



Wheelabrator South Broward Inc.

A Waste Management Company

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May 12, 2011

UPS# 1Z2AW 7390199054066

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

RECEIVED

MAY 13 2011

BUREAU OF
AIR REGULATION

Re: Wheelabrator South Broward
2011 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 28-30 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 McIlvaine
Plant Manager

cc: USEPA, Region IV, Pesticides and Toxics Management Division, Air & EPCRA Enforcement
Branch, Air Enforcement Section (with) UPS# 1Z2AW 7390198362654

FDEP, Tallahassee, Bureau of Air Regulation, New Source Review Section,
(with) UPS# 1Z2AW 7390196102634

Broward County Department of Planning and Environmental Protection, Air Quality Division
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Chuck Faller (with)
Ram Tewari - BCWRS (without)
Tim Porter (without)
Rob French - MPI (with) - Hand delivered - T J

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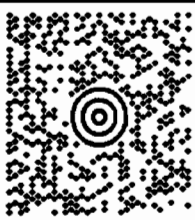
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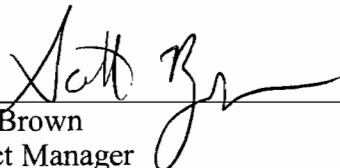
REPORT ON COMPLIANCE TESTING

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: 11182-3
Revision 0: May 11, 2011

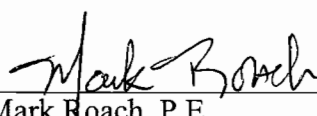
To the best of our knowledge, the data presented in this report are accurate, complete, error free, legible and representative of the actual emissions during the test program. Clean Air Engineering operates in conformance with the requirements of ASTM D7036-04 Standard Practice for Competence of Air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

Prepared and Submitted by,



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Reviewed by,



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WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

REVISION HISTORY

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REPORT ON COMPLIANCE TESTING***DRAFT REPORT REVISION HISTORY***

Revision:	Date	Pages	Comments
D0a	04/29/11	All	Draft version of original document.

FINAL REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
0	05/11/11	All	Final version of original document.

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WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

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CleanAir Project No: 11182-3

PROJECT OVERVIEW

1-1

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 (FDEP). Wheelabrator South Broward, Inc. contracted Clean Air Engineering (CleanAir) to perform a compliance test program at its municipal waste combustor (MWC) facility, located in Ft. Lauderdale, Florida.

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 Title V Conditions B.53(6), B.76 and B.81. Testing was conducted in accordance with the Wheelabrator North and South Broward Protocol on Compliance, dated February 8, 2011, 40 CFR 60 Subpart Cb, and applicable sections of the facility's Title V Permit No. 0112119-014-AV.

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

Key Project Participants

Individuals responsible for coordinating and conducting the test program were:

B. Hooper – Wheelabrator
S. Brown – CleanAir

William Forrest of the FDEP 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
C. Slimp
B. Arnold

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

PROJECT OVERVIEW

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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 28 through 30, 2011, and included the following emissions measurements:

- beryllium (Be);
- cadmium (Cd);
- lead (Pb);
- mercury (Hg);
- polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF), Unit 3 only;
- total filterable particulate (TFP);
- hydrogen chloride (HCl);
- total fluoride;
- fugitive emissions (FE);
- visual emissions (VE).

