.048	6.012	
13:06:51	**14.033**	**5.998**	**span**
13:07:06	14.017	5.929	
13:07:21	13.970	5.994	
13:07:36	13.983	5.939	
13:07:51	13.821	5.893	
13:08:06	14.068	6.016	
13:08:21	13.402	5.695	
13:08:36	14.074	6.019	
13:08:51	14.070	6.011	
13:09:06	18.646	1.001	
13:09:21	1.086	-0.007	
13:09:36	0.063	-0.012	
13:09:51	**0.045**	**-0.017**	**zero**
13:10:06	0.044	-0.018	
13:10:21	0.041	-0.018	

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Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 21, 2012
Start Time 16:55
Stop Time 17:09

IGS Bag Concentrations

		Channel 1	Channel 2	
		O2	CO2	
		FF Outlet	FF Outlet	
		%dv	%dv	
Calibration Checks				
C_{oi}	Initial zero	-0.023	-0.037	
C_{ui}	Initial upscale	14.033	5.947	
C_{of}	Final zero	0.028	-0.014	
C_{uf}	Final upscale	14.035	5.948	
C_{ma}	Actual gas value	14.0	5.99	
C_{lin}	Linearity Gas Value	6.0	13.9	
Averages (concentrations)		**U1 R3 M23**		**Fd**
C_{Avg}	Average conc.	8.989	10.463	
C_{Gas}	**Bias adjusted**	**8.97**	**10.52**	**1.13**
Averages (concentrations)		**U2 R2 5//29**		
C_{Avg}	Average conc.	9.561	9.746	
C_{Gas}	**Bias adjusted**	**9.54**	**9.80**	**1.16**
Averages (concentrations)		**U2 R3 5/29**		
C_{Avg}	Average conc.	9.685	9.772	
C_{Gas}	**Bias adjusted**	**9.66**	**9.82**	**1.14**
Averages (concentrations)		**U1 R4 M29**		
C_{Avg}	Average conc.	8.965	10.375	
C_{Gas}	**Bias adjusted**	**8.94**	**10.43**	**1.15**

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16:55:44	20.743	0.014	
16:55:59	10.706	-0.014	
16:56:14	-0.304	-0.024	
16:56:29	-0.159	-0.024	
16:56:44	-0.024	-0.024	
16:56:59	**-0.023**	**-0.037**	**zero**
16:57:14	0.965	-0.020	
16:57:29	19.853	0.019	
16:57:44	18.011	3.053	
16:57:59	14.184	5.922	
16:58:14	14.058	5.949	
16:58:29	**14.033**	**5.947**	**span**
16:58:44	14.061	5.967	
16:58:59	18.132	2.116	
16:59:14	19.852	0.058	
16:59:29	1.030	-0.010	
16:59:44	1.766	-0.009	
16:59:59	13.138	7.193	
17:00:14	6.139	13.849	
17:00:29	6.104	13.886	
17:00:44	**6.110**	**13.922**	**linearity**
17:00:59	8.547	11.283	

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Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 21, 2012
Start Time 16:55
Stop Time 17:09

IGS Bag Concentrations

	Channel 1 O2 FF Outlet %dv	Channel 2 CO2 FF Outlet %dv	
17:01:14	20.539	0.150	
17:01:29	12.809	7.752	
17:01:44	9.003	10.420	
17:01:59	8.973	10.387	
17:02:14	**8.989**	**10.463**	**U1 R3 M23**
17:02:29	10.981	8.437	
17:02:44	20.660	0.134	
17:02:59	20.904	0.077	
17:03:14	18.129	2.930	
17:03:29	9.779	9.721	
17:03:44	9.561	9.746	
17:03:59	**9.561**	**9.746**	**U2 R2 5//29**
17:04:14	9.567	9.766	
17:04:29	17.956	2.161	
17:04:44	15.176	5.229	
17:04:59	17.169	3.700	
17:05:14	9.783	9.769	
17:05:29	**9.685**	**9.772**	**U2 R3 5/29**
17:05:44	9.659	9.769	
17:05:59	18.353	1.803	
17:06:14	20.783	0.073	
17:06:29	14.951	5.858	
17:06:44	9.009	10.362	
17:06:59	**8.965**	**10.375**	**U1 R4 M29**
17:07:14	8.968	10.418	
17:07:29	16.101	4.072	
17:07:44	14.079	5.959	
17:07:59	14.044	5.926	
17:08:14	**14.035**	**5.948**	**span**
17:08:29	16.014	3.996	
17:08:44	18.877	0.084	
17:08:59	0.726	-0.002	
17:09:14	0.055	-0.011	
17:09:29	**0.028**	**-0.014**	**zero**
17:09:44	4.690	0.003	

QA/QC__________
Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 22, 2012
Start Time 11:58
Stop Time 12:19

IGS Bag Concentrations

		Channel 1 O2	Channel 2 CO2	
		FF Outlet %dv	FF Outlet %dv	
Calibration Checks				
C_{oi}	Initial zero	-0.031	-0.024	
C_{ui}	Initial upscale	13.954	6.024	
C_{of}	Final zero	-0.003	-0.012	
C_{uf}	Final upscale	13.934	6.012	
C_{ma}	Actual gas value	14.0	5.99	
C_{lin}	Linearity Gas Value	6.0	13.9	
Averages (concentrations)		**U1 R1 Inlet 26A**		**Fd**
C_{Avg}	Average conc.	6.942	11.899	
C_{Gas}	**Bias adjusted**	**6.98**	**11.83**	**1.18**
Averages (concentrations)		**U1 R2 Inlet 26A**		
C_{Avg}	Average conc.	7.071	11.892	
C_{Gas}	**Bias adjusted**	**7.11**	**11.82**	**1.17**
Averages (concentrations)		**U1 R3 Inlet 26A**		
C_{Avg}	Average conc.	7.810	11.125	
C_{Gas}	**Bias adjusted**	**7.85**	**11.06**	**1.18**
Averages (concentrations)		**U1 R1 Outlet 26A**		
C_{Avg}	Average conc.	9.110	10.013	
C_{Gas}	**Bias adjusted**	**9.15**	**9.95**	**1.18**
Averages (concentrations)		**U1 R2 Outlet 26A**		
C_{Avg}	Average conc.	8.635	10.403	
C_{Gas}	**Bias adjusted**	**8.68**	**10.34**	**1.18**
Averages (concentrations)		**U1 R3 Outlet 26A**		
C_{Avg}	Average conc.	9.158	9.851	
C_{Gas}	**Bias adjusted**	**9.20**	**9.79**	**1.19**
Averages (concentrations)		**U2 R4 M29**		
C_{Avg}	Average conc.	9.128	10.015	
C_{Gas}	**Bias adjusted**	**9.17**	**9.96**	**1.18**
Averages (concentrations)		**U3 R2 5/29**		
C_{Avg}	Average conc.	8.805	10.223	
C_{Gas}	**Bias adjusted**	**8.85**	**10.16**	**1.19**

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11:58:17	-0.031	-0.024
11:58:32	1.946	-0.017
11:58:47	16.497	3.517
11:59:02	13.952	6.101
11:59:17	13.938	6.074

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Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 22, 2012
Start Time 11:58
Stop Time 12:19

IGS Bag Concentrations

	Channel 1 O2 FF Outlet %dv	Channel 2 CO2 FF Outlet %dv	
11:58:17	**-0.031**	**-0.024**	**zero**
11:58:32	1.946	-0.017	
11:58:47	16.497	3.517	
11:59:02	13.952	6.101	
11:59:17	13.938	6.074	
11:59:32	13.742	5.912	
11:59:47	13.960	6.112	
12:00:02	13.951	6.093	
12:00:17	13.947	6.111	
12:00:32	13.959	6.067	
12:00:47	**13.954**	**6.024**	**span**
12:01:02	14.565	5.344	
12:01:17	17.385	3.868	
12:01:32	5.940	14.223	
12:01:47	5.676	14.133	
12:02:02	**5.746**	**14.280**	**linearity**
12:02:17	6.635	13.236	
12:02:32	19.846	-3.310	
12:02:47	20.443	-2.028	
12:03:02	20.194	-5.085	
12:03:17	20.571	-1.626	
12:03:32	18.688	2.458	
12:03:47	7.220	11.842	
12:04:02	6.947	11.884	
12:04:17	**6.942**	**11.899**	**U1 R1 Inlet 26A**
12:04:32	6.922	11.892	
12:04:47	17.655	2.811	
12:05:02	11.341	8.173	
12:05:17	16.695	4.209	
12:05:32	7.202	11.853	
12:05:47	**7.071**	**11.892**	**U1 R2 Inlet 26A**
12:06:02	7.062	11.894	
12:06:17	14.976	4.800	
12:06:32	16.250	4.218	
12:06:47	20.308	0.206	
12:07:02	16.253	4.527	
12:07:17	7.895	11.119	
12:07:32	7.819	11.128	
12:07:47	**7.810**	**11.125**	**U1 R3 Inlet 26A**
12:08:02	11.956	7.213	
12:08:17	20.552	0.127	
12:08:32	17.659	3.212	
12:08:47	9.230	9.972	
12:09:02	9.122	10.010	
12:09:17	**9.110**	**10.013**	**U1 R1 Outlet 26A**
12:09:32	11.679	7.559	
12:09:47	20.513	0.128	
12:10:02	14.350	6.171	
12:10:17	8.687	10.381	

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Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 22, 2012
Start Time 11:58
Stop Time 12:19

IGS Bag Concentrations

	Channel 1 O2 FF Outlet %dv	Channel 2 CO2 FF Outlet %dv	
12:10:32	**8.635**	**10.403**	**U1 R2 Outlet 26A**
12:10:47	8.937	10.071	
12:11:02	19.915	0.435	
12:11:17	19.314	1.527	
12:11:32	9.292	8.558	
12:11:47	9.062	7.499	
12:12:02	9.319	7.462	
12:12:17	9.574	8.025	
12:12:32	9.170	9.814	
12:12:47	9.140	9.848	
12:13:02	**9.158**	**9.851**	**U1 R3 Outlet 26A**
12:13:17	9.180	9.881	
12:13:32	11.728	7.433	
12:13:47	20.492	0.134	
12:14:02	20.657	0.101	
12:14:17	11.871	8.261	
12:14:32	9.126	9.979	
12:14:47	**9.128**	**10.015**	**U2 R4 M29**
12:15:02	9.117	10.012	
12:15:17	15.195	4.476	
12:15:32	20.683	0.106	
12:15:47	20.084	0.936	
12:16:02	9.437	10.035	
12:16:17	8.814	10.227	
12:16:32	**8.805**	**10.223**	**U3 R2 5/29**
12:16:47	8.810	10.227	
12:17:02	13.729	5.739	
12:17:17	9.871	0.046	
12:17:32	0.054	-0.013	
12:17:47	-0.010	-0.015	
12:18:02	**-0.003**	**-0.012**	**zero**
12:18:17	3.291	0.870	
12:18:32	13.705	5.949	
12:18:47	13.928	6.013	
12:19:02	**13.934**	**6.012**	**span**
12:19:17	15.906	4.063	

QA/QC__________
Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 22, 2012
Start Time 15:07
Stop Time 15:16

IGS Bag Concentrations

		Channel 1	Channel 2	
		O2	CO2	
		FF Outlet	FF Outlet	
		%dv	%dv	
Calibration Checks				
C_{oi}	Initial zero	-0.122	-0.023	
C_{ui}	Initial upscale	13.978	5.940	
C_{of}	Final zero	-0.120	-0.010	
C_{uf}	Final upscale	13.952	5.938	
C_{ma}	Actual gas value	14.0	5.99	
C_{lin}	Linearity Gas Value	6.0	13.9	
Averages (concentrations)		**U3 R3 5/29**		**Fd**
C_{Avg}	Average conc.	9.163	9.971	
C_{Gas}	**Bias adjusted**	**9.23**	**10.05**	**1.16**
Averages (concentrations)		**U3 R4 M29**		
C_{Avg}	Average conc.	9.180	9.966	
C_{Gas}	**Bias adjusted**	**9.24**	**10.04**	**1.16**

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15:07:14	20.602	0.042	
15:07:29	6.754	0.005	
15:07:44	-0.058	-0.023	
15:07:59	**-0.122**	**-0.023**	**zero**
15:08:14	-0.146	-0.024	
15:08:29	3.964	0.001	
15:08:44	17.646	2.645	
15:08:59	13.909	5.914	
15:09:14	13.937	5.912	
15:09:29	**13.978**	**5.940**	**span**
15:09:44	14.915	4.911	
15:09:59	14.418	6.734	
15:10:14	5.814	14.081	
15:10:29	5.754	14.114	
15:10:44	**5.741**	**14.117**	**linearity**
15:10:59	9.199	10.919	
15:11:14	6.116	14.006	
15:11:29	9.893	9.860	
15:11:44	20.575	0.186	
15:11:59	13.047	7.280	
15:12:14	9.189	9.951	
15:12:29	9.160	9.978	
15:12:44	**9.163**	**9.971**	**U3 R3 5/29**
15:12:59	9.182	9.920	
15:13:14	19.518	0.876	
15:13:29	20.440	0.355	
15:13:44	10.986	9.045	
15:13:59	9.198	9.951	
15:14:14	**9.180**	**9.966**	**U3 R4 M29**
15:14:29	9.170	9.973	

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Date__________

Wheelabrator
CleanAir Project No. 11414
South Broward
FF Outlet, SDA Inlet

March 22, 2012
Start Time 15:07
Stop Time 15:16

IGS Bag Concentrations

	Channel 1	**Channel 2**	
	O2	**CO2**	
	FF Outlet	**FF Outlet**	
	%dv	**%dv**	
15:14:44	15.766	4.001	
15:14:59	20.698	0.195	
15:15:14	14.829	5.533	
15:15:29	13.996	5.956	
15:15:44	**13.952**	**5.938**	**span**
15:15:59	14.807	4.672	
15:16:14	1.746	0.028	
15:16:29	-0.097	-0.004	
15:16:44	**-0.120**	**-0.010**	**zero**
15:16:59	6.018	0.021	

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Date__________

WHEELABRATOR SOUTH BROWARD, INC.
Clean Air Project No: 11414
Location: Ash Unloading / Conveyor
Date (2010): March 22
Start Time: 10:53
End Time: 12:43

METHOD 22 FIELD DATA PRINTOUT

Run	Clock Time (start)	Observation Period (minutes)	Accumulated Emission Duration (seconds)
1	10:53 11:13	20	0
2	11:18 11:38	20	0
3	11:43 12:03	20	0
4	12:08 12:28	20	0
5	12:33 12:43	10	0
		Total (%)	**0**
		Total (minutes)	**0**

WHEELABRATOR SOUTH BROWARD, INC.
Clean Air Project No: 11414
Location: Ash Unloading / Conveyor
Date (2010): March 22
Start Time: 13:03
End Time: 15:53

METHOD 22 FIELD DATA PRINTOUT

Run	Clock Time (start)	Observation Period (minutes)	Accumulated Emission Duration (seconds)
1	13:03 13:23	20	0
2	13:28 13:48	20	0
3	13:53 14:13	20	0
4	14:18 14:38	20	0
5	14:43 14:53	10	0
		Total (%)	**0**
		Total (minutes)	**0**

LABORATORY DATA

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I herby certify that all pages contained within this Appendix have been reviewed and, to the best of my ability, verified as accurate.

QA/QC Initials: MC

Date: 4/27/12

CleanAir

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 5/202 (FPM/CPM)
Gravimetric Laboratory Data Summary for FPM

☐ Draft Lab Data

Run No.		**Blank**	**1**	**2**	**3**
Date (2012)			Mar 20	Mar 20	Mar 20
Start Time (approx.)			07:52	10:29	13:04
Stop Time (approx.)			10:05	12:44	15:20
	Analytical Detection Limits				
MDL_f	Minimum detection limit for filter (g)	0.00010			
MDL_s	Minimum detection limit for solvent rinse (g)	0.00010			
	Carbon Feed Rate - (lbs/hr)				
m_{f1}	Filter No. 1 residue mass (g)		0.00010	nd	0.00030
m_{f2}	Filter No. 2 residue mass (g)		[redacted]	[redacted]	[redacted]
m_{f3}	Filter No. 3 residue mass (g)		[redacted]	[redacted]	[redacted]
m_{f4}	Filter No. 4 residue mass (g)		[redacted]	[redacted]	[redacted]
m_{filter}	*Total filter residue (g)*		0.00010	0.00000	0.00030
	First Solvent Rinse				
	Acetone				
ρ_1	Density (g/mL)	0.785			
v_{s1}	Sample volume (mL)		45	75	85
v_{a1}	Aliquot volume (mL)	145	45	75	85
r_{a1}	Aliquot residue mass (g)	nd	0.00400	0.00670	0.00630
r_{s1}	Sample residue mass (g)		0.00400	0.00670	0.00630
m_{b1}	Allowable blank correction (g)		0.00000	0.00000	0.00000
m_1	Net residue mass (g)		0.00400	0.00670	0.00630
	Second Solvent Rinse				
	N/A				
ρ_2	Density (g/mL)				
v_{s2}	Sample volume (mL)		[redacted]	[redacted]	[redacted]
v_{a2}	Aliquot volume (mL)	[redacted]	[redacted]	[redacted]	[redacted]
r_{a2}	Aliquot residue mass (g)	[redacted]	[redacted]	[redacted]	[redacted]
r_{s2}	Sample residue mass (g)				
m_{b2}	Allowable blank correction (g)				
m_2	Net residue mass (g)		0.00000	0.00000	0.00000
m_s	*Total Solvent Residue (g)*		0.00400	0.00670	0.00630
m_T	*Total Gravimetric Result (g)*		0.00410	0.00670	0.00660
m_D	*Total Gravimetric Detection Limit g)*		0.00020	0.00020	0.00020
m_n	*Total Filterable Particulate Matter (g)*		0.00410	0.00670	0.00660
n_{MDL}	*Number of Non-Detectable Fractions*		N/A	1 out of 2	N/A
DLC	*Detection Level Classification*		ADL	DLL	ADL

Comments:

For analytical results below detection limits:

Run samples are treated as zero in calculations.

Reagent blank samples are treated as zero in calculations.

Detection level classifications are defined as follows:

ADL = Above Detection Level - all fractions are above detection limit

DLL = Detection Level Limited - some fractions are below detection limit

BDL = Below Detection Limit - all fractions are below detection limit

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 5/29
Lead (Pb) Laboratory Parameters

Run No.		**1**	**2**	**3**
Date (2012)		Mar 20	Mar 20	Mar 20
Start Time (approx.)		07:52	10:29	13:04
Stop Time (approx.)		10:05	12:44	15:20
Combined Front and Back Analyses				
$m_{F\text{-}DL}$	Front half detection limit (µg)	0.2000	0.2000	0.2000
m_{FS}	Matter collected in front half sample (µg)	2.5997	1.9973	2.9046
m_{FB}	Matter collected in front half blank (µg)	0.6220	0.6220	0.6220
$m_{FB\text{-}allow}$	Allowable front half blank correction (µg)	0.6220	0.6220	0.6220
m_n	Total matter corrected for allowable blanks (µg)	1.9777	1.3753	2.2826

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 5/29
Cadmium (Cd) Laboratory Parameters

Run No.		**1**	**2**	**3**
Date (2012)		Mar 20	Mar 20	Mar 20
Start Time (approx.)		07:52	10:29	13:04
Stop Time (approx.)		10:05	12:44	15:20
Combined Front and Back Analyses				
$m_{F\text{-}DL}$	Front half detection limit (µg)	0.2000	0.2000	0.2000
m_{FS}	Matter collected in front half sample (µg)	0.2268	0.9492	0.2913
m_{FB}	Matter collected in front half blank (µg)	<0.2000	<0.2000	<0.2000
$m_{FB\text{-}allow}$	Allowable front half blank correction (µg)	0.0000	0.0000	0.0000
m_n	Total matter corrected for allowable blanks (µg)	0.2268	0.9492	0.2913

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SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 29
Mercury (Hg) Laboratory Parameters

Detection Limits		
$m_{1b\text{-}DL}$	Fraction 1B Detection Limit (µg)	0.1000
$m_{2b\text{-}DL}$	Fraction 2B Detection Limit (µg)	0.2000
$m_{3a\text{-}DL}$	Fraction 3A Detection Limit (µg)	0.2000
$m_{3b\text{-}DL}$	Fraction 3B Detection Limit (µg)	0.5000
$m_{3c\text{-}DL}$	Fraction 3C Detection Limit (µg)	0.4000
Blank Analysis		
$m_{1b\text{-}B}$	Fraction 1B Blank (µg)	<0.1000
$m_{2b\text{-}B}$	Fraction 2B Blank (µg)	<0.2000
$m_{3a\text{-}B}$	Fraction 3A Blank (µg)	<0.2000
$m_{3b\text{-}B}$	Fraction 3B Blank (µg)	<0.5000
$m_{3c\text{-}B}$	Fraction 3C Blank (µg)	<0.4000
$m_{total\text{-}B}$	Total Blank Amount (µg)	<1.4000

Run No.		1	2	3	4
Date (2012)		Mar 20	Mar 20	Mar 20	Mar 21
Start Time (approx.)		07:52	10:29	13:04	13:18
Stop Time (approx.)		10:05	12:44	15:20	15:38
Sample Analysis					
$m_{1b\text{-}S}$	Fraction 1B Sample (µg)	<0.1000	<0.1000	<0.1000	<0.1000
$m_{2b\text{-}S}$	Fraction 2B Sample (µg)	3.4141	3.3755	3.3764	3.7572
$m_{3a\text{-}S}$	Fraction 3A Sample (µg)	<0.2000	<0.2000	<0.2000	<0.2000
$m_{3b\text{-}S}$	Fraction 3B Sample (µg)	<0.5000	<0.5000	<0.5000	<0.5000
$m_{3c\text{-}S}$	Fraction 3C Sample (µg)	<0.4000	<0.4000	<0.4000	<0.4000
$m_{total\text{-}S}$	Total Sample Amount (µg)	3.4141	3.3755	3.3764	3.7572
Allowable Blank					
$m_{T\text{-}B\text{-}allow}$	Total Allowable Blank (µg)	0.0000	0.0000	0.0000	0.0000
Sample Corrected for Blank					
m_n	Total Sample Amount (µg)	3.4141	3.3755	3.3764	3.7572
Sample Corrected for Blank - Fractions					
$m_{n\text{-}1b}$	Fraction 1B (µg)	<0.1000	<0.1000	<0.1000	<0.1000
$m_{n\text{-}2b}$	Fraction 2B (µg)	3.4141	3.3755	3.3764	3.7572
$m_{n\text{-}3a}$	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000	<0.2000
$m_{n\text{-}3b}$	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000	<0.5000
$m_{n\text{-}3c}$	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000	<0.4000

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SS Metals-1 Version 2006-12b

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 5/202 (FPM/CPM)
Gravimetric Laboratory Data Summary for FPM

☐ Draft Lab Data

Run No.		Blank	1	2	3
Date (2012)			Mar 21	Mar 21	Mar 21
Start Time (approx.)			08:16	10:52	13:29
Stop Time (approx.)			10:28	13:07	15:41
	Analytical Detection Limits				
MDL_f	Minimum detection limit for filter (g)	0.00010			
MDL_s	Minimum detection limit for solvent rinse (g)	0.00010			
	Carbon Feed Rate - (lbs/hr)				
m_{f1}	Filter No. 1 residue mass (g)		0.00220	0.00380	0.00260
m_{f2}	Filter No. 2 residue mass (g)		[redacted]	[redacted]	[redacted]
m_{f3}	Filter No. 3 residue mass (g)		[redacted]	[redacted]	[redacted]
m_{f4}	Filter No. 4 residue mass (g)		[redacted]	[redacted]	[redacted]
m_{filter}	*Total filter residue (g)*		0.00220	0.00380	0.00260
	First Solvent Rinse				
	Acetone				
ρ_1	Density (g/mL)	0.785			
V_{s1}	Sample volume (mL)		70	60	55
V_{a1}	Aliquot volume (mL)	145	70	60	55
r_{a1}	Aliquot residue mass (g)	nd	0.00670	0.00520	0.00290
r_{s1}	Sample residue mass (g)		0.00670	0.00520	0.00290
m_{b1}	Allowable blank correction (g)		0.00000	0.00000	0.00000
m_1	Net residue mass (g)		0.00670	0.00520	0.00290
	Second Solvent Rinse				
	N/A				
ρ_2	Density (g/mL)				
V_{s2}	Sample volume (mL)		[redacted]	[redacted]	[redacted]
V_{a2}	Aliquot volume (mL)	[redacted]	[redacted]	[redacted]	[redacted]
r_{a2}	Aliquot residue mass (g)	[redacted]	[redacted]	[redacted]	[redacted]
r_{s2}	Sample residue mass (g)				
m_{b2}	Allowable blank correction (g)				
m_2	Net residue mass (g)		0.00000	0.00000	0.00000
m_s	*Total Solvent Residue (g)*		0.00670	0.00520	0.00290
m_T	*Total Gravimetric Result (g)*		0.00890	0.00900	0.00550
m_D	*Total Gravimetric Detection Limit g)*		0.00020	0.00020	0.00020
m_n	*Total Filterable Particulate Matter (g)*		0.00890	0.00900	0.00550
n_{MDL}	*Number of Non-Detectable Fractions*		N/A	N/A	N/A
DLC	*Detection Level Classification*		ADL	ADL	ADL

Comments:

For analytical results below detection limits:
- Run samples are treated as zero in calculations.
- Reagent blank samples are treated as zero in calculations.

Detection level classifications are defined as follows:
- ADL = Above Detection Level - all fractions are above detection limit
- DLL = Detection Level Limited - some fractions are below detection limit
- BDL = Below Detection Limit - all fractions are below detection limit

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 5/29
Cadmium (Cd) Laboratory Parameters

Run No.		1	2	3
Date (2012)		Mar 21	Mar 21	Mar 21
Start Time (approx.)		08:16	10:52	13:29
Stop Time (approx.)		10:28	13:07	15:41
Combined Front and Back Analyses				
$m_{F\text{-}DL}$	Front half detection limit (µg)	0.2000	0.2000	0.2000
m_{FS}	Matter collected in front half sample (µg)	2.5502	2.0332	1.4806
m_{FB}	Matter collected in front half blank (µg)	<0.2000	<0.2000	<0.2000
$m_{FB\text{-}allow}$	Allowable front half blank correction (µg)	0.0000	0.0000	0.0000
m_n	Total matter corrected for allowable blanks (µg)	2.5502	2.0332	1.4806

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 5/29
Lead (Pb) Laboratory Parameters

Run No.		**1**	**2**	**3**
Date (2012)		Mar 21	Mar 21	Mar 21
Start Time (approx.)		08:16	10:52	13:29
Stop Time (approx.)		10:28	13:07	15:41
Combined Front and Back Analyses				
$m_{F\text{-}DL}$	Front half detection limit (µg)	0.2000	0.2000	0.2000
m_{FS}	Matter collected in front half sample (µg)	24.3628	23.2659	11.5257
m_{FB}	Matter collected in front half blank (µg)	0.6220	0.6220	0.6220
$m_{FB\text{-}allow}$	Allowable front half blank correction (µg)	0.6220	0.6220	0.6220
m_n	Total matter corrected for allowable blanks (µg)	23.7408	22.6439	10.9037

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 29
Mercury (Hg) Laboratory Parameters

Detection Limits		
$m_{1b\text{-}DL}$	Fraction 1B Detection Limit (µg)	0.1000
$m_{2b\text{-}DL}$	Fraction 2B Detection Limit (µg)	0.2000
$m_{3a\text{-}DL}$	Fraction 3A Detection Limit (µg)	0.2000
$m_{3b\text{-}DL}$	Fraction 3B Detection Limit (µg)	0.5000
$m_{3c\text{-}DL}$	Fraction 3C Detection Limit (µg)	0.4000
Blank Analysis		
$m_{1b\text{-}B}$	Fraction 1B Blank (µg)	<0.1000
$m_{2b\text{-}B}$	Fraction 2B Blank (µg)	<0.2000
$m_{3a\text{-}B}$	Fraction 3A Blank (µg)	<0.2000
$m_{3b\text{-}B}$	Fraction 3B Blank (µg)	<0.5000
$m_{3c\text{-}B}$	Fraction 3C Blank (µg)	<0.4000
$m_{total\text{-}B}$	Total Blank Amount (µg)	<1.4000

Run No.		**1**	**2**	**3**	**4**
Date (2012)		Mar 21	Mar 21	Mar 21	Mar 22
Start Time (approx.)		08:16	10:52	13:29	07:43
Stop Time (approx.)		10:28	13:07	15:41	09:56
Sample Analysis					
$m_{1b\text{-}S}$	Fraction 1B Sample (µg)	<0.1000	<0.1000	<0.1000	<0.1000
$m_{2b\text{-}S}$	Fraction 2B Sample (µg)	2.4063	2.0337	1.6400	2.1908
$m_{3a\text{-}S}$	Fraction 3A Sample (µg)	<0.2000	<0.2000	<0.2000	<0.2000
$m_{3b\text{-}S}$	Fraction 3B Sample (µg)	<0.5000	<0.5000	<0.5000	<0.5000
$m_{3c\text{-}S}$	Fraction 3C Sample (µg)	<0.4000	<0.4000	<0.4000	<0.4000
$m_{total\text{-}S}$	Total Sample Amount (µg)	2.4063	2.0337	1.6400	2.1908
Allowable Blank					
$m_{T\text{-}B\text{-}allow}$	Total Allowable Blank (µg)	0.0000	0.0000	0.0000	0.0000
Sample Corrected for Blank					
m_n	Total Sample Amount (µg)	2.4063	2.0337	1.6400	2.1908
Sample Corrected for Blank - Fractions					
$m_{n\text{-}1b}$	Fraction 1B (µg)	<0.1000	<0.1000	<0.1000	<0.1000
$m_{n\text{-}2b}$	Fraction 2B (µg)	2.4063	2.0337	1.6400	2.1908
$m_{n\text{-}3a}$	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000	<0.2000
$m_{n\text{-}3b}$	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000	<0.5000
$m_{n\text{-}3c}$	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000	<0.4000

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 5/202 (FPM/CPM)
Gravimetric Laboratory Data Summary for FPM

☐ Draft Lab Data

	Run No.	Blank	1	2	3
	Date (2012)		Mar 20	Mar 22	Mar 22
	Start Time (approx.)		07:54	07:37	10:11
	Stop Time (approx.)		10:11	09:50	12:23
	Analytical Detection Limits				
MDL_f	Minimum detection limit for filter (g)	0.00010			
MDL_s	Minimum detection limit for solvent rinse (g)	0.00010			
	Carbon Feed Rate - (lbs/hr)				
m_{f1}	Filter No. 1 residue mass (g)		0.00190	0.00200	0.00270
m_{f2}	Filter No. 2 residue mass (g)		[redacted]	[redacted]	[redacted]
m_{f3}	Filter No. 3 residue mass (g)		[redacted]	[redacted]	[redacted]
m_{f4}	Filter No. 4 residue mass (g)		[redacted]	[redacted]	[redacted]
m_{filter}	*Total filter residue (g)*		0.00190	0.00200	0.00270
	First Solvent Rinse				
	<u>Acetone</u>				
ρ_1	Density (g/mL)	0.785			
V_{s1}	Sample volume (mL)		105	65	65
V_{a1}	Aliquot volume (mL)	145	105	65	65
r_{a1}	Aliquot residue mass (g)	nd	0.00540	0.00490	0.00410
r_{s1}	Sample residue mass (g)		0.00540	0.00490	0.00410
m_{b1}	Allowable blank correction (g)		0.00000	0.00000	0.00000
m_1	Net residue mass (g)		0.00540	0.00490	0.00410
	Second Solvent Rinse				
	<u>N/A</u>				
ρ_2	Density (g/mL)				
V_{s2}	Sample volume (mL)		[redacted]	[redacted]	[redacted]
V_{a2}	Aliquot volume (mL)	[redacted]	[redacted]	[redacted]	[redacted]
r_{a2}	Aliquot residue mass (g)	[redacted]	[redacted]	[redacted]	[redacted]
r_{s2}	Sample residue mass (g)				
m_{b2}	Allowable blank correction (g)				
m_2	Net residue mass (g)		0.00000	0.00000	0.00000
m_s	*Total Solvent Residue (g)*		0.00540	0.00490	0.00410
m_T	*Total Gravimetric Result (g)*		0.00730	0.00690	0.00680
m_D	*Total Gravimetric Detection Limit g)*		0.00020	0.00020	0.00020
m_n	*Total Filterable Particulate Matter (g)*		0.00730	0.00690	0.00680
n_{MDL}	*Number of Non-Detectable Fractions*		N/A	N/A	N/A
DLC	*Detection Level Classification*		ADL	ADL	ADL

<u>Comments:</u>

For analytical results below detection limits:
- Run samples are treated as zero in calculations.
- Reagent blank samples are treated as zero in calculations.

Detection level classifications are defined as follows:
- ADL = Above Detection Level - all fractions are above detection limit
- DLL = Detection Level Limited - some fractions are below detection limit
- BDL = Below Detection Limit - all fractions are below detection limit

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 5/29
Cadmium (Cd) Laboratory Parameters

Run No.		**1**	**2**	**3**
Date (2012)		Mar 20	Mar 22	Mar 22
Start Time (approx.)		07:54	07:37	10:11
Stop Time (approx.)		10:11	09:50	12:23
Combined Front and Back Analyses				
$m_{F\text{-}DL}$	Front half detection limit (µg)	0.2000	0.2000	0.2000
m_{FS}	Matter collected in front half sample (µg)	1.6744	2.2224	1.7914
m_{FB}	Matter collected in front half blank (µg)	<0.2000	<0.2000	<0.2000
m_n	Total matter corrected for allowable blanks (µg)	1.6744	2.2224	1.7914

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 5/29
Lead (Pb) Laboratory Parameters

Run No.		**1**	**2**	**3**
Date (2012)		Mar 20	Mar 22	Mar 22
Start Time (approx.)		07:54	07:37	10:11
Stop Time (approx.)		10:11	09:50	12:23
Combined Front and Back Analyses				
m_{F-DL}	Front half detection limit (µg)	0.2000	0.2000	0.2000
m_{FS}	Matter collected in front half sample (µg)	23.8060	15.8886	16.1647
m_{FB}	Matter collected in front half blank (µg)	0.6220	0.6220	0.6220
m_n	Total matter corrected for allowable blanks (µg)	23.1840	15.2666	15.5427

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 29
Mercury (Hg) Laboratory Parameters

Detection Limits

$m_{1b\text{-}DL}$	Fraction 1B Detection Limit (µg)	0.1000
$m_{2b\text{-}DL}$	Fraction 2B Detection Limit (µg)	0.2000
$m_{3a\text{-}DL}$	Fraction 3A Detection Limit (µg)	0.2000
$m_{3b\text{-}DL}$	Fraction 3B Detection Limit (µg)	0.5000
$m_{3c\text{-}DL}$	Fraction 3C Detection Limit (µg)	0.4000

Blank Analysis

$m_{1b\text{-}B}$	Fraction 1B Blank (µg)	<0.1000
$m_{2b\text{-}B}$	Fraction 2B Blank (µg)	<0.2000
$m_{3a\text{-}B}$	Fraction 3A Blank (µg)	<0.2000
$m_{3b\text{-}B}$	Fraction 3B Blank (µg)	<0.5000
$m_{3c\text{-}B}$	Fraction 3C Blank (µg)	<0.4000
$m_{total\text{-}B}$	Total Blank Amount (µg)	<1.4000

Run No.		**1**	**2**	**3**	**4**
Date (2012)		Mar 20	Mar 22	Mar 22	Mar 22
Start Time (approx.)		07:54	07:37	10:11	12:50
Stop Time (approx.)		10:11	09:50	12:23	15:01
Sample Analysis					
$m_{1b\text{-}S}$	Fraction 1B Sample (µg)	<0.1000	<0.1000	0.1378	<0.1000
$m_{2b\text{-}S}$	Fraction 2B Sample (µg)	3.0947	3.0276	3.2500	5.2098
$m_{3a\text{-}S}$	Fraction 3A Sample (µg)	<0.2000	<0.2000	<0.2000	<0.2000
$m_{3b\text{-}S}$	Fraction 3B Sample (µg)	<0.5000	<0.5000	<0.5000	<0.5000
$m_{3c\text{-}S}$	Fraction 3C Sample (µg)	<0.4000	<0.4000	<0.4000	<0.4000
$m_{total\text{-}S}$	Total Sample Amount (µg)	3.0947	3.0276	3.3878	5.2098
Allowable Blank					
$m_{T\text{-}B\text{-}allow}$	Total Allowable Blank (µg)	0.0000	0.0000	0.0000	0.0000
Sample Corrected for Blank					
m_n	Total Sample Amount (µg)	3.0947	3.0276	3.3878	5.2098
Sample Corrected for Blank - Fractions					
$m_{n\text{-}1b}$	Fraction 1B (µg)	<0.1000	<0.1000	0.1378	<0.1000
$m_{n\text{-}2b}$	Fraction 2B (µg)	3.0947	3.0276	3.2500	5.2098
$m_{n\text{-}3a}$	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000	<0.2000
$m_{n\text{-}3b}$	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000	<0.5000
$m_{n\text{-}3c}$	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000	<0.4000

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SS Metals-1 Version 2006-12b

Clean Air Engineering, Inc.