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

PROJECT OVERVIEW

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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 3 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/28/11	07:31	09:43
1	U1 FF Outlet / SDA Inlet	USEPA Method 26A	HCl	03/28/11	07:48	08:48
2	U1 FF Outlet / SDA Inlet	USEPA Method 26A	HCl	03/28/11	09:11	10:11
2	Unit 3 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/28/11	10:05	12:19
1	Unit 3 FF Outlet	USEPA Method 23	PCDD/F	03/28/11	10:05	14:25
3	U1 FF Outlet / SDA Inlet	USEPA Method 26A	HCl	03/28/11	10:35	11:35
1	Unit 1 FF Outlet	USEPA Method 13B	Total Fluorides	03/28/11	12:03	13:12
3	Unit 3 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/28/11	12:43	14:55
2	Unit 1 FF Outlet	USEPA Method 13B	Total Fluorides	03/28/11	13:33	14:44
3	Unit 1 FF Outlet	USEPA Method 13B	Total Fluorides	03/28/11	15:02	16:11
1	Unit 1 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/29/11	07:41	09:53
2	Unit 3 FF Outlet	USEPA Method 23	PCDD/F	03/29/11	07:41	11:59
1	U2 FF Outlet / SDA Inlet	USEPA Method 26A	HCl	03/29/11	07:50	08:50
2	U2 FF Outlet / SDA Inlet	USEPA Method 26A	HCl	03/29/11	09:23	10:23
2	Unit 1 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/29/11	10:15	15:00
3	U2 FF Outlet / SDA Inlet	USEPA Method 26A	HCl	03/29/11	10:39	11:39
4	U2 FF Outlet / SDA Inlet	USEPA Method 26A	HCl	03/29/11	11:54	12:54
3	Unit 3 FF Outlet	USEPA Method 23	PCDD/F	03/29/11	12:38	16:59
1	Unit 2 FF Outlet	USEPA Method 13B	Total Fluorides	03/29/11	13:21	14:30
2	Unit 2 FF Outlet	USEPA Method 13B	Total Fluorides	03/29/11	14:49	15:57
3	Unit 1 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/29/11	15:16	17:27
3	Unit 2 FF Outlet	USEPA Method 13B	Total Fluorides	03/29/11	16:11	17:23
1	Unit 2 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/30/11	07:31	09:42
1	Ash Handling System	USEPA Method 22	Fugitive Emissions	03/30/11	07:33	15:52
1	U3 FF Outlet / SDA Inlet	USEPA Method 26A	HCl	03/30/11	07:47	08:47
2	U3 FF Outlet / SDA Inlet	USEPA Method 26A	HCl	03/30/11	09:06	10:06
2	Unit 2 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/30/11	09:59	12:10
3	U3 FF Outlet / SDA Inlet	USEPA Method 26A	HCl	03/30/11	10:22	11:22
1	Unit 3 FF Outlet	USEPA Method 13B	Total Fluorides	03/30/11	11:40	12:47
1	Lime Silo	USEPA Method 9	Opacity	03/30/11	11:50	14:05
3	Unit 2 FF Outlet	USEPA Method 5/29	Particulate/Metals	03/30/11	12:29	14:41
2	Unit 3 FF Outlet	USEPA Method 13B	Total Fluorides	03/30/11	13:04	14:12
3	Unit 3 FF Outlet	USEPA Method 13B	Total Fluorides	03/30/11	14:26	15:30

PROJECT OVERVIEW

1-4

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)	1.6	1.3	1.6	25
Visual Emissions (% by COMS) ²	0	0	0	10
Fluoride (lb/MMBtu as HF) ³	<0.000044	<0.000041	<0.000041	0.0040
Total PCCD/PCDF (ng/dscm @ 7% O ₂)	NA	NA	0.29	30
Hydrogen Chloride (ppmdv @ 7% O ₂) or Hydrogen Chloride Removal (%) ⁴	10 98%	3.6 99%	8.3 98%	29 >95
Beryllium (mg/dscm @ 7% O ₂)	<0.00003	<0.00003	<0.00003	0.001
Cadmium (mg/dscm @ 7% O ₂)	<0.00015	<0.00023	<0.00013	0.035
Lead (mg/dscm @ 7% O ₂)	0.00043	0.0012	0.00022	0.40
Mercury (mg/dscm @ 7% O ₂)	0.0012	0.0013	0.0016	0.050
Carbon Feed Rate (lbs/hr) ⁵	6	6	6	NA
Average Steam Flow (Klbs/hr) ⁶	183.1	181.5	183.3	192
Average FF Inlet Temperature (°F) ⁶	315	315	315	NA

¹ Limits obtained from facilities Title V Permit 0112119-014-AV. If a second limit is shown that limit is being implemented by the EPA as of April 28, 2009.

² Visual Emissions (opacity) was obtained from the facilities COMS data as allowed under Title V Conditions B.53(6), B.76 and B.81.

³ lb/MMBtu calculations used Fd of 9,570 for MSW as per Method 19.

⁴ Removal for mercury and hydrogen chloride calculated in the unit of its standard (ppmdv @ 7% O₂). The hydrogen chloride limit is 29 ppmv @ 7% O₂ or 95% removal and the mercury limit is 70/50 µg/dscm @ 7% O₂ or 85% removal, whichever is less stringent.

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.

⁶ From all compliance test runs.

PROJECT OVERVIEW**Table 1-3:
Subpart Cb-required Operating Data****Process Condition**

Unit 1 Maximum Demonstrated Combustor Load (Klbs/hr) ¹	184.2 ²
Unit 2 Maximum Demonstrated Combustor Load (Klbs/hr) ¹	183.9 ³
Unit 3 Maximum Demonstrated Combustor Load (Klbs/hr) ¹	183.6
Unit 1 Maximum Particulate Control Device Inlet Temperature (°F) ⁴	320 ²
Unit 2 Maximum Particulate Control Device Inlet Temperature (°F) ⁴	315 ³
Unit 3 Maximum Particulate Control Device Inlet Temperature (°F) ⁴	315
Unit 1 Carbon Feed Rate (lbs/hr) ⁵	6
Unit 2 Carbon Feed Rate (lbs/hr) ⁵	6
Unit 3 Carbon Feed rate (Klbs/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 April 28, 2009.³ From CleanAir Cb test report dated May 5 2010.⁴ 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**

<u>Source</u>	<u>Constituent</u>	<u>Sampling Method</u>	<u>Results</u>	<u>Permit Limit¹</u>
<u>Ash Handling System²</u>				
	Fugitive Emissions (%)	EPA M22	0	5% of observation time
	Fugitive Emissions (minutes)		0	9 minutes
<u>Lime Silo³</u>				
	Visual Emissions (%)	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 modified 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. 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 O₂/CO₂ analyzer utilized for all of the integrated gas sample (IGS) bag analyses.

PROJECT OVERVIEW

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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 2-7 inches of water and scrubber dilution water flow varies from 0-40 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 I.

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 beryllium, 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 Method 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 H. 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 H.

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.

PROJECT OVERVIEW

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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.

Bill Hooper of Wheelabrator provided the process (operating) data. This data is presented in its entirety in Appendix C. All process data and CleanAir run times are based on facility CEM time. The supporting data obtained from the Bailey system is one (1) hour behind the CEM time.

IGS's were collected in a vinyl sample bag from every sample train. The contents of the bag were then analyzed for oxygen (O₂) and carbon dioxide (CO₂) concentrations, using an O₂/CO₂ 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 G.

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".

Problems Encountered

There are 26 extra minutes of Lime Silo opacity readings included on the field data sheets because the plant did not notify the VE reader when the truck unloading had stopped. All opacity readings were zero.

The first Method 26A test run on Unit 2 was not valid due to the average steam flow being below the required 90% of the boiler's maximum steam flow rating. A fourth run was performed at the SDA Inlet and FF Outlet. The first test run samples were not analyzed.

There were multiple delays during the Unit 1 Run 2 Method 5/29 test due to loss of steam flow. The loss of steam flow was caused by wet garbage being fed into the boiler. The sample train was pulled out of the duct and capped during each of the delay periods.

The initial Method 29 beryllium recoveries did not fall within the requirements of the method. The recoveries were reanalyzed at a two-fold dilution which put them inside the 25% requirement. This is documented in the Element One laboratory report in Appendix H. Beryllium was not detected in any of the samples.

PROJECT OVERVIEW

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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.

As a modification to EPA Method 13B for total fluorides, the samples were analyzed by ion chromatography (IC), per EPA Method 26 requirements. This analytical approach was accepted in an e-mail sent by Gary McAlister of the EPA on September 21, 2010. A copy of the e-mail is presented in Appendix J of this test report.

End of Section 1 – Project Overview

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

2-1

RESULTS

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

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:41	10:15	15:16	
Stop Time (approx.)	09:53	15:00	17:27	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	182.2	180.3	184.0	182.2
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/hr)	6	6	6	6
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.0	9.0	9.4	9.1
CO ₂ Carbon dioxide (dry volume %)	10.1	10.5	10.3	10.3
T _s Sample temperature (°F)	301	301	302	301
B _w Actual water vapor in gas (% by volume)	23.3	23.3	23.3	23.3
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	168,000	161,000	173,000	167,000
Q _{std} Volumetric flow rate, dry standard (dscfm)	86,900	83,600	89,700	86,800
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	67.81	65.48	70.63	67.97
%I Isokinetic sampling (%)	100.5	100.9	101.5	101.0
Particulate Laboratory Data				
m _n Total FPM (g)	0.00300	0.00280	0.00220	
FPM Results				
C _{sd} Particulate Concentration (mg/dscm)	1.6	1.5	1.1	1.4
C _{sd7} Particulate Concentration @7% O ₂ (mg/dscm)	1.8	1.8	1.3	1.6
Mercury Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	2.1553	1.8062	2.0364	
Mercury Results - Total				
C _{sd} Concentration (mg/dscm)	0.0011	0.00097	0.0010	0.0010
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.0013	0.0011	0.0012	0.0012
Beryllium Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.0500	<0.0500	<0.0500	
Beryllium Results - Total				
C _{sd} Concentration (mg/dscm)	<0.000026	<0.000027	<0.000025	<0.000026
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<0.000030	<0.000031	<0.000030	<0.000031
Cadmium Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2000	0.3149	
Cadmium Results - Total				
C _{sd} Concentration (mg/dscm)	<0.00010	<0.00011	0.00016	<0.00012
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<0.00012	<0.00013	0.00019	<0.00015
Lead Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	1.2360	0.2977	0.5696	
Lead Results - Total				
C _{sd} Concentration (mg/dscm)	0.00064	0.00016	0.00028	0.00036
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.00075	0.00019	0.00035	0.00043