500 West Wood Street
Palatine, IL 60067

Project Number: 11414SB-S Broward

Particulate Matter, Cadmium, Lead and Mercury

EPA Methods 29 & 5 Analyses

Analytical Report
18417

Element One, Inc.
5022-C Wrightsville Av., Wilmington, NC 28403
910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 18417
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:

Katie Strickland, Chemist
April 5, 2012

Report Reviewed and Finalized By:

Ken Smith, Laboratory Director
April 5, 2012

SUMMARY OF RESULTS

Summary of Analysis

Unit 1 - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front Half µg	H_2O_2 /HNO_3 µg	Empty Impinger µg	$KMnO_4$ µg	HCl µg
U1 FF Outlet R1	#1	3.41	< 0.1	3.42	< 0.2	< 0.5	< 0.4
	#2		< 0.1	3.40	< 0.2	< 0.5	< 0.4
U1 FF Outlet R2	#1	3.38	< 0.1	3.36	< 0.2	< 0.5	< 0.4
	#2		< 0.1	3.39	< 0.2	< 0.5	< 0.4
U1 FF Outlet R3	#1	3.38	< 0.1	3.36	< 0.2	< 0.5	< 0.4
	#2		< 0.1	3.39	< 0.2	< 0.5	< 0.4
U1 FF Outlet R4	#1	3.76	< 0.1	3.76	< 0.2	< 0.5	< 0.4
	#2		< 0.1	3.75	< 0.2	< 0.5	< 0.4

Summary of Analysis

Unit 1 - Summary of Method 5 Particulate Analysis

Fraction	U1 FF Outlet R1 e18417-1 Catch, mg	U1 FF Outlet R2 e18417-2 Catch, mg	U1 FF Outlet R3 e18417-3 Catch, mg
Filter	0.1	< 0.1	0.3
Rinse	4.0	6.7	6.3
Total PM	4.1	6.7	6.6

Unit 1 - Summary of Method 29 Metals Analysis

Element	U1 FF Outlet R1 e18417-1 Total µg	U1 FF Outlet R2 e18417-2 Total µg	U1 FF Outlet R2 e18417-2 dup Total µg	U1 FF Outlet R3 e18417-3 Total µg
Cadmium	0.227	0.967	0.931	0.291
Lead	2.60	1.98	2.02	2.90

Summary of Analysis

Unit 2 - Summary of Method 29 Mercury Analysis

Run Number	---	Average Total Catch, µg	Front Half µg	H_2O_2 /HNO_3 µg	Empty Impinger µg	$KMnO_4$ µg	HCl µg
U2 FF Outlet R1	#1	2.41	< 0.1	2.41	< 0.2	< 0.5	< 0.4
	#2		< 0.1	2.40	< 0.2	< 0.5	< 0.4
U2 FF Outlet R2	#1	2.03	< 0.1	2.02	< 0.2	< 0.5	< 0.4
	#2		< 0.1	2.05	< 0.2	< 0.5	< 0.4
U2 FF Outlet R3	#1	1.64	< 0.1	1.63	< 0.2	< 0.5	< 0.4
	#2		< 0.1	1.65	< 0.2	< 0.5	< 0.4
U2 FF Outlet R4	#1	2.19	< 0.1	2.20	< 0.2	< 0.5	< 0.4
	#2		< 0.1	2.18	< 0.2	< 0.5	< 0.4

Summary of Analysis

Unit 2 - Summary of Method 5 Particulate Analysis

Fraction	U2 FF Outlet R1 e18417-5 Catch, mg	U2 FF Outlet R2 e18417-6 Catch, mg	U2 FF Outlet R3 e18417-7 Catch, mg
Filter	2.2	3.8	2.6
Rinse	6.7	5.2	2.9
Total PM	8.9	9.0	5.5

Unit 2 - Summary of Method 29 Metals Analysis

Element	U2 FF Outlet R1 e18417-5 Total µg	U2 FF Outlet R2 e18417-6 Total µg	U2 FF Outlet R2 e18417-6 dup Total µg	U2 FF Outlet R3 e18417-7 Total µg
Cadmium	2.55	2.02	2.04	1.48
Lead	24.4	23.3	23.2	11.5

Summary of Analysis

Unit 3 - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front Half µg	H_2O_2 /HNO_3 µg	Empty Impinger µg	$KMnO_4$ µg	HCl µg
U3 FF Outlet R1	#1	3.09	< 0.1	3.09	< 0.2	< 0.5	< 0.4
	#2		< 0.1	3.10	< 0.2	< 0.5	< 0.4
U3 FF Outlet R2	#1	3.03	< 0.1	3.03	< 0.2	< 0.5	< 0.4
	#2		< 0.1	3.03	< 0.2	< 0.5	< 0.4
U3 FF Outlet R3	#1	3.39	0.139	3.25	< 0.2	< 0.5	< 0.4
	#2		0.136	3.25	< 0.2	< 0.5	< 0.4
U3 FF Outlet R4	#1	5.21	< 0.1	5.22	< 0.2	< 0.5	< 0.4
	#2		< 0.1	5.20	< 0.2	< 0.5	< 0.4
Field Blank	#1	< 0.5	< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
Reagent Blank	#1	< 0.5	< 0.1	< 0.2	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.2	< 0.2	< 0.5	< 0.4

Summary of Analysis

Unit 3 - Summary of Method 5 Particulate Analysis

Fraction	U3 FF Outlet R1 e18417-9 Catch, mg	U3 FF Outlet R2 e18417-10 Catch, mg	U3 FF Outlet R3 e18417-11 Catch, mg
Filter	1.9	2.0	2.7
Rinse	5.4	4.9	4.1
Total PM	7.3	6.9	6.8

Unit 3 - Summary of Method 29 Metals Analysis

Element	U3 FF Outlet R1 e18417-9 Total µg	U3 FF Outlet R2 e18417-10 Total µg	U3 FF Outlet R2 e18417-10 dup Total µg	U3 FF Outlet R3 e18417-11 Total µg
Cadmium	1.67	2.14	2.31	1.79
Lead	23.8	15.1	16.7	16.2

Summary of Analysis

Blanks - Summary of Method 5 Particulate Analysis

Fraction	Reagent Blank e18417-14 Catch, mg
Filter	NA
Rinse	< 0.1
Total PM	< 0.1

Blanks - Summary of Method 29 Metals Analysis

Element	Field Blank e18417-13 Total µg	Reagent Blank e18417-14 Total µg
Cadmium	< 0.2	< 0.2
Lead	0.577	0.622

ANALYTICAL NARRATIVE

Element One Analytical Narrative

Client:	Clean Air, IL	Element One #:	18417
Client ID:	11414SB-S Broward	Analyst:	KLS, LAL, KLW & KMS
Method:	Methods 29 & 5	Dates Received:	03.26.12
Analytes:	PM, Cd, Pb & Hg	Dates Analyzed:	03.27-04.05.12

Summary of Analysis

The Method 5 particulate samples were analyzed in accordance with EPA Method 5 guidelines. Particulate samples were weighed to a constant weight of ±0.5mg and reported to the nearest 0.1mg. The Method 29 samples were digested, prepared, and analyzed according to Method 29 protocol. Samples were analyzed for mercury on a PerkinElmer FIMS-100 CVAA mercury analyzer. The samples were analyzed for metals on a PerkinElmer ELAN 6100 ICP-MS.

Detection Limits

The FIMS-100 CVAA instrument reporting limit for mercury was 0.004 µg per aliquot analyzed. The ICP-MS instrument reporting limit was 1.0µg/L for the other metals.

Analysis QA/QC

Duplicate analyses relative percent difference (RPD), spike sample recovery and second source calibration verification data are summarized in the Quality Control Section. All QA/QC data was within the criteria of the method.

Additional Comments

The reported results have not been corrected for any blank values or spike recovery values. The Method 5 blank correction factor has not been implemented. The ICP analysis of the Reagent Blank samples revealed detectable concentrations of lead.
This is the first revision to this report; the Field Blank and Reagent Blank Hg results were left off of the original report.

QUALITY CONTROL SUMMARY

Summary of Quality Control Data

Mercury Duplicate Analysis RPD

(Method 29 QC limits: < 10% for RPD)

Run Number	Front Half	H_2O_2/HNO_3	Empty Imp	$KMnO_4$	HCl
U1 FF Outlet R1	NA	0.6%	NA	NA	NA
U1 FF Outlet R2	NA	0.7%	NA	NA	NA
U1 FF Outlet R3	NA	0.7%	NA	NA	NA
U1 FF Outlet R4	NA	0.1%	NA	NA	NA
U2 FF Outlet R1	NA	0.2%	NA	NA	NA
U2 FF Outlet R2	NA	1.5%	NA	NA	NA
U2 FF Outlet R3	NA	0.8%	NA	NA	NA
U2 FF Outlet R4	NA	0.9%	NA	NA	NA
U3 FF Outlet R1	NA	0.1%	NA	NA	NA
U3 FF Outlet R1	NA	0.1%	NA	NA	NA
U3 FF Outlet R2	1.9%	0.2%	NA	NA	NA
U3 FF Outlet R3	NA	0.3%	NA	NA	NA
U3 FF Outlet R4	NA	NA	NA	NA	NA
Field Blank	NA	NA	NA	NA	NA
Reagent Blank	NA	NA	NA	NA	NA

Summary of Quality Control Data

Mercury Spike Recoveries

(Method 29 QC limits: ± 25% for Spike Recoveries)

Run Number		Front Half	H_2O_2/HNO_3	Empty Imp	$KMnO_4$	HCl
U1 FF Outlet R3	#1	115%	111%	98%	108%	86%
	#2	114%	112%	95%	107%	86%
U2 FF Outlet R3	#1	109%	102%	94%	102%	91%
	#2	108%	102%	97%	101%	91%
U3 FF Outlet R3	#1	102%	99%	87%	109%	94%
	#2	101%	100%	84%	109%	93%
U1 FF Outlet R3	#1	115%	111%	98%	108%	86%
	#2	114%	112%	95%	107%	86%

Summary of Quality Control Data

Metals Duplicate Analysis RPD

(Method 29 QC limits: < 20% for RPD)

Element	U1 FF Outlet R2 RPD	U2 FF Outlet R2 RPD	U3 FF Outlet R2 RPD
Cadmium	3.8%	1.1%	7.7%
Lead	2.2%	0.6%	9.8%

Metals Analysis Spike Recoveries

(Method 29 QC limits: ± 25% for Spike Recoveries)

Element	U1 FF Outlet R3 Recovery	U2 FF Outlet R3 Recovery	U3 FF Outlet R3 Recovery
Cadmium	79%	104%	79%
Lead	91%	98%	96%

Second Source Calibration Check Recoveries

(QC limits: ±10% for Second Source Continuing Check Standard)*

Element	1 ppb	50 ppb	100 ppb*	250 ppb
Cadmium	99%	100%	103%	100%
Lead	97%	101%	102%	99%

SAMPLE CUSTODY

e18417

CLIENT	Wheelabrator	PROJECT	11414SB
PLANT	South Broward	DEPT.	66
PROJECT MANAGER	S. Brown		

66-11414SB-9

CleanAir
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

FORWARDING LAB
Element One, Inc
6022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0128 (phone)
910-792-6853 (fax)

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-5/29	1	QUARTZ FILTER PETRI DISH

ANALYSIS REQUESTED

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	3/20	Unit 1 FF Outlet	1	Quartz Filter No. e28-08	1		X	X	X		
	3/20	Unit 1 FF Outlet	2	Quartz Filter No. e28-09	1		X	X	X		
	3/20	Unit 1 FF Outlet	3	Quartz Filter No. e28-11	1		X	X	X		
	3/21	Unit 1 FF Outlet	4	Quartz Filter	1				X		
	3/20	FF Outlet	Field Blank	Quartz Filter No.	1			X	X		
	3/21	Unit 2 FF Outlet	1	Quartz Filter No. e28-18	1		X	X	X		
	3/21	Unit 2 FF Outlet	2	Quartz Filter No. e28-13	1		X	X	X		
	3/21	Unit 2 FF Outlet	3	Quartz Filter No. e31-05	1		X	X	X		
		Unit 2 FF Outlet	4	Quartz Filter	1				X		
	3/20	Unit 3 FF Outlet	1	Quartz Filter No. e28-10	1		X	X	X		
	3/22	Unit 3 FF Outlet	2	Quartz Filter No. e28-21	1		X	X	X		
	3/22	Unit 3 FF Outlet	3	Quartz Filter No. e282-6	1		X	X	X		Run 4 filters are in 250 ml nalgenes
	3/22	Unit 3 FF Outlet	4	Quartz Filter	1				X		

Metals include:
Cadmium (Cd)
Lead (Pb)

FH/BH Combined per email lcc 03.26.12 @0758

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S. Brown	3/23/2012 10:00					S. Brown
Received By: (signature)	Date / Time	Received By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Signature / Date
	3-26-12 0844 fedex					3/23/2012

All samples for CAE 11414SB Methods 5/29 received in good condition in Fisher Brand And QEC Level 2 containers 3-26-12

elementOne
18417 CAE M29-5 Report Packet Rev 4.10.12.doc
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CLIENT	Wheelabrator	PROJECT	11414SB
PLANT	South Broward	DEPT.	66
PROJECT MANAGER	S. Brown		66-11414SB-10

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-5/29	2	FRONT HALF ACETONE RINSE 250 mL CLEAR GLASS

CleanAir
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYSIS REQUESTED

FORWARDING LAB
Element One, Inc
5022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0128 (phone)
910-792-6853 (fax)

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
											Metals include
	3/20	Unit 1 FF Outlet	1	Front Half Acetone Rinse, 250 mL Clear Glass	1		X	X	X		Cadmium (Cd) Lead (Pb)
	3/20	Unit 1 FF Outlet	2	Front Half Acetone Rinse, 250 mL Clear Glass	1		X	X	X		
	3/20	Unit 1 FF Outlet	3	Front Half Acetone Rinse, 250 mL Clear Glass	1		X	X	X		
	~~3/20~~	~~FF Outlet~~	~~Field Blank~~	~~Front Half Acetone Rinse, 250 mL Clear Glass~~	~~1~~			~~X~~	~~X~~		No FB M5 Confirmed via phone 3-26-12
	3/21	Unit 2 FF Outlet	1	Front Half Acetone Rinse, 250 mL Clear Glass	1		X	X	X		
	3/21	Unit 2 FF Outlet	2	Front Half Acetone Rinse, 250 mL Clear Glass	1		X	X	X		
	3/21	Unit 2 FF Outlet	3	Front Half Acetone Rinse, 250 mL Clear Glass	1		X	X	X		
	3/20	Unit 3 FF Outlet	1	Front Half Acetone Rinse, 250 mL Clear Glass	1		X	X	X		
	3/22	Unit 3 FF Outlet	2	Front Half Acetone Rinse, 250 mL Clear Glass	1		X	X	X		
	3/22	Unit 3 FF Outlet	3	Front Half Acetone Rinse, 250 mL Clear Glass	1		X	X	X		

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S. Brown	3/23/2012 10:00					S. Brown
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Paul Smith	3-26-12 0944 fedex					3/23/2012

e18417

66-11414SB-11

CLIENT Wheelabrator
PLANT South Broward
PROJECT MANAGER S. Brown

PROJECT 11414SB
DEPT. 66

CleanAir
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-5/29	3	FRONT HALF HNO_3 RINSE 250 mL HDLP

FORWARDING LAB
Element One, Inc.
5022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0128 (phone)
910-792-6853 (fax)

ANALYSIS REQUESTED

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	3/20	Unit 1 FF Outlet	1	Front Half HNO_3 Rinse, 250 mL HDLP	1			X	X		
	3/20	Unit 1 FF Outlet	2	Front Half HNO_3 Rinse, 250 mL HDLP	1			X	X		
	3/20	Unit 1 FF Outlet	3	Front Half HNO_3 Rinse, 250 mL HDLP	1			X	X		
	3/21	Unit 1 FF Outlet	4	Front Half HNO_3 Rinse, 250 mL HDLP	1				X		
	3/20	FF Outlet	Field Blank	Front Half HNO_3 Rinse, 250 mL HDLP	1			X	X		
	3/21	Unit 2 FF Outlet	1	Front Half HNO_3 Rinse, 250 mL HDLP	1			X	X		
	3/21	Unit 2 FF Outlet	2	Front Half HNO_3 Rinse, 250 mL HDLP	1			X	X		
	3/21	Unit 2 FF Outlet	3	Front Half HNO_3 Rinse, 250 mL HDLP	1			X	X		
		Unit 2 FF Outlet	4	Front Half HNO_3 Rinse, 250 mL HDLP	1				X		
	3/20	Unit 3 FF Outlet	1	Front Half HNO_3 Rinse, 250 mL HDLP	1			X	X		
	3/22	Unit 3 FF Outlet	2	Front Half HNO_3 Rinse, 250 mL HDLP	1			X	X		
	3/22	Unit 3 FF Outlet	3	Front Half HNO_3 Rinse, 250 mL HDLP	1			X	X		
	3/22	Unit 3 FF Outlet	4	Front Half HNO_3 Rinse, 250 mL HDLP	1				X		

Metals include:
Cadmium (Cd)
Lead (Pb)

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D. Smith	3-26-12 0944 FedEx					3/23/2012

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CLIENT	Wheelabrator	PROJECT	11414SB	66-11414SB-12
PLANT	South Broward	DEPT.	66	
PROJECT MANAGER	S. Brown			

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-5/29	4	IMPINGERS 1-3 CATCH AND RINSE 1000 mL HDLP

CleanAir
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

FORWARDING LAB
Element One, Inc
5022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0128 (phone)
910-792-6853 (fax)

ANALYSIS REQUESTED

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	3/20	Unit 1 FF Outlet	1	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1		X	X			
	3/20	Unit 1 FF Outlet	2	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1		X	X			
	3/20	Unit 1 FF Outlet	3	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1		X	X			Metals include: Cadmium (Cd) Lead (Pb)
	3/21	Unit 1 FF Outlet	4	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1		X	X			
	3/20	FF Outlet	Field Blank	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1			X			
	3/21	Unit 2 FF Outlet	1	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1		X	X			
	3/21	Unit 2 FF Outlet	2	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1		X	X			
	3/21	Unit 2 FF Outlet	3	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1		X	X			
		Unit 2 FF Outlet	4	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1			X			
	3/20	Unit 3 FF Outlet	1	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1		X	X			
	3/22	Unit 3 FF Outlet	2	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1		X	X			
	3/22	Unit 3 FF Outlet	3	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1		X	X			
	3/22	Unit 3 FF Outlet	4	Impingers 1-3 Catch and Rinse, 1000 mL HDLP	1			X			

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Paul Smith	3-26-12 0944 Fedex					3/23/2012

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CLIENT	Wheelabrator	PROJECT	11414SB	66-11414SB-13
PLANT	South Broward	DEPT.	66	
PROJECT MANAGER	S. Brown			

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-5/29	5A	IMPINGER 4 CATCH AND RINSE 250 mL HDLP

CleanAir
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYSIS REQUESTED

FORWARDING LAB
Element One, Inc
5022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0128 (phone)
910-792-6853 (fax)

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	3/20	Unit 1 FF Outlet	1	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
	3/20	Unit 1 FF Outlet	2	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
	3/20	Unit 1 FF Outlet	3	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
	3/21	Unit 1 FF Outlet	4	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
	3/20	FF Outlet	Field Blank	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
	3/21	Unit 2 FF Outlet	1	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
	3/21	Unit 2 FF Outlet	2	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
	3/21	Unit 2 FF Outlet	3	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
		Unit 2 FF Outlet	4	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
	3/20	Unit 3 FF Outlet	1	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
	3/22	Unit 3 FF Outlet	2	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
	3/22	Unit 3 FF Outlet	3	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		
	3/22	Unit 3 FF Outlet	4	Impinger 4 Catch and Rinse, 250 mL HDLP	1				X		

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Paula Smith	3-26-12 0944 FedEx					3/23/2012

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CLIENT Wheelabrator
PLANT South Broward
PROJECT MANAGER S. Brown

PROJECT 11414SB
DEPT. 66

66-11414SB-14

CleanAir

500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-5/29	5B	IMPINGERS 5-6 CATCH AND RINSE 950 mL AMBER GLASS

FORWARDING LAB
Element One, Inc
5022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0128 (phone)
910-792-6853 (fax)

ANALYSIS REQUESTED

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	3/20	Unit 1 FF Outlet	1	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
	3/20	Unit 1 FF Outlet	2	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
	3/20	Unit 1 FF Outlet	3	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
	3/21	Unit 1 FF Outlet	4	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
	3/20	FF Outlet	Field Blank	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
	3/21	Unit 2 FF Outlet	1	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
	3/21	Unit 2 FF Outlet	2	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
	3/21	Unit 2 FF Outlet	3	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
		Unit 2 FF Outlet	4	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
	3/20	Unit 3 FF Outlet	1	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
	3/22	Unit 3 FF Outlet	2	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
	3/22	Unit 3 FF Outlet	3	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			
	3/22	Unit 3 FF Outlet	4	Impingers 5-6 Catch and Rinse, 950 mL Amber Glass	1			X			

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S. Brown	3/23/2012 10:00					S. Brown
Received By: (signature)	**Date / Time**	**Received By: (signature)**	**Date / Time**	**Relinquished By: (signature)**	**Date / Time**	**Signature / Date**
Paul Smith	3-26-12 0944 fedex					3/23/2012

e18417

CLIENT	Wheelabrator
PLANT	South Broward
PROJECT MANAGER	S. Brown
PROJECT	11414SB
DEPT.	66

66-11414SB-15

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-5/29	5C	IMPINGERS 5-6 8N HCL RINSE 250 mL AMBER GLASS

CleanAir
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

FORWARDING LAB
Element One, Inc
5022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0128 (phone)
910-792-6853 (fax)

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	ANALYSIS REQUESTED: Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	3/20	Unit 1 FF Outlet	1	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	3/20	Unit 1 FF Outlet	2	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	3/20	Unit 1 FF Outlet	3	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	3/21	Unit 1 FF Outlet	4	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	3/20	FF Outlet	Field Blank	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	3/21	Unit 2 FF Outlet	1	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	3/21	Unit 2 FF Outlet	2	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	3/21	Unit 2 FF Outlet	3	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
		Unit 2 FF Outlet	4	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	3/20	Unit 3 FF Outlet	1	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	3/22	Unit 3 FF Outlet	2	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	3/22	Unit 3 FF Outlet	3	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		
	3/22	Unit 3 FF Outlet	4	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1				X		

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S. Brown	3/23/2012 10:00					S. Brown
Received By: (signature)	**Date / Time**	**Received By: (signature)**	**Date / Time**	**Relinquished By: (signature)**	**Date / Time**	**Signature / Date**
Paul Smith	3-26-12 0914 FedEx					3/23/2012

e18417

CLIENT	Wheelabrator	PROJECT	11414SB
PLANT	South Broward	DEPT.	66
PROJECT MANAGER	S. Brown		66-11414SB-16

CleanAir
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-5/29	SEE BELOW (IF APPLICABLE)	REAGENT BLANKS

FORWARDING LAB
Element One, Inc
5022-C Wrightsville Avenue
Wilmington, NC 28403
910-793-0128 (phone)
910-792-6853 (fax)

ANALYSIS REQUESTED

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	Gravimetric	Metals	Mercury	Archive	ADDITIONAL INFORMATION
	3/20	Reagent Blank	All	Acetone (200 mL), Container 7, 250 mL Clear Glass	1		X	X	X		
	3/20	Reagent Blank	All	0.1 N HNO_3 (300 mL), Container 8A: 1000 mL HDPE	1			X	X		
	3/20	Reagent Blank	All	DI Water (100 mL), Container 8B: 250 mL HDPE	1			X	X		
	3/20	Reagent Blank	All	5% HNO_3 / 10% H_2O_2 (200 mL), Container 9: 250 mL HDPE	1			X	X		
	3/20	Reagent Blank	All	4% $KMnO_4$ / 10% H_2SO_4 (100 mL), Container 10: 250 mL Amber Glass	1				X		
	3/20	Reagent Blank	All	DI Water (200 mL) / 8N HCl (25 mL), Container 11: 250 mL Amber Glass	1				X		
	3/20	Reagent Blank	All	Quartz Filters (3), Container 12: 250 mL HDPE	1			X	X		
	3/20	Train Proof	NA	Acetone probe rinse						X	
	3/20	Train Proof	NA	Acetone probe rinse						X	
	3/20	Train Proof	NA	0.1 N Probe Rinse						X	
	3/20	Train Proof	NA	0.1 N Probe Rinse						X	

Metals include:
~~Beryllium (Be)~~ PDS 3-26-12
Cadmium (Cd)
Lead (Pb)

Be not needed per phone call from SB

Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:
S. Brown	3/23/2012 10:00					S. Brown
Received By: (signature)	**Date / Time**	**Received By: (signature)**	**Date / Time**	**Relinquished By: (signature)**	**Date / Time**	**Signature / Date**
Paula Smith	3-26-12 0944 fedex					3/23/2012

ANALYTICAL DATA

Analytical Calculations

Metals-

Element Results (µg) =ICP Results (µg/L)*Dilution*Final Volume (L)

Where-

ICP Results= Raw sample concentration (ppb)--*ICP-Data Sheet*

Dilution= $\frac{\text{Diluted Volume}}{\text{Aliquot}}$--*ICP-MS Run Sheet*

Final Volume=FH=Final Volume (FV)--*Sample Submission*

BH= $\frac{\text{Received Volume (BV)}}{\text{Aliquot (Used)}}$.*Final Volume (FV)--*Sample Submission*

Combined Results=FH+BH

Mercury-

Mercury Results (µg) = $\frac{\textbf{CVAA Results (µg)}}{\textbf{Aliquot (ml)}}$ ***Final Volume (ml)**

Where-

CVAA Results= Raw sample reading (µg)--*Hg-Data Sheet*

Aliquot= Sample Aliquot (Alq.)--*Hg-Data Sheet*

Final Volume=Final Volume (FV)*--*Sample Submission*

* With the exception of the BH fraction where-
=Received Volume (BV)--*Sample Submission*

Analytical Calculations

Spike Recovery-

$$\text{Spike (\%)} = \frac{\text{(Spiked Result (µg/L) – Sample Result (µg/L))}}{\text{Spike Amount (µg/L)}} \quad \text{X100}$$

Where-

Spike Result = Raw sample concentration (ppb)--*ICP-Data Sheet*

Sample Result = Raw sample concentration (ppb)--*ICP-Data Sheet*

Spike Amount--*ICP-MS Spike Table*

Duplicate Analysis RPD-

$$\text{RPD (\%)} = \frac{\text{(Duplicate Result (µg/L) - Sample Result (µg/L))}}{\text{Average (µg/L)}} \quad \text{X100}$$

Where-

Sample Result =Raw sample concentration (ppb)--*ICP-Data Sheet*

Duplicate Results=Raw sample concentration (ppb)--*ICP-Data Sheet*

Average= $\frac{\textit{(Duplicate + Sample Results)}}{2}$

elementOne **AIR TESTING SAMPLE SUBMISSION FORM** **Lab ID 18417**

FH/BH Combined		Analysis Due Date	04.04.12
		QA/QC/Report Due Date	04.05.12

Client	Clean Air IL	Date Rec	03.26.12
Project No	11414SB—S Broward	Time Rec	0944

HNO_3 Lot: 1110070	HF Lot: 5110080	HCl Lot: 4110080	**Ref. Method:**
Volume Marked Y / N	Volume Loss Y / N / ?	Acetone: 50102	**29 / 5**

Sample Identification

1	U1 FF Outlet R1	5	U2 FF Outlet R1	9	U3 FF Outlet R1
2	U1 FF Outlet R2	6	U2 FF Outlet R2	10	U3 FF Outlet R2
	U1 FF Outlet R2 Duplicate		U2 FF Outlet R2 Duplicate		U3 FF Outlet R2 Duplicate
3	U1 FF Outlet R3	7	U2 FF Outlet R3	11	U3 FF Outlet R3
	U1 FF Outlet R3 Spike		U2 FF Outlet R3 Spike		U3 FF Outlet R3 Spike
4	U1 FF Outlet R4	8	U2 FF Outlet R4	12	U3 FF Outlet R4
				13	Field Blank
15	**Train Proof–Archive**			14	Reagent Blank

Analyses Requested	Samples 1-14	Hg
	Samples 1-3, 5-7, 9-11, 13-14	Cd, Pb
	Samples 1-3, 5-7, 9-11, 14	PM

vol. marked BV vol. loss

Runs / FB	Fil / Ace (FH)		HNO_3 (FH)		5% HNO_3/10% H_2O_2 (BH)			HNO_3 (A)		$KMnO_4$ (B)		HCl (C)	
	~~pH <2.0 Y / N~~		pH <2.0 Y / N		pH <2.0 Y / N			pH <2.0 Y / N		pH <2.0 Y / N		pH <2.0 Y / N	
Lab ID	Fil ID	BV ml	BV ml	FV ml	BV ml	Used	FV ml	BV ml	FV ml	BV ml	FV ml	BV ml	FV ml
1	28-08	45	100	100	350	375	50	107	200	360	500	220	400
2.D	28-09	75	100		340	370		104		280		225	
3.S	28-11	85	105		320	360		103		360		230	
4			105		350	—	—	102		380		225	
5	28-18	70	110		340	370		107		370		220	
6.D	28-13	60	105		700	350		106		380		230	
7.S	31-05	55	105		920	350		106		380		240	
8			105		650	—	—	109		360		230	
9	28-10	105	110		320	360		111		380		240	
10.D	28-21	65	110		360	380		104		360		230	
11.S	28-26	65	140		360	380		106		380		230	
12			105		380	—		110		380		240	
13			105		380	150		102		380		230	

M-29 Reagent Blank

Lab ID	Fraction			BV, ml	FV, ml	Comments
14	C 7	FH	Acetone	145		
	C 8A	FH	0.1N HNO_3	304	100	
	C 8A	A	0.1N HNO_3	304	—	
	C 8B	B	DI H_2O	102	100+33	
	C 9	BH	5% HNO_3/10% H_2O_2	190	50	used 95 mLs
	C 10	B	4% $KMnO_4$/10%H_2SO_4	100	100+33	100mL $KMnO_4$ + 33mL DI H_2O
	C 11	C	8N HCl DI H_2O	220	400	
	C 12	FH	Filter			

Lab Communications Samples spiked w/ .02mL of 25ppm Std A (021412A) .5ug, .05ppm, 50ppb

18417-14 C12 - client provided 3 blank filters, only 1 [Filter ID: 1 of 28-15, 28-16, 28-17] used for analysis

M29/5: Received C1, C2, C3, C4, C5a, C5b, C5c; RB C12, C7, C8a, C8b, C9, C10, C11—T Proof HNO3 & Acetone (2 each) Archive—03.26.12 PDS

SS Page 1 of 1
3/26/2012 4:30:59 PM
SS by [signature]
Labeled By/Date KCS 3.27.12

FH Prep By/Date KLW/4.3.12
A Prep By/Date KCS 3.27.12
BH Prep By/Date KLW/3.28.12
B Prep By/Date KLW 3.28.12
BH/FH Prep By/Date KLW/4-3-12
C Prep By/Date KLW 3.29.12
PM Prep By / Date KLW/3.27.12
ID Verification By/Date LAC 3.27.12

LRB + BH spiked w/100uL Std. A
LRB + FH spiked w/200uL Std A

elementOne **Method 5 Particulate** Lab # 18417

Client Clean Air Page 1 of 2.