RESULTS

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**Table 2-2:
Unit 1 FF Outlet - Fluorides**

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	12:03	13:33	15:02	
Stop Time (approx.)	13:12	14:44	16:11	
Process Conditions				
R _p Production rate(Klbs/hour)	182.6	181.2	184.0	182.6
P ₁ Fabric Filter Inlet Temperature (°F)	315	316	315	315
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.6	9.5	9.3	9.5
CO ₂ Carbon dioxide (dry volume %)	10.0	10.1	10.3	10.2
T _s Sample temperature (°F)	297	300	300	299
B _w Actual water vapor in gas (% by volume)	22.8	22.9	22.9	22.9
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	177,613	177,548	173,811	176,324
Q _{std} Volumetric flow rate, dry standard (dscfm)	93,061	92,543	90,580	92,061
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	37.97	37.86	36.96	37.59
%I Isokinetic sampling (%)	102.1	102.4	102.1	102.2
Laboratory Data				
m _n Total HF collected (mg)	<0.04321	<0.04256	<0.04083	
Hydrogen Fluoride (HF) Results				
C _{sd} HF Concentration (ppmdv)	<0.048	<0.048	<0.047	<0.048
C _{sd7} HF Concentration @7% O ₂ (ppmdv)	<0.060	<0.058	<0.056	<0.058
C _{sd} HF Concentration (mg/dscm)	<0.040	<0.040	<0.039	<0.040
C _{sd7} HF Concentration @7% O ₂ (mg/dscm)	<0.049	<0.049	<0.047	<0.048
E _{lb/hr} HF Rate (lb/hr)	<0.014	<0.014	<0.013	<0.014
E _{Fd} HF Rate - Fd-based (lb/MMBtu)	<0.000045	<0.000044	<0.000043	<0.000044

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

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Table 2-3:
Unit 1 FF Outlet and SDA Inlet - Hydrogen Chloride

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:48	09:11	10:35	
Stop Time (approx.)	08:48	10:11	11:35	
Process Conditions				
R _P Production Rate (Klbs/hour)	185.4	182.8	185.2	184.5
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
SDA Inlet Gas Conditions				
O ₂ Oxygen (dry volume %)	8.4	8.5	7.9	8.3
CO ₂ Carbon dioxide (dry volume %)	10.9	10.9	11.4	11.1
T _s Sample temperature (°F)	485	484	485	485
B _w Actual water vapor in gas (% by volume)	19.0	18.8	19.6	19.1
SDA Inlet Sampling Data				
V _{mstd} Volume metered, standard (dscf)	35.28	35.29	35.43	35.33
SDA Inlet Laboratory Data				
m _n Total HCl collected (mg)	667.683	648.844	597.602	
SDA Inlet Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (ppmdv)	441	429	393	421
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	490	480	421	464
FF Outlet Gas Conditions				
O ₂ Oxygen (dry volume %)	9.5	9.8	8.8	9.4
CO ₂ Carbon dioxide (dry volume %)	10.1	9.8	10.6	10.1
T _s Sample temperature (°F)	301	304	302	302
B _w Actual water vapor in gas (% by volume)	22.7	22.2	23.4	22.8
FF Outlet Sampling Data				
V _{mstd} Volume metered, standard (dscf)	40.58	40.36	40.18	40.37
FF Outlet Laboratory Data				
m _n Total HCl collected (mg)	15.502	14.986	13.066	
FF Outlet Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (ppmdv)	8.9	8.7	7.6	8.4
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	11	11	8.7	10
RE Reduction Efficiency (% Removal)	97.8%	97.7%	97.9%	97.8%

RESULTS

Table 2-4:
Unit 2 FF Outlet – Particulate, Mercury and Metals

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:31	09:59	12:29	
Stop Time (approx.)	09:42	12:10	14:41	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	185.2	184.2	183.2	184.2
P ₁ Fabric Filter Inlet Temperature (°F)	314	315	315	315
P ₂ Carbon Injection Rate (lb/hr)	6	6	6	6
Gas Conditions				
O ₂ Oxygen (dry volume %)	8.0	8.5	8.5	8.3
CO ₂ Carbon dioxide (dry volume %)	11.3	10.8	11.0	11.0
T _s Sample temperature (°F)	300	300	300	300
B _w Actual water vapor in gas (% by volume)	23.04	22.87	22.80	22.90
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,000	154,000	161,000	156,000
Q _{std} Volumetric flow rate, dry standard (dscfm)	79,800	80,900	84,400	81,700
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	61.66	63.23	66.80	63.89
%I Isokinetic sampling (%)	99.6	100.8	102.0	100.8
Particulate Laboratory Data				
m _n Total FPM (g)	0.00120	0.00320	0.00210	
FPM Results				
C _{sd} Particulate Concentration (mg/dscm)	0.69	1.8	1.1	1.2
C _{sd7} Particulate Concentration @7% O ₂ (mg/dscm)	0.74	2.0	1.2	1.3
Mercury Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	1.6143	1.5609	3.0872	
Mercury Results - Total				
C _{sd} Concentration (mg/dscm)	0.00092	0.00087	0.0016	0.0011
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.0010	0.0010	0.0018	0.0013
Beryllium Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.0500	<0.0500	<0.0500	
Beryllium Results - Total				
C _{sd} Concentration (mg/dscm)	<0.000029	<0.000028	<0.000026	<0.000028
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<0.000031	<0.000031	<0.000030	<0.000031
Cadmium Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	0.3306	0.3264	0.4915	
Cadmium Results - Total				
C _{sd} Concentration (mg/dscm)	0.00019	0.00018	0.00026	0.00021
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.00020	0.00020	0.00029	0.00023
Lead Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	2.0036	2.0300	2.0770	
Lead Results - Total				
C _{sd} Concentration (mg/dscm)	0.0011	0.0011	0.0011	0.0011
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.0012	0.0013	0.0012	0.0012

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RESULTS

Table 2-5:
Unit 2 FF Outlet - Fluorides

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	13:21	14:49	16:11	
Stop Time (approx.)	14:30	15:57	17:23	
Process Conditions				
R _P Production rate(Klbs/hour)	175.8	188.0	182.4	182.1
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
Gas Conditions				
O ₂ Oxygen (dry volume %)	8.8	7.9	8.8	8.5
CO ₂ Carbon dioxide (dry volume %)	10.7	11.7	10.9	11.1
T _s Sample temperature (°F)	301	299	299	300
B _w Actual water vapor in gas (% by volume)	23.3	23.1	24.1	23.5
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	168,795	151,842	163,572	161,403
Q _{std} Volumetric flow rate, dry standard (dscfm)	87,853	79,346	84,398	83,866
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	36.43	32.95	35.49	34.96
%I Isokinetic sampling (%)	103.8	103.9	105.2	104.3
Laboratory Data				
m _n Total HF collected (mg)	<0.03811	<0.03959	<0.04093	
Hydrogen Fluoride (HF) Results				
C _{sd} HF Concentration (ppmdv)	<0.044	<0.051	<0.049	<0.048
C _{sd7} HF Concentration @7% O ₂ (ppmdv)	<0.051	<0.055	<0.056	<0.054
C _{sd} HF Concentration (mg/dscm)	<0.037	<0.042	<0.041	<0.040
C _{sd7} HF Concentration @7% O ₂ (mg/dscm)	<0.043	<0.045	<0.047	<0.045
E _{lb/hr} HF Rate (lb/hr)	<0.012	<0.013	<0.013	<0.013
E _{Fd} HF Rate - Fd-based (lb/MMBtu)	<0.000039	<0.000042	<0.000043	<0.000041

RESULTS

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Table 2-6:
Unit 2 FF Outlet and SDA Inlet – Hydrogen Chloride

Run No.	1	2	3	4	Average
Date (2011)	Mar 29	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:50	09:23	10:39	11:54	
Stop Time (approx.)	08:50	10:23	11:39	12:54	
Process Conditions					
R _p Production Rate (Klbs/hour)	171.1	175.8	182.8	183.1	180.6
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	316	315
SDA Inlet Gas Conditions					
O ₂ Oxygen (dry volume %)	8.5	8.1	8.3	7.9	8.1
CO ₂ Carbon dioxide (dry volume %)	10.9	11.3	11.1	11.6	11.3
T _s Sample temperature (°F)	478	481	476	478	478
B _w Actual water vapor in gas (% by volume)	18.3	19.7	18.6	19.5	19.2
SDA Inlet Sampling Data					
V _{mstd} Volume metered, standard (dscf)	35.02	34.97	35.36	35.46	35.26
SDA Inlet Laboratory Data					
m _n Total HCl collected (mg)		588.638	714.315	792.624	
SDA Inlet Hydrogen Chloride (HCl) Results					
C _{sd} HCl Concentration (ppmdv)		392	471	521	462
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)		426	520	555	501
O ₂ Oxygen (dry volume %)	9.6	9.4	9.1	8.7	9.0
CO ₂ Carbon dioxide (dry volume %)	9.9	10.1	10.4	10.9	10.4
T _s Sample temperature (°F)	300	300	300	301	300
B _w Actual water vapor in gas (% by volume)	21.5	22.5	22.1	22.9	22.5
FF Outlet Sampling Data					
V _{mstd} Volume metered, standard (dscf)	41.20	40.70	40.37	40.29	40.45
FF Outlet Laboratory Data					
m _n Total HCl collected (mg)		4.588	6.181	5.114	
FF Outlet Hydrogen Chloride (HCl) Results					
C _{sd} HCl Concentration (ppmdv)		2.6	3.6	3.0	3.1
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)		3.2	4.2	3.4	3.6
RE Reduction Efficiency (% Removal)		99.3%	99.2%	99.4%	99.3%