Balance checks Date: 03.29.12 2 g = 2.0000
Date: 03.31.12 2g = 2.0000
Date: 04.02.12 2g = 1.9999

Acetone Concentration 0.00E+00 mg/mg

Filters

Sample ID #	Filter ID	Tin ID	A	B		B		B		Catch Description and Loading
			Filter Tare, g	Date - 03.29.12 Initials - LAL		Date - 03.30.12 Initials -KLS		Date - 04.02.12 Initials -KLS		
				Time	Filter Weight, g	Time	Filter Weight, g	Time	Filter Weight, g	
18417-1	e28-08	T-27	0.3457	1048	0.3458	800	0.3460			
18417-2	e28-09	T-28	0.3252	1048	0.3251	800	0.3251			
18417-3	e28-11	T-29	0.3359	1048	0.3362	800	0.3365			
18417-5	e28-18	T-32	0.3390	1048	0.3412	800	0.3413			
18417-6	e28-13	T-33	0.3418	1048	0.3456	800	0.3457			
18417-7	e31-05	T-34	0.3432	1048	0.3458	800	0.3462			
Client Blk										
E1 Blank										

Acetone Rinses

Sample ID #	Sample Volume, ml	Bag ID	C	D		D		D		Catch Description and Loading
			Bag Tare, g	Date - 03.29.12 Initials - LAL		Date - 03.30.12 Initials -KLS		Date - 04.02.12 Initials -KLS		
				Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	
18417-1	45	x46	10.1787	1048	10.1836	800	10.1827	800	10.1827	
18417-2	75	624	10.0216	1048	10.0314	800	10.0283	800	10.0285	
18417-3	85	685	10.5766	1048	10.5843	800	10.5831	800	10.5829	
18417-5	70	595	10.3312	1048	10.3379	800	10.3383			
18417-6	60	634	10.1966	1048	10.2018	800	10.2022			
18417-7	55	572	10.2452	1048	10.2481	800	10.2482			
Client Ace Blk	145	666	10.2282	1048	10.2298	800	10.2286	800	10.2282	
E1 Acetone Blank	100	658	10.5610	1048	10.5611	800	10.5613	800	10.5609	

Total Catches

Sample ID #	Filter ID	Filter Tare, g	Final Filter + Catch, g	Filter Catch, mg		Acetone Bag ID	Bag Tare, g	Final Bag + Ace Catch, g	Acetone Catch, mg	Total Catch, mg
18417-1	e28-08	0.3457	0.3458	0.1		x46	10.1787	10.1827	4.0	4.1
18417-2	e28-09	0.3252	0.3251	<0.1		624	10.0216	10.0283	6.7	6.7
18417-3	e28-11	0.3359	0.3362	0.3		685	10.5766	10.5829	6.3	6.6
18417-5	e28-18	0.3390	0.3412	2.2		595	10.3312	10.3379	6.7	8.9
18417-6	e28-13	0.3418	0.3456	3.8		634	10.1966	10.2018	5.2	9.0
18417-7	e31-05	0.3432	0.3458	2.6		572	10.2452	10.2481	2.9	5.5
Client Blk						666	10.2282	10.2282	<0.1	<0.1
E1 Blank						658	10.5610	10.5609	<0.1	<0.1

Element One, Inc. Form 123 - Revision 2.01.24.12

elementOne **Method 5 Particulate** Lab # 18417

Client Clean Air Page 2 of 2

Balance checks Date: 03.29.12 2 g = 2.0000
Date: 03.31.12 2g = 2.0000
Date: 04.02.12 2g = 1.9999

Acetone Concentration 0.00E+00 mg/mg

Filters

Sample ID #	Filter ID	Tin ID	A	B		B		B		Catch Description and Loading
			Filter Tare, g	Date - 03.29.12 Initials - LAL		Date - 03.30.12 Initials -KLS		Date - 04.02.12 Initials -KLS		
				Time	Filter Weight, g	Time	Filter Weight, g	Time	Filter Weight, g	
18417-9	e28-10	T-35	0.3437	1048	0.3456	800	0.3456			
18417-10	e28-21	T-23	0.3428	1048	0.3448	800	0.3451			
18417-11	e28-26	T-21	0.3403	1048	0.3430	800	0.3430			
Client Blk										
E1 Blank										

Acetone Rinses

Sample ID #	Sample Volume, ml	Bag ID	C	D		D		D		Catch Description and Loading
			Bag Tare, g	Date - 03.29.12 Initials - LAL		Date - 03.30.12 Initials -KLS		Date - 04.02.12 Initials -KLS		
				Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	
18417-9	105	x02	10.034	1048	10.0413	800	10.0394	800	10.0395	
18417-10	65	642	9.9226	1048	9.9296	800	9.9279	800	9.9275	
18417-11	65	505	10.2487	1048	10.2528	800	10.2533			
Client Ace Blk	145	666	10.2282	1048	10.2298	800	10.2286	800	10.2282	
E1 Acetone Blank	100	658	10.5610	1048	10.5611	800	10.5613	800	10.5609	

Total Catches

Sample ID #	Filter ID	Filter Tare, g	Final Filter + Catch, g	Filter Catch, mg		Acetone Bag ID	Bag Tare, g	Final Bag + Ace Catch, g	Acetone Catch, mg	Total Catch, mg
18417-9	e28-10	0.3437	0.3456	1.9		x02	10.034	10.0394	5.4	7.3
18417-10	e28-21	0.3428	0.3448	2.0		642	9.9226	9.9275	4.9	6.9
18417-11	e28-26	0.3403	0.343	2.7		505	10.2487	10.2528	4.1	6.8
Client Blk						666	10.2282	10.2282	<0.1	<0.1
E1 Blank						658	10.5610	10.5609	<0.1	<0.1

Element One, Inc. Form 123 - Revision 2.01.24.12

elementOne

Method 29 Microwave Worksheet

Lab ID # e 18417
Client:

Date Digested: 4.3.12 Initials: AOS Worksheet Prepared by: AOS

Auto Sample Loc.	Sample Lab ID	Sample Weight (g)	# of filters digested	Spike	Prep Volume (ml)	Weight In Micro / Weight Out Micro	Units
1	LRB						
2	LCB7						
3	18417-1		1				
4	-2						
5	-3						
6	-4						
7	-5						
8	-6						
9	-7						
10	-8						
11	-9						
12	-10						
13	-11						
14	-12						
15	-13						
16	-14						
				AOS			

2mLs HF (5110090) 6mLs HNO_3 (K44023)

Element One, Inc. Form 104 - Revision 1.0

Sample/Batch Report

User Name: icp
Computer Name: ICP-MS
Sample File: C:\elandata_icp\Sample\x19.sam
Report Date/Time: Wednesday, April 04, 2012 15:06:21

KS 4-4-12

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant.	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
5		QC Std 2	CAE	Sample					
203		18417-1	CAE	Sample					
204		18417-2	CAE	Sample					
205	d	18417-2	CAE	Duplicate of 3					
206		18417-3	CAE	Sample					
207	s	18417-3	CAE	Spike - 1 of 5					
208		18417-5	CAE	Sample					
209		18417-6	CAE	Sample					
210	d	18417-6	CAE	Duplicate of 8					
211		18417-7	CAE	Sample					
212	s	18417-7	CAE	Spike - 1 of 10					
213		18417-9	CAE	Sample					
214		18417-10	CAE	Sample					
215	d	18417-10	CAE	Duplicate of 13					
216		18417-11	CAE	Sample					
217	s	18417-11	CAE	Spike - 1 of 15					
218		18417-13	CAE	Sample					
219		18417-14	CAE	Sample					
220		18417-2	CAE	Sample					
221	d	18417-2	CAE	Duplicate of 19					
222	x2	18417-7	CAE	Sample					
223	x2s	18417-7	CAE	Spike - 1 of 21					

344

Dataset Report

User Name: icp
Computer Name: ICP-MS
Dataset File Path: C:\elandata_icp\DataSet\040412-1\
Report Date/Time: Wednesday, April 04, 2012 15:05:58

KLS
4.4.12

The Dataset

Batch ID	Sample ID	Date and Time	Read Type	Samp. File Name	Description
	Blank	12:13:37 Wed 04-Apr-12	Blank	C:\elandata_icp\DataSet\040412-1\Blank.001	
	Standard 1	12:15:06 Wed 04-Apr-12	Standard #1	C:\elandata_icp\DataSet\040412-1\Standard 1.002	
	Standard 2	12:16:34 Wed 04-Apr-12	Standard #2	C:\elandata_icp\DataSet\040412-1\Standard 2.003	
	Standard 3	12:18:03 Wed 04-Apr-12	Standard #3	C:\elandata_icp\DataSet\040412-1\Standard 3.004	
	QC Std 1	12:19:33 Wed 04-Apr-12	QC Std #1	C:\elandata_icp\DataSet\040412-1\QC Std 1.005	
	QC Std 2	12:21:02 Wed 04-Apr-12	QC Std #2	C:\elandata_icp\DataSet\040412-1\QC Std 2.006	
	QC Std 3	12:22:31 Wed 04-Apr-12	QC Std #3	C:\elandata_icp\DataSet\040412-1\QC Std 3.007	
	QC Std 4	12:24:01 Wed 04-Apr-12	QC Std #4	C:\elandata_icp\DataSet\040412-1\QC Std 4.008	
	QC Std 5	12:25:31 Wed 04-Apr-12	QC Std #5	C:\elandata_icp\DataSet\040412-1\QC Std 5.009	
	QC Std 7	12:27:01 Wed 04-Apr-12	QC Std #7	C:\elandata_icp\DataSet\040412-1\QC Std 7.010	
	QC Std 9	12:28:32 Wed 04-Apr-12	QC Std #9	C:\elandata_icp\DataSet\040412-1\QC Std 9.011	
	QC Std 10	12:30:01 Wed 04-Apr-12	QC Std #10	C:\elandata_icp\DataSet\040412-1\QC Std 10.012	
	QC Std 2	12:31:32 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
	18417-1	12:33:03 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
	18417-2	12:34:32 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
d	18417-2	12:36:01 Wed 04-Apr-12	Duplicate of 15	C:\elandata_icp\DataSet\0CAE	
	18417-3	12:37:30 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
s	18417-3	12:38:59 Wed 04-Apr-12	Spike - 1 of 17	C:\elandata_icp\DataSet\0CAE	
	18417-5	12:40:28 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
	18417-6	12:41:57 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
d	18417-6	12:43:26 Wed 04-Apr-12	Duplicate of 20	C:\elandata_icp\DataSet\0CAE	
	18417-7	12:44:55 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
s	18417-7	12:46:24 Wed 04-Apr-12	Spike - 1 of 22	C:\elandata_icp\DataSet\0CAE	
	QC Std 1	12:47:55 Wed 04-Apr-12	QC Std #1	C:\elandata_icp\DataSet\040412-1\QC Std 1.024	
	QC Std 4	12:49:24 Wed 04-Apr-12	QC Std #4	C:\elandata_icp\DataSet\040412-1\QC Std 4.025	
	18417-9	12:50:55 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
	18417-10	12:52:24 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
d	18417-10	12:53:53 Wed 04-Apr-12	Duplicate of 27	C:\elandata_icp\DataSet\0CAE	
	18417-11	12:55:22 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
s	18417-11	12:56:51 Wed 04-Apr-12	Spike - 1 of 29	C:\elandata_icp\DataSet\0CAE	
	18417-13	12:58:19 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
	18417-14	12:59:50 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
	QC Std 1	13:01:22 Wed 04-Apr-12	QC Std #1	C:\elandata_icp\DataSet\040412-1\QC Std 1.033	
	QC Std 4	13:02:51 Wed 04-Apr-12	QC Std #4	C:\elandata_icp\DataSet\040412-1\QC Std 4.034	
	18417-2	14:54:44 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
d	18417-2	14:56:13 Wed 04-Apr-12	Duplicate of 35	C:\elandata_icp\DataSet\0CAE	
x2	18417-7	14:57:41 Wed 04-Apr-12	Sample	C:\elandata_icp\DataSet\0CAE	
x2s	18417-7	14:59:10 Wed 04-Apr-12	Spike - 1 of 37	C:\elandata_icp\DataSet\0CAE	
	QC Std 1	15:00:42 Wed 04-Apr-12	QC Std #1	C:\elandata_icp\DataSet\040412-1\QC Std 1.039	
	QC Std 4	15:02:12 Wed 04-Apr-12	QC Std #4	C:\elandata_icp\DataSet\040412-1\QC Std 4.040	

elementOne
Analyst:--KMS--

ICP-MS RUN SHEET
4/4/2012

Job Number:

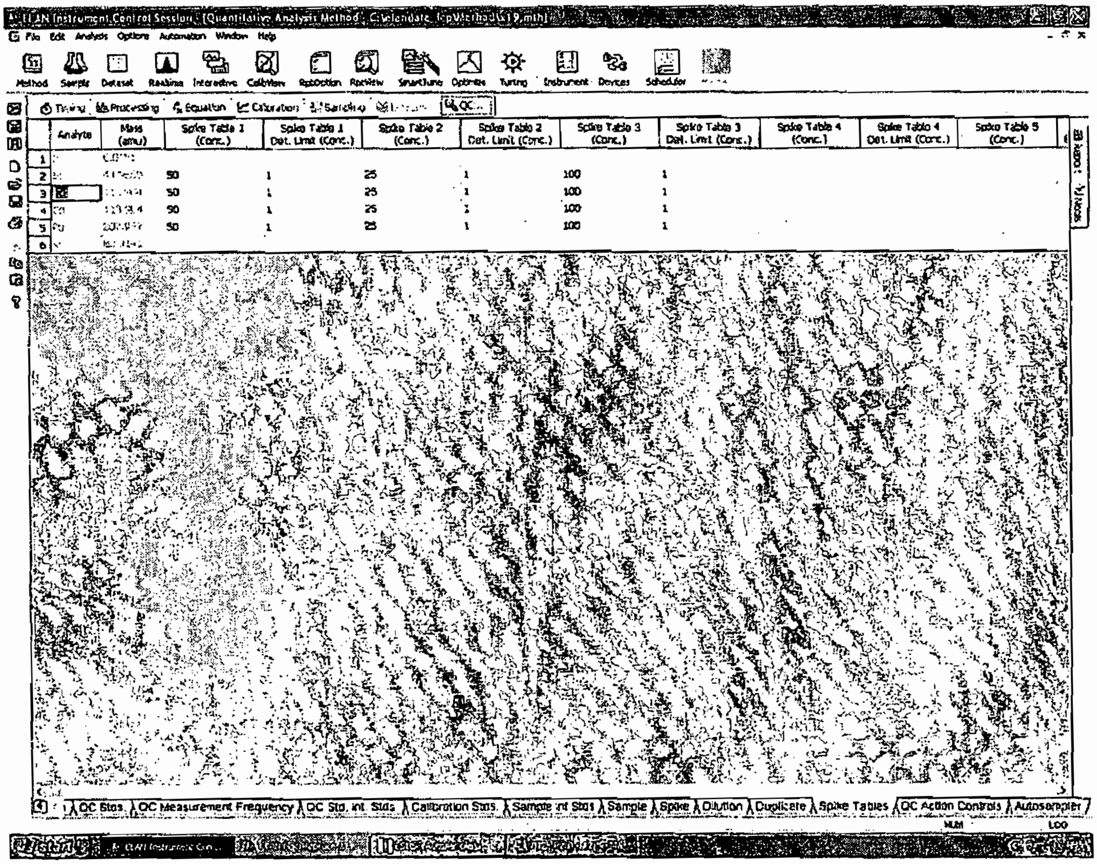
KMS 4-4-12

A/S Loc.	Dilution	Sample ID	Client	Type	Weight (g)	Prep Vol (ml)
5		QC Std 2	CAE	Sample		
203		18417-1	CAE	Sample		100x2
204		18417-2	CAE	Sample		100x3
205	d	18417-2	CAE	Duplicate of 3		100x4
206		18417-3	CAE	Sample		100x5
207	s	18417-3	CAE	Spike - 1 of 5		100x6
208		18417-5	CAE	Sample		100x7
209		18417-6	CAE	Sample		100x8
210	d	18417-6	CAE	Duplicate of 8		100x9
211		18417-7	CAE	Sample		100x10
212	s	18417-7	CAE	Spike - 1 of 10		100x11
213		18417-9	CAE	Sample		100x12
214		18417-10	CAE	Sample		100x13
215	d	18417-10	CAE	Duplicate of 13		100x14
216		18417-11	CAE	Sample		100x15
217	s	18417-11	CAE	Spike - 1 of 15		100x16
218		18417-13	CAE	Sample		100x17
219		18417-14	CAE	Sample		100x18
220		18417-2	CAE	Sample		100x19
221	d	18417-2	CAE	Duplicate of 19		100x20
222	x2	18417-7	CAE	Sample		100x21
223	x2s	18417-7	CAE	Spike - 1 of 21		100x22

Spikes are post at 0.02mL of 25ppm spiking solutions lot 021412-ABCD & F in a final volume of 10mL

Submitted for QC by:	Date/Time:		QC Review By:	Date/Time:	
kms	4/4/12 15:09		KLS	4.5.12 1000	
Re-Test Required:	No: ✓	Yes:	Comments:		
Resubmitted for QC by:	Date/Time:		QC Review:	By:	Date/Time:

KM
4-4-12



	Analyte	Mass (amu)	Spike Table 1 (Conc.)	Spike Table 1 Det. Limit (Conc.)	Spike Table 2 (Conc.)	Spike Table 2 Det. Limit (Conc.)	Spike Table 3 (Conc.)	Spike Table 3 Det. Limit (Conc.)	Spike Table 4 (Conc.)	Spike Table 4 Det. Limit (Conc.)	Spike Table 5 (Conc.)
1	[illegible]	[illegible]									
2	[illegible]	[illegible]	50	1	25	1	100	1			
3	[illegible]	[illegible]	50	1	25	1	100	1			
4	[illegible]	[illegible]	50	1	25	1	100	1			
5	[illegible]	[illegible]	50	1	25	1	100	1			
6	[illegible]	[illegible]									

Wednesday, Apr 04, 2012 03:06 PM

ICP Standards and QC Standards Values Table

Element or Test	Mass	Symbol	Std.#1 ppb	Std.#2 ppb	Std.#3 ppb	QC #1	QC #2	QC #3	QC #4	QC #6 A	QC #7 AB	QC #8 .25	QC #9 LRB	QC #10 LRB+	QC #11 LRB+
Lithium	6	*Li*													
Lithium	7	Li	1	100	500	0	1	250	100				0	50	100
Beryllium	9	Be	1	100	500	0	1	250	100			0.25	0	50	100
Boron	10	*B*	1	50	100	0	1	250	100				0	50	100
Boron	11	B	1	50	100	0	1	250	100				0	50	100
Sodium	23	Na	20	1100	5500	0	21	2500	1100				0	718	
Magnesium	24	Mg	20	1100	5500	0	21	2500	1100				0	550	
Magnesium	25	*Mg*	20	1100	5500	0	21	2500	1100				0	550	
Aluminum	27	Al	1	100	500	0	1	250	100				0	50	100
Phosphorus	31	P	20	1000	5000	0	20	2500	1000				0	200	
Potassium	39	K	20	1100	5500	0	21	2500	1100				0	500	
Calcium	44	Ca	50	1100	5500	0	21	2500	1100				0	550	
Scandium	45														
Titanium	47	Ti	1	100	500	0	1	250	100				0	50	100
Titanium	49	Ti	1	100	500	0	1	250	100				0	50	100
Vanadium	51	V	1	100	500	0	1	250	100	0	20		0	50	100
Vanadium	51	V	1	100	500	0	1	250	100	0	20		0	50	100
Chromium	52	Cr	1	100	500	0	1	250	100		10		0	50	100
Chromium	53	*Cr*	1	100	500	0	1	250	100		10		0	50	100
Iron	54	*Fe*	20	1100	5500	0	21	2500	1100	0			0		
Manganese	55	Mn	1	100	500	0	1	250	100	0	10		0	50	100
Iron	57	Fe	20	1100	5500	0	21	2500	1100	0			0		
Cobalt	59	Co	1	100	500	0	1	250	100	0	20		0	50	100
Nickel	60	Ni	1	100	500	0	1	250	100	0	20		0	50	100
Copper	63	Cu	1	100	500	0	1	250	100	0	10		0	50	100
Copper	65	Cu	1	100	500	0	1	250	100	0	10		0	50	100
Zinc	66	Zn	1	100	500	0	1	250	100	0	10		0	50	100
Zinc	67	*Zn*	1	100	500	0	1	250	100	0	10		0	50	100
Zinc	68	*Zn*	1	100	500	0	1	250	100	0	10		0	50	100
Germanium	72	Ge	1	100	500	0	1	250	100				0	50	100
Arsenic	75	As	1	100	500	0	1	250	100	0	10		0	50	100
Selenium	77	*Se*	1	100	500	0	1	250	100	0	10		0	50	100
Selenium	82	Se	1	100	500	0	1	250	100	0	10		0	50	100
Strontium	88	Sr	1	100	500	0	1	250	100	0			0	50	100
Molybdenum	95	*Mo*	1	100	500	0	1	250	100				0	50	100
Molybdenum	97	*Mo*	1	100	500	0	1	250	100				0	50	100
Molybdenum	98	Mo	1	100	500	0	1	200	100				0	50	100
Rhodium	103														
Silver	107	Ag	1	100	500	0	1	250	100	0	10		0	50	100
Silver	109	*Ag*	1	100	500	0	1	250	100	0	10		0	50	100
Cadmium	111	Cd	1	100	500	0	1	250	100	0	5		0	50	100
Cadmium	114	*Cd*	1	100	500	0	1	250	100	0	5		0	50	100
Tin	118	Sn	1	100	500	0	1	250	100	0			0	50	100
Antimony	121	*Sb*	1	100	500	0	1	250	100	0			0	50	100
Antimony	123	Sb	1	100	500	0	1	250	100	0			0	50	100
Tellurium	128	Te	1	100	500	0	1	250	100				0	50	100
Cesium	133														
Barium	135	*Ba*	1	100	500	0	1	250	100	0			0	50	100
Barium	137	Ba	1	100	500	0	1	250	100	0			0	50	100
Lanthanum	139	La	1	100	500	0	1	250	100				0	60	100
Tantalum	159	Ta	1	100	500	0	1	250	100				0	50	100
Platinum	195	Pt	1	100	500	0	1	250	100				0	50	100
Gold	181	Au	1	100	500	0	1	250	100				0	50	100
Thallium	205	Tl	1	100	500	0	1	250	100	0			0	50	100
Lead	208	Pb	1	100	500	0	1	250	100	0			0	50	100
Bismuth	209	Bi	1	100	500	0	1	250	100				0	50	100
Thorium	232	Th	1	100	500	0	1	250	100				0	50	100
Uranium	238	U	1	100	500	0	1	250	100				0	50	100
Krypton	83														

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Method 6020 & 200.8 Metals Summary Report
Sample ID: Blank
Sample Da Wednesday, April 04, 2012 12:13:37
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	66657.8		ppb
|-	Sc	45	241261.7		ppb
|>	Rh	103	530251.5		ppb
|	Cd	111	18.1		ppb
|-	Cd	114	43.4		ppb
|>	Ho	165	968274.4		ppb
|-	Pb	208	3058.5		ppb
	Kr	83	350.8		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: Standard 1
Sample Da Wednesday, April 04, 2012 12:15:06
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	67668.4		ppb
|-	Sc	45	246935.6		ppb
|>	Rh	103	549733.1		ppb
|	Cd	111	2447.3	1.02799	ppb
|-	Cd	114	5855.7	1.04084	ppb
|>	Ho	165	1002291.3		ppb
|-	Pb	208	42386.7	1.02374	ppb
	Kr	83	188.6		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: Standard 2
Sample Da Wednesday, April 04, 2012 12:16:34
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	69159.3		ppb
|-	Sc	45	256181		ppb
|>	Rh	103	561895.7		ppb
|	Cd	111	246432.9	102.07926	ppb
|-	Cd	114	575656.4	100.895	ppb
|>	Ho	165	1028986.3		ppb
|-	Pb	208	3959615.7	100.59691	ppb
	Kr	83	-16507.5		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: Standard 3
Sample Da Wednesday, April 04, 2012 12:18:03
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	66089.7		ppb
|-	Sc	45	245751.2		ppb
|>	Rh	103	538914.6		ppb
|	Cd	111	1156866.1	499.58409	ppb
|-	Cd	114	2735751.5	499.82092	ppb
|>	Ho	165	1007528.7		ppb
|-	Pb	208	19253184	499.88057	ppb
	Kr	83	-80928.6		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 1
Sample Da Wednesday, April 04, 2012 12:19:33
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	64246.4		ppb
|-	Sc	45	242742.4		ppb
|>	Rh	103	536159.8		ppb
|	Cd	111	260.7	0.10629	ppb
|-	Cd	114	595.3	0.10237	ppb
|>	Ho	165	976507.3		ppb
|-	Pb	208	8095.3	0.13524	ppb
	Kr	83	325.1		mg/L

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Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 2
Sample Da Wednesday, April 04, 2012 12:21:02
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Inten:	Conc. Mear	Report Unit
	Li	6	66187.1		ppb
|-	Sc	45	244588.8		ppb
|>	Rh	103	541717.4		ppb
|	Cd	111	2332.5	0.99403	ppb
|-	Cd	114	5505.7	0.9927	ppb
|>	Ho	165	989435		ppb
|-	Pb	208	39626.6	0.96531	ppb
	Kr	83	168		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 3
Sample Da Wednesday, April 04, 2012 12:22:31
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Inten:	Conc. Mear	Report Unit
	Li	6	68773.9		ppb
|-	Sc	45	255879.6		ppb
|>	Rh	103	562865.2		ppb
|	Cd	111	602956.6	249.32814	ppb
|-	Cd	114	1408894.1	246.46725	ppb
|>	Ho	165	1036695.4		ppb
|-	Pb	208	9826818.1	247.92173	ppb
	Kr	83	-42119.7		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 4
Sample Da Wednesday, April 04, 2012 12:24:01
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Inten:	Conc. Mear	Report Unit
	Li	6	66611.5		ppb
|-	Sc	45	250317.5		ppb
|>	Rh	103	553379.1		ppb
|	Cd	111	244806.8	102.95549	ppb
|-	Cd	114	580153.4	103.27135	ppb
|>	Ho	165	1010008.2		ppb
|-	Pb	208	3957873.7	102.43524	ppb
	Kr	83	-16531.3		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 5
Sample Da Wednesday, April 04, 2012 12:25:31
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Inten:	Conc. Mear	Report Unit
	Li	6	68511.6		ppb
|-	Sc	45	254248.9		ppb
|>	Rh	103	561448.8		ppb
|	Cd	111	120043.5	49.75036	ppb
|-	Cd	114	285741.6	50.11671	ppb
|>	Ho	165	1018030.9		ppb
|-	Pb	208	1963233	50.38476	ppb
	Kr	83	335.6		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 7
Sample Da Wednesday, April 04, 2012 12:27:01
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Inten:	Conc. Mear	Report Unit
	Li	6	67253.2		ppb
|-	Sc	45	262120.2		ppb
|>	Rh	103	539716		ppb
|	Cd	111	10567.4	4.54799	ppb
|-	Cd	114	30225.4	5.50551	ppb
|>	Ho	165	1051086		ppb
|-	Pb	208	9113.1	0.1445	ppb
	Kr	83	376		mg/L

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Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 9
Sample Da Wednesday, April 04, 2012 12:28:32
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	74847.3		ppb
|-	Sc	45	273284.7		ppb
|>	Rh	103	592784.3		ppb
|	Cd	111	340.5	0.12589	ppb
|-	Cd	114	644	0.09906	ppb
|>	Ho	165	1116912.8		ppb
|-	Pb	208	94571	2.13254	ppb
	Kr	83	293		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 10
Sample Da Wednesday, April 04, 2012 12:30:01
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	74861.4		ppb
|-	Sc	45	277141.2		ppb
|>	Rh	103	595670.8		ppb
|	Cd	111	95558.2	37.33838	ppb
|-	Cd	114	224734.8	37.15004	ppb
|>	Ho	165	1112589.5		ppb
|-	Pb	208	2030679.9	47.67757	ppb
	Kr	83	320.1		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 2
Sample Da Wednesday, April 04, 2012 12:31:32
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	69512.5		ppb
|-	Sc	45	260818.6		ppb
|>	Rh	103	575008.7		ppb
|	Cd	111	2476.3	0.99438	ppb
|-	Cd	114	5829.7	0.99038	ppb
|>	Ho	165	1018424.1		ppb
|-	Pb	208	40723.8	0.96364	ppb
	Kr	83	172.6		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-1
Sample Da Wednesday, April 04, 2012 12:33:03
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	77119.1		ppb
|-	Sc	45	273526		ppb
|>	Rh	103	560867.3		ppb
|	Cd	111	2752	1.13405	ppb
|-	Cd	114	4267.9	0.74116	ppb
|>	Ho	165	1072222.9		ppb
|-	Pb	208	536089.1	12.99841	ppb
	Kr	83	-192.8		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-2
Sample Da Wednesday, April 04, 2012 12:34:32
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	75525.4		ppb
|-	Sc	45	267616.4		ppb
|>	Rh	103	520367.8		ppb
|	Cd	111	6284.2	2.80355	ppb
|-	Cd	114	12811.7	2.41822	ppb
|>	Ho	165	989341.3		ppb
|-	Pb	208	376575.2	9.87565	ppb
	Kr	83	-153.8		mg/L

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Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-2
Sample Da Wednesday, April 04, 2012 12:36:01
Sample De CAE
Concentration Results

	Analyte	Mass	Meas. Inten	Conc. Mear	Report Unit
	Li	6	77056.3		ppb
|-	Sc	45	268547.9		ppb
|>	Rh	103	512352.3		ppb
|	Cd	111	3783	1.7104	ppb
|-	Cd	114	7450.1	1.4241	ppb
|>	Ho	165	955621.8		ppb
|-	Pb	208	371789.5	10.09714	ppb
	Kr	83	-148.4		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-3
Sample Da Wednesday, April 04, 2012 12:37:30
Sample De CAE
Concentration Results

	Analyte	Mass	Meas. Inten	Conc. Mear	Report Unit
	Li	6	58171.7		ppb
|-	Sc	45	253109.1		ppb
|>	Rh	103	373979.2		ppb
|	Cd	111	2354.4	1.45672	ppb
|-	Cd	114	3950.5	1.03363	ppb
|>	Ho	165	694394.3		ppb
|-	Pb	208	387648.6	14.52308	ppb
	Kr	83	-108.5		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-3
Sample Da Wednesday, April 04, 2012 12:38:59
Sample De CAE
Concentration Results

	Analyte	Mass	Meas. Inten	Conc. Mear	Report Unit
	Li	6	75873.7		ppb
|-	Sc	45	298617.4		ppb
|>	Rh	103	478268.6		ppb
|	Cd	111	84031.1	40.88267	ppb
|-	Cd	114	197942.5	40.74727	ppb
|>	Ho	165	904195.1		ppb
|-	Pb	208	2072172.3	59.87041	ppb
	Kr	83	-121.3		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-5
Sample Da Wednesday, April 04, 2012 12:40:28
Sample De CAE
Concentration Results

	Analyte	Mass	Meas. Inten	Conc. Mear	Report Unit
	Li	6	61086.9		ppb
|-	Sc	45	209830.7		ppb
|>	Rh	103	382733		ppb
|	Cd	111	20981.7	12.75104	ppb
|-	Cd	114	47608.3	12.23996	ppb
|>	Ho	165	720547.6		ppb
|-	Pb	208	3356769.3	121.81413	ppb
	Kr	83	-661		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-6
Sample Da Wednesday, April 04, 2012 12:41:57
Sample De CAE
Concentration Results

	Analyte	Mass	Meas. Inten	Conc. Mear	Report Unit
	Li	6	76543.8		ppb
|-	Sc	45	253095.6		ppb
|>	Rh	103	482931.1		ppb
|	Cd	111	20988.6	10.10885	ppb
|-	Cd	114	48624.4	9.90633	ppb
|>	Ho	165	902419.7		ppb
|-	Pb	208	4027564.1	116.69533	ppb
	Kr	83	-1303.5		mg/L

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Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-6
Sample Da Wednesday, April 04, 2012 12:43:26
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	75215.7		ppb
|-	Sc	45	251501.5		ppb
|>	Rh	103	485907.8		ppb
|	Cd	111	21361	10.22343	ppb
|-	Cd	114	48227.4	9.76556	ppb
|>	Ho	165	899672		ppb
|-	Pb	208	3990891	115.96333	ppb
	Kr	83	-1315.8		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-7
Sample Da Wednesday, April 04, 2012 12:44:55
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	78103.1		ppb
|-	Sc	45	271058.1		ppb
|>	Rh	103	520640.8		ppb
|	Cd	111	16577.6	7.4029	ppb
|-	Cd	114	38909.8	7.35166	ppb
|>	Ho	165	990916.8		ppb
|-	Pb	208	2077519.4	54.76807	ppb
	Kr	83	-1075		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-7
Sample Da Wednesday, April 04, 2012 12:46:24
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	67625.5		ppb
|-	Sc	45	233439.1		ppb
|>	Rh	103	442133.6		ppb
|	Cd	111	113038.4	59.50292	ppb
|-	Cd	114	267724.8	59.62952	ppb
|>	Ho	165	833644.9		ppb
|-	Pb	208	3815391	119.65903	ppb
	Kr	83	-1080.5		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 1
Sample Da Wednesday, April 04, 2012 12:47:55
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	69877.2		ppb
|-	Sc	45	224127.7		ppb
|>	Rh	103	486663		ppb
|	Cd	111	25.6	0.00433	ppb
|-	Cd	114	59.8	0.00411	ppb
|>	Ho	165	895263.9		ppb
|-	Pb	208	3021.2	0.00577	ppb
	Kr	83	268.3		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 4
Sample Da Wednesday, April 04, 2012 12:49:24
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	71586.4		ppb
|-	Sc	45	234171.8		ppb
|>	Rh	103	511002.5		ppb
|	Cd	111	229506.5	104.5164	ppb
|-	Cd.	114	534934.1	103.07948	ppb
|>	Ho	165	953364.8		ppb
|-	Pb	208	3702338.1	101.5309	ppb
	Kr	83	-15240.4		mg/L

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Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-9
Sample Da Wednesday, April 04, 2012 12:50:55
Sample De CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	62653.2		ppb
|-	Sc	45	241016.8		ppb
|>	Rh	103	426592.3		ppb
|	Cd	111	15353.8	8.37219	ppb
|-	Cd	114	34097.4	7.86608	ppb
|>	Ho	165	795061.1		ppb
|-	Pb	208	3619661.7	119.03001	ppb
	Kr	83	-1039.7		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-10
Sample Da Wednesday, April 04, 2012 12:52:24
Sample De CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	73533.8		ppb
|-	Sc	45	244962		ppb
|>	Rh	103	484704.4		ppb
|	Cd	111	22267.3	10.68648	ppb
|-	Cd	114	50812.9	10.31601	ppb
|>	Ho	165	889810.9		ppb
|-	Pb	208	2571615.5	75.54044	ppb
	Kr	83	-1180.6		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-10
Sample Da Wednesday, April 04, 2012 12:53:53
Sample De CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	66571.8		ppb
|-	Sc	45	224481.7		ppb
|>	Rh	103	441988		ppb
|	Cd	111	21922.7	11.53781	ppb
|-	Cd	114	49961.6	11.12471	ppb
|>	Ho	165	807879.8		ppb
|-	Pb	208	2576085.1	83.34551	ppb
	Kr	83	-1206.5		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-11
Sample Da Wednesday, April 04, 2012 12:55:22
Sample De CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	74658.1		ppb
|-	Sc	45	243260.3		ppb
|>	Rh	103	490313.8		ppb
|	Cd	111	18889.4	8.95711	ppb
|-	Cd	114	43718.3	8.77319	ppb
|>	Ho	165	907965.1		ppb
|-	Pb	208	2807520.4	80.82368	ppb
	Kr	83	-1197.7		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-11
Sample Da Wednesday, April 04, 2012 12:56:51
Sample De CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	73770.7		ppb
|-	Sc	45	243356.8		ppb
|>	Rh	103	487023.7		ppb
|	Cd	111	100978.2	48.24735	ppb
|-	Cd	114	234764.6	47.46288	ppb
|>	Ho	165	903486.1		ppb
|-	Pb	208	4459131.1	129.03844	ppb
	Kr	83	-1203.6		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-13
Sample Da Wednesday, April 04, 2012 12:58:19
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	65789.8		ppb
|-	Sc	45	245046.8		ppb
|>	Rh	103	467102.8		ppb
|	Cd	111	911.9	0.44621	ppb
|-	Cd	114	307.4	0.05615	ppb
|>	Ho	165	859279.4		ppb
|-	Pb	208	97501.6	2.88686	ppb
	Kr	83	-101.3		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-14
Sample Da Wednesday, April 04, 2012 12:59:50
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	130288.3		ppb
|-	Sc	45	449173.4		ppb
|>	Rh	103	879782.8		ppb
|	Cd	111	1212.3	0.31274	ppb
|-	Cd	114	462.2	0.04264	ppb
|>	Ho	165	1619068.4		ppb
|-	Pb	208	197564.9	3.10987	ppb
	Kr	83	-16.3		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 1
Sample Da Wednesday, April 04, 2012 13:01:22
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	68383.1		ppb
|-	Sc	45	226069.1		ppb
|>	Rh	103	501936.8		ppb
|	Cd	111	7.5	-0.00449	ppb
|-	Cd	114	24.4	-0.00325	ppb
|>	Ho	165	919936.7		ppb
|-	Pb	208	2399.8	-0.01438	ppb
	Kr	83	297.8		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 4
Sample Da Wednesday, April 04, 2012 13:02:51
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	70766		ppb
|-	Sc	45	236789.1		ppb
|>	Rh	103	521401.5		ppb
|	Cd	111	231600.3	103.36649	ppb
|-	Cd	114	545902.9	103.0933	ppb
|>	Ho	165	963699.8		ppb
|-	Pb	208	3727795.6	101.13117	ppb
	Kr	83	-15545.1		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-2
Sample Da Wednesday, April 04, 2012 14:54:44
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	55838.1		ppb
|-	Sc	45	271907.9		ppb
|>	Rh	103	557278.3		ppb
|	Cd	111	5808.4	2.41786	ppb
|-	Cd	114	12208.1	2.14934	ppb
|>	Ho	165	1041678.9		ppb
|-	Pb	208	402155	10.01881	ppb
	Kr	83	-108.6		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-2
Sample Da Wednesday, April 04, 2012 14:56:13
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	60404.9		ppb
|-	Sc	45	272424.9		ppb
|>	Rh	103	543614.7		ppb
|	Cd	111	5457.6	2.32791	ppb
|-	Cd	114	10799	1.94929	ppb
|>	Ho	165	1025603.8		ppb
|-	Pb	208	400572.8	10.1359	ppb
	Kr	83	-146.5		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-7
Sample Da Wednesday, April 04, 2012 14:57:41
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	62061.6		ppb
|-	Sc	45	273288.9		ppb
|>	Rh	103	569929.6		ppb
|	Cd	111	9485.6	3.86545	ppb
|-	Cd	114	22243.5	3.83527	ppb
|>	Ho	165	1017335.5		ppb
|-	Pb	208	1123627.9	28.81437	ppb
	Kr	83	-426.6		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: 18417-7
Sample Da Wednesday, April 04, 2012 14:59:10
Sample De: CAE
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	62486.5		ppb
|-	Sc	45	265442.9		ppb
|>	Rh	103	550938.8		ppb
|	Cd	111	120550.1	50.91221	ppb
|-	Cd	114	283535.4	50.66785	ppb
|>	Ho	165	1011565.9		ppb
|-	Pb	208	3005559.7	77.65088	ppb
	Kr	83	-381.6		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 1
Sample Da Wednesday, April 04, 2012 15:00:42
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	58228.8		ppb
|-	Sc	45	237761.1		ppb
|>	Rh	103	522492.3		ppb
|	Cd	111	48.3	0.01385	ppb
|-	Cd	114	102.6	0.01158	ppb
|>	Ho	165	931059.7		ppb
|-	Pb	208	3561.6	0.01761	ppb
	Kr	83	360.9		mg/L

Method 6020 & 200.8 Metals Summary Report
Sample ID: QC Std 4
Sample Da Wednesday, April 04, 2012 15:02:12
Sample Description:
Concentration Results

	Analyte	Mass	Meas. Intens	Conc. Mear	Report Unit
	Li	6	60411		ppb
|-	Sc	45	247507.2		ppb
|>	Rh	103	538497.2		ppb
|	Cd	111	237434.1	102.60485	ppb
|-	Cd	114	554083.8	101.31054	ppb
|>	Ho	165	974266.5		ppb
|-	Pb	208	3743061.7	100.44215	ppb
	Kr	83	-15730		mg/L

PerkinElmer FIMS-100 CVAA Mercury Analyzer

Sample_ID	Date	Time	Mean_Sig	Mean_Rd	Mean_Rt	Units	Alq.	Vol.	Sig 1	Reading-1	Result-1	Sig 2	Reading-2	Result-2
Calib Blank	3/28/2012	13:42:53	0.0020012			µg	4	200	0.0020012					
STD1=.004ug	3/28/2012	13:44:09	0.001038			µg	4	200	0.001038					
STD2=.04ug	3/28/2012	13:45:25	0.0126426			µg	4	200	0.0126426					
STD3=.08ug	3/28/2012	13:46:42	0.026349			µg	4	200	0.026349					
STD4=.16ug	3/28/2012	13:48:00	0.0523873			µg	4	200	0.0523873					
STD5=.2ug	3/28/2012	13:49:19	0.0693067			µg	4	200	0.0693067					
Reagent Blank	3/28/2012	13:51:07	-0.0000997	0.0015043	0.0015043	µg	4	200	2.763E-05	0.0018769	0.0018769	-0.000227	0.0011316	0.0011316
0.004ug = DL	3/28/2012	13:52:21	0.0007878	0.0041012	0.0041012	µg	4	200	0.0007878	0.0041012	0.0041012			
0.080ug = STD.2	3/28/2012	13:53:38	0.0276105	0.082588	0.082588	µg	4	200	0.0276105	0.082588	0.082588			
0.080ug = QC STD 3	3/28/2012	13:54:58	0.0281952	0.0842987	0.0842987	µg	4	200	0.0281952	0.0842987	0.0842987			
REAGENT BLANK	3/28/2012	13:56:15	-0.0001181	0.0014504	0.0014504	µg	4	200	-0.0001181	0.0014504	0.0014504			
0.004ug = DL	3/28/2012	14:37:22	0.0006778	0.0037793	0.0037793	µg	4	200	0.0006778	0.0037793	0.0037793			
0.080ug = STD.2	3/28/2012	14:38:39	0.0279046	0.0834486	0.0834486	µg	4	200	0.0279046	0.0834486	0.0834486			
REAGENT BLANK	3/28/2012	14:39:56	-0.0001084	0.0014788	0.0014788	µg	4	200	-0.0001084	0.0014788	0.0014788			
18417-1 A	3/28/2012	14:50:30	-0.0003504	0.0007706	0.038528	µg	4	200	-0.00031	0.0008889	0.0444427	-0.0003908	0.0006523	0.0326133
18417-2 A	3/28/2012	14:52:16	-0.000276	0.0009883	0.0494167	µg	4	200	-0.0001803	0.0012683	0.0634136	-0.0003716	0.0007084	0.0354199
18417-2 A dup	3/28/2012	14:54:04	-0.0000481	0.001655	0.0827518	µg	4	200	-0.0000521	0.0016435	0.0821766	-0.0000442	0.0016665	0.083327
0.004ug = DL	3/28/2012	14:58:56	0.0007624	0.0040268	0.0040268	µg	4	200	0.0007624	0.0040268	0.0040268			
0.080ug = STD.2	3/28/2012	15:00:13	0.0276331	0.0826539	0.0826539	µg	4	200	0.0276331	0.0826539	0.0826539			
REAGENT BLANK	3/28/2012	15:01:30	-0.00015	0.0013568	0.0013568	µg	4	200	-0.00015	0.0013568	0.0013568			
18417-4 A	3/28/2012	15:03:18	0.0001597	0.0022632	0.1131586	µg	4	200	0.0001871	0.0023435	0.1171758	0.0001322	0.0021828	0.1091415
18417-5 A	3/28/2012	15:05:07	-0.0000497	0.0016504	0.0825198	µg	4	200	-0.0000441	0.0016667	0.0833356	-0.0000553	0.0016341	0.0817039
18417-6 A	3/28/2012	15:06:56	0.0000025	0.0018033	0.0901665	µg	4	200	3.633E-05	0.0019023	0.0951162	-0.0000313	0.0017043	0.0852168
18417-6 A dup	3/28/2012	15:08:47	5.694E-05	0.0019626	0.0981307	µg	4	200	2.834E-05	0.0018789	0.0939466	8.553E-05	0.0020463	0.1023148
18417-7 A	3/28/2012	15:10:34	4.821E-05	0.0019371	0.0968545	µg	4	200	8.297E-05	0.0020388	0.1019392	1.346E-05	0.0018354	0.0917698
18417-7 A spk	3/28/2012	15:12:18	0.0254797	0.0763528	3.8176422	µg	4	200	0.0251212	0.0753038	3.765188	0.0258382	0.0774019	3.8700964
18417-8 A	3/28/2012	15:14:02	-0.0000685	0.0015954	0.0797723	µg	4	200	7.97E-06	0.0018193	0.0909669	-0.000145	0.0013716	0.0685777
18417-9 A	3/28/2012	15:15:47	0.0005191	0.003315	0.1657511	µg	4	200	0.0005903	0.0035232	0.1761584	0.000448	0.0031069	0.1553438
18417-10 A	3/28/2012	15:17:33	0.0003492	0.0028177	0.1408837	µg	4	200	0.0003055	0.00269	0.1345009	0.0003928	0.0029453	0.1472666
18417-10 A dup	3/28/2012	15:19:19	-0.0000045	0.0017827	0.0891368	µg	4	200	0.0001356	0.0021929	0.109644	-0.0001446	0.0013726	0.0686297
0.004ug = DL	3/28/2012	15:23:02	0.0008747	0.0043555	0.0043555	µg	4	200	0.0008747	0.0043555	0.0043555			
0.080ug = STD.2	3/28/2012	15:24:19	0.0264978	0.0793319	0.0793319	µg	4	200	0.0264978	0.0793319	0.0793319			
REAGENT BLANK	3/28/2012	15:25:36	-0.0001615	0.0013231	0.0013231	µg	4	200	-0.0001615	0.0013231	0.0013231			
Calib Blank	3/28/2012	15:50:30	0.0010646			µg	4	500	0.0010646					
STD1=.004ug	3/28/2012	15:51:45	0.0018665			µg	4	500	0.0018665					
STD2=.04ug	3/28/2012	15:53:00	0.0138767			µg	4	500	0.0138767					
STD3=.08ug	3/28/2012	15:54:17	0.0281935			µg	4	500	0.0281935					
STD4=.16ug	3/28/2012	15:55:34	0.0545049			µg	4	500	0.0545049					
STD5=.2ug	3/28/2012	15:56:53	0.0695188			µg	4	500	0.0695188					
Reagent Blank	3/28/2012	15:58:41	0.000104	-0.0004036	-0.0004036	µg	4	500	0.0005218	0.0008108	0.0008108	-0.0003137	-0.0016181	-0.0016181
0.004ug = DL	3/28/2012	16:02:23	0.0017171	0.0042853	0.0042853	µg	4	500	0.0017171	0.0042853	0.0042853			
0.080ug = STD.2	3/28/2012	16:04:27	0.0283441	0.081686	0.081686	µg	4	500	0.0283441	0.081686	0.081686			
0.080ug = QC STD 3	3/28/2012	16:05:47	0.0296828	0.0855774	0.0855774	µg	4	500	0.0296828	0.0855774	0.0855774			
REAGENT BLANK	3/28/2012	16:07:04	0.000316	0.0002126	0.0002126	µg	4	500	0.000316	0.0002126	0.0002126			
18417-11 A	3/28/2012	16:08:50	0.0009682	0.0021085	0.1054245	µg	4	200	0.000994	0.0021835	0.1091746	0.0009424	0.0020335	0.1016745
18417-11 A spk	3/28/2012	16:12:18	0.0237087	0.0682116	3.4105776	µg	4	200	0.02406	0.0692328	3.4616393	0.0233573	0.0671903	3.3595158
18417-12 A	3/28/2012	16:14:06	0.0009736	0.002124	0.1062001	µg	4	200	0.0009936	0.0021822	0.1091098	0.0009535	0.0020658	0.1032905
18417-13 A	3/28/2012	16:15:54	0.0010649	0.0023894	0.1194711	µg	4	200	0.0012126	0.0028189	0.1409452	0.0009171	0.0019599	0.097997
18417-14 A	3/28/2012	16:17:43	0.0007988	0.0016159	0.0807958	µg	4	200	0.0008212	0.0016812	0.0840601	0.0007763	0.0015506	0.0775315
0.004ug = DL	3/28/2012	16:28:01	0.0015871	0.0039075	0.0039075	µg	4	500	0.0015871	0.0039075	0.0039075			
0.080ug = STD.2	3/28/2012	16:29:18	0.0286282	0.0825119	0.0825119	µg	4	500	0.0286282	0.0825119	0.0825119			
REAGENT BLANK	3/28/2012	16:30:35	7.134E-05	-0.0004985	-0.0004985	µg	4	500	7.134E-05	-0.0004985	-0.0004985			
Calib Blank	3/30/2012	9:17:14	0.0011745			µg			0.0011745					
STD1=.004ug	3/30/2012	9:18:29	0.001816			µg			0.001816					
STD2=.04ug	3/30/2012	9:19:45	0.0159457			µg			0.0159457					
STD3=.08ug	3/30/2012	9:21:03	0.0315671			µg			0.0315671					
STD4=.16ug	3/30/2012	9:22:20	0.0574826			µg			0.0574826					
STD5=.2ug	3/30/2012	9:23:40	0.0762393			µg			0.0762393					
Reagent Blank	3/30/2012	9:25:29	-0.0000277	-0.0014955	-0.0014955	µg			6.11E-06	-0.0014043	-0.0014043	-0.0000616	-0.0015866	-0.0015866
0.004ug = DL	3/30/2012	9:27:57	0.0019524	0.0038324	0.0038324	µg			0.0019524	0.0038324	0.0038324			
0.080ug = STD.2	3/30/2012	9:29:14	0.0304054	0.0803895	0.0803895	µg			0.0304054	0.0803895	0.0803895			
0.080ug = QC STD 3	3/30/2012	9:30:34	0.032799	0.0868296	0.0868296	µg			0.032799	0.0868296	0.0868296			
REAGENT BLANK	3/30/2012	9:31:51	-0.0000455	-0.0015433	-0.0015433	µg			-0.0000455	-0.0015433	-0.0015433			
0.004ug = DL	3/30/2012	10:01:29	0.001894	0.0036752	0.0036752	µg	4	500	0.001894	0.0036752	0.0036752			
0.080ug = STD.2	3/30/2012	10:02:45	0.0294819	0.0779045	0.0779045	µg	4	500	0.0294819	0.0779045	0.0779045			
REAGENT BLANK	3/30/2012	10:04:03	-0.000021	-0.0014775	-0.0014775	µg	4	500	-0.000021	-0.0014775	-0.0014775			
18417-3A	3/30/2012	10:22:07	0.0004747	-0.0001436	-0.0071833	µg	4	200	0.0004876	-0.0001087	-0.0054371	0.0004617	-0.0001785	-0.0089296
0.004ug = DL	3/30/2012	10:23:23	0.0019352	0.0037861	0.0037861	µg	4	200	0.0019352	0.0037861	0.0037861			
0.080ug = STD.2	3/30/2012	10:24:40	0.0296842	0.0784491	0.0784491	µg	4	200	0.0296842	0.0784491	0.0784491			
REAGENT BLANK	3/30/2012	10:25:57	-0.000064	-0.001593	-0.001593	µg	4	200	-0.000064	-0.001593	-0.001593			
0.004ug = DL	3/30/2012	10:45:08	0.0019548	0.0038389	0.0038389	µg	20	1	0.0019548	0.0038389	0.0038389			
0.080ug = STD.2	3/30/2012	10:46:25	0.0299954	0.0792861	0.0792861	µg	20	1	0.0299954	0.0792861	0.0792861			
REAGENT BLANK	3/30/2012	10:47:43	-0.0000136	-0.0014574	-0.0014574	µg	20	1	-0.0000136	-0.0014574	-0.0014574			
Calib Blank	4/2/2012	14:20:38	0.0011997			µg	0.1	720	0.0011997					
STD1=.004ug	4/2/2012	14:21:53	0.0015474			µg	0.1	720	0.0015474					
STD2=.04ug	4/2/2012	14:23:08	0.0135861			µg	0.1	720	0.0135861					
STD3=.08ug	4/2/2012	14:24:25	0.0252698			µg	0.1	720	0.0252698					
STD4=.16ug	4/2/2012	14:25:42	0.0504759			µg	0.1	720	0.0504759					

PerkinElmer FIMS-100 CVAA Mercury Analyzer

Sample_ID	Date	Time	Mean_Sig	Mean_Rd	Mean_Rt	Units	Alq.	Vol.	Sig 1	Reading-1	Result-1	Sig 2	Reading-2	Result-2
STD5=.2ug	4/2/2012	14:27:01	0.0625881			µg	0.1	720	0.0625881					
Reagent Blank	4/2/2012	14:28:49	-0.000176	-0.00189	-0.00189	µg	0.1	720	-0.0001116	-0.0016838	-0.0016838	-0.0002403	-0.0020963	-0.0020963
0.004ug = DL	4/2/2012	14:30:03	0.0016593	0.0039932	0.0039932	µg	0.1	720	0.0016593	0.0039932	0.0039932			
0.080ug = STD.2	4/2/2012	14:31:20	0.027214	0.0859115	0.0859115	µg	0.1	720	0.027214	0.0859115	0.0859115			
0.080ug = QC STD 3	4/2/2012	14:32:40	0.0268113	0.0846204	0.0846204	µg	0.1	720	0.0268113	0.0846204	0.0846204			
REAGENT BLANK	4/2/2012	14:33:57	-0.0001604	-0.0018401	-0.0018401	µg	0.1	720	-0.0001604	-0.0018401	-0.0018401			
0.004ug = DL	4/2/2012	15:41:56	0.0017436	0.0042635	0.0042635	µg	4	400	0.0017436	0.0042635	0.0042635			
0.080ug = STD.2	4/2/2012	15:43:13	0.0238362	0.0750834	0.0750834	µg	4	400	0.0238362	0.0750834	0.0750834			
REAGENT BLANK	4/2/2012	15:44:29	-0.0003227	-0.0023605	-0.0023605	µg	4	400	-0.0003227	-0.0023605	-0.0023605			
18417-1B	4/2/2012	15:48:03	-0.0002831	-0.0022336	-0.2792069	µg	4	500	-0.0002637	-0.0021712	-0.2714071	-0.0003026	-0.002296	-0.2870066
18417-2B	4/2/2012	15:49:51	2.82E-06	-0.0013168	-0.1646036	µg	4	500	0.0000047	-0.0013108	-0.1638501	9.4E-07	-0.0013228	-0.1653572
18417-3B	4/2/2012	15:53:27	-0.0001281	-0.0017368	-0.2171007	µg	4	500	-0.0001231	-0.0017205	-0.2150687	-0.0001332	-0.001753	-0.2191327
18417-4B	4/2/2012	15:57:06	-0.0001287	-0.0017385	-0.2173216	µg	4	500	-0.0001208	-0.0017134	-0.2141775	-0.0001365	-0.0017637	-0.2204657
18417-5B	4/2/2012	15:58:56	7.335E-05	-0.0010907	-0.1363421	µg	4	500	9.172E-05	-0.0010318	-0.1289799	5.498E-05	-0.0011496	-0.1437043
18417-6B	4/2/2012	16:00:46	-0.0003905	-0.0025777	-0.3222164	µg	4	500	-0.0003898	-0.0025755	-0.3219423	-0.0003912	-0.0025799	-0.3224906
18417-6B dup	4/2/2012	16:02:33	-0.0001636	-0.0018505	-0.2313157	µg	4	500	-0.0001685	-0.001866	-0.2332617	-0.0001588	-0.0018349	-0.2293696
0.004ug = DL	4/2/2012	16:03:46	0.0016061	0.0038227	0.0038227	µg	4	500	0.0016061	0.0038227	0.0038227			
0.080ug = STD.2	4/2/2012	16:05:03	0.0249393	0.0786196	0.0786196	µg	4	500	0.0249393	0.0786196	0.0786196			
REAGENT BLANK	4/2/2012	16:06:20	-0.0003073	-0.0023112	-0.0023112	µg	4	500	-0.0003073	-0.0023112	-0.0023112			
18417-7B	4/2/2012	16:08:04	-0.0002728	-0.0022003	-0.2750481	µg	4	500	-0.0002701	-0.0021917	-0.2739675	-0.0002755	-0.002209	-0.2761288
18417-8B	4/2/2012	16:12:17	-0.0003579	-0.0024734	-0.3091848	µg	4	500	-0.0003677	-0.0025046	-0.3130843	-0.0003482	-0.0024422	-0.3052854
18417-9B	4/2/2012	16:14:02	-0.0001864	-0.0019235	-0.2404445	µg	4	500	-0.0001884	-0.0019298	-0.2412308	-0.0001844	-0.0019172	-0.2396582
18417-10B	4/2/2012	16:15:48	-0.0002058	-0.0019858	-0.2482315	µg	4	500	-0.0002216	-0.0020365	-0.2545653	-0.00019	-0.0019351	-0.2418977
18417-10B dup	4/2/2012	16:17:34	-0.0001299	-0.0017423	-0.2177984	µg	4	500	-0.0001153	-0.0016956	-0.211953	-0.0001445	-0.0017891	-0.2236437
18417-11B	4/2/2012	16:19:21	-0.0001427	-0.0017834	-0.2229323	µg	4	500	-0.0001387	-0.0017707	-0.2213457	-0.0001467	-0.0017961	-0.2245189
18417-12B	4/2/2012	16:22:57	0.0001157	-0.000955	-0.1193807	µg	4	500	0.0001425	-0.000869	-0.1086309	8.885E-05	-0.001041	-0.1301305
18417-13B	4/2/2012	16:24:45	-0.0006339	-0.003358	-0.4197536	µg	4	500	-0.0010129	-0.0045729	-0.5716183	-0.0002549	-0.0021431	-0.2678889
0.004ug = DL	4/2/2012	16:27:14	0.0017565	0.0043048	0.0043048	µg	4	500	0.0017565	0.0043048	0.0043048			
0.080ug = STD.2	4/2/2012	16:28:31	0.024023	0.0756822	0.0756822	µg	4	500	0.024023	0.0756822	0.0756822			
REAGENT BLANK	4/2/2012	16:29:48	-0.0003578	-0.0024729	-0.0024729	µg	4	500	-0.0003578	-0.0024729	-0.0024729			
18417-14B	4/2/2012	16:31:35	-0.000138	-0.0017685	-0.2210666	µg	4	500	-0.0001189	-0.0017071	-0.2133984	-0.0001572	-0.0018298	-0.2287348
0.004ug = DL	4/2/2012	16:51:11	0.001763	0.0043256	0.0043256	µg	20	1	0.001763	0.0043256	0.0043256			
0.080ug = STD.2	4/2/2012	16:52:28	0.0240684	0.0758279	0.0758279	µg	20	1	0.0240684	0.0758279	0.0758279			
REAGENT BLANK	4/2/2012	16:53:48	-0.0003697	-0.002511	-0.002511	µg	20	1	-0.0003697	-0.002511	-0.002511			
Calib Blank	4/4/2012	9:41:13	0.0006394			µg			0.0006394					
STD1=.004ug	4/4/2012	9:42:28	0.0014224			µg			0.0014224					
STD2=.04ug	4/4/2012	9:43:45	0.0114494			µg			0.0114494					
STD3=.08ug	4/4/2012	9:45:02	0.023406			µg			0.023406					
STD4=.16ug	4/4/2012	9:46:19	0.0432345			µg			0.0432345					
STD5=.2ug	4/4/2012	9:47:38	0.0559097			µg			0.0559097					
Reagent Blank	4/4/2012	9:49:26	0.0002057	-0.0006257	-0.0006257	µg			0.0002643	-0.0004131	-0.0004131	0.0001472	-0.0008384	-0.0008384
0.004ug = DL	4/4/2012	10:06:44	0.0014664	0.0039567	0.0039567	µg	4	500	0.0014664	0.0039567	0.0039567			
0.080ug = STD.2	4/4/2012	10:08:01	0.0215456	0.076942	0.076942	µg	4	500	0.0215456	0.076942	0.076942			
0.080ug = QC STD 3	4/4/2012	10:09:21	0.0219403	0.0783766	0.0783766	µg	4	500	0.0219403	0.0783766	0.0783766			
REAGENT BLANK	4/4/2012	10:10:38	0.0002183	-0.0005799	-0.0005799	µg	4	500	0.0002183	-0.0005799	-0.0005799			
0.004ug = DL	4/4/2012	11:13:25	0.0015035	0.0040913	0.0040913	µg	20	1	0.0015035	0.0040913	0.0040913			
0.080ug = STD.2	4/4/2012	11:14:42	0.0215856	0.0770874	0.0770874	µg	20	1	0.0215856	0.0770874	0.0770874			
REAGENT BLANK	4/4/2012	11:15:59	5.925E-05	-0.0011582	-0.0011582	µg	20	1	5.925E-05	-0.0011582	-0.0011582			
18417-LRB FH	4/4/2012	11:25:01	2.49E-06	-0.0013645	-0.0341139	µg	4	100	0.0000071	-0.0013478	-0.0336954	-0.0000021	-0.0013812	-0.0345324
18417-1FH	4/4/2012	11:28:41	0.0002271	-0.0005482	-0.0137072	µg	4	100	0.0002364	-0.0005142	-0.0128555	0.0002177	-0.0005823	-0.0145589
18417-2FH	4/4/2012	11:30:31	0.0004663	0.0003213	0.0080336	µg	4	100	0.0004737	0.0003484	0.0087089	0.0004589	0.0002943	0.0073584
18417-2FH dup	4/4/2012	11:32:23	0.0004924	0.0004161	0.0104018	µg	4	100	0.0004994	0.0004415	0.0110383	0.0004854	0.0003906	0.0097653
18417-3FH	4/4/2012	11:34:11	0.000613	0.0008544	0.0213595	µg	4	100	0.0006158	0.0008647	0.0216164	0.0006101	0.0008441	0.0211027
0.004ug = DL	4/4/2012	11:35:24	0.0014317	0.0038303	0.0038303	µg	4	100	0.0014317	0.0038303	0.0038303			
0.080ug = STD.2	4/4/2012	11:36:41	0.0218359	0.0779972	0.0779972	µg	4	100	0.0218359	0.0779972	0.0779972			
REAGENT BLANK	4/4/2012	11:37:58	4.118E-05	-0.0012239	-0.0012239	µg	4	100	4.118E-05	-0.0012239	-0.0012239			
18417-4FH	4/4/2012	11:41:28	0.0002293	-0.0005402	-0.0135067	µg	4	100	0.0002638	-0.0004146	-0.0103658	0.0001947	-0.0006659	-0.0166477
18417-5FH	4/4/2012	11:43:13	0.000653	0.0009998	0.0249944	µg	4	100	0.0006511	0.000993	0.0248251	0.0006548	0.0010065	0.0251637
18417-6FH	4/4/2012	11:44:59	0.0010764	0.0025388	0.06347	µg	4	100	0.0010796	0.0025507	0.063768	0.0010731	0.0025269	0.0631721
18417-6FH dup	4/4/2012	11:46:45	0.000984	0.0022032	0.0550788	µg	4	100	0.0010039	0.0022753	0.0568815	0.0009642	0.002131	0.0532762
18417-7FH	4/4/2012	11:48:31	0.0008821	0.0018326	0.0458151	µg	4	100	0.0008882	0.0018549	0.0463727	0.0008759	0.0018103	0.0452575
18417-8FH	4/4/2012	11:52:06	0.0008705	0.0017905	0.0447626	µg	4	100	0.0008872	0.0018512	0.0462811	0.0008538	0.0017298	0.0432441
18417-9FH	4/4/2012	11:53:54	0.001083	0.002563	0.0640757	µg	4	100	0.0011009	0.0026278	0.0656956	0.0010652	0.0024982	0.0624557
18417-10FH	4/4/2012	11:56:18	0.0007026	0.0011802	0.0295057	µg	4	100	0.0007227	0.0012534	0.0313351	0.0006825	0.0011071	0.0276763
0.004ug = DL	4/4/2012	12:01:24	0.0015045	0.0040949	0.0040949	µg	4	100	0.0015045	0.0040949	0.0040949			
0.080ug = STD.2	4/4/2012	12:02:41	0.0217845	0.0778102	0.0778102	µg	4	100	0.0217845	0.0778102	0.0778102			
REAGENT BLANK	4/4/2012	12:03:58	8.409E-05	-0.0010679	-0.0010679	µg	4	100	8.409E-05	-0.0010679	-0.0010679			
18417-10FH dup	4/4/2012	12:05:45	0.0008082	0.0015639	0.0390987	µg	4	100	0.0008015	0.0015396	0.0384893	0.0008149	0.0015883	0.0397082
18417-11FH	4/4/2012	12:07:35	0.0018945	0.0055128	0.1378191	µg	4	100	0.0019093	0.0055663	0.1391563	0.0018798	0.0054593	0.1364819
18417-12FH	4/4/2012	12:11:15	0.0012168	0.0030493	0.0762336	µg	4	100	0.0012294	0.0030952	0.0773801	0.0012042	0.0030035	0.0750871
18417-13FH	4/4/2012	12:13:03	0.0004607	0.000301	0.0075259	µg	4	100	0.0004594	0.0002964	0.007409	0.000462	0.0003057	0.0076427
18417-14FH	4/4/2012	12:14:47	0.0003456	-0.0001175	-0.0029392	µg	4	100	0.0003454	-0.000118	-0.0029523	0.0003457	-0.000117	-0.002926
18417-1BH	4/4/2012	12:16:31	0.0053873	0.0182087	3.4141224	µg	4	750	0.0054032	0.0182662	3.4249033	0.0053715	0.0181512	3.4033414
18417-2BH	4/4/2012	12:18:16	0.0053975	0.0182457	3.3754507	µg	4	740	0.0053793	0.0181793	3.3631619	0.0054158	0.0183121	3.3877395
18417-2BH dup	4/4/2012	12:20:02	0.0051659	0.0174037	3.2196894	µg	4	740	0.005171	0.0174221	3.2230905	0.0051608	0.0173853	3.2162883
18417-3BH	4/4/2012	12:21:48	0.0055384	0.0187577	3.3763921	µg	4	720	0.0055209	0.0186943	3.3649714	0.0055559	0.0188212	3.3878129
0.004ug = DL	4/4/2012	12:25:30	0.0014171	0.0037772	0.0037772	µg	4	720	0.0014171	0.0037772	0.0037772			
0.080ug = STD.2	4/4/2012	12:26:47	0.0220581	0.0788047	0.0788047	µg	4	720	0.0220581	0.0788047	0.0788047			

PerkinElmer FIMS-100 CVAA Mercury Analyzer

Sample_ID	Date	Time	Mean_Sig	Mean_Rd	Mean_Rt	Units	Alq.	Vol.	Sig 1	Reading-1	Result-1	Sig 2	Reading-2	Result-2
REAGENT BLANK	4/4/2012	12:28:04	0.0001959	-0.0006616	-0.0006616	µg	4	720	0.0001959	-0.0006616	-0.0006616			
18417-4BH	4/4/2012	12:31:36	0.0058907	0.0200384	3.7572013	µg	4	750	0.0058947	0.020053	3.7599359	0.0058867	0.0200238	3.7544668
18417-5BH	4/4/2012	12:33:22	0.0039564	0.0130072	2.406341	µg	4	740	0.0039601	0.013021	2.408879	0.0039526	0.0129935	2.4038031
18417-6BH	4/4/2012	12:35:10	0.003575	0.0116212	2.0337115	µg	4	700	0.0035516	0.0115362	2.0188276	0.0035984	0.0117063	2.0485954
18417-6BH dup	4/4/2012	12:36:58	0.0034723	0.0112476	1.9683328	µg	4	700	0.0034608	0.011206	1.9610468	0.0034837	0.0112893	1.9756188
18417-7BH	4/4/2012	12:38:46	0.0029561	0.0093712	1.6399685	µg	4	700	0.002946	0.0093345	1.6335446	0.0029662	0.009408	1.6463924
18417-8BH	4/4/2012	12:42:26	0.004087	0.0134821	2.1908406	µg	4	650	0.0041029	0.0135399	2.2002297	0.0040711	0.0134243	2.1814515
18417-9BH	4/4/2012	12:44:16	0.0051078	0.0171926	3.0946722	µg	4	720	0.0051056	0.0171846	3.0932224	0.00511	0.0172007	3.096122
0.004ug = DL	4/4/2012	12:47:16	0.0015263	0.0041741	0.0041741	µg	4	760	0.0015263	0.0041741	0.0041741			
0.080ug = STD.2	4/4/2012	12:48:33	0.0224638	0.0802796	0.0802796	µg	4	760	0.0224638	0.0802796	0.0802796			
REAGENT BLANK	4/4/2012	12:49:50	0.0001201	-0.0009372	-0.0009372	µg	4	760	0.0001201	-0.0009372	-0.0009372			
18417-11BH	4/4/2012	12:53:29	0.0050838	0.0171052	3.2499892	µg	4	760	0.0050798	0.0170909	3.2472644	0.0050877	0.0171195	3.2527139
18417-12BH	4/4/2012	12:57:00	0.0077281	0.0267169	5.2097905	µg	4	780	0.0077402	0.0267609	5.2183784	0.0077159	0.0266728	5.2012027
18417-13BH	4/4/2012	12:58:46	0.0004516	0.0002677	0.02008	µg	4	300	0.0004666	0.0003222	0.0241668	0.0004366	0.0002132	0.0159932
18417-14BH	4/4/2012	13:00:32	0.0001568	-0.0008038	-0.0381829	µg	4	190	0.0001539	-0.000814	-0.0386687	0.0001596	-0.0007936	-0.0376972
0.004ug = DL	4/4/2012	13:10:13	0.0015541	0.0042755	0.0042755	µg	0	690	0.0015541	0.0042755	0.0042755			
0.080ug = STD.2	4/4/2012	13:11:30	0.0233254	0.0834111	0.0834111	µg	0	690	0.0233254	0.0834111	0.0834111			
REAGENT BLANK	4/4/2012	13:12:47	0.0001468	-0.0008398	-0.0008398	µg	0	690	0.0001468	-0.0008398	-0.0008398			
Calib Blank	4/4/2012	11:53:23	0.0007408			µg			0.0007408					
STD1=.004ug	4/4/2012	11:54:37	0.0009403			µg			0.0009403					
STD2=.04ug	4/4/2012	11:55:52	0.0120235			µg			0.0120235					
STD3=.08ug	4/4/2012	11:57:08	0.0228853			µg			0.0228853					
STD4=.16ug	4/4/2012	11:58:24	0.0457823			µg			0.0457823					
STD5=.2ug	4/4/2012	11:59:43	0.057902			µg			0.057902					
Reagent Blank	4/4/2012	12:01:29	3.377E-05	0.0001172	0.0001172	µg			2.072E-05	7.187E-05	7.187E-05	4.683E-05	0.0001625	0.0001625
0.004ug = DL	4/4/2012	12:05:08	0.0011668	0.0040472	0.0040472	µg			0.0011668	0.0040472	0.0040472			
0.080ug = STD.2	4/4/2012	12:09:02	0.0227186	0.0788046	0.0788046	µg			0.0227186	0.0788046	0.0788046			
0.080ug = QC STD 3	4/4/2012	12:10:21	0.0224011	0.0777031	0.0777031	µg			0.0224011	0.0777031	0.0777031			
REAGENT BLANK	4/4/2012	12:11:37	-0.0000547	-0.0001899	-0.0001899	µg			-0.0000547	-0.0001899	-0.0001899			
18417-1C	4/4/2012	12:29:21	0.0002949	0.0010229	0.1022859	µg	4	400	0.000355	0.0012314	0.1231362	0.0002348	0.0008144	0.0814355
0.004ug = DL	4/4/2012	12:30:34	0.0012272	0.0042569	0.0042569	µg	4	400	0.0012272	0.0042569	0.0042569			
0.080ug = STD.2	4/4/2012	12:31:50	0.0223513	0.0775302	0.0775302	µg	4	400	0.0223513	0.0775302	0.0775302			
REAGENT BLANK	4/4/2012	12:33:06	-0.0000684	-0.0002374	-0.0002374	µg	4	400	-0.0000684	-0.0002374	-0.0002374			
18417-2C	4/4/2012	12:34:50	0.0002491	0.0008642	0.0864223	µg	4	400	0.0003172	0.0011004	0.1100438	0.000181	0.000628	0.0628009
18417-2C DUP	4/4/2012	12:36:34	0.0000202	0.0000701	0.0070101	µg	4	400	3.808E-05	0.0001321	0.0132108	2.33E-06	8.09E-06	0.0008093
18417-3C	4/4/2012	12:38:18	3.18E-06	1.106E-05	0.0011061	µg	4	400	3.613E-05	0.0001253	0.012534	-0.0000297	-0.0001032	-0.0103218
18417-4C	4/4/2012	12:41:48	3.17E-06	0.000011	0.0011002	µg	4	400	8.7E-07	3.02E-06	0.0003023	5.47E-06	1.898E-05	0.0018981
18417-5C	4/4/2012	12:43:34	0.0000224	7.772E-05	0.0077729	µg	4	400	1.384E-05	4.801E-05	0.0048018	3.097E-05	0.0001074	0.010744
18417-6C	4/4/2012	12:45:21	-0.0002071	-0.0007185	-0.0718537	µg	4	400	-0.0001935	-0.0006714	-0.0671413	-0.0002207	-0.0007656	-0.0765662
18417-6C DUP	4/4/2012	12:47:09	1.662E-05	5.766E-05	0.0057661	µg	4	400	6.36E-06	2.208E-05	0.0022089	2.687E-05	9.323E-05	0.0093233
18417-7C	4/4/2012	12:48:57	-0.0000806	-0.0002798	-0.0279866	µg	4	400	-0.0001005	-0.0003486	-0.0348655	-0.0000608	-0.000211	-0.0211076
0.004ug = DL	4/4/2012	12:52:00	0.0012488	0.0043319	0.0043319	µg	4	400	0.0012488	0.0043319	0.0043319			
0.080ug = STD.2	4/4/2012	12:53:16	0.0227157	0.0787943	0.0787943	µg	4	400	0.0227157	0.0787943	0.0787943			
REAGENT BLANK	4/4/2012	12:54:32	4.213E-05	0.0001461	0.0001461	µg	4	400	4.213E-05	0.0001461	0.0001461			
Calib Blank	4/4/2012	14:02:23	0.0007915			µg	4	1000	0.0007915					
STD1=.004ug	4/4/2012	14:03:37	0.0010785			µg	4	1000	0.0010785					
STD2=.04ug	4/4/2012	14:04:52	0.0126565			µg	4	1000	0.0126565					
STD3=.08ug	4/4/2012	14:06:08	0.02408			µg	4	1000	0.02408					
STD4=.16ug	4/4/2012	14:07:25	0.0482091			µg	4	1000	0.0482091					
STD5=.2ug	4/4/2012	14:08:42	0.0608194			µg	4	1000	0.0608194					
Reagent Blank	4/4/2012	14:10:28	-0.0000339	-0.0001121	-0.0001121	µg	4	1000	-0.0000209	-0.0000692	-0.0000692	-0.0000469	-0.0001549	-0.0001549
0.004ug = DL	4/4/2012	14:14:08	0.0013384	0.004415	0.004415	µg	4	1000	0.0013384	0.004415	0.004415			
0.080ug = STD.2	4/4/2012	14:15:24	0.0237163	0.0782361	0.0782361	µg	4	1000	0.0237163	0.0782361	0.0782361			
0.080ug = QC STD 3	4/4/2012	14:16:44	0.0241926	0.0798074	0.0798074	µg	4	1000	0.0241926	0.0798074	0.0798074			
REAGENT BLANK	4/4/2012	14:17:59	-0.0000167	-0.0000551	-0.0000551	µg	4	1000	-0.0000167	-0.0000551	-0.0000551			
18417-8C	4/4/2012	14:19:45	4.396E-05	0.000145	0.0145038	µg	4	400	4.633E-05	0.0001529	0.0152864	4.159E-05	0.0001372	0.0137211
18417-9C	4/4/2012	14:21:34	0.0003436	0.0011334	0.1133384	µg	4	400	0.000366	0.0012074	0.1207399	0.0003211	0.0010594	0.105937
18417-10C	4/4/2012	14:23:23	-0.000014	-0.0000463	-0.0046379	µg	4	400	-0.0000216	-0.0000714	-0.0071491	-0.0000064	-0.0000212	-0.0021266
18417-10C DUP	4/4/2012	14:25:09	3.736E-05	0.0001233	0.0123256	µg	4	400	3.567E-05	0.0001177	0.0117676	3.905E-05	0.0001288	0.0128837
18417-11C	4/4/2012	14:26:52	0.0001624	0.0005358	0.0535783	µg	4	400	0.0001444	0.0004763	0.0476304	0.0001804	0.0005953	0.0595261
16417-12C	4/4/2012	14:30:18	0.0002557	0.0008436	0.0843565	µg	4	400	0.0003031	0.0009999	0.0999881	0.0002083	0.0006872	0.0687248
18417-13C	4/4/2012	14:32:02	-0.0001703	-0.0005619	-0.0561926	µg	4	400	-0.0002488	-0.000821	-0.0821067	-0.0000917	-0.0003027	-0.0302785
18417-14C	4/4/2012	14:33:46	-0.0000102	-0.0000336	-0.0033669	µg	4	400	4.644E-05	0.0001532	0.0153207	-0.0000668	-0.0002205	-0.0220546
0.004ug = DL	4/4/2012	14:37:01	0.0011599	0.0038263	0.0038263	µg	4	1000	0.0011599	0.0038263	0.0038263			
0.080ug = STD.2	4/4/2012	14:38:53	0.0240509	0.0793397	0.0793397	µg	4	1000	0.0240509	0.0793397	0.0793397			
REAGENT BLANK	4/4/2012	14:40:09	-0.0000229	-0.0000755	-0.0000755	µg	4	1000	-0.0000229	-0.0000755	-0.0000755			
Calib Blank	4/5/2012	12:49:21	0.0009415			µg	4	400	0.0009415					
STD1=.004ug	4/5/2012	12:50:36	0.0018305			µg	4	400	0.0018305					
STD2=.04ug	4/5/2012	12:51:51	0.0137063			µg	4	400	0.0137063					
STD3=.08ug	4/5/2012	12:53:08	0.0257342			µg	4	400	0.0257342					
STD4=.16ug	4/5/2012	12:54:26	0.0534424			µg	4	400	0.0534424					
STD5=.2ug	4/5/2012	12:55:46	0.0662509			µg	4	400	0.0662509					
Reagent Blank	4/5/2012	12:57:34	2.004E-05	-0.0004141	-0.0004141	µg	4	400	2.249E-05	-0.0004066	-0.0004066	1.758E-05	-0.0004215	-0.0004215
0.004ug = DL	4/5/2012	13:01:16	0.0015049	0.004077	0.004077	µg	4	400	0.0015049	0.004077	0.004077			
0.080ug = STD.2	4/5/2012	13:02:33	0.0254837	0.0766026	0.0766026	µg	4	400	0.0254837	0.0766026	0.0766026			
REAGENT BLANK	4/5/2012	13:03:50	1.25E-06	-0.0004709	-0.0004709	µg	4	400	1.25E-06	-0.0004709	-0.0004709			
0.080ug = QC STD 3	4/5/2012	13:16:52	0.0273451	0.0822325	0.0822325	µg	4	400	0.0273451	0.0822325	0.0822325			
REAGENT BLANK	4/5/2012	13:18:09	7.514E-05	-0.0002474	-0.0002474	µg	4	400	7.514E-05	-0.0002474	-0.0002474			