Run 1 was not valid due to low steam flow.

WHEELABRATOR SOUTH BROWARD, INC.
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RESULTS

Table 2-7:
Unit 3 FF Outlet – Particulate, Mercury and Metals

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:31	10:05	12:43	
Stop Time (approx.)	09:43	12:19	14:55	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	184.0	183.4	184.0	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/hr)	6	6	6	6
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.3	9.2	8.9	9.1
CO ₂ Carbon dioxide (dry volume %)	10.1	10.2	10.7	10.3
T _s Sample temperature (°F)	297	296	297	297
B _w Actual water vapor in gas (% by volume)	23.0	22.7	22.8	22.8
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	153,000	155,000	159,000	156,000
Q _{std} Volumetric flow rate, dry standard (dscfm)	81,000	82,400	84,000	82,500
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	63.37	64.09	64.59	64.02
%I Isokinetic sampling (%)	100.8	100.2	99.0	100.0
Particulate Laboratory Data				
m _n Total FPM (g)	0.00240	0.00170	0.00350	
FPM Results				
C _{sd} Particulate Concentration (mg/dscm)	1.3	0.9	1.9	1.4
C _{sd7} Particulate Concentration @7% O ₂ (mg/dscm)	1.6	1.1	2.2	1.6
Mercury Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	2.3159	2.6142	2.5786	
Mercury Results - Total				
C _{sd} Concentration (mg/dscm)	0.0013	0.0014	0.0014	0.0014
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.0015	0.0017	0.0016	0.0016
Beryllium Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.0500	<0.0500	<0.0500	
Beryllium Results - Total				
C _{sd} Concentration (mg/dscm)	<0.000028	<0.000028	<0.000027	<0.000028
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<0.000033	<0.000033	<0.000032	<0.000033
Cadmium Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2000	<0.2000	
Cadmium Results - Total				
C _{sd} Concentration (mg/dscm)	<0.00011	<0.00011	<0.00011	<0.00011
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<0.00013	<0.00013	<0.00013	<0.00013
Lead Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	0.4387	0.4188	0.1294	
Lead Results - Total				
C _{sd} Concentration (mg/dscm)	0.00024	0.00023	0.000071	0.00018
C _{sd7} Concentration @7% O ₂ (mg/dscm)	0.00029	0.00027	0.000082	0.00022

RESULTS

Table 2-8:
Unit 3 FF Outlet – Fluorides

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	11:40	13:04	14:26	
Stop Time (approx.)	12:47	14:12	15:30	
Process Conditions				
R _P Production rate(Klbs/hour)	183.7	178.7	185.5	182.6
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
Gas Conditions				
O ₂ Oxygen (dry volume %)	8.0	9.2	8.3	8.5
CO ₂ Carbon dioxide (dry volume %)	11.4	10.4	11.3	11.0
T _s Sample temperature (°F)	297	297	298	297
B _w Actual water vapor in gas (% by volume)	23.9	23.4	24.2	23.8
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,902	171,013	158,120	160,679
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,364	89,857	82,508	84,243
Sampling Data				
V _{msld} Volume metered, standard (dscf)	33.13	37.42	34.41	34.99
%I Isokinetic sampling (%)	103.2	104.2	104.4	103.9
Laboratory Data				
m _n Total HF collected (mg)	<0.03885	<0.04004	<0.04108	
Hydrogen Fluoride (HF) Results				
C _{sd} HF Concentration (ppmdv)	<0.050	<0.045	<0.051	<0.049
C _{sd7} HF Concentration @7% O ₂ (ppmdv)	<0.054	<0.054	<0.056	<0.055
C _{sd} HF Concentration (mg/dscm)	<0.041	<0.038	<0.042	<0.040
C _{sd7} HF Concentration @7% O ₂ (mg/dscm)	<0.045	<0.045	<0.046	<0.045
E _{lb/hr} HF Rate (lb/hr)	<0.012	<0.013	<0.013	<0.013
E _{Fd} HF Rate - Fd-based (lb/MMBtu)	<0.000041	<0.000041	<0.000043	<0.000041