PerkinElmer FIMS-100 CVAA Mercury Analyzer

Sample_ID	Date	Time	Mean_Sig	Mean_Rd	Mean_Rt	Units	Alq.	Vol.	Sig 1	Reading-1	Result-1	Sig 2	Reading-2	Result-2
18417-10BH	4/5/2012	13:28:44	0.0054253	0.0159346	3.027571	µg	4	760	0.0054289	0.0159452	3.0295961	0.0054218	0.0159239	3.0255459
18417-10BH dup	4/5/2012	13:30:32	0.0056265	0.0165431	3.1431888	µg	4	760	0.0056433	0.016594	3.1528542	0.0056097	0.0164922	3.1335235
0.004ug = DL	4/5/2012	13:37:12	0.0014609	0.0039438	0.0039438	µg	4	400	0.0014609	0.0039438	0.0039438			
0.080ug = STD.2	4/5/2012	13:38:29	0.0254159	0.0763975	0.0763975	µg	4	400	0.0254159	0.0763975	0.0763975			
REAGENT BLANK	4/5/2012	13:39:46	0.0001114	-0.0001376	-0.0001376	µg	4	400	0.0001114	-0.0001376	-0.0001376			

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ANALYTICAL PERSPECTIVES

31 March 2012

Scott Brown
Clean Air Engineering
500 West Wood Street
Palatine, IL 60067

Ph.: 847-991-3300
Email: scott_brown@cleanair.com

Subject: Certificate of Results

Dear Scott;

Attached to this narrative are the analytical results you requested on samples submitted for the determination of polychlorinated dibenzo-*p*-dioxins and dibenzofurans. The insert below summarizes the relevant information pertaining to your project. In particular, QC annotations bring to your attention specific analytical observations and assessments made during the sample handling and data interpretation phases. A brief description of the report's components is provided. Results reported relate only to the items tested.

Project Information Summary	When applicable, see QC Annotations for details
Client Project No.	11414SB
AP Project No.	A4103
Analytical Protocol	Method 23
No. Samples Submitted	5
No. Samples Analyzed	4 (Reagent Blank Archived)
No. Laboratory Method Blanks	1
No. OPRs / Batch CS3	1
No. Outstanding Samples	0
Date Received	23-Mar-2012
Condition Received	good
Temperature upon Receipt (C)	5 (XAD, filters), 21 (solvents)
Extraction within Holding Time	yes
Analysis within Holding Time	yes
Data meet QA/QC Requirements	see below
Exceptions	see below
Analytical Difficulties	see below

QC Annotations:

See Appendix A&B for data qualifier, data attributes, and lab identifier information.

Analytical Perspectives Certification IDs

SOUTH CAROLINA	99054
ARKANSAS	88-0628
NEW JERSEY-NELAP SECONDARY	NC005
FLORIDA-NELAP PRIMARY	E87608
LOUISIANA	4024
NORTH CAROLINA	37783
WASHINGTON	C2027
NEW YORK	11988
VIRGINIA	460180
MINNESOTA	037-999-448
OREGON	pending
TEXAS	T104704484-10-1
PENNSYLVANIA-NELAP SECONDARY	68-01849

Analytical Perspectives remains committed to serving you in the most effective manner. Should you have any questions or need additional information and technical support, please do not hesitate to contact us. Thank you for choosing Analytical Perspectives as part of your analytical support team.

Sincerely,

Donna R McCall

Donna R McCall
Project Scientist Associate

APPENDIX A: DATA QUALIFIERS / DATA ATTRIBUTES	
*	The reported concentration exceeds the calibration range (upper point of the calibration curve).[1]
>	Indicates high recoveries. Shown with the numeric value at the top of the range.[1]
B	The analyte is found in the method blank, at a level that is <=10x the sample concentration.
C	Two or more congeners co-elute. In EDDs C denotes the lowest IUPAC congener in a co-elution group and additional co-eluters for the group are shown with the number of the lowest IUPAC co-eluter.
E	The reported concentration exceeds the calibration range (upper point of the calibration curve).
EMPC	Represents an Estimated Maximum Possible Concentration. EMPC's arise in cases where the signal/noise ratio is not sufficient for peak identification (the determined ion-abundance ratio is outside the allowed theoretical range), where there is a co-eluting interference, or where a single ion is utilized for quantitation due to PFK interference.
ETH	Indicates the presence of a diphenyl ether that appears to interfere with the quantitation of a furan. The reported concentration is the maximum.
H/h	If the standard recovery is below the method or SOP specified value "H" is assigned. If the obtained value is less than half the specified value "h" is assigned.[1]
J	Indicates that an analyte has a concentration below the reporting limit (lowest point of the calibration curve).
ND	Indicates a non-detect.
NR	Indicates a value that is not reportable.
PR	Due to interference, the associated congener is poorly resolved.
QI	Indicates the presence of a quantitative interference.
Ra	The new ratio – [Ra] -- for 2,3,7,8-TCDD following the $^{37}Cl_4$-2,3,7,8-TCDD correction is shown between squared brackets in the DL column.[1]
SI	Denotes "Single Ion Mode" and is utilized for PCBs where the secondary ion trace has a significantly elevated noise level due to background PFK. Responses for such peaks are calculated using an EMPC approach based solely on the primary ion area(s) and may be considered estimates.[1]
U	The analyte was not detected. The estimated detection limit (EDL) may be reported for this analyte.
V	The labeled standard recovery was found to be outside of the method control limits.
X	Indicates results reported from reinjection, refractionation, or repeat analyses.
APPENDIX B: LAB ID IDENTIFIERS	
AR	Indicates use of the archived portion of the sample extract.
CU	Indicates a sample that required additional clean-up prior to MS injection/processing.
D	Indicates a dilution of the sample extract. The number that follows the "D" indicates the dilution factor.
DE	Indicates a dilution performed with the addition of ES (extraction standard) solution.
DUP	Designation for a duplicate sample.
MS	Designation for a matrix spike.
MSD	Designation for a matrix spike duplicate.
RJ	Indicates a reinjection of the sample extract.
S	Indicates a sample split. The number that follows the "S" indicates the split factor.

[1]Denotes data qualifiers/attributes whose use will be phased out over time

2714 Exchange Drive
Wilmington, NC 28405
Ph.: 910-794-1613

A4103 - TEQ
Project ID: 11414SB

Sample Summary
Part 1

ANALYTICAL PERSPECTIVES

Method 23

Analyte	Method Blank pg	UI FF OUTLET-FIELD BLANK pg	U1 FF OUTLET-RUN 1 pg	U1 FF OUTLET-RUN 2 pg	U1 FF OUTLET-RUN 3 pg
2,3,7,8-TCDD	(2.29)	1.8	20.5	[17.8]	22.1
1,2,3,7,8-PeCDD	(1.98)	(1.88)	101	97.2	105
1,2,3,4,7,8-HxCDD	(2.2)	(1.33)	166	156	171
1,2,3,6,7,8-HxCDD	(2.38)	(1.39)	596	540	605
1,2,3,7,8,9-HxCDD	(2.66)	(1.46)	251	225	251
1,2,3,4,6,7,8-HpCDD	(3.19)	(1.93)	3,680	3,380	3,720
OCDD	(4.11)	[5.07]	3,680	3,320	3,710
2,3,7,8-TCDF	(1.64)	(1.43)	24.5	23.1	29.6
1,2,3,7,8-PeCDF	(2)	(1.39)	47.2	43.9	50.2
2,3,4,7,8-PeCDF	(1.83)	(1.37)	134	121	140
1,2,3,4,7,8-HxCDF	(1.37)	(1.15)	77.1	73.5	84.1
1,2,3,6,7,8-HxCDF	(1.29)	(1.09)	105	101	107
2,3,4,6,7,8-HxCDF	(1.21)	(1.06)	210	184	210
1,2,3,7,8,9-HxCDF	(1.69)	(1.39)	(2.99)	(3.82)	(3.66)
1,2,3,4,6,7,8-HpCDF	(1.89)	(1.26)	238	210	233
1,2,3,4,7,8,9-HpCDF	(2.61)	(1.91)	51.1	42	50.1
OCDF	(5.7)	(4.84)	[62.2]	50.5	66.2
ITEF TEQ (ND=0; EMPC=0)	**0.00**	**1.80**	**327**	**281**	**337**
ITEF TEQ (ND=0; EMPC=EMPC)	**0.00**	**1.81**	**327**	**299**	**337**
ITEF TEQ (ND=DL/2; EMPC=0)	**2.91**	**3.2**	**327**	**283**	**337**
ITEF TEQ (ND=DL/2; EMPC=EMPC)	**2.91**	**3.2**	**327**	**299**	**337**
ITEF TEQ (ND=DL; EMPC=EMPC)	**5.82**	**4.59**	**327**	**300**	**337**
Checkcode	216-642-CGD	605-310-PPN	312-205-NCJ	976-212-XQP	704-143-YHM
Lab ID	MB1_9630_DF_SDS	A4103_9630_DF_001	A4103_9630_DF_002	A4103_9630_DF_003	A4103_9630_DF_004

( ) = DL
[ ] = EMPC

A4103 - WHO-2005-TEQ
Project ID: 11414SB

Sample Summary Part 1	ANALYTICAL PERSPECTIVES				Method 23
Analyte	Method Blank pg	UI FF OUTLET-FIELD BLANK pg	U1 FF OUTLET-RUN 1 pg	U1 FF OUTLET-RUN 2 pg	U1 FF OUTLET-RUN 3 pg
2,3,7,8-TCDD	(2.29)	1.8	20.5	[17.8]	22.1
1,2,3,7,8-PeCDD	(1.98)	(1.88)	101	97.2	105
1,2,3,4,7,8-HxCDD	(2.2)	(1.33)	166	156	171
1,2,3,6,7,8-HxCDD	(2.38)	(1.39)	596	540	605
1,2,3,7,8,9-HxCDD	(2.66)	(1.46)	251	225	251
1,2,3,4,6,7,8-HpCDD	(3.19)	(1.93)	3,680	3,380	3,720
OCDD	(4.11)	[5.07]	3,680	3,320	3,710
2,3,7,8-TCDF	(1.64)	(1.43)	24.5	23.1	29.6
1,2,3,7,8-PeCDF	(2)	(1.39)	47.2	43.9	50.2
2,3,4,7,8-PeCDF	(1.83)	(1.37)	134	121	140
1,2,3,4,7,8-HxCDF	(1.37)	(1.15)	77.1	73.5	84.1
1,2,3,6,7,8-HxCDF	(1.29)	(1.09)	105	101	107
2,3,4,6,7,8-HxCDF	(1.21)	(1.06)	210	184	210
1,2,3,7,8,9-HxCDF	(1.69)	(1.39)	(2.99)	(3.82)	(3.66)
1,2,3,4,6,7,8-HpCDF	(1.89)	(1.26)	238	210	233
1,2,3,4,7,8,9-HpCDF	(2.61)	(1.91)	51.1	42	50.1
OCDF	(5.7)	(4.84)	[62.2]	50.5	66.2
WHO-2005 TEQ (ND=0; EMPC=0)	**0.00**	**1.80**	**347**	**303**	**357**
WHO-2005 TEQ (ND=0; EMPC=EMPC)	**0.00**	**1.81**	**347**	**320**	**357**
WHO-2005 TEQ (ND=DL/2; EMPC=0)	**3.20**	**3.51**	**347**	**304**	**358**
WHO-2005 TEQ (ND=DL/2; EMPC=EMPC)	**3.20**	**3.51**	**347**	**321**	**358**
WHO-2005 TEQ (ND=DL; EMPC=EMPC)	**6.40**	**5.22**	**347**	**321**	**358**
Checkcode	216-642-CGD	605-310-PPN	312-205-NCJ	976-212-XQP	704-143-YHM
Lab ID	MB1_9630_DF_SDS	A4103_9630_DF_001	A4103_9630_DF_002	A4103_9630_DF_003	A4103_9630_DF_004

( ) = DL
[ ] = EMPC

A4103 - Totals
Project ID: 11414SB

Sample Summary Part 2	ANALYTICAL PERSPECTIVES				**Method 23**
Analyte	**Method Blank** pg	**UI FF OUTLET-FIELD BLANK** pg	**U1 FF OUTLET-RUN 1** pg	**U1 FF OUTLET-RUN 2** pg	**U1 FF OUTLET-RUN 3** pg
Totals					
TCDDs	0	1.8	5,710	5,440	5,960
PeCDDs	0	0	8,250	7,720	8,750
HxCDDs	0	0	14,300	13,200	14,700
HpCDDs	0	0	7,780	7,130	7,860
OCDD	0	0	3,680	3,320	3,710
TCDFs	0	0	2,540	2,300	2,440
PeCDFs	0	0	2,270	2,120	2,470
HxCDFs	0	0	1,500	1,340	1,550
HpCDFs	0	0	559	476	546
OCDF	0	0	0	50.5	66.2
Total PCDD/Fs (ND=0; EMPC=0)	**0.00**	**1.80**	**46,600**	**43,100**	**48,100**
Total PCDD/Fs (ND=0; EMPC=EMPC)	**0.00**	**6.88**	**46,600**	**43,200**	**48,100**
Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)	**40.0**	**31.8**	**46,700**	**43,200**	**48,100**
Total 2378s (ND=0; EMPC=0)	**0.00**	**1.80**	**9,380**	**8,580**	**9,550**
Total 2378s (ND=0.5; EMPC=0)	**20.0**	**16.5**	**9,390**	**8,580**	**9,560**
Total 2378s (ND=1; EMPC=0)	**40.0**	**31.2**	**9,390**	**8,580**	**9,560**
Total 2378s (ND=0; EMPC=1)	**0.00**	**6.88**	**9,440**	**8,590**	**9,550**
Total 2378s (ND=0.5; EMPC=1)	**20.0**	**19.3**	**9,450**	**8,600**	**9,560**
Total 2378s (ND=1; EMPC=1)	**40.0**	**31.8**	**9,450**	**8,600**	**9,560**
Checkcode	216-642-CGD	605-310-PPN	312-205-NCJ	976-212-XQP	704-143-YHM
Lab ID	MB1_9630_DF_SDS	A4103_9630_DF_001	A4103_9630_DF_002	A4103_9630_DF_003	A4103_9630_DF_004

( ) = DL
[ ] = EMPC

A4103 - Others
Project ID: 11414SB

Sample Summary Part 3 ANALYTICAL PERSPECTIVES **Method 23**

Analyte	Method Blank pg	UI FF OUTLET-FIELD BLANK pg	U1 FF OUTLET-RUN 1 pg	U1 FF OUTLET-RUN 2 pg	U1 FF OUTLET-RUN 3 pg
Other PCDD/Fs (ND=0, EMPC=0)					
Other TCDD	0	0	5,690	5,440	5,940
Other PeCDD	0	0	8,150	7,620	8,650
Other HxCDD	0	0	13,300	12,300	13,700
Other HpCDD	0	0	4,100	3,740	4,140
Other TCDF	0	0	2,510	2,280	2,420
Other PeCDF	0	0	2,090	1,960	2,280
Other HxCDF	0	0	1,110	976	1,150
Other HpCDF	0	0	270	224	263
Other PCDD/Fs (ND=0, EMPC=EMPC)					
Other TCDD	0	0	5,690	5,440	5,950
Other PeCDD	0	0	8,150	7,620	8,650
Other HxCDD	0	0	13,300	12,300	13,700
Other HpCDD	0	0	4,100	3,740	4,140
Other TCDF	0	0	2,510	2,280	2,430
Other PeCDF	0	0	2,100	1,960	2,280
Other HxCDF	0	0	1,110	976	1,150
Other HpCDF	0	0	270	224	263
Checkcode	216-642-CGD	605-310-PPN	312-205-NCJ	976-212-XQP	704-143-YHM
Lab ID	MB1_9630_DF_SDS	A4103_9630_DF_001	A4103_9630_DF_002	A4103_9630_DF_003	A4103_9630_DF_004

( ) = DL
[ ] = EMPC

A4103 - DLs

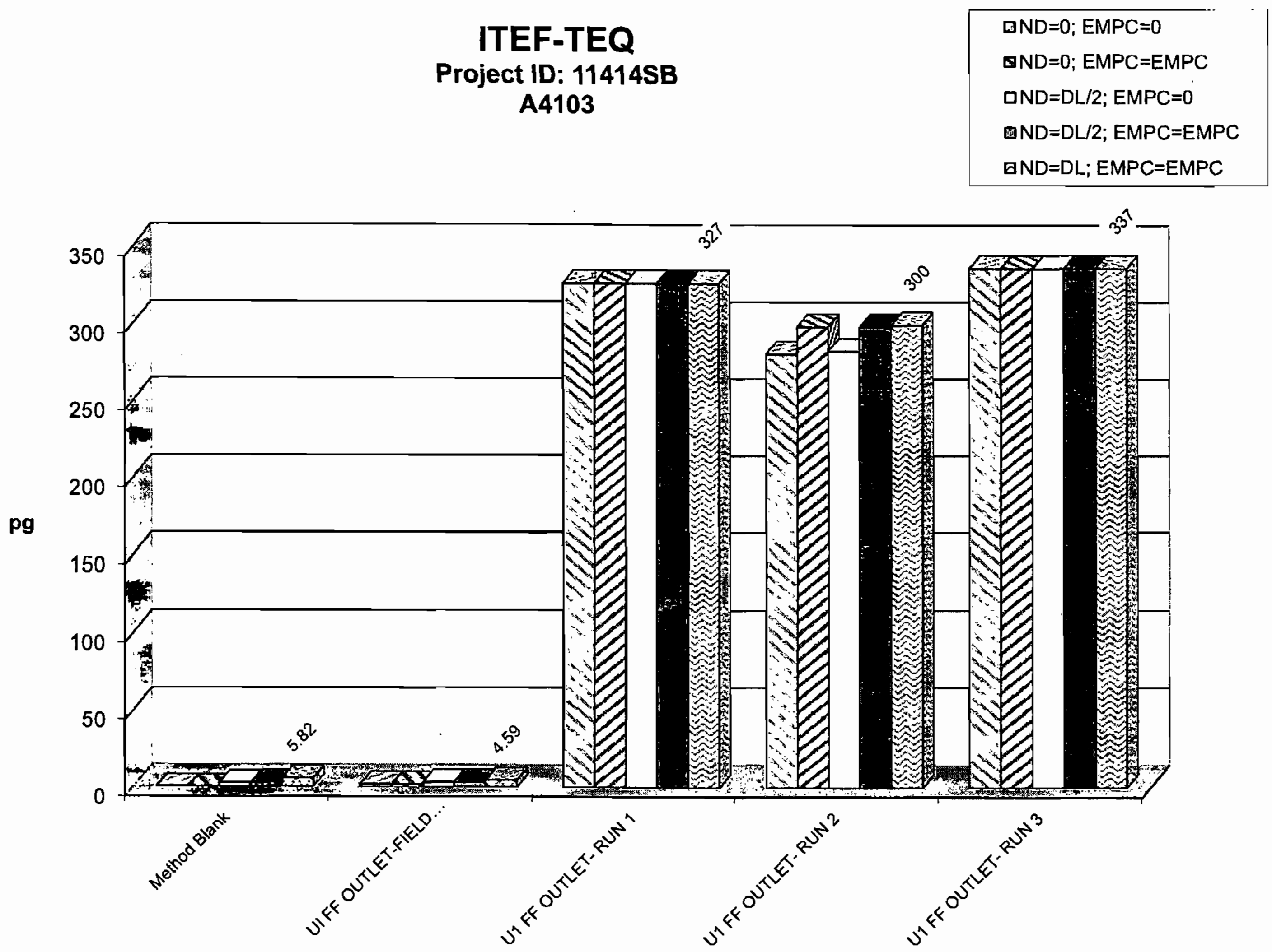
Project ID: 11414SB

Sample Summary Part 5 (DLs)

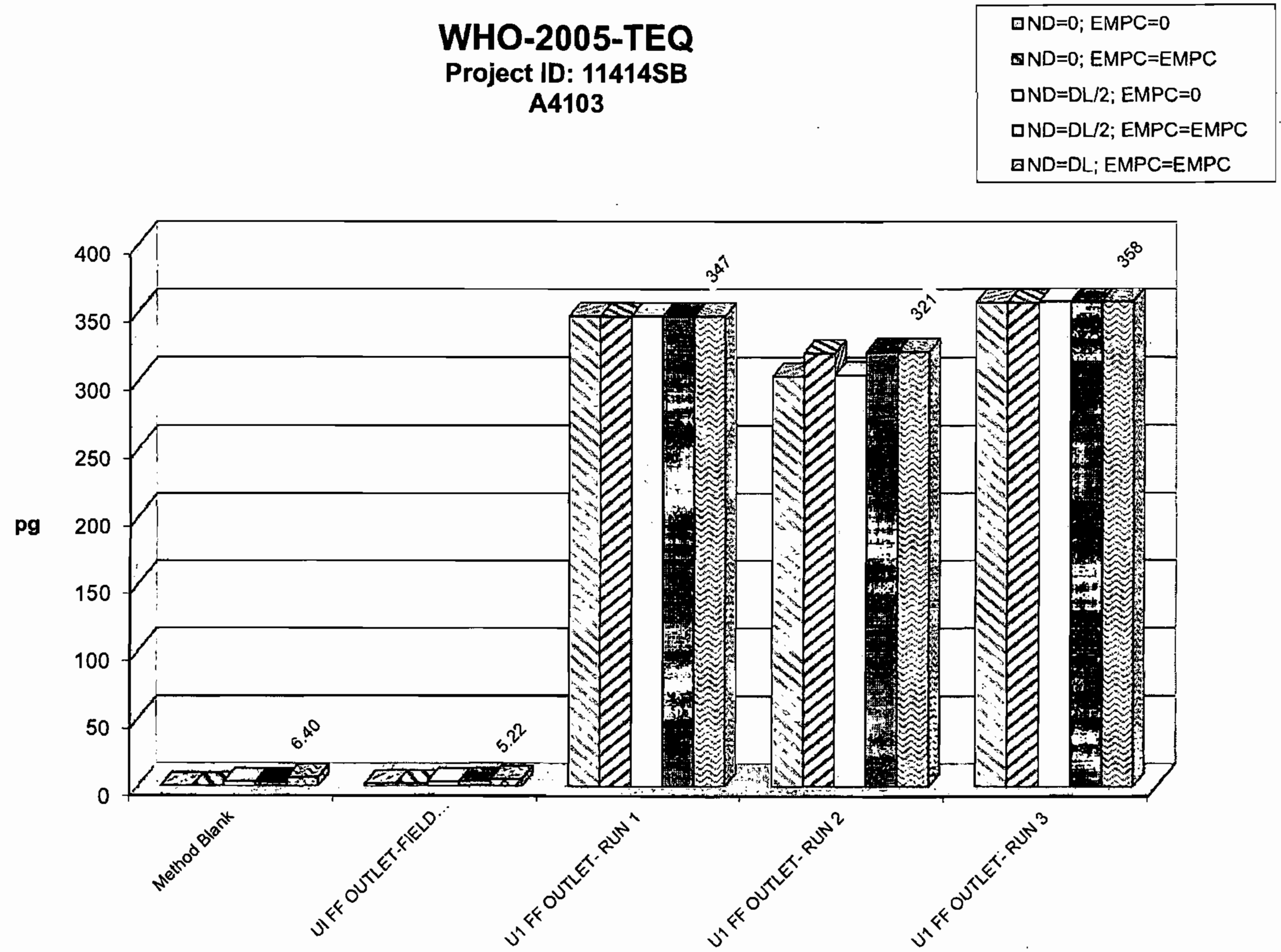
ANALYTICAL PERSPECTIVES

Method 23

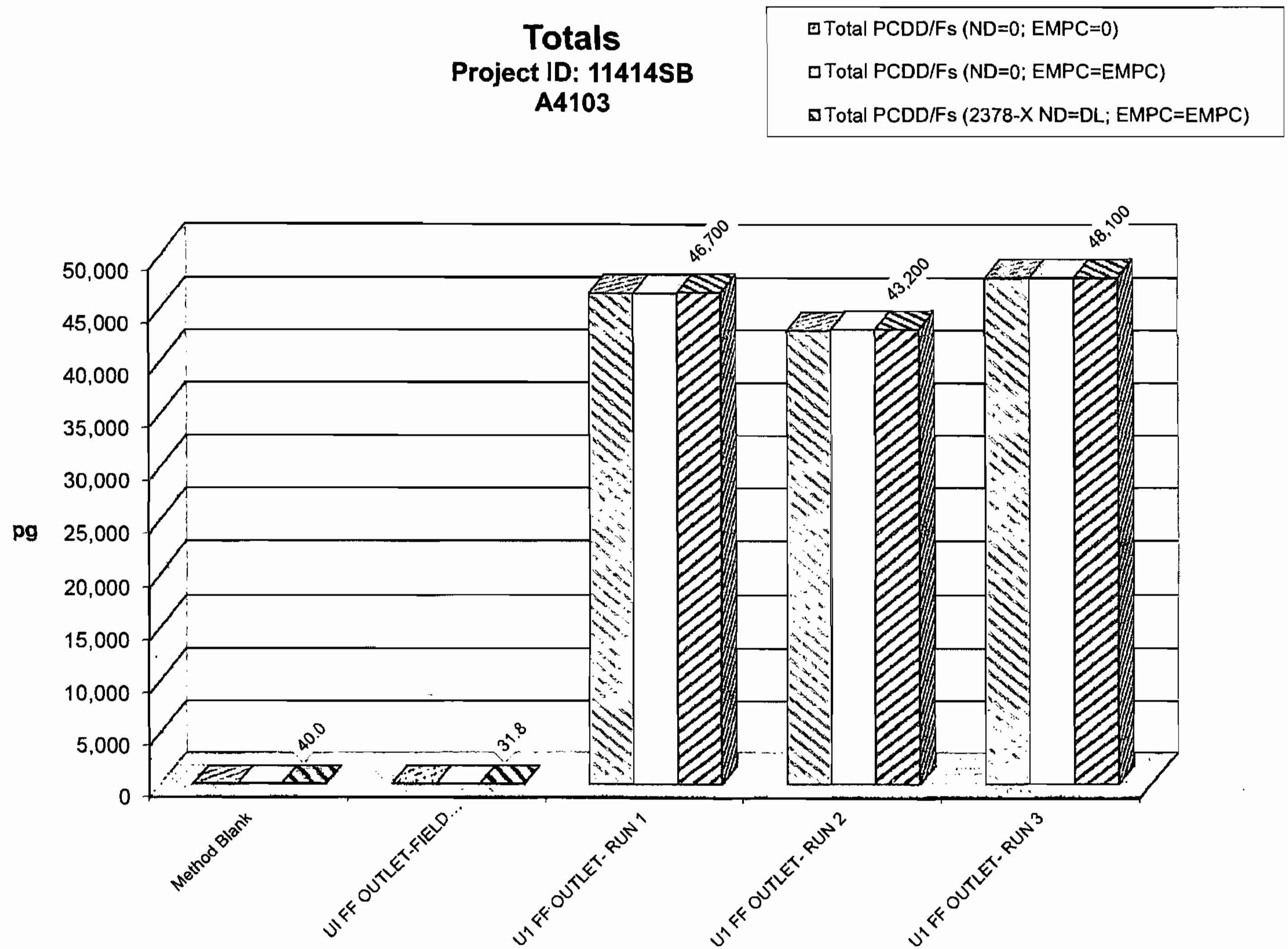
Analyte	Method Blank pg	UI FF OUTLET-FIELD BLANK pg	U1 FF OUTLET-RUN 1 pg	U1 FF OUTLET-RUN 2 pg	U1 FF OUTLET-RUN 3 pg
2,3,7,8-TCDD	2.29	1.76	3.06	2.2	2.88
1,2,3,7,8-PeCDD	1.98	1.88	1.58	2.01	2.75
1,2,3,4,7,8-HxCDD	2.2	1.33	1.76	2.14	2.93
1,2,3,6,7,8-HxCDD	2.38	1.39	1.92	2.23	3.11
1,2,3,7,8,9-HxCDD	2.66	1.46	2.03	2.5	3.35
1,2,3,4,6,7,8-HpCDD	3.19	1.93	2.83	2.84	3.25
OCDD	4.11	4.55	4.29	4.21	6.14
2,3,7,8-TCDF	1.64	1.43	1.96	2.07	1.63
1,2,3,7,8-PeCDF	2	1.39	2.94	2.94	3.46
2,3,4,7,8-PeCDF	1.83	1.37	2.83	2.78	3.21
1,2,3,4,7,8-HxCDF	1.37	1.15	2.42	2.99	2.69
1,2,3,6,7,8-HxCDF	1.29	1.09	2.32	2.94	2.75
2,3,4,6,7,8-HxCDF	1.21	1.06	2.16	2.68	2.52
1,2,3,7,8,9-HxCDF	1.69	1.39	2.99	3.82	3.66
1,2,3,4,6,7,8-HpCDF	1.89	1.26	1.36	1.68	1.94
1,2,3,4,7,8,9-HpCDF	2.61	1.91	2.11	2.51	2.7
OCDF	5.7	4.84	4.3	5.13	5.57
Total TCDD	2.29	1.76	3.06	2.2	2.88
Total PeCDD	1.98	1.88	1.58	2.01	2.75
Total HxCDD	2.41	1.39	1.9	2.28	3.11
Total HpCDD	3.19	1.93	2.83	2.84	3.25
Total TCDF	1.64	1.43	1.96	2.07	1.63
Total PeCDF	1.91	1.38	2.88	2.86	3.33
Total HxCDF	1.37	1.16	2.44	3.07	2.87
Total HpCDF	2.22	1.54	1.69	2.05	2.28
Checkcode	216-642-CGD	605-310-PPN	312-205-NCJ	976-212-XQP	704-143-YHM
Lab ID	MB1_9630_DF_SDS	A4103_9630_DF_001	A4103_9630_DF_002	A4103_9630_DF_003	A4103_9630_DF_004