RESULTS**Table 2-9:
Unit 3 FF Outlet – PCDDs/PCDFs**

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 29	Mar 29	
Start Time (approx.)	10:05	07:41	12:38	
Stop Time (approx.)	14:25	11:59	16:59	
Process Conditions				
R _P Production Rate (Klbs/hour)	184	182	182	183
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/hr)	6	6	6	6
Gas Conditions				
O ₂ Oxygen (dry volume %)	9.0	9.1	9.0	9.0
CO ₂ Carbon dioxide (dry volume %)	10.5	10.3	10.6	10.5
T _s Sample temperature (°F)	297	295	296	296
B _w Actual water vapor in gas (% by volume)	22.5	23.1	23.8	23.1
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	168,907	175,303	176,406	173,539
Q _{std} Volumetric flow rate, dry standard (dscfm)	89,718	92,797	92,049	91,521
Sampling Data				
V _{std} Volume metered, standard (dscf)	144.67	145.55	148.18	146.13
%I Isokinetic sampling (%)	103.1	100.3	102.9	102.1
Results (ND and EMPC = 0)				
Laboratory Data from USEPA Method 23				
m _n Total PCDDs & PCDFs (ng)	1.0900	0.8160	1.1500	
m _{n,TEQ} Total TEQ PCDDs & PCDFs (ng)	0.0072	0.0062	0.0092	
Total PCDD/F Results (TEF=1)				
C _{sd} PCDD/F Concentration (ng/dscm)	0.27	0.20	0.27	0.25
C _{sd7} PCDD/F Concentration @7% O ₂ (ng/dscm)	0.31	0.23	0.32	0.29
E _{lb/hr} PCDD/F Rate (lb/hr)	8.9E-08	6.9E-08	9.5E-08	8.4E-08
E _{Fd} PCDD/F Rate - F _d -based (lb/MMBtu)	2.8E-10	2.1E-10	2.9E-10	2.6E-10
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)				
C _{sdTEQ} TEQ Concentration (ng/dscm)	0.0018	0.0015	0.0022	0.0018
C _{sd7TEQ} TEQ Concentration @7% O ₂ (ng/dscm)	0.0020	0.0018	0.0026	0.0021
E _{lb/hrTEQ} TEQ Rate (lb/hr)	5.9E-10	5.2E-10	7.6E-10	6.2E-10
E _{FdTEQ} TEQ Rate - F _d -based (lb/MMBtu)	1.9E-12	1.6E-12	2.3E-12	1.9E-12
Results (ND and EMPC = actual value)				
Laboratory Data from USEPA Method 23, including NDs and EMPCs				
m _n Total PCDDs & PCDFs (ng)	1.1500	0.8550	1.1800	
m _{n,TEQ} Total TEQ PCDDs & PCDFs (ng)	0.0110	0.0088	0.0103	
Total PCDD/F Results (TEF=1)				
C _{sd} PCDD/F Concentration (ng/dscm)	0.28	0.21	0.28	0.26
C _{sd7} PCDD/F Concentration @7% O ₂ (ng/dscm)	0.33	0.24	0.33	0.30
E _{lb/hr} PCDD/F Rate (lb/hr)	9.4E-08	7.2E-08	9.7E-08	8.8E-08
E _{Fd} PCDD/F Rate - F _d -based (lb/MMBtu)	3.0E-10	2.2E-10	3.0E-10	2.7E-10
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)				
C _{sdTEQ} TEQ Concentration (ng/dscm)	0.0027	0.0021	0.0025	0.0024
C _{sd7TEQ} TEQ Concentration @7% O ₂ (ng/dscm)	0.0031	0.0025	0.0029	0.0028
E _{lb/hrTEQ} TEQ Rate (lb/hr)	9.0E-10	7.4E-10	8.5E-10	8.3E-10
E _{FdTEQ} TEQ Rate - F _d -based (lb/MMBtu)	2.9E-12	2.3E-12	2.6E-12	2.6E-12