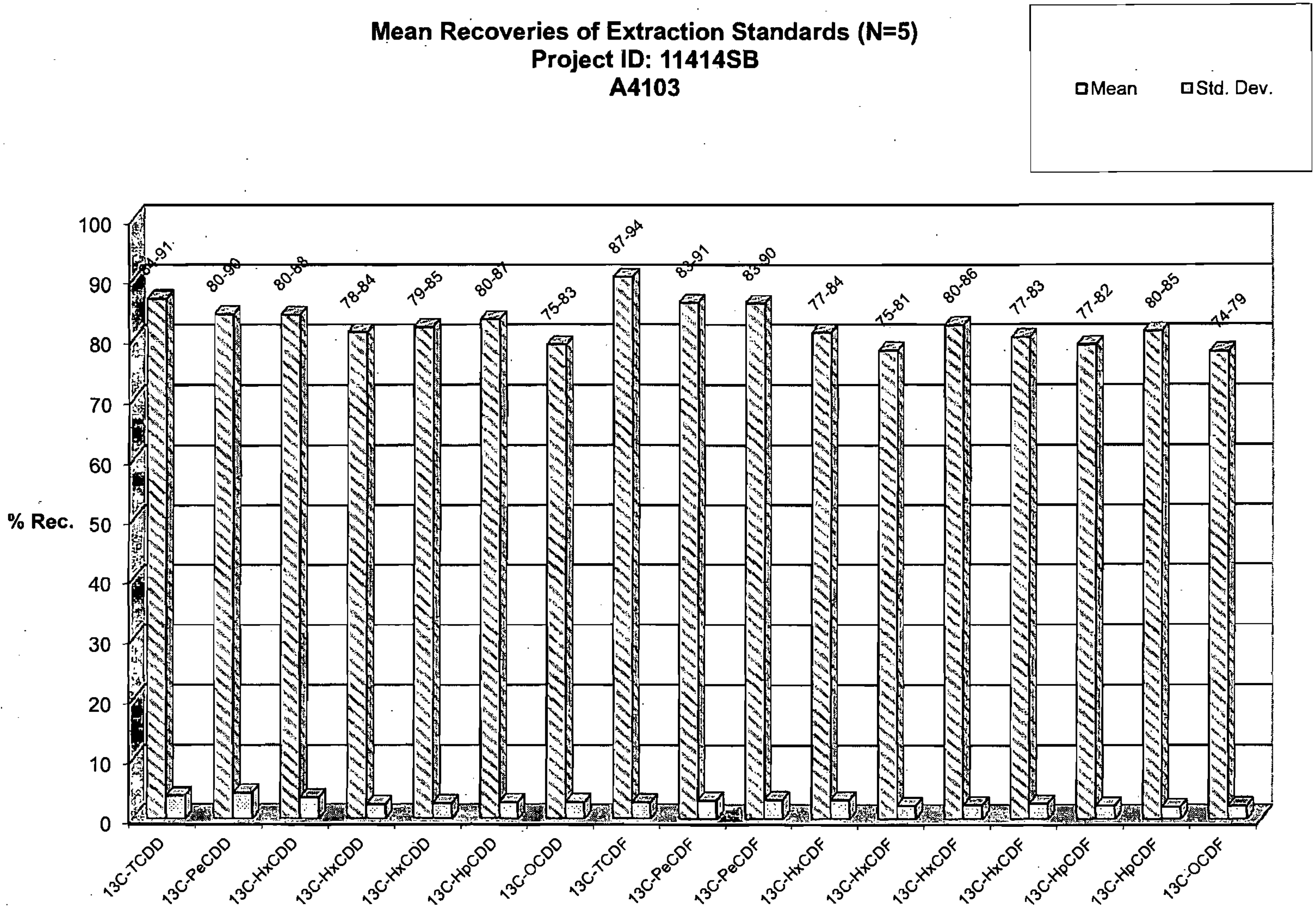
ITEF-TEQ
Project ID: 11414SB
A4103
ND=0; EMPC=0
ND=0; EMPC=EMPC
ND=DL/2; EMPC=0
ND=DL/2; EMPC=EMPC
ND=DL; EMPC=EMPC
pg
350
300
250
200
150
100
50
0
5.82
4.59
327
300
337
Method Blank
UI FF OUTLET-FIELD...
U1 FF OUTLET- RUN 1
U1 FF OUTLET- RUN 2
U1 FF OUTLET- RUN 3



WHO-2005-TEQ
Project ID: 11414SB
A4103
ND=0; EMPC=0
ND=0; EMPC=EMPC
ND=DL/2; EMPC=0
ND=DL/2; EMPC=EMPC
ND=DL; EMPC=EMPC
pg
400
350
300
250
200
150
100
50
0
6.40
5.22
347
321
358
Method Blank
UI FF OUTLET-FIELD...
U1 FF OUTLET- RUN 1
U1 FF OUTLET- RUN 2
U1 FF OUTLET- RUN 3

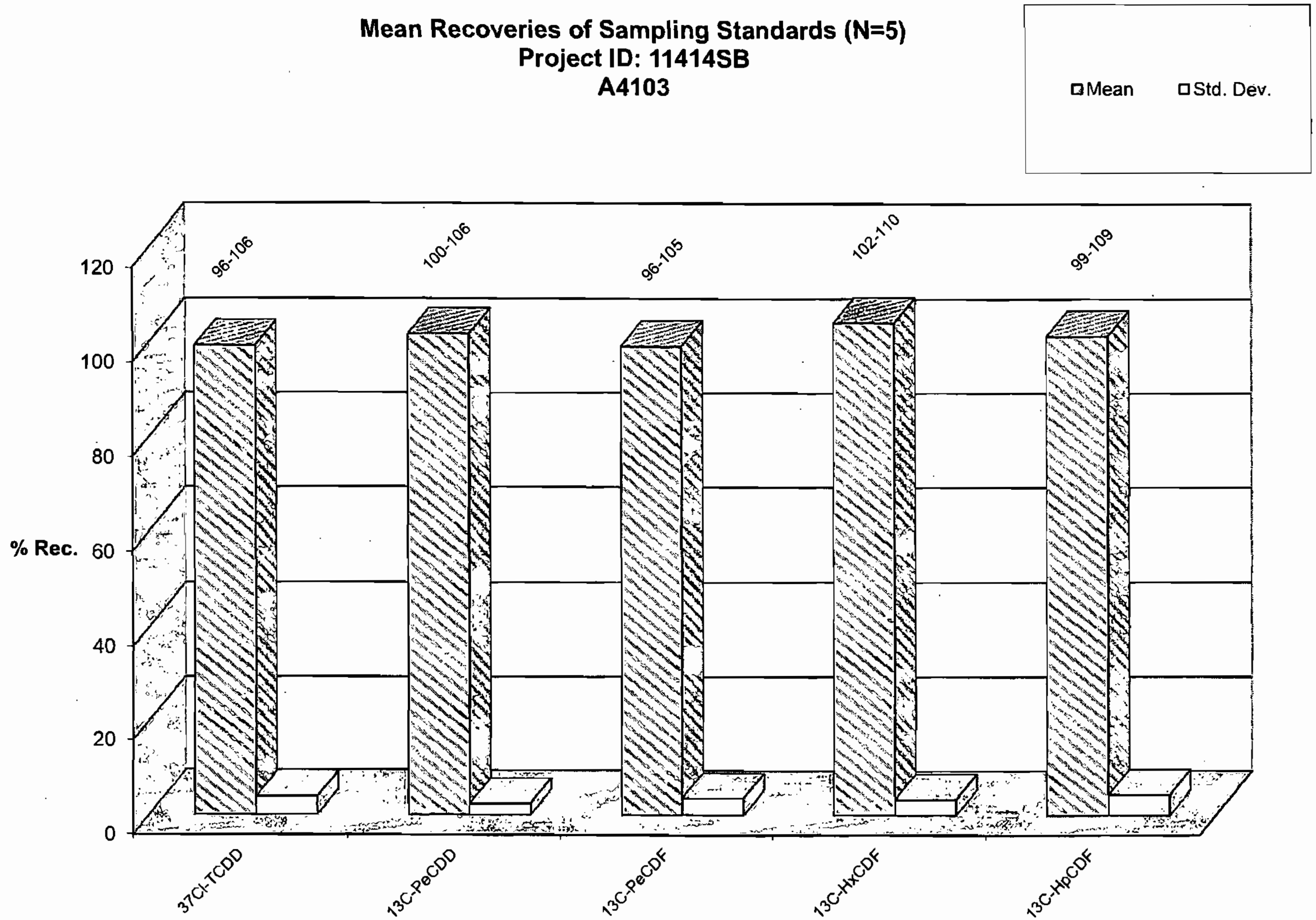

Totals
Project ID: 11414SB
A4103
Total PCDD/Fs (ND=0; EMPC=0)
Total PCDD/Fs (ND=0; EMPC=EMPC)
Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)
pg
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
40.0
31.8
46,700
43,200
48,100
Method Blank
UI FF OUTLET-FIELD...
U1 FF OUTLET- RUN 1
U1 FF OUTLET- RUN 2
U1 FF OUTLET- RUN 3

Mean Recoveries of Extraction Standards (N=5)
Project ID: 11414SB
A4103

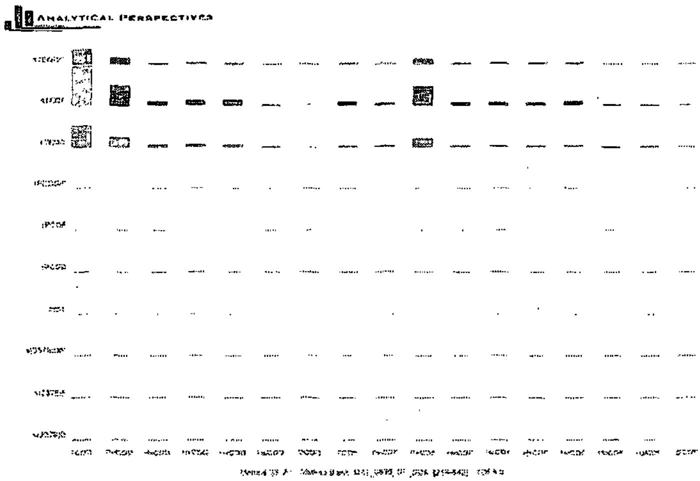


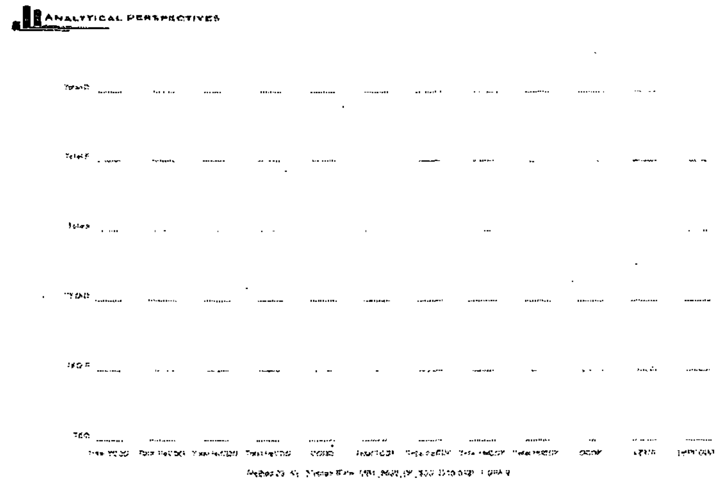
Method Specification Limits: Tetra-Hexa ES: 40-130%, Hepta-Octa ES: 25-130% (F = fail)

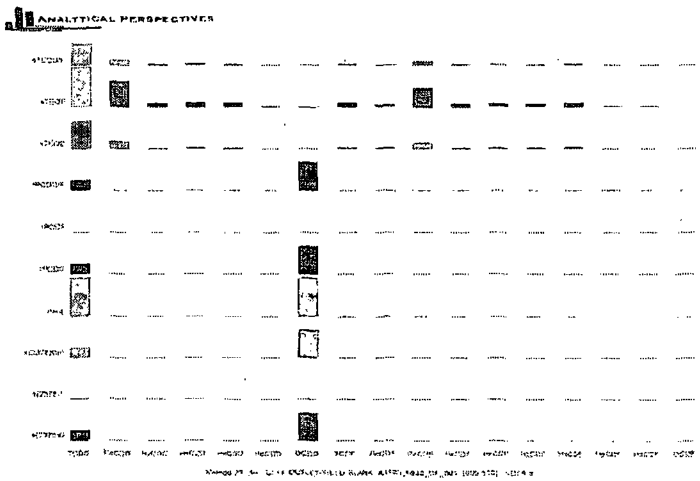
Mean Recoveries of Sampling Standards (N=5)
Project ID: 11414SB
A4103

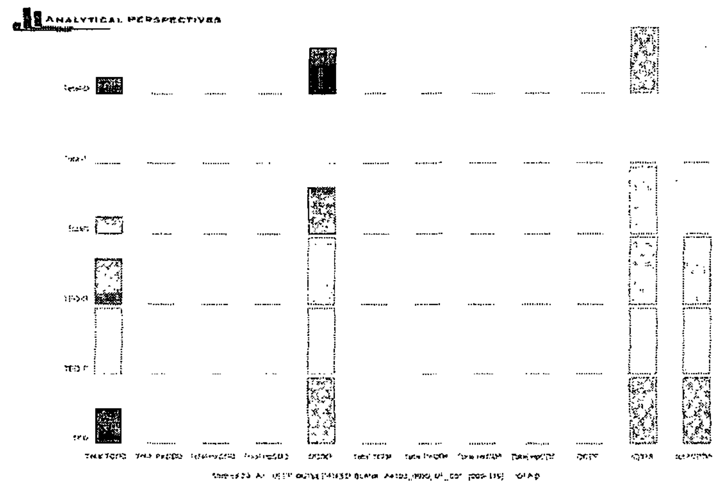


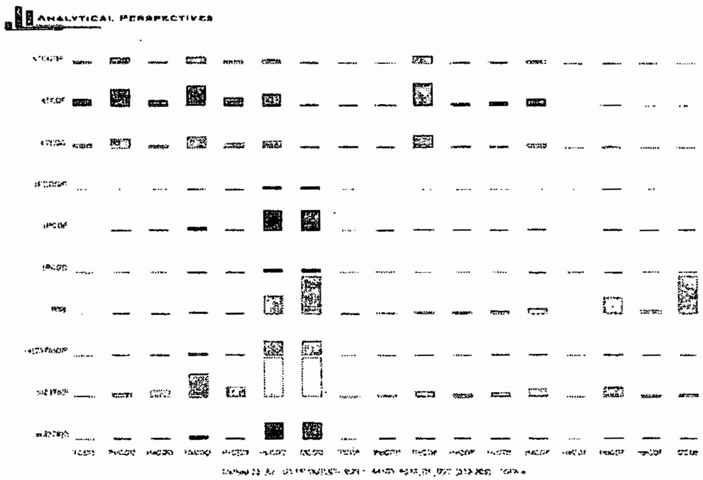
Method Specification Limits: Tetra-Octa SS: 70-130% (F = fail)

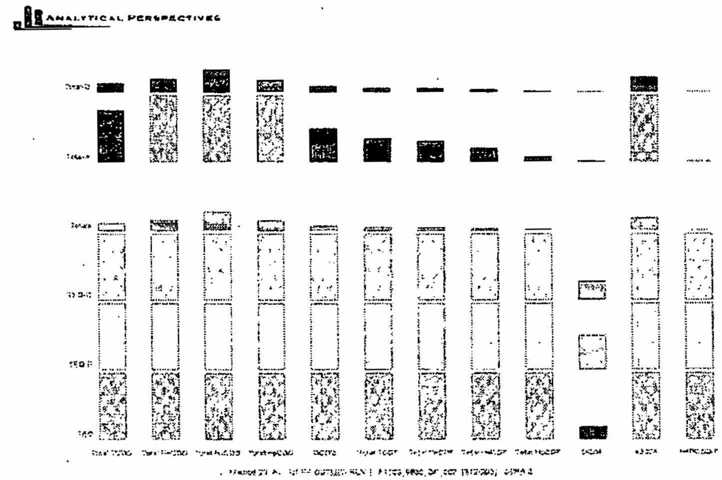

ANALYTICAL PERSPECTIVES

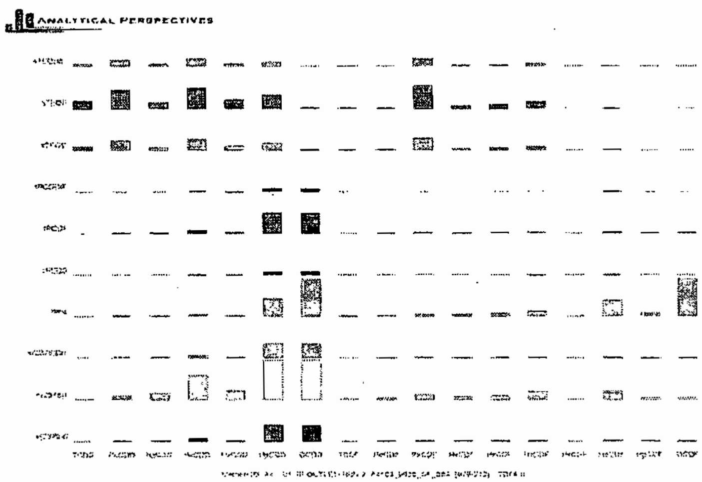

ANALYTICAL PERSPECTIVES

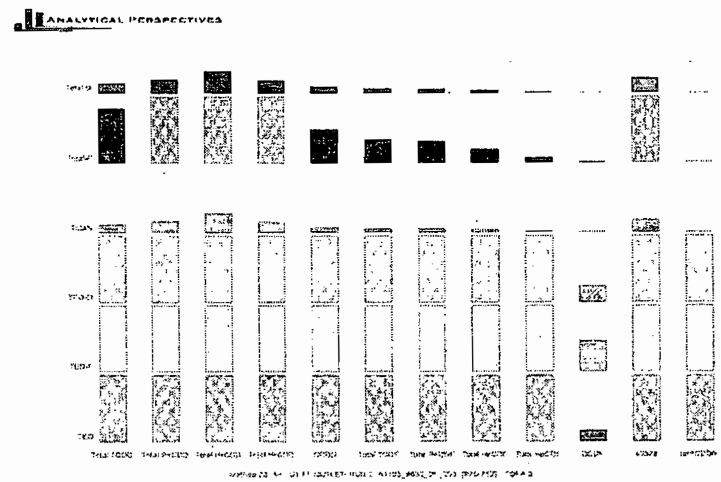

ANALYTICAL PERSPECTIVES


ANALYTICAL PERSPECTIVES


ANALYTICAL PERSPECTIVES

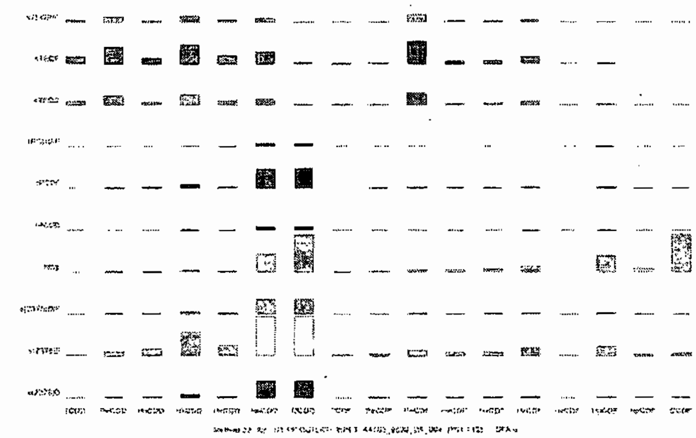

ANALYTICAL PERSPECTIVES


ANALYTICAL PERSPECTIVES

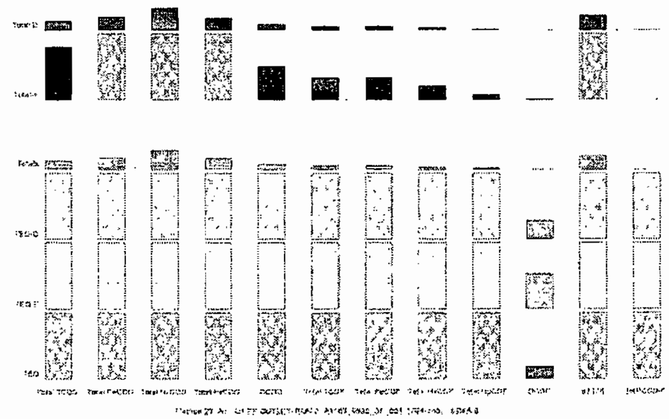

ANALYTICAL PERSPECTIVES

I - 80

ANALYTICAL PERSPECTIVES



ANALYTICAL PERSPECTIVES



Sample ID: Method Blank — Method 23

Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A4103	Date Received:	n/a
Project ID:	11414SB	Weight/Volume:	1	Lab Sample ID	MB1_9630_DF_SDS	Date Extracted:	28-Mar-2012
Date Collected:	n/a			QC Batch No:	9630	Date Analyzed:	30-Mar-2012
		Split:	2	Dilution:	-	Time Analyzed:	18:19:07

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	2.29			ES 2378-TCDD	83.6	
12378-PeCDD	ND	1.98			ES 12378-PeCDD	82.4	
123478-HxCDD	ND	2.2			ES 123478-HxCDD	80.1	
123678-HxCDD	ND	2.38			ES 123678-HxCDD	78.3	
123789-HxCDD	ND	2.66			ES 123789-HxCDD	79.2	
1234678-HpCDD	ND	3.19			ES 1234678-HpCDD	82	
OCDD	ND	4.11			ES OCDD	77.9	
2378-TCDF	ND	1.64			ES 2378-TCDF	87.2	
12378-PeCDF	ND	2			ES 12378-PeCDF	84.6	
23478-PeCDF	ND	1.83			ES 23478-PeCDF	84.6	
123478-HxCDF	ND	1.37			ES 123478-HxCDF	76.6	
123678-HxCDF	ND	1.29			ES 123678-HxCDF	76.3	
234678-HxCDF	ND	1.21			ES 234678-HxCDF	80.1	
123789-HxCDF	ND	1.69			ES 123789-HxCDF	77.4	
1234678-HpCDF	ND	1.89			ES 1234678-HpCDF	76.8	
1234789-HpCDF	ND	2.61			ES 1234789-HpCDF	80.2	
OCDF	ND	5.7			ES OCDF	79.3	
Totals					**Standard**	**SS/AS Recoveries**	
					SS 37Cl-2378-TCDD	106	
Total TCDD	ND	2.29	ND		SS 12347-PeCDD	106	
Total PeCDD	ND	1.98	ND		SS 12346-PeCDF	105	
Total HxCDD	ND	2.41	ND		SS 123469-HxCDF	110	
Total HpCDD	ND	3.19	ND		SS 1234689-HpCDF	109	
					AS 1368-TCDD	89.8	
Total TCDF	ND	1.64	ND		AS 1368-TCDF	92.8	
Total PeCDF	ND	1.91	ND				
Total HxCDF	ND	1.37	ND				
Total HpCDF	ND	2.22	ND				
Total PCDD/Fs	**ND**		**ND**				
ITEF TEQs							
TEQ: ND=0	0		0				
TEQ: ND=DL/2	2.91	2.91	2.91				
TEQ: ND=DL	5.82	5.82	5.82				

ANALYTICAL PERSPECTIVES
2714 Exchange Drive
Wilmington, NC 28405 , USA
info@ultratrace.com
Tel: +1 910 794-1613 (Fax: -3919); Toll-Free 866 846-8290
www.ultratrace.com

Sample ID: UI FF OUTLET-FIELD BLANK — Method 23

Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A4103	Date Received:	23-Mar-2012
Project ID:	11414SB	Weight/Volume:	1	Lab Sample ID	A4103_9630_DF_001	Date Extracted:	28-Mar-2012
Date Collected:	20-Mar-2012			QC Batch No:	9630	Date Analyzed:	30-Mar-2012
		Split:	2	Dilution:	-	Time Analyzed:	19:12:30

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	1.8			J	ES 2378-TCDD	91.4	
12378-PeCDD	ND	1.88			ES 12378-PeCDD	90.4	
123478-HxCDD	ND	1.33			ES 123478-HxCDD	87.6	
123678-HxCDD	ND	1.39			ES 123678-HxCDD	82.7	
123789-HxCDD	ND	1.46			ES 123789-HxCDD	83.6	
1234678-HpCDD	ND	1.93			ES 1234678-HpCDD	83.2	
OCDD	EMPC		5.07	J	ES OCDD	78.5	
2378-TCDF	ND	1.43			ES 2378-TCDF	91.9	
12378-PeCDF	ND	1.39			ES 12378-PeCDF	90.6	
23478-PeCDF	ND	1.37			ES 23478-PeCDF	89.6	
123478-HxCDF	ND	1.15			ES 123478-HxCDF	81.5	
123678-HxCDF	ND	1.09			ES 123678-HxCDF	79.7	
234678-HxCDF	ND	1.06			ES 234678-HxCDF	83.1	
123789-HxCDF	ND	1.39			ES 123789-HxCDF	82.6	
1234678-HpCDF	ND	1.26			ES 1234678-HpCDF	79.7	
1234789-HpCDF	ND	1.91			ES 1234789-HpCDF	80.4	
OCDF	ND	4.84			ES OCDF	77.9	

Totals					Standard	SS/AS Recoveries
					SS 37Cl-2378-TCDD	95.8
Total TCDD	1.8		1.8		SS 12347-PeCDD	100
Total PeCDD	ND	1.88	ND		SS 12346-PeCDF	96.1
Total HxCDD	ND	1.39	ND		SS 123469-HxCDF	102
Total HpCDD	ND	1.93	ND		SS 1234689-HpCDF	102
					AS 1368-TCDD	89.4
Total TCDF	ND	1.43	ND		AS 1368-TCDF	90.7
Total PeCDF	ND	1.38	ND			
Total HxCDF	ND	1.16	ND			
Total HpCDF	ND	1.54	ND			
Total PCDD/Fs	**1.80**		**6.88**			
ITEF TEQs						
TEQ: ND=0	1.8		1.81			
TEQ: ND=DL/2	3.2	2.28	3.2			
TEQ: ND=DL	4.59	4.55	4.59			

ANALYTICAL PERSPECTIVES
2714 Exchange Drive
Wilmington, NC 28405 , USA
info@ultratrace.com
www.ultratrace.com
Tel: +1 910 794-1613 (Fax: -3919); Toll-Free 866 846-8290

Sample ID: U1 FF OUTLET- RUN 1 — Method 23

Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A4103	Date Received:	23-Mar-2012
Project ID:	11414SB	Weight/Volume:	1	Lab Sample ID	A4103_9630_DF_002	Date Extracted:	28-Mar-2012
Date Collected:	20-Mar-2012			QC Batch No:	9630	Date Analyzed:	30-Mar-2012
		Split:	2	Dilution:	-	Time Analyzed:	20:05:46

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	20.5				ES 2378-TCDD	90.4	
12378-PeCDD	101				ES 12378-PeCDD	86.7	
123478-HxCDD	166				ES 123478-HxCDD	87.6	
123678-HxCDD	596				ES 123678-HxCDD	84	
123789-HxCDD	251				ES 123789-HxCDD	85	
1234678-HpCDD	3680				ES 1234678-HpCDD	87.2	
OCDD	3680				ES OCDD	82.6	
2378-TCDF	24.5				ES 2378-TCDF	93.8	
12378-PeCDF	47.2			J	ES 12378-PeCDF	87.9	
23478-PeCDF	134				ES 23478-PeCDF	89.1	
123478-HxCDF	77.1				ES 123478-HxCDF	83.9	
123678-HxCDF	105				ES 123678-HxCDF	80.6	
234678-HxCDF	210				ES 234678-HxCDF	85.7	
123789-HxCDF	ND	2.99			ES 123789-HxCDF	82.9	
1234678-HpCDF	238				ES 1234678-HpCDF	81.6	
1234789-HpCDF	51.1				ES 1234789-HpCDF	84.7	
OCDF	EMPC		62.2	J	ES OCDF	78.7	
Totals					**Standard**	**SS/AS Recoveries**	
					SS 37Cl-2378-TCDD	97.5	
Total TCDD	5710		5710		SS 12347-PeCDD	100	
Total PeCDD	8250		8250		SS 12346-PeCDF	98	
Total HxCDD	14300		14300		SS 123469-HxCDF	103	
Total HpCDD	7780		7780		SS 1234689-HpCDF	98.7	
					AS 1368-TCDD	88.1	
Total TCDF	2540		2540		AS 1368-TCDF	91.3	
Total PeCDF	2270		2290				
Total HxCDF	1500		1500				
Total HpCDF	559		559				
Total PCDD/Fs	**46,600**		**46,600**				
ITEF TEQs							
TEQ: ND=0	327		327				
TEQ: ND=DL/2	327	3.62	327				
TEQ: ND=DL	327	7.23	327				

ANALYTICAL PERSPECTIVES
2714 Exchange Drive
Wilmington, NC 28405 , USA
info@ultratrace.com
Tel: +1 910 794-1613 (Fax: -3919); Toll-Free 866 846-8290
www.ultratrace.com

Sample ID: U1 FF OUTLET- RUN 2 Method 23

Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A4103	Date Received:	23-Mar-2012
Project ID:	11414SB	Weight/Volume:	1	Lab Sample ID	A4103_9630_DF_003	Date Extracted:	28-Mar-2012
Date Collected:	21-Mar-2012			QC Batch No:	9630	Date Analyzed:	30-Mar-2012
		Split:	2	Dilution:	-	Time Analyzed:	20:59:04

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	EMPC		17.8		ES 2378-TCDD	84.6	
12378-PeCDD	97.2				ES 12378-PeCDD	81.3	
123478-HxCDD	156				ES 123478-HxCDD	83.6	
123678-HxCDD	540				ES 123678-HxCDD	81.6	
123789-HxCDD	225				ES 123789-HxCDD	82.6	
1234678-HpCDD	3380				ES 1234678-HpCDD	84.1	
OCDD	3320				ES OCDD	80.7	
2378-TCDF	23.1				ES 2378-TCDF	87.9	
12378-PeCDF	43.9			J	ES 12378-PeCDF	82.9	
23478-PeCDF	121				ES 23478-PeCDF	82.8	
123478-HxCDF	73.5				ES 123478-HxCDF	84	
123678-HxCDF	101				ES 123678-HxCDF	78	
234678-HxCDF	184				ES 234678-HxCDF	82	
123789-HxCDF	ND	3.82			ES 123789-HxCDF	80.5	
1234678-HpCDF	210				ES 1234678-HpCDF	80.4	
1234789-HpCDF	42			J	ES 1234789-HpCDF	81.3	
OCDF	50.5			J	ES OCDF	79.3	
Totals					**Standard**	**SS/AS Recoveries**	
					SS 37Cl-2378-TCDD	98	
Total TCDD	5440		5460		SS 12347-PeCDD	102	
Total PeCDD	7720		7720		SS 12346-PeCDF	96.8	
Total HxCDD	13200		13200		SS 123469-HxCDF	102	
Total HpCDD	7130		7130		SS 1234689-HpCDF	98.6	
					AS 1368-TCDD	86.2	
Total TCDF	2300		2300		AS 1368-TCDF	85.5	
Total PeCDF	2120		2120				
Total HxCDF	1340		1340				
Total HpCDF	476		476				
Total PCDD/Fs	**43,100**		**43,200**				
ITEF TEQs							
TEQ: ND=0	281		299				
TEQ: ND=DL/2	283	3.48	299				
TEQ: ND=DL	284	6.96	300				

ANALYTICAL PERSPECTIVES
2714 Exchange Drive
Wilmington, NC 28405 , USA
info@ultratrace.com
Tel: +1 910 794-1613 (Fax: -3919); Toll-Free 866 846-8290
www.ultratrace.com

Checkcode: 976-212-XQP AP D/F 2012 Rev. 1.3 Report Created: 31-Mar-2012 09:23 Analyst: MC

Sample ID: U1 FF OUTLET- RUN 3 — Method 23

Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A4103	Date Received:	23-Mar-2012
Project ID:	11414SB	Weight/Volume:	1	Lab Sample ID	A4103_9630_DF_004	Date Extracted:	28-Mar-2012
Date Collected:	21-Mar-2012			QC Batch No:	9630	Date Analyzed:	30-Mar-2012
		Split:	2	Dilution:	-	Time Analyzed:	21:52:21

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	22.1				ES 2378-TCDD	83.6	
12378-PeCDD	105				ES 12378-PeCDD	79.7	
123478-HxCDD	171				ES 123478-HxCDD	81.1	
123678-HxCDD	605				ES 123678-HxCDD	78.9	
123789-HxCDD	251				ES 123789-HxCDD	79.2	
1234678-HpCDD	3720				ES 1234678-HpCDD	79.6	
OCDD	3710				ES OCDD	75.3	
2378-TCDF	29.6				ES 2378-TCDF	90.3	
12378-PeCDF	50.2				ES 12378-PeCDF	84.2	
23478-PeCDF	140				ES 23478-PeCDF	83.4	
123478-HxCDF	84.1				ES 123478-HxCDF	79.1	
123678-HxCDF	107				ES 123678-HxCDF	75.3	
234678-HxCDF	210				ES 234678-HxCDF	80.2	
123789-HxCDF	ND	3.66			ES 123789-HxCDF	77.7	
1234678-HpCDF	233				ES 1234678-HpCDF	76.7	
1234789-HpCDF	50.1				ES 1234789-HpCDF	79.6	
OCDF	66.2			J	ES OCDF	74	
Totals					**Standard**	**SS/AS Recoveries**	
					SS 37Cl-2378-TCDD	100	
Total TCDD	5960		5970		SS 12347-PeCDD	102	
Total PeCDD	8750		8750		SS 12346-PeCDF	101	
Total HxCDD	14700		14700		SS 123469-HxCDF	105	
Total HpCDD	7860		7860		SS 1234689-HpCDF	99.5	
					AS 1368-TCDD	87.5	
Total TCDF	2440		2460		AS 1368-TCDF	86.3	
Total PeCDF	2470		2470				
Total HxCDF	1550		1550				
Total HpCDF	546		546				
Total PCDD/Fs	**48,100**		**48,100**				
ITEF TEQs							
TEQ: ND=0	337		337				
TEQ: ND=DL/2	337	4.19	337				
TEQ: ND=DL	337	8.39	337				

ANALYTICAL PERSPECTIVES
2714 Exchange Drive
Wilmington, NC 28405, USA
info@ultratrace.com
Tel: +1 910 794-1613 (Fax: -3919); Toll-Free 866 846-8290
www.ultratrace.com

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 SDA Inlet

USEPA Method 26A
Chloride Laboratory Data Summary

Run No.		**Blank**	**1**	**2**	**3**	
Date (2012)			Mar 22	Mar 22	Mar 22	
Start Time (approx.)			07:44	09:07	10:32	
Stop Time (approx.)			08:44	10:07	11:32	
☐ DRAFT LAB DATA						
MDL	Min. detectable limit (mg Cl^-/liter)	0.0110				
	HCl as Total Chloride					
B_{Cl}	Blank concentration (mg Cl^-/liter)	<0.1010				
S_{Cl-1}	Fraction 1 concentration (mg Cl^-/liter)		891.0000	1225.0000	1214.0000	[redacted]
S_{Cl-2}	Fraction 2 concentration (mg Cl^-/liter)		[redacted]	[redacted]	[redacted]	[redacted]
V_1	Fraction 1 sample volume (ml)		890.0	709.0	695.0	[redacted]
V_2	Fraction 2 sample volume (ml)		[redacted]	[redacted]	[redacted]	[redacted]
m_{HCl}	HCl collected before blank subtraction (mg)		815.1937	892.8437	867.3544	
m_b	Allowable blank subtraction (mg)		0.0000	0.0000	0.0000	
m_{nb}	HCl collected after blank subtraction (mg)		815.1937	892.8437	867.3544	
m_{MDL}	Minimum detectable HCl (mg)		0.0101	0.0080	0.0079	
m_n	*Total HCl used in emission calculations (mg)*		815.1937	892.8437	867.3544	

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SS EPA26-1 Version 2006-10a (Cl)

QA/QC ________
Date ________

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 1 FF Outlet

USEPA Method 26A
Chloride Laboratory Data Summary

Run No.		**Blank**	**1**	**2**	**3**
Date (2012)			Mar 22	Mar 22	Mar 22
Start Time (approx.)			07:44	09:07	10:32
Stop Time (approx.)			08:44	10:07	11:32

☐ DRAFT LAB DATA

MDL	Min. detectable limit (mg Cl⁻/liter)	0.0110			
	HCl as Total Chloride				
B_{Cl}	Blank concentration (mg Cl⁻/liter)	<0.1010			
S_{Cl-1}	Fraction 1 concentration (mg Cl⁻/liter)		22.1000	20.4000	16.9400
S_{Cl-2}	Fraction 2 concentration (mg Cl⁻/liter)				
v_1	Fraction 1 sample volume (ml)		710.0	729.0	776.0
v_2	Fraction 2 sample volume (ml)				
m_{HCl}	HCl collected before blank subtraction (mg)		16.1303	15.2880	13.5135
m_b	Allowable blank subtraction (mg)		0.0000	0.0000	0.0000
m_{nb}	HCl collected after blank subtraction (mg)		16.1303	15.2880	13.5135
m_{MDL}	Minimum detectable HCl (mg)		0.0080	0.0082	0.0088
m_n	*Total HCl used in emission calculations (mg)*		16.1303	15.2880	13.5135

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QA/QC ________
Date ________

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 SDA Inlet

USEPA Method 26A
Chloride Laboratory Data Summary

Run No.		**Blank**	**1**	**2**	**3**
Date (2012)			Mar 20	Mar 20	Mar 20
Start Time (approx.)			08:08	09:49	12:22
Stop Time (approx.)			09:08	10:49	13:22

☐ DRAFT LAB DATA

MDL	Min. detectable limit (mg Cl⁻/liter)	0.0110				
	HCl as Total Chloride					
B_{Cl}	Blank concentration (mg Cl⁻/liter)	<0.1010				
S_{Cl-1}	Fraction 1 concentration (mg Cl⁻/liter)		821.0000	844.0000	842.0000	[redacted]
S_{Cl-2}	Fraction 2 concentration (mg Cl⁻/liter)		[redacted]	[redacted]	[redacted]	[redacted]
V_1	Fraction 1 sample volume (ml)		881.0	869.0	784.0	[redacted]
V_2	Fraction 2 sample volume (ml)		[redacted]	[redacted]	[redacted]	[redacted]
m_{HCl}	HCl collected before blank subtraction (mg)		743.5534	753.9722	678.6116	
m_b	Allowable blank subtraction (mg)		0.0000	0.0000	0.0000	
m_{nb}	HCl collected after blank subtraction (mg)		743.5534	753.9722	678.6116	
m_{MDL}	Minimum detectable HCl (mg)		0.0100	0.0098	0.0089	
m_n	*Total HCl used in emission calculations (mg)*		743.5534	753.9722	678.6116	

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Prepared by Clean Air Engineering Proprietary Software
SS EPA26-1 Version 2006-10a (Cl)

QA/QC ________
Date ________

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 2 FF Outlet

USEPA Method 26A
Chloride Laboratory Data Summary

Run No.		**Blank**	**1**	**2**	**3**
Date (2012)			Mar 20	Mar 20	Mar 20
Start Time (approx.)			08:08	09:49	12:22
Stop Time (approx.)			09:08	10:49	13:22

☐ DRAFT LAB DATA

MDL	Min. detectable limit (mg Cl⁻/liter)	0.0110			
	HCl as Total Chloride				
B_{Cl}	Blank concentration (mg Cl⁻/liter)	<0.1010			
$S_{Cl\text{-}1}$	Fraction 1 concentration (mg Cl⁻/liter)		10.6600	10.1900	9.5600
$S_{Cl\text{-}2}$	Fraction 2 concentration (mg Cl⁻/liter)				
V_1	Fraction 1 sample volume (ml)		659.0	743.0	693.0
V_2	Fraction 2 sample volume (ml)				
m_{HCl}	HCl collected before blank subtraction (mg)		7.2216	7.7832	6.8106
m_b	Allowable blank subtraction (mg)		0.0000	0.0000	0.0000
m_{nb}	HCl collected after blank subtraction (mg)		7.2216	7.7832	6.8106
m_{MDL}	Minimum detectable HCl (mg)		0.0075	0.0084	0.0078
m_n	*Total HCl used in emission calculations (mg)*		7.2216	7.7832	6.8106

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Prepared by Clean Air Engineering Proprietary Software
SS EPA26-1 Version 2006-10a (CI)

QA/QC ________
Date ________

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 SDA Inlet

USEPA Method 26A
Chloride Laboratory Data Summary

Run No.		**Blank**	**1**	**2**	**3**
Date (2012)			Mar 21	Mar 21	Mar 21
Start Time (approx.)			07:54	07:54	10:04
Stop Time (approx.)			09:39	09:39	11:04

☐ DRAFT LAB DATA

MDL	Min. detectable limit (mg Cl^-/liter)	0.0110			
	HCl as Total Chloride				
B_{Cl}	Blank concentration (mg Cl^-/liter)	<0.1010			
S_{Cl-1}	Fraction 1 concentration (mg Cl^-/liter)		1200.0000	877.0000	856.0000
S_{Cl-2}	Fraction 2 concentration (mg Cl^-/liter)				
v_1	Fraction 1 sample volume (ml)		659.0	843.0	833.0
v_2	Fraction 2 sample volume (ml)				
m_{HCl}	HCl collected before blank subtraction (mg)		812.9424	760.0117	733.0133
m_b	Allowable blank subtraction (mg)		0.0000	0.0000	0.0000
m_{nb}	HCl collected after blank subtraction (mg)		812.9424	760.0117	733.0133
m_{MDL}	Minimum detectable HCl (mg)		0.0075	0.0095	0.0094
m_n	*Total HCl used in emission calculations (mg)*		812.9424	760.0117	733.0133

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Prepared by Clean Air Engineering Proprietary Software
SS EPA26-1 Version 2006-10a (Cl)

QA/QC ________
Date ________

Wheelabrator South Broward, Inc.
Clean Air Project No: 11414
Unit 3 FF Outlet

USEPA Method 26A
Chloride Laboratory Data Summary

Run No.		Blank	1	2	3
Date (2012)			Mar 21	Mar 21	Mar 21
Start Time (approx.)			07:54	10:04	11:30
Stop Time (approx.)			09:40	11:04	12:30

☐ DRAFT LAB DATA

MDL	Min. detectable limit (mg Cl^-/liter)	0.0110
	HCl as Total Chloride	
B_{Cl}	Blank concentration (mg Cl^-/liter)	<0.1010

		1	2	3	
S_{Cl-1}	Fraction 1 concentration (mg Cl^-/liter)	31.7600	32.3100	26.2000	[redacted]
S_{Cl-2}	Fraction 2 concentration (mg Cl^-/liter)	[redacted]	[redacted]	[redacted]	[redacted]
v_1	Fraction 1 sample volume (ml)	695.0	744.0	754.0	[redacted]
v_2	Fraction 2 sample volume (ml)	[redacted]	[redacted]	[redacted]	[redacted]
m_{HCl}	HCl collected before blank subtraction (mg)	22.6912	24.7117	20.3079	
m_b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000	
m_{nb}	HCl collected after blank subtraction (mg)	22.6912	24.7117	20.3079	
m_{MDL}	Minimum detectable HCl (mg)	0.0079	0.0084	0.0085	
m_n	*Total HCl used in emission calculations (mg)*	22.6912	24.7117	20.3079	

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Prepared by Clean Air Engineering Proprietary Software
SS EPA26-1 Version 2006-10a (Cl)

QA/QC ________
Date ________

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CleanAir

CleanAir Engineering
500 W. Wood Street
Palatine, IL 60067-4975
800-627-0033
www.cleanair.com

Laboratory Analysis for Anions

Performed For:

Palatine Source Testing
500 West Wood Street
Palatine, IL 60067

Laboratory Report No: 64-28828_IC_Cl_V1
Customer Reference No: 11414

Revision 0 - Dated: 04/16/2012

To the best of our knowledge, the laboratory results presented in this report are accurate, complete, error free, legible and representative of the samples per the analysis described here-in.

Digitally signed by Eric Ewing
Date: 2012.04.16 11:40:29 -05'00'

Digitally signed by Douglas D. Rhoades
Date: 2012.04.16 13:44:48 -05'00'

Eric Ewing
Title: Analyst
email: eewing@cleanair.com
Ph: 847-654-4519

Douglas D. Rhoades
Title: Team Leader
email: drhoades@cleanair.com
Ph: 847-654-4504

ACCREDITED IN ACCORDANCE WITH nelac
TCEQ No: T104704431-09-TX
LADEQ No: 05009
NJDEP No: IL004

File: SPS-64-28828_IC_Cl_V1
Date: 4/16/2012
Time: 11:37 AM

CleanAir

CERTIFICATE OF ANALYSIS
Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Laboratory Sample Identification Number	Sample Identification	Sample Volume (mL)	Chloride Sample Conc. (mg/L)	Method Detection Limit (mg/L)	Limit of Quantitation (mg/L)
Reagent Blanks					
28828-01	DI H2O RB	300	<	0.011	0.101
28828-02	0.1N H2SO4 RB	880	<	0.011	0.101
U1 SDA Inlet					
28828-03	Imp C&R R1	890	891	0.011	0.101
28828-04	Imp C&R R2	709	1,225	0.011	0.101
28828-05	Imp C&R R3	695	1,214	0.011	0.101
U1 FF Outlet					
28828-06	Imp C&R R1	710	22.10	0.011	0.101
28828-07	Imp C&R R2	729	20.40	0.011	0.101
28828-08	Imp C&R R3	776	16.94	0.011	0.101
U2 SDA Inlet					
28828-09	Imp C&R R1	881	821	0.011	0.101
28828-10	Imp C&R R2	869	844	0.011	0.101
28828-11	Imp C&R R3	784	842	0.011	0.101
U2 FF Outlet					
28828-12	Imp C&R R1	659	10.66	0.011	0.101
28828-13	Imp C&R R2	743	10.19	0.011	0.101
28828-14	Imp C&R R3	693	9.56	0.011	0.101
U3 SDA Inlet					
28828-15	Imp C&R R1	659	1,200	0.011	0.101
28828-16	Imp C&R R2	843	877	0.011	0.101
28828-17	Imp C&R R3	833	856	0.011	0.101
U3 FF Outlet					
28828-18	Imp C&R R1	695	31.76	0.011	0.101
28828-19	Imp C&R R2	744	32.31	0.011	0.101
28828-20	Imp C&R R3	754	26.20	0.011	0.101

File: SPS-64-28828_IC_Cl_V1
Date: 4/16/2012
Time: 11:37 AM

Analysis Case Narrative

Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Summary of Analysis

This report summarizes the results of the analysis performed on samples received on: 04/02/12
The samples were anlayzed in accordance with NELAC and procedures found in U.S. EPA Method 26A and U.S. EPA Method 300.1.

All analysis was carried out using a Dionex ICS-90, Dionex AS22 column, 4.5mM/1.5mM sodium carbonate/bicarbonate eluent, and 40mN sulfuric acid regenerant.

Detection Limits

Method Detection Limits have been determined in accordance with procedures in 40 CFR 136, Appendix B. Documentation showing the determination of detection limits are included with this report. The Limit of Quantitation (LOQ) is set to be the concentration of the lowest calibration point for each analyte. Values between these limits were quantified, but should be used with discretion as they were below the LOQ. Values that were below the MDL are indicated by a "<" where appropriate.

Sample Preparation

Samples were prepared according to the procedures listed in the EPA Method above. Each sample was analyzed at full strength and a dilution was prepared if necessary to achieve a concentration that was within calibration range limits.

Standard and Reagent Traceability

Each calibration standard has been prepared in accordance with US EPA Method 300.1 and US EPA Method 26 and has been designated an original lot number. This number can be used to trace back to the original dry salts used in the preparation of these standards. This number is found in Table 1 below. In addition, the dilution scheme used for the preparation of standards is included in this report.

Table 1: Standard Lot Numbers Used For Analysis

Standard Type	Lot Number	Concentration of Analyte
Stock Standard	03221202-64-00000-03	1009.27 mg/L
QC Standard	03221202-64-00000-04	234.15 mg/L
Working Standard	03221202-64-00000-05	10.0927 mg/L
Cal 01	03221202-64-00000-06	0.1009 mg/L
Cal 02	03221202-64-00000-07	0.4037 mg/L
Cal 03	03221202-64-00000-08	0.8074 mg/L
Cal 04	03221202-64-00000-09	1.2616 mg/L
Cal 05	03221202-64-00000-10	1.6148 mg/L
Cal 06	03221202-64-00000-11	2.5232 mg/L
CCV	03221202-64-00000-12	1.0093 mg/L
QC	03221202-64-00000-13	1.1707 mg/L

In suppressed ion chromatography, eluent is defined as the carrier that moves chemicals through the column and regenerant is defined as a reagent used to remove ions opposite in charge of the specific analyte. Regenerant also reduces the overall conductivity of the eluent. A table displaying the lot numbers of these reagents used for each day of analysis is displayed below in Table 2.

Table 2: Eluent and Regenerant Lot Numbers Used for Each Day of Analysis

Analysis Date	Eluent Lot Number	Regenerant Lot Number
3/30/2012	1067-64-00000-03	1200-64-00000-01
4/3/2012	1067-64-00000-04	1200-64-00000-01
4/4/2012	1067-64-00000-04	1200-64-00000-02
4/5/2012	1067-64-00000-04	1200-64-00000-02
4/6/2012	1067-64-00000-04	1200-64-00000-02
4/7/2012	1205-64-00000-01	1200-64-00000-02

Analysis Case Narrative

Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Instrument Calibration

Instrument calibration followed regulations found in US EPA Method 300.1 and U.S. EPA Method 26A.
Calibration standards were prepared from ACS grade dry salts as per section 7.3 of US EPA Method 300.1. As per section 4.2.2 of US EPA CTM-027, a series of 6 diluted standards are prepared from the original calibration standard and run through the column in duplicate from lowest concentration to highest. The average peak area for each calibration point is gathered and plotted against the expected solution concentration. In accordance with section 7.2.3 of EPA Method 9057, a least-squares regression with an r^2 value of .995 or greater must be produced from the resulting curve. In accordance with US EPA Method 26 a full post-test calibration is preformed. The pre test calibration and post test calibration average peak area for any standard must agree within ± 5% of any observed area. All calibration standards were prepared in a deionized water matrix.

Chromatograms

Chromatograms were generated using Dionex Chromeleon software. All chromatograms are included as an appendix of this report. Please note: Chromatograms marked as "End" are place markers meant to signify the end of a batch run and are purposfully left blank as no data was aquired for that run.

Analysis QA/QC

Many elements of various EPA methods have been combined and are adhered to:

EPA Method 300.1 quality procedures:

1 Before the first sample was analyzed and every twenty samples thereafter (and before the post-test calibration) a laboratory blank and a Continuing Calibration Verification (CCV) were analyzed.
The CCV is prepared from the same calibration standard as used to create the 7 diluted standards that make up the calibration curve.
The laboratory blank must show a regression concentration of zero, and the CCV must show a regression concentration within 10 percent of the expected concentration

2 After the first ten samples and every twenty there after, a Quality Control (QC) sample was analyzed.
The QC sample was created using ACS grade dry salts from a different manufacturer and or lot number than for the salts used to create the calibration standards.
The QC must meet the same acceptance criteria as noted for the CCV above.

3 A matrix spike analysis was performed on ten percent of the total number of samples. This sample was prepared with equal amounts of a sample and a calibration standard whose concentration was known to be larger than that of the sample.
The matrix spike is acceptable when the recovery is found to be 100 ± 10 percent.

4 As a measure of precision, all matrix spikes were prepared and analyzed in duplicate. The average area count of two identical matrix spikes may not have a relative percent difference of more that 10 percent.

EPA Method 26 quality procedure:

1 As per section 11.1.3, every sample was analyzed in duplicate and the mean area count used to determine the concentration. The duplicate area counts must have a relative percent difference of no greater than five percent. If this was the case, a third injection was made and the average of the three injections was used to determine the concentration.

EPA Method 7E quality procedures:

1 Each point on the calibration curve should be within ± 2 percent of the calibration span of the curve used.

Other CleanAir quality procedures:

1 The observed concentration value of each point on the calibration curve should have a relative percent difference of no more than 10 percent from its expected concentration.

Analysis Case Narrative

Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Additional Comments

This report shall in no way be reproduced except in full without the prior written approval of Clean Air Analytical Laboratory management.

A copy of this report and all associated supporting records will be archived and stored for at least 20 years. All samples are archived for a period of one year from date of receipt in a non-temperature controlled facility. All samples are stored in the original container, any digestates or reconstitutions are stored in a adequately sized Nalgene container.

Sample 28828-02 did not have a volume recorded at time of sample receipt. The volume for this sample was determined volumetrically using a serialized Class A graduated cylinder (S/N 0591). All other sample volumes were determined by field personnel.

Table 3 below shows the average analyte concentration found, the standard deviation, and percent relative standard deviation for each sample fraction. This data does not include any corrections for plant conditions. In addition, no sample concentrations reported were corrected for any blanks.

Table 3: Statistical Description of the Ion Chromatography Results

Sample Fraction	Location	Average Concentration (mg/L)	Standard Deviation of Concentration (mg/L)	Relative Standard Deviation of Concentration (%)
Imp C&R	U1 SDA Inlet	1110	189	17.07%
Imp C&R	U1 FF Outlet	19.8	2.6	13.27%
Imp C&R	U2 SDA Inlet	836	13	1.55%
Imp C&R	U2 FF Outlet	10.1	0.55	5.46%
Imp C&R	U3 SDA Inlet	977	193	19.71%
Imp C&R	U3 FF Outlet	30.1	3.4	11.23%

Clean Air Laboratory Services is accredited in the following states. Please visit the respective state websites to view our current status and a comprehensive list of our accredited services.

Table 4: Specific Accreditation and Expiration Date

State	Certificate Number	Expiration Date
Texas	T104704431-11-2	6/30/2012
New Jersey	IL004	6/30/2012
Louisiana	169249	6/30/2012

CleanAir

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Stock Standard: 1009.27 mg/L
Working Stock Conc.: 10.0927 mg/L
QC Standard: 234.15 mg/L

Analyte: **Chloride** — **Standards Calibration Data †**

Calibration ID	**Date of**	**0**	**Cal 01**	**Cal 02**	**Cal O3**	**Cal 04**	**Cal 05**	**Cal 06**
Conc. (mg/L)	**Injection**	**0.0000**	**0.1009**	**0.4037**	**0.8074**	**1.2616**	**1.6148**	**2.5232**
Cal 1 Trial 1	03/30/2012	0.0000	0.0326	0.1153	0.2324	0.3536	0.4509	0.7110
Cal 1 Trial 2		0.0000	0.0328	0.1132	0.2357	0.3588	0.4562	0.6986
Cal 2 Trial 1	04/03/2012			0.1196				
Cal 2 Trial 2				0.1150				
Cal 3 Trial 1	04/04/2012				0.2258	0.3501		
Cal 3 Trial 2					0.2289	0.3536		
Cal 4 Trial 1	04/06/2012						0.4406	
Cal 4 Trial 2							0.4468	
Cal 5 Trial 1	04/07/2012							0.6844
Cal 5 Trial 2								0.6788
Cal 6 Trial 1	04/07/2012		0.0320	0.1145	0.2355	0.3455	0.4361	0.6804
Cal 6 Trial 2			0.0326	0.1136	0.2296	0.3468	0.4350	0.6793
n		**2**	**4**	**6**	**6**	**6**	**6**	**6**
Average		**0.0000**	**0.0325**	**0.1152**	**0.2313**	**0.3514**	**0.4443**	**0.6888**
Standard Deviation		**0.0000**	**0.0003**	**0.0023**	**0.0039**	**0.0049**	**0.0085**	**0.0132**
%RSD		0.00	1.07	2.00	1.70	1.41	1.91	1.91

Measured Area Counts (Counts)	Actual Concentration (mg/L)	Regression Concentration (mg/L)	Quality Control Checks: Difference pt-Line (% Scale)	Is Difference Less Than 2% of Scale?	Difference pt-Line (Relative %)	Is Relative Difference Less Than 10%?
0.0000	0.000	-0.019	0.76%	Yes	0.00%	Yes
0.0325	0.101	0.100	0.03%	Yes	0.78%	Yes
0.1152	0.404	0.404	-0.01%	Yes	-0.07%	Yes
0.2313	0.807	0.831	-0.92%	Yes	-2.87%	Yes
0.3514	1.262	1.272	-0.41%	Yes	-0.81%	Yes
0.4443	1.615	1.613	0.07%	Yes	0.11%	Yes
0.6888	2.523	2.511	0.47%	Yes	0.47%	Yes

Regression Constants			Is Coefficient of Regression > 0.995?
Slope	m =	3.6742	
Intercept	b =	-0.0193	
Coeff.	R^2 =	0.99977	Yes

† Lot numbers for the individual calibration standards are listed in the Standard and Reagent Traceability section in the Case Narrative.

File: SPS-64-28828_IC_Cl_V1
Date: 4/18/2012
Time: 11:37 AM

Stock Solution Standard Mixing Recipe (Anions)
Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Order of Elution	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Analyte	**Fluoride**	**Chloride**	**Nitrite**	**Bromide**	**Nitrate**	**Phosphate**	**Sulfate**	**Iodide**
Analyte Weight (g/g-mole)	19.00	35.45	46.01	79.90	62.01	94.97	96.07	126.91
Solid Formula	NaF	NaCl	$NaNO_2$	NaBr	$NaNO_3$	Na_2HPO_4	Na_2SO_4	NaI
Number of ions/Formula	1	1	1	1	1	1	1	1
Formula Weight (g/g-mole)	41.99	58.44	69.00	102.89	85.00	141.96	142.04	149.90
% Analyte in Solid	45.25%	60.66%	66.68%	77.66%	72.95%	66.90%	67.63%	84.66%
Recomended Analyte Concentration (mg/L)	500	1007.21	2000	3000	3000	5000	5000	7000

Amount of Solid Required to Achieve the Above Stock Solution Concentration In The Listed Volumetric Flask:

500 ml	0.5525	0.8302	1.4997	1.9316	2.0561	3.7370	3.6964	4.1341
Size of Flask	500 ml							
Amount of Solid Used	1.1077 g	0.8319 g		1.2907 g				
Actual Concentration (mg/L)	1002.44	1009.27		2004.61				

Concentration in the Five Cal Flasks (mg/L)

Stock (1 liter Flask) Solution Concentrations

10 ml Original Solution Used		10.0244	10.0927	20.0461	Cal. ID
Dilution Flask Size	Aliquot Stock				
200	2	0.1002	0.1009	0.2005	Cal 01
250	10	0.4010	0.4037	0.8018	Cal 02
250	20	0.8020	0.8074	1.6037	Cal 03
200	20	1.0024	1.0093	2.0046	CCV
200	25	1.2531	1.2616	2.5058	Cal 04
250	40	1.6039	1.6148	3.2074	Cal 05
200	50	2.5061	2.5232	5.0115	Cal 06

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QC Standard Mixing Recipe (Anions)

Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

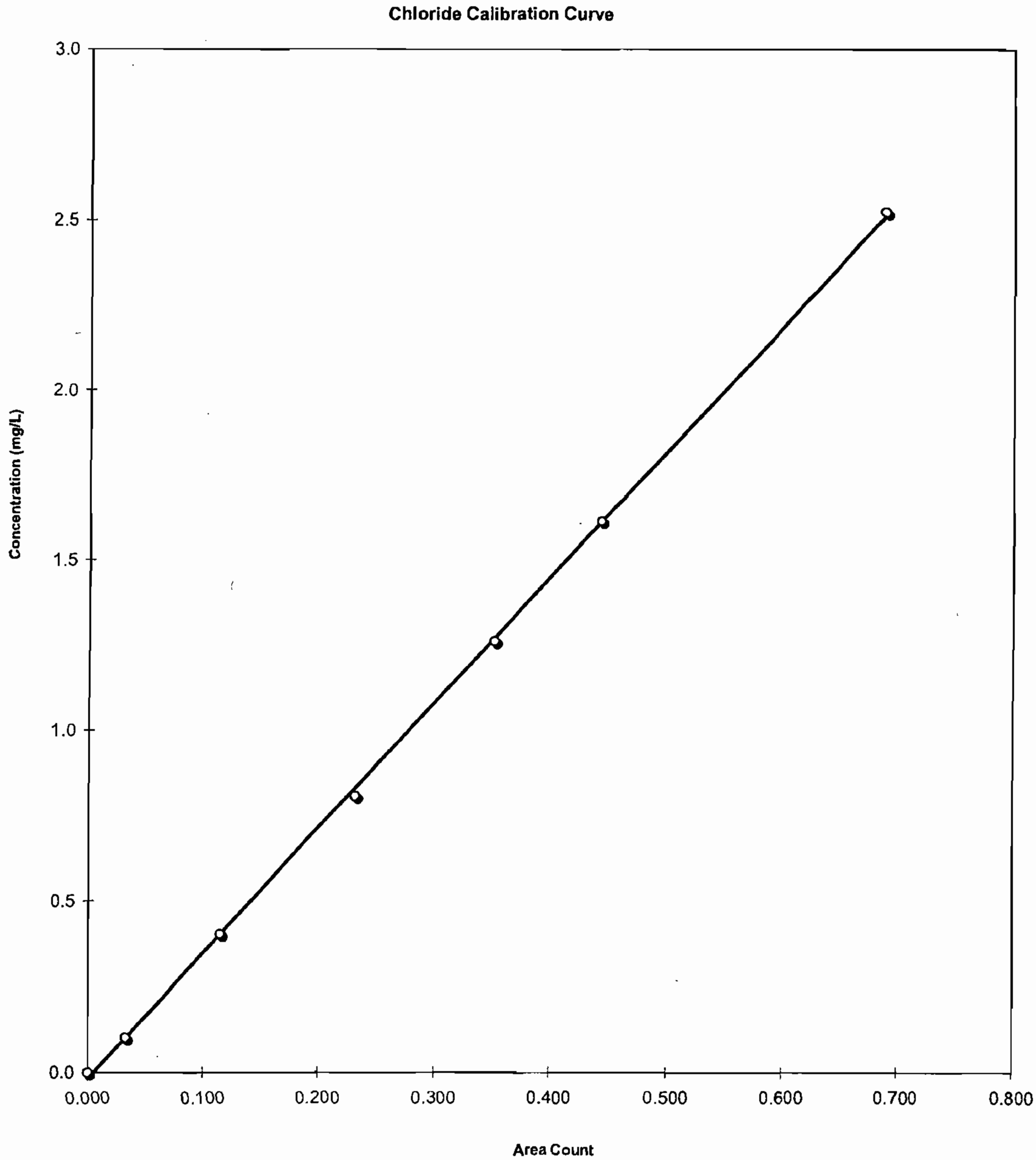
Order of Elution	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Analyte	**Fluoride**	**Chloride**	**Nitrite**	**Bromide**	**Nitrate**	**Phosphate**	**Sulfate**	**Iodide**
Analyte Weight (g/g-mole)	19.00	35.45	46.01	79.90	62.01	94.97	96.07	126.91
Solid Formula	NaF	NaCl	$NaNO_2$	NaBr	$NaNO_3$	Na_2HPO_4	Na_2SO_4	NaI
Number of ions/Formula	1	1	1	1	1	1	1	1
Formula Weight (g/g-mole)	41.99	58.44	69.00	102.89	85.00	141.96	142.04	149.90
% Analyte in Solid	45.25%	60.66%	66.68%	77.66%	72.95%	66.90%	67.63%	84.66%
Recomended Analyte Concentration (mg/L)	140	200	200	400	300	300	300	500
Amount of Solid Required to Achieve the Above Stock Solution Concentration In The Listed Volumetric Flask: 500 ml	0.1547	0.1649	0.1500	0.2575	0.2056	0.2242	0.2218	0.2953
Size of Flask	500 ml							
Amount of Solid Used	0.1558 g	0.1930 g		0.2615 g				
Actual Concentration (mg/L)	141.00	234.15		406.14				

Concentration in the QC Flask (mg/L)

Dilution Flask Size	Aliquot Stock					Cal. ID
1000	5	0.7050	1.1707		2.0307	QC

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride



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Sample Information

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Sample Identification Number	Sample Location	Run No.	Sample Identification	Sample Recovery Date	Field Tech	Sample Volume (mL)
28828-01	Reagent Blank	RB	DI H2O RB	3/20/2012	DL	300
28828-02	Reagent Blank	RB	0.1N H2SO4 RB	3/20/2012	DL	880
28828-03	U1 SDA Inlet	1	Imp C&R R1	3/22/2012	DL	890
28828-04	U1 SDA Inlet	2	Imp C&R R2	3/22/2012	RV	709
28828-05	U1 SDA Inlet	3	Imp C&R R3	3/22/2012	RV	695
28828-06	U1 FF Outlet	1	Imp C&R R1	3/22/2012	RV	710
28828-07	U1 FF Outlet	2	Imp C&R R2	3/22/2012	RV	729
28828-08	U1 FF Outlet	3	Imp C&R R3	3/22/2012	RV	776
28828-09	U2 SDA Inlet	1	Imp C&R R1	3/20/2012	DL	881
28828-10	U2 SDA Inlet	2	Imp C&R R2	3/20/2012	DL	869
28828-11	U2 SDA Inlet	3	Imp C&R R3	3/20/2012	DL	784
28828-12	U2 FF Outlet	1	Imp C&R R1	3/20/2012	RV	659
28828-13	U2 FF Outlet	2	Imp C&R R2	3/20/2012	RV	743
28828-14	U2 FF Outlet	3	Imp C&R R3	3/20/2012	RV	693
28828-15	U3 SDA Inlet	1	Imp C&R R1	3/21/2012	SB	659
28828-16	U3 SDA Inlet	2	Imp C&R R2	3/21/2012	DL	843
28828-17	U3 SDA Inlet	3	Imp C&R R3	3/21/2012	DL	833
28828-18	U3 FF Outlet	1	Imp C&R R1	3/21/2012	RV	695
28828-19	U3 FF Outlet	2	Imp C&R R2	3/21/2012	RV	744
28828-20	U3 FF Outlet	3	Imp C&R R3	3/21/2012	RV	754

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CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

MDL=	0.011 mg/L	Average Flow Rate
LOQ=	0.101 mg/L	0.80 mL/min

Sample Location	Sample Identification Number	Sample Identification	Date of Injection	Area Counts Trial 1	Area Counts Trial 2	Area Count Average	DF (Analysis Dilution Factor)	V_{soln} (Total Sample Volume, mL)	C_{Reg} (Concentration, mg/L from Reg Curve)	$M_{analyte}$ Total Amount of Analyte (mg)
Reagent Blank	28828-01	DI H2O RB	04/04/12	0.0000	0.0000	0.0000	1	300.0	<	<0.030
Reagent Blank	28828-02	0.1N H2SO4 RB	04/04/12	0.0000	0.0000	0.0000	1	880.0	<	<0.089
U1 SDA Inlet	28828-03	Imp C&R R1	04/05/12	0.2449	0.2507	0.2478	1000	890.0	891.18	793.15
U1 SDA Inlet	28828-04	Imp C&R R2	04/05/12	0.3335	0.3436	0.3386	1000	709.0	1,224.61	868.25
U1 SDA Inlet	28828-05	Imp C&R R3	04/06/12	0.3323	0.3388	0.3356	1000	695.0	1,213.59	843.45
U1 FF Outlet	28828-06	Imp C&R R1	04/06/12	0.3078	0.3043	0.3061	20	710.0	22.10	15.69
U1 FF Outlet	28828-07	Imp C&R R2	04/06/12	0.2872	0.2784	0.2828	20	729.0	20.40	14.87
U1 FF Outlet	28828-08	Imp C&R R3	04/06/12	0.2377	0.2339	0.2358	20	776.0	16.94	13.15
U2 SDA Inlet	28828-09	Imp C&R R1	04/06/12	0.2279	0.2293	0.2286	1000	881.0	820.64	722.98
U2 SDA Inlet	28828-10	Imp C&R R2	04/06/12	0.2335	0.2366	0.2351	1000	869.0	844.34	733.73
U2 SDA Inlet	28828-11	Imp C&R R3	04/06/12	0.2306	0.2380	0.2343	1000	784.0	841.58	659.80
U2 FF Outlet	28828-12	Imp C&R R1	04/06/12	0.2985	0.2923	0.2954	10	659.0	10.66	7.03
U2 FF Outlet	28828-13	Imp C&R R2	04/06/12	0.2852	0.2799	0.2826	10	743.0	10.19	7.57
U2 FF Outlet	28828-14	Imp C&R R3	04/06/12	0.2659	0.2649	0.2654	10	693.0	9.56	6.62
U3 SDA Inlet	28828-15	Imp C&R R1	04/06/12	0.3320	0.3315	0.3318	1000	659.0	1,199.63	790.56
U3 SDA Inlet	28828-16	Imp C&R R2	04/06/12	0.2451	0.2429	0.2440	1000	843.0	877.22	739.50
U3 SDA Inlet	28828-17	Imp C&R R3	04/06/12	0.2401	0.2361	0.2381	1000	833.0	855.54	712.67
U3 FF Outlet	28828-18	Imp C&R R1	04/06/12	0.3541	0.3479	0.3510	25	695.0	31.76	22.07
U3 FF Outlet	28828-19	Imp C&R R2	04/06/12	0.3591	0.3548	0.3570	25	744.0	32.31	24.04
U3 FF Outlet	28828-20	Imp C&R R3	04/06/12	0.2959	0.2850	0.2905	25	754.0	26.20	19.75

CleanAir

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

QUALITY CONTROL CHECKS

Sample Location	Sample Identification Number	Sample Identification	Date of Injection	Area Counts Trial 1	Area Counts Trial 2	Area Count Average	Area Count Duplicate Difference	Duplicate Relative Difference (%)	Is Duplicate Difference < 5%?
Reagent Blank	28828-01	DI H2O RB	04/04/12	0.0000	0.0000	0.0000	na	na	Yes
Reagent Blank	28828-02	0.1N H2SO4 RB	04/04/12	0.0000	0.0000	0.0000	na	na	Yes
U1 SDA Inlet	28828-03	Imp C&R R1	04/05/12	0.2449	0.2507	0.2478	0.0058	2.3%	Yes
U1 SDA Inlet	28828-04	Imp C&R R2	04/05/12	0.3335	0.3436	0.3386	0.0101	3.0%	Yes
U1 SDA Inlet	28828-05	Imp C&R R3	04/06/12	0.3323	0.3388	0.3356	0.0065	1.9%	Yes
U1 FF Outlet	28828-06	Imp C&R R1	04/06/12	0.3078	0.3043	0.3061	0.0035	1.1%	Yes
U1 FF Outlet	28828-07	Imp C&R R2	04/06/12	0.2872	0.2784	0.2828	0.0088	3.1%	Yes
U1 FF Outlet	28828-08	Imp C&R R3	04/06/12	0.2377	0.2339	0.2358	0.0038	1.6%	Yes
U2 SDA Inlet	28828-09	Imp C&R R1	04/06/12	0.2279	0.2293	0.2286	0.0014	0.6%	Yes
U2 SDA Inlet	28828-10	Imp C&R R2	04/06/12	0.2335	0.2366	0.2351	0.0031	1.3%	Yes
U2 SDA Inlet	28828-11	Imp C&R R3	04/06/12	0.2306	0.2380	0.2343	0.0074	3.2%	Yes
U2 FF Outlet	28828-12	Imp C&R R1	04/06/12	0.2985	0.2923	0.2954	0.0062	2.1%	Yes
U2 FF Outlet	28828-13	Imp C&R R2	04/06/12	0.2852	0.2799	0.2826	0.0053	1.9%	Yes
U2 FF Outlet	28828-14	Imp C&R R3	04/06/12	0.2659	0.2649	0.2654	0.0010	0.4%	Yes
U3 SDA Inlet	28828-15	Imp C&R R1	04/06/12	0.3320	0.3315	0.3318	0.0005	0.2%	Yes
U3 SDA Inlet	28828-16	Imp C&R R2	04/06/12	0.2451	0.2429	0.2440	0.0022	0.9%	Yes
U3 SDA Inlet	28828-17	Imp C&R R3	04/06/12	0.2401	0.2361	0.2381	0.0040	1.7%	Yes
U3 FF Outlet	28828-18	Imp C&R R1	04/06/12	0.3541	0.3479	0.3510	0.0062	1.8%	Yes
U3 FF Outlet	28828-19	Imp C&R R2	04/06/12	0.3591	0.3548	0.3570	0.0043	1.2%	Yes
U3 FF Outlet	28828-20	Imp C&R R3	04/06/12	0.2959	0.2850	0.2905	0.0109	3.8%	Yes

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CleanAir

CHROMATOGRAPHIC DATA REDUCTION

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

CCV Concentration: 1.01 mg/L
QC Concentration: 1.17 mg/L

MDL= 0.011 mg/L
LOQ= 0.101 mg/L

QUALITY CONTROL CHECKS (CONT)

Sample Location	Sample Identification Number	Sample Identification	Date of Injection	Area Counts Trial 1	Area Counts Trial 2	Area Count Average	Area Count Duplicate Difference	Duplicate Relative Difference (%)	C_{Reg} (Concentration, mg/L from Reg Curve)	Percent Difference from Actual Value (%)	Is Percent Difference from Actual Value <10%?
CleanAir	28828-00	CCB	04/03/12	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28828-990	CCV	04/03/12	0.2772	0.2764	0.2768	0.0008	0.3%	1.00	1.14%	Yes
CleanAir	28828-991	QC	04/04/12	0.3410	0.3306	0.3358	0.0104	3.1%	1.21	3.74%	Yes
CleanAir	28828-00	CCB	04/06/12	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28828-992	CCV	04/06/12	0.2851	0.2820	0.2836	0.0031	1.1%	1.02	1.31%	Yes
CleanAir	28828-993	QC	04/06/12	0.3321	0.3313	0.3317	0.0008	0.2%	1.20	2.45%	Yes
CleanAir	28828-00	CCB	04/07/12	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28828-994	CCV	04/07/12	0.2748	0.2672	0.2710	0.0076	2.8%	0.98	3.25%	Yes

Sample Duplicate Analysis Area Count Check

									Precision		Is Precision within ±5% Tolerance?
U1 FF Outlet	28828-06	Imp C&R R1	04/06/12	0.3078	0.3043	0.3061	0.0035	1.1%			
U1 FF Outlet	28828-06	Imp C&R R1	04/06/12	0.3008	0.3005	0.3007	0.0003	0.1%	1.8%		Yes
U3 FF Outlet	28828-18	Imp C&R R1	04/08/12	0.3541	0.3479	0.3510	0.0062	1.8%			
U3 FF Outlet	28828-18	Imp C&R R1	04/06/12	0.3450	0.3443	0.3447	0.0007	0.2%	1.8%		Yes

Matrix Spike Recoveries

									Precision	Spike Recovery	Is Spike Recovery Between 90-110%
Matrix Spike	28828-07	Imp C&R R2	04/07/12	0.4800	0.4690	0.4745	0.0110	2.3%		97.3%	Yes
Matrix Spike	28828-07	Imp C&R R2	04/07/12	0.4628	0.4833	0.4731	0.0205	4.3%	0.3%	97.0%	Yes
Matrix Spike	28828-13	Imp C&R R2	04/07/12	0.4456	0.4615	0.4536	0.0159	3.5%		93.0%	Yes

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Determination of Method Detection Limit

Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

MDL Reference	40 CFR 136, Appendix B
CleanAir Reference	SOP EPA5-11
Matrix	Deionized Water
Analyte	Chloride
Spike Concentration	0.1009 mg/L
Slope	3.6742
Intercept	-0.0193
Coefficient of Corr.	0.9998

Non-Iterative Study

No. of Replicates	$t_{(n-1,0.99)}$
7	3.143
8	2.998
9	2.896
10	2.821
11	2.764
16	2.602
21	2.528

Spike Aliquots	Spike Result Area Count	Measured Concentration (mg/L)
1	0.0344	0.107
2	0.0346	0.108
3	0.0326	0.101
4	0.0328	0.101
5	0.0320	0.098
6	0.0326	0.101
7	0.0341	0.106
8	0.0342	0.106

Average Spike Concentration:	0.103
Recovery (R_a):	102.54%
Standard Deviation (S_a):	0.00372
RMS Deviation:	3.6%
$t_{(n-1,0.99)}$:	2.998
MDL:	0.011
LOQ:	0.101

Is the spike level higher than the MDL?	Yes
Is the spike level less than ten times the MDL?	Yes
Is the Avg Recovery between 90% < R_a < 110% ?	Yes

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CleanAir.

Sample Calculations

Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Calibration Point No: Cal 02
Sample No: 28828-03
Sample Location: U1 SDA Inlet

1. Difference between duplicate injections for pre-test calibration (Pre Cal 1).

$$\Delta_{Injection} = \left| Area_{Trial\ 2} - Area_{Tria\ 1} \right|$$

Where:

$\Delta_{Injection}$ = Area count difference between duplicate injections

$Area_{Trial2}$ = Area count for injection Trial 2

$Area_{Trial1}$ = Area count for injection Trial 1

$\Delta_{Injection}$ = 0.0021

$Area_{Trial2}$ = 0.1132

$Area_{Trial1}$ = 0.1153

2. Average area count value for duplicate injections for pre-test calibration (Pre Cal 1).

$$Avg_{PreInj} = \frac{(Area_{Trial1} + Area_{Trial2})}{2}$$

Where:

Avg_{PreInj} = Average of duplicate injection area counts

$Area_{Trial2}$ = Area count for injection Trial 2

$Area_{Trial1}$ = Area count for injection Trial 1

2 = Constant (number of values)

Avg_{Inj} = 0.1143

$Area_{Trial2}$ = 0.1132

$Area_{Trial1}$ = 0.1153

Sample Calculations
Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Calibration Point No: Cal 02
Sample No: 28828-03
Sample Location: U1 SDA Inlet

3. Difference between individual injection and average area count for pre-test calibration.

$$\Delta_{PreMean\%} = \frac{\left|Area_{Trail2} - Avg_{PreInj}\right|}{Avg_{PreInj}} 100$$

Where:

$\Delta_{PreMean\%}$ = Difference between individual injection and average area count (%).

Avg_{PreInj} = Average of duplicate injection area counts

$Area_{Trial2}$ = Area count for injection Trial 2

100 = *Constant (conversion factor for percentage)*

$\Delta_{PreMean\%}$ = 0.9276

Avg_{PreInj} = 0.1143

$Area_{Trial2}$ = 0.1132

Note: EPA Method 26 requires $\Delta_{PreMean\%}$ to be less than 5%.

4. Average of all area count values for a given calibration point.

$$\overline{X} = \frac{\sum_{i=1}^{n} x_i}{n}$$

Where:

$\overline{X}$ = Average of all area count values for a given calibration point.

x_i = Individual area count values for each individual injection.

i = Iteration value.

n = Number of injections for the calibration point under question.

$\overline{X}$ = 0.1152

x_1 = 0.1153

x_2 = 0.1132

n = 6

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Source Testing		Lab Project No:	28828	Analyst:	Eric Ewing
Plant: Wheelabrator South Broward		Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Calibration Point No: Cal 02
Sample No: 28828-03
Sample Location: U1 SDA Inlet

5. Average of all concentration values used for generating calibration curve.

$$\overline{Y_{All}} = \frac{\sum_{i=1}^{n} y_i}{n}$$

Where:

$\overline{Y}_{All}$	=	Average of all area concentration values.
y_i	=	Individual concentration values for each individual injection.
n	=	Number of injections.

$\overline{Y}_{All}$	=	0.9588
y_1	=	0.0000
y_2	=	0.1009
n	=	7

6. Average of all area count values for the calibration curve.

$$\overline{X_{All}} = \frac{\sum_{i=1}^{n} x_i}{n}$$

Where:

$\overline{X}_{All}$	=	Average of all area count values.
x_i	=	Individual area count values.
i	=	Iteration value.
n	=	Number of injections.

$\overline{X}_{All}$	=	0.3088
x_1	=	0.1153
x_2	=	0.1132
n	=	36

Sample Calculations

Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Calibration Point No: Cal 02
Sample No: 28828-03
Sample Location: U1 SDA Inlet

7. Determination of slope (least-squares regression) value for calibration curve.

$$m = \frac{\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^{n} (x_i - \bar{x})^2}$$

Where:

m	=	Slope of least-squares regression curve.
x_i	=	Individual area count values for each individual injection.
$\bar{x}$	=	Average of all area count values = $\overline{X}_{All}$
y_i	=	Actual area concentration values for each individual injection.
$\bar{y}$	=	Average of all concentration values = $\overline{Y}_{All}$
i	=	Iteration value.
n	=	Number of injections.

m	=	3.67416
x_1	=	0.1153
x_2	=	0.1132
$\bar{x}$	=	0.3088
y_1	=	0.0000
y_2	=	0.1009
$\bar{y}$	=	0.9588
n	=	36

8. Determination of y-intercept (least-squares regression) value for calibration curve.

$$b = \bar{y} - m\,\bar{x}$$

Where:

b	=	Y-axis intercept.
$\bar{x}$	=	Average of all area count values = $\overline{X}_{All}$
$\bar{y}$	=	Average of all concentration values = $\overline{Y}_{All}$

b	=	-0.01927
m	=	3.67416
$\bar{x}$	=	0.3088
$\bar{y}$	=	0.9588

Sample Calculations

Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Calibration Point No: Cal 02
Sample No: 28828-03
Sample Location: U1 SDA Inlet

9. Determination of coefficient of correlation (least-squares regression) value for calibration curve.

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2 \sum_{i=1}^{n}(y_i - \bar{y})^2}}$$

Where:

r^2	=	Square of the Pearson product moment correlation coefficient through data points in known y's and known x's.
r	=	Pearson product moment correlation coefficient through data points in known y's and known x's.
x_i	=	Individual area count values for each individual injection.
y_i	=	Actual area concentration values for each individual injection.
$\bar{x}$	=	Average of all area count values = $\overline{X}_{All}$
$\bar{y}$	=	Average of all concentration values = $\overline{Y}_{All}$
i	=	Iteration value.
n	=	Number of injections.

r^2	=	0.99977
r	=	0.99988
x_1	=	0.1153
x_2	=	0.1132
$\bar{x}$	=	0.3088
y_1	=	0.0000
y_2	=	0.1009
$\bar{y}$	=	0.9588
n	=	36

Sample Calculations
Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Calibration Point No: Cal 02
Sample No: 28828-03
Sample Location: U1 SDA Inlet

10. Determination of average sample area counts from duplicate injections.

$$Avg_{Sample} = \frac{(Area_{Trial1} + Area_{Trial2})}{2}$$

Where:

Avg_{Sample} = Average of duplicate injection area counts
$Area_{Trial2}$ = Area count for injection Trial 2
$Area_{Trial1}$ = Area count for injection Trial 1
2 = Constant (number of injections)

Avg_{Inj} = 0.2478
$Area_{Trial2}$ = 0.2507
$Area_{Trial1}$ = 0.2449

11. Difference between duplicate injections for the sample.

$$\Delta_{Injection} = |Area_{Trial\ 2} - Area_{Tria\ 1}|$$

Where:

$\Delta_{Injection}$ = Area count difference between duplicate injections
$Area_{Trial2}$ = Area count for injection Trial 2
$Area_{Trial1}$ = Area count for injection Trial 1

$\Delta_{Injection}$ = 0.0058
$Area_{Trial2}$ = 0.2507
$Area_{Trial1}$ = 0.2449

Sample Calculations

Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Calibration Point No: Cal 02
Sample No: 28828-03
Sample Location: U1 SDA Inlet

12. Difference between individual injection and average area count for the sample.

$$\Delta_{Injection} = \frac{\left|Area_{Trail2} - Avg_{Inj}\right|}{Avg_{Inj}} 100$$

Where:

$\Delta_{Injection}$	=	Difference between individual injection and average area count (%).
Avg_{Inj}	=	Average of duplicate injection area counts
$Area_{Trial2}$	=	Area count for injection Trial 2
100	=	Constant (conversion factor for percentage)

$\Delta_{Injection}$	=	1.2%
Avg_{Inj}	=	0.2478
$Area_{Trial2}$	=	0.2507

Note: EPA Method 26 requires $\Delta_{Injection}$ to be less than 5%.

13. Determination of sample concentration from least-squares regression curve (mg/L).

$$C_{Reg} = DF\left[m\left(Avg_{Inj}\right) + b\right]$$

Where:

C_{Reg}	=	Sample concentration determined using the regression curve (mg/L)
DF	=	Sample dilution factor
Avg_{Inj}	=	Average of duplicate injection area counts.
m	=	Slope of least-squares regression curve.
b	=	Y-intercept of least-squares regression curve.

C_{Reg}	=	891.18
DF	=	1000
Avg_{Inj}	=	0.2478
m	=	3.6742
b	=	-0.0193

Sample Calculations
Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Calibration Point No: Cal 02
Sample No: 28828-03
Sample Location: U1 SDA Inlet

14. Determination of total amount of analyte in sample (total mg).

$$M_{Analyte} = \frac{(C_{Reg})(V_{Soln})}{1000}$$

Where:

$M_{Analyte}$ = Amount of analyte in sample (total mg)
C_{Reg} = Sample concentration determined using the response factor (mg/L)
V_{Soln} = Sample volume (ml)
1000 = Conversion constant (ml to L)

$M_{Analyte}$ = 793.15
C_{Reg} = 891.1840
V_{Soln} = 890.0

15. Determination of Detection Limits.

15a. Determination of average spike result.

$$AvgM_{f\_i} = \frac{\sum_{i=1}^{n} M_{f\_i}}{n}$$

Where:

$AvgM_{f\_i}$ = Average of spike result (mg/L)
M_{f_i} = Net results recorded for each iteration (mg/L)
n = Number of iterations.
i = Placeholder for iteration.

$AvgM_{f\_i}$	=	0.103			
M_{f_1}	=	0.107	M_{f_5}	=	0.098
M_{f_2}	=	0.108	M_{f_6}	=	0.101
M_{f_3}	=	0.101	M_{f_7}	=	0.106
M_{f_4}	=	0.101	M_{f_8}	=	0.106
n	=	8			

Sample Calculations
Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Calibration Point No: Cal 02
Sample No: 28828-03
Sample Location: U1 SDA Inlet

15b. Determination of standard deviation of spike result.

$$\sigma_{f-i} = \sqrt{\frac{\sum_{i=1}^{n}\left(M_{f\_i} - AvgM_{f\_i}\right)^2}{(n-1)}}$$

Where:

σ_{f_i}	=	Standard deviation of spike result.
$AvgM_{f\_i}$	=	Average spike result (mg/L)
M_{f_i}	=	Concentration recorded for each iteration (mg/L)
n	=	Number of iterations.
i	=	Placeholder for iteration.

σ_{f_i}	=	0.0037			
$AvgM_{f\_i}$	=	0.103			
M_{f_1}	=	0.107	M_{f_5}	=	0.098
M_{f_2}	=	0.108	M_{f_6}	=	0.101
M_{f_3}	=	0.101	M_{f_7}	=	0.106
M_{f_4}	=	0.101	M_{f_8}	=	0.106
n	=	8			

15c. Determination of variance of spike result.

$$V_{f\_i} = (\sigma_{f\_i})^2$$

Where:

V_{f_i}	=	Variance of spike result.
σ_{f_i}	=	Standard deviation of spike result.

V_{f_i}	=	1.38E-05
σ_{f_i}	=	0.0037

Sample Calculations
Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Calibration Point No: Cal 02
Sample No: 28828-03
Sample Location: U1 SDA Inlet

15d. Determination of RMS deviation of spike result.

$$RMS_{f\_i} = 100 \frac{\sigma_{f\_i}}{AvgM_{f\_i}}$$

Where:

RMS_{f_i}	=	RMS deviation of spike results (%).
σ_{f_i}	=	Standard deviation of spike result.
$AvgM_{f\_i}$	=	Average spike result (mg/L)
100	=	Conversion constant (fraction to percent)

RMS_{f_i}	=	0.0359
σ_{f_i}	=	0.0037
$AvgM_{f\_i}$	=	0.1035

15e. Determination of average spike recovery.

$$R_f = 100 \frac{AvgM_{f\_i}}{RA}$$

Where:

R_f	=	Average spike recovery (%)
$AvgM_{f\_i}$	=	Average spike result (mg/L)
RA	=	Spike concentration added (mg/L)
100	=	Conversion constant (fraction to percent)

R_f	=	102.5%
$AvgM_{f\_i}$	=	0.10349
RA	=	0.10093

Sample Calculations

Ion Chromatography Analysis

Customer:	Palatine Source Testing	Lab Project No:	28828	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11414	Received:	4/2/12
Applicable Analytical Method:			U.S. EPA Method 26A	Analyte:	Chloride

Calibration Point No: Cal 02
Sample No: 28828-03
Sample Location: U1 SDA Inlet

15f. Determination of $t_{(n-1,\,0.99)}$.

Value taken from the following Table:

n	$t_{(n-1,\,0.99)}$
7	3.143
8	2.998
9	2.896
10	2.821
11	2.764
16	2.602
21	2.528

Where:

$t_{(n-1,\,0.99)}$ = Students' t value appropriate for a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom.

n = Number of iterations.

$t_{(n-1,\,0.99)}$ = 2.998

n = 8

15g. Determination of Method Detection Limit (MDL).

$$MDL = \sigma_{f\_i}\, t_{(n-1,0.99)}$$

Where:

MDL = Method detection limit (mg/L)

$t_{(n-1,\,0.99)}$ = Students' t value appropriate for a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom.

σ_{f_i} = Standard deviation of spike result.

MDL = 0.011

$t_{(n-1,\,0.99)}$ = 2.998

σ_{f_i} = 0.0037

AS40 Log Sheet

Customer Project No:	11414	Analyte(s):	Cl
Lab Project No:	28828		
Date:	3/30/12		
Analyst:	Eric Ewing		

Standard Lot# 03221202-64-00000-03
QC Standard Lot# 03221202-64-00000-04
Working Stock Lot# 03221202-64-00000-05

Inj Type: Loop Conc   Inj Mode: Prop Cnst   Inj / Vial: 1 2 3

Cartridge ID: 1B

Pos	Sample #	Identification	Volume	Dilution Ratio
1		Blank		
2		Cal 01 03221202-64-00000-06		
3		Cal 01 03221202-64-00000-06		
4		Cal 02 03221202-64-00000-07		
5		Cal 03 03221202-64-00000-08		
6		Cal 04 03221202-64-00000-09		

Cartridge ID: 2B

Pos	Sample #	Identification	Volume	Dilution Ratio
1		Cal 05 03221202-64-00000-10		
2		Cal 06 03221202-64-00000-11		
3		Blank		
4				
5				
6				

Cartridge ID:

Pos	Sample #	Identification	Volume	Dilution Ratio
1				
2				
3				
4				
5				
6				

Serial Dilution Data

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Microlab 600 Dilution Data

Aliquot Size (uL)	Total Volume (uL)

Aliquot Size (uL)	Total Volume (uL)

Aliquot Size (uL)	Total Volume (uL)

Analyst Signature Eric Ewing

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AS40 Log Sheet

Customer Project No:	11414	Analyte(s):	Cl
Lab Project No:	28828		
Date:	4/3/12		
Analyst:	Eric Ewing		

Standard Lot#	03221202-64-00000-03
QC Standard Lot#	03221202-64-00000-04
Working Stock Lot#	03221202-64-00000-05

Inj Type: Loop / Conc   Inj Mode: Prop / Cnst   Inj / Vial: 1 2 3

Serial Dilution Data   Microlab 600 Dilution Data

Cartridge ID: 1B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1		Blank								
2		Cal 02 03221202-64-00000-07								
3		Blank								
4		CCV 03221202-64-00000-12								
5		Blank								
6	-01	DI H_2O RB	300	1						

Cartridge ID: 2B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1	-02	0.1 N H_2SO_4 RB	880	1						
2	-06	U1 FF Outlet Imp Chk R1	710	1						
3	-07	" " " " " R2	729	1						
4	-08	" " " " " R3	776	1						
5	-12	U2 FF Outlet Imp Chk R1	659	1						
6	-13	" " " " " R2	743	1						

Cartridge ID: 3B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1	-14	U2 FF Outlet Imp Chk R3	693	1						
2	-18	U3 FF Outlet Imp Chk R1	695	1						
3	-19	" " " " " R2	744	1						
4	-20	" " " " " R3	754	1						
5		Blank								
6		QC 03221202-64-00000-13								

Analyst Signature: Eric Ewing

AS40 Log Sheet

Customer Project No:	11414	Analyte(s):	Cl
Lab Project No:	28828		
Date:	4/3/12 - 4/5/12		
Analyst:	Eric Ewing		

Standard Lot#	03221202-64-00000-03
QC Standard Lot#	03221202-64-00000-04
Working Stock Lot#	03221202-64-00000-05

Inj Type: Loop / Conc

Inj Mode: Prop / Cnst

Inj / Vial: 1 2 3

Serial Dilution Data

Microlab 600 Dilution Data

Cartridge ID: 4B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1		Blank								
2		Cal 03 03221202-64-00000-08								
3		Blank								
4										
5										
6										

Cartridge ID: 1B 4/5/12

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1		Blank								
2		Cal 04 03221202-64-00000-08								
3		Blank								
4		QC, 03221202-64-00000-13								
5		Blank								
6	-03	V1 SDA Inlet Imp C&R R1	890	1000					30	30,000

Cartridge ID: 2B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1	-04	V1 SDA Inlet Imp C&R R2	709	1000					30	30,000
2	-05	" " " " " R3	695	1000					30.	30,000
3	-09	V2 SDA Inlet Imp C&R R1	881	1000					30	30,000
4	-10	" " " " " R2	869	1000					30	30,000
5	-11	" " " " " R3	784	1000					30	30,000
6	-15	V3 SDA Inlet Imp C&R R1	659	1000					30	30,000

Analyst Signature: Eric Ewing

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AS40 Log Sheet

Customer Project No:	11414	Analyte(s):	Cl
Lab Project No:	28828		
Date:	4/5/12		
Analyst:	Eric Ewing		

Standard Lot#: 03221202-64-00000-03
QC Standard Lot#: 03221202-64-00000-04
Working Stock Lot#: 03221202-64-00000-05

Inj Type: Loop / Conc   Inj Mode: Prop / Cnst   Inj / Vial: 1 2 3

Serial Dilution Data   **Microlab 600 Dilution Data**

Cartridge ID: 3B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1	-16	U3 SDA Inlet Imp Ccr R2	843	1000					30	30,000
2	-17	" " " " " R3	833	1000					30	30,000
3	-06			20					300	6000
4		Blank								
5		CCV 03221202-64-00000-12								
6		Blank								

Cartridge ID: 4B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1	-07			20					300	6000
2	-08			20					300	6000
3	-12			10					600	6000
4	-13			10					600	6000
5	-14			10					600	6000
6	-18			25					240	6000

Cartridge ID: 5B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1	-19			25					240	6000
2	-20			25					240	6000
3	-06			20					300	6000
4	-18			25						
5		Blank								
6		QC 03221202-64-00000-13								

Analyst Signature: Eric Ewing

AS40 Log Sheet

Customer Project No:	11414	Analyte(s):	Cl	Standard Lot#	03221202-64-00000-03
Lab Project No:	28828			QC Standard Lot#	03221202-64-00000-04
Date:	4/5/12 - 4/7/12			Working Stock Lot#	03221202-64-00000-05
Analyst:	Eric Ewing				

Inj Type: Loop / Conc   Inj Mode: Prop / Cnst   Inj / Vial: 1 2 3

Serial Dilution Data   Microlab 600 Dilution Data

Cartridge ID: 6B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1		Blank								
2		Cal 05 03221202-64-00000-10								
3		Blank								
4										
5										
6										

Cartridge ID: 4B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1		Blank								
2		Cal 06 03221202-64-00000-11								
3		Blank								
4		CCV 03221202-64-00000-12								
5		Blank								
6	-07	Matrix Spike 03221202-64-00000-11		20					137.5	2750

Cartridge ID: 2B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1	-07	Matrix Spike 03221202-64-00000-11		20					137.5	2750
2	-13	Matrix Spike 03221202-64-00000-11		10					275	2750
3		Blank								
4		Cal 01 03221202-64-00000-06								
5		Cal 01 " " " "								
6		Cal 02 03221202-64-00000-07								

Analyst Signature Eric Ewing

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AS40 Log Sheet

Customer Project No:	11414	Analyte(s):	Cl
Lab Project No:	28828		
Date:	4/7/12		
Analyst:	Eric Ewing		

Standard Lot#	03221202-64-00000-03
QC Standard Lot#	03221202-64-00000-04
Working Stock Lot#	03221202-64-00000-05

Inj Type: Loop / Conc   Inj Mode: Prop / Cnst   Inj / Vial: 1 2 3

Serial Dilution Data

Microlab 600 Dilution Data

Cartridge ID: 3B

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1		Cal 03 03221202-64-00000-08								
2		Cal 04 03221202-64-00000-09								
3		Cal 05 03221202-64-00000-10								
4		Cal 06 03221202-64-00000-11								
5		Blank								
6										

Cartridge ID:

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1										
2										
3										
4										
5										
6										

Cartridge ID:

Pos	Sample #	Identification	Volume	Dilution Ratio	Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size	Aliquot Size (uL)	Total Volume (uL)
1										
2										
3										
4										
5										
6										

Analyst Signature Eric Ewing

Page: 6 of 6

Lab Project No.: 28828 **Date Received:** 4/2/2012

CleanAir No.: 11414

66

South Broward

Customer : 66

Contact : Scott Brown

Phone :

Fax :

Email : sbrown@cleanair.com

Requested Analysis

Due	Analyst	Status	Sample	Type	Container	Method
4/16/2012	EE	In Queue	1-20	Impinger C&R	Nalgene Contair	US EPA Method 26A Chloride

Printed 2012/04/02 12:45:21

CLIENT	Wheelabrator
PLANT	South Broward
PROJECT MANAGER	S. Brown
PROJECT	11414SB
DEPT.	66

66-11414SB-8

CleanAir ENGINEERING
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-26	SEE BELOW (IF APPLICABLE)	REAGENT BLANKS

FORWARDING LAB
CleanAir Analytical Services
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYSIS REQUESTED

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	Chloride	Fluoride	Bromide	Archive	ADDITIONAL INFORMATION
28828-01 K	3/20	Reagent Blank	All	DI Water (~200 mL), 250 mL HDPE	1		X				Please Report North
↓ -02 K	3/20	Reagent Blank	All	0.1 N H_2SO_4 (~200 mL), 1000 mL HDPE	1		X				and South Broward Separately

Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:
S. Brown	3/28/2012 17:00					S. Brown
Received By: (signature)	**Date / Time**	**Received By: (signature)**	**Date / Time**	**Relinquished By: (signature)**	**Date / Time**	**Signature / Date**
[signature]	4/2/12 1230					[signature] 3/28/2012

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CLIENT	Wheelabrator	PROJECT	11414SB
PLANT	South Broward	DEPT.	66
PROJECT MANAGER	S. Brown		

66-11414SB-7

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-26	2	ALKALINE IMPINGER CATCH AND RINSE 1000 mL HDPE

CleanAir Engineering
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

FORWARDING LAB
CleanAir Analytical Services
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYSIS REQUESTED

LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	Chloride	Bromide		Archive	ADDITIONAL INFORMATION
28828-06 K	3/22	Unit 1 FF Outlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				Please Report North
-07 K	3/22	Unit 1 FF Outlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				and South Broward Separately
-08 K	3/22	Unit 1 FF Outlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-03 K	3/22	Unit 1 SDA Inlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-04 K	3/22	Unit 1 SDA Inlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-05 K	3/22	Unit 1 SDA Inlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-12 K	3/20	Unit 2 FF Outlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-13 K	3/20	Unit 2 FF Outlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-14 K	3/20	Unit 2 FF Outlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-09 K	3/20	Unit 2 SDA Inlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-10 K	3/20	Unit 2 SDA Inlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-11 K	3/20	Unit 2 SDA Inlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				

Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:
S. Brown	3/28/2012 17:00					S. Brown
Received By: (signature)	Date / Time	Received By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Signature / Date
[signature]	4/2/12 1230					[signature] 3/28/2012

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CLIENT	Wheelabrator	PROJECT	11414SB
PLANT	South Broward	DEPT.	66
PROJECT MANAGER	S. Brown		

66-11414SB-6

ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION
USEPA M-26	1	ACIDIC IMPINGER CATCH AND RINSE 1000 mL HDPE

CleanAir ENGINEERING
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

FORWARDING LAB
CleanAir Analytical Services
500 West Wood Street
Palatine, IL 60067
800-627-0033 (phone)
847-991-3385 (fax)

ANALYSIS REQUESTED

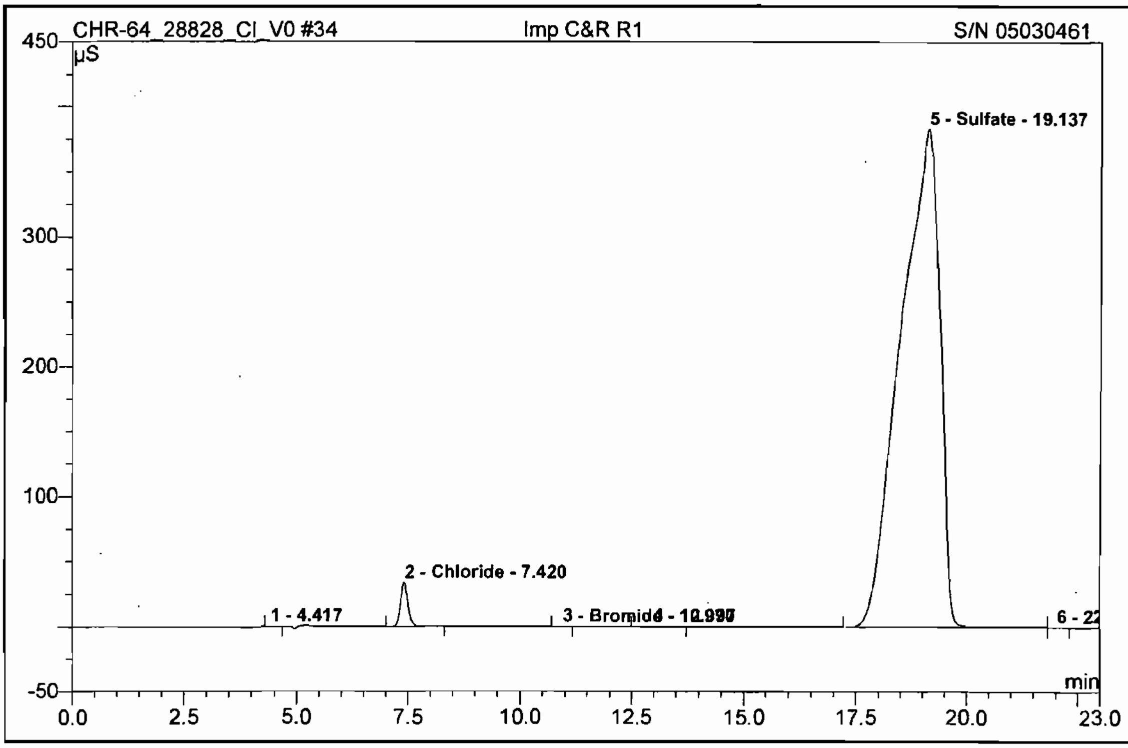
LAB ID NUMBER	DATE (2012)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	Chloride	Fluoride	Bromide	Archive	ADDITIONAL INFORMATION
											Please Report North
											and South Broward Separately
28828-18	3/21	Unit 3 FF Outlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-19	3/21	Unit 3 FF Outlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-20	3/21	Unit 3 FF Outlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-15	3/21	Unit 3 SDA Inlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-16	3/21	Unit 3 SDA Inlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				
-17	3/21	Unit 3 SDA Inlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X				

Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:
S. Brown	3/28/2012 17:00					S. Brown
Received By: (signature)	**Date / Time**	**Received By: (signature)**	**Date / Time**	**Relinquished By: (signature)**	**Date / Time**	**Signature / Date**
Eg/ Eg	4/2/12 1230					3/28/2012

34 Imp C&R R1

U1 FF Outlet

Sample Name:	**Imp C&R R1**	*Sample Volume:*	**710.0**
Vial Number:	**4**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*ICS Conductivity*	**34.140**
Control Program:	**AS40LongInj1CAE**	*ICS Pressure*	**1441.17**
Quantif. Method:	**Method**	*Dilution Factor:*	**1.0 X**
Run Time (min):	**23.00**	*Sample ID:*	**28828-06**
Recording Time:	**04/04/12 04:38**	*Replicate ID:*	



No.	Ret.Time min	Peak Name	Height µS	Area µS*min	Rel.Area %	Peak Width min	Plates(EP)
1	4.42	n.a.	0.1053	0.0252	0.01	n.a.	1677
2	7.42	Chloride	33.4909	6.4897	1.63	0.30	10056
3	10.97	Bromide	0.0764	0.0187	0.00	0.37	11384
4	13.00	n.a.	0.2597	0.1617	0.04	1.27	2477
5	19.14	Sulfate	382.8071	390.5811	98.31	1.83	1817
6	22.02	n.a.	0.0542	0.0192	0.00	1.03	n.a.
Total:			416.794	397.296	100.00	4.796	

End of Appendix

PERTINENT CERTIFICATIONS

J

I herby certify that all pages contained within this Appendix have been reviewed and, to the best of my ability, verified as accurate.

QA/QC Initials: WL

Date: 4/27/12

CleanAir

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AeroMet Engineering, Inc.

Solutions for a Changing Environment

Certification of Visible Opacity Reading

Daniel Luckhard

qualified to conduct EPA Method 9 Tests for visible opacity in accordance with the methods established for such qualification in 40 CFR Part 60 Appendix A.

Certification Date: March 7, 2012

Expiration Date: September 7, 2012

AeroMet Instructor: Trey Beauchamp

Trey Beauchamp

AEROMET ENGINEERING INC. CERTIFIES THAT

Daniel Luckhard

has qualified as a CERTIFIED VISIBLE EMISSIONS READER per Title 40 Part 60 Appendix A USEPA Method

Issued: 3/7/12

Expires: 9/7/12

Questions? Call 573.636.6393

AeroMet Public School

GIFT CARD DRAWING

To see if you have won:

1. Go to www.aeromet.org
2. Click on Smoke School.
3. Click on Gift Card Drawing.
4. Look for your location on the list.

The winner from each public location will be announced within 7 days of the training event. You are automatically registered when you pass the certification test.

If your name is listed, you must contact AeroMet at

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