RESULTS

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

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:47	09:06	10:22	
Stop Time (approx.)	08:47	10:06	11:22	
Process Conditions				
R _P Production Rate (Klbs/hour)	184.3	184.0	184.2	184.2
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
SDA Inlet Gas Conditions				
O ₂ Oxygen (dry volume %)	8.0	8.0	7.0	7.7
CO ₂ Carbon dioxide (dry volume %)	11.5	11.6	12.5	11.9
T _s Sample temperature (°F)	475	469	469	471
B _w Actual water vapor in gas (% by volume)	20.4	20.1	20.9	20.5
SDA Inlet Sampling Data				
V _{mstd} Volume metered, standard (dscf)	35.92	35.82	35.16	35.63
SDA Inlet Laboratory Data				
m _n Total HCl collected (mg)	622.164	645.352	729.942	
SDA Inlet Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (ppmdv)	404	420	484	436
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	435	453	483	457
Ff Outlet Gas Conditions				
O ₂ Oxygen (dry volume %)	8.3	7.6	7.7	7.9
CO ₂ Carbon dioxide (dry volume %)	11.1	11.2	11.8	11.4
T _s Sample temperature (°F)	299	300	298	299
B _w Actual water vapor in gas (% by volume)	24.2	24.2	24.2	24.2
FF Outlet Sampling Data				
V _{mstd} Volume metered, standard (dscf)	40.75	40.55	40.37	40.56
FF Outlet Laboratory Data				
m _n Total HCl collected (mg)	18.457	11.723	9.968	
FF Outlet Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (ppmdv)	11	6.7	5.8	7.7
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	12	7.0	6.1	8.3
RE Reduction Efficiency (% Removal)	97.3%	98.4%	98.7%	98.2%

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

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RESULTS

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

Run No.	1	2	3	Average
Unit 1				
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:42	10:18	15:18	
Stop Time (approx.)	09:48	15:00	17:24	
Visible Emissions (%)¹				
Average Opacity	0	0	0	0
Maximum Reading	0	0	0	0
Minimum Reading	0	0	0	0
Unit 2				
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:36	10:00	12:30	
Stop Time (approx.)	09:42	12:06	14:54	
Visible Emissions (%)¹				
Average Opacity	0	0	0	0
Maximum Reading	0	0	1	0
Minimum Reading	0	0	0	0
Unit 3				
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:36	10:06	12:48	
Stop Time (approx.)	09:42	12:18	14:54	
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) and Title V Conditions A.36(6), A.53 and A.54 and coincide with Method 5/29 test runs.

RESULTS

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**Table 2-12:
Ash Handling System – Fugitive Emissions**

<u>Source</u> Constituent	<u>Date</u> (2011)	<u>Start Time</u> (approx.)	<u>Stop Time</u> (approx.)	<u>Observation</u> Duration (minutes)	<u>Accumulated</u> Emission Duration (seconds)	
<u>Ash Unloading / Conveyor</u>						
Visual Opacity (%)	March 30	7:33	8:43	60	0	
<u>Roll up Door to Baghouse</u>						
Visual Opacity (%)	March 30	8:48	9:58	60	0	
<u>Roll up Door to Baghouse</u>						
Visual Opacity (%)	March 30	14:42	15:52	60	0	<u>Permit Limit</u>
				Total (% of observation time) = 0		
				< 5% of observation Time		
				Total (minutes) = 0		
				< 9 minutes		

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

Run No.	1
Date (2011)	Mar 30
Start Time (approx.)	11:50
Stop Time (approx.)	14:05
<u>Process Conditions</u>	
Total lime unloaded (tons)	25.38
Rate of unloading (tons/hr)	11.3
<u>Visible Emissions</u>	
Average (percent opacity)	0
Maximum reading (percent opacity)	0

WHEELABRATOR SOUTH BROWARD, INC.
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RESULTS

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**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	3/29/2011	07:41-09:53	182.2	301	167,669	9.0	10.1	86,930	74,610
1-O-M5/29-2	3/29/2011	10:15-15:00	180.3	301	160,680	9.0	10.5	83,647	71,852
1-O-M5/29-3	3/29/2011	15:16-17:27	184.0	302	172,556	9.4	10.3	89,678	74,000
1-O-M13B-1	3/28/2011	12:03-13:12	182.6	297	177,613	9.6	10.0	93,061	75,587
1-O-M13B-2	3/28/2011	13:33-14:44	181.2	300	177,548	9.5	10.1	92,543	75,632
1-O-M13B-3	3/28/2011	15:02-16:11	184.0	300	173,811	9.3	10.3	90,580	75,657
		Average	182.4	300	171,646	9.3	10.2	89,407	74,556
2-O-M5/29-1	3/30/2011	07:31-09:42	185.2	300	152,381	8.0	11.3	79,793	73,823
2-O-M5/29-2	3/30/2011	09:59-12:10	184.2	300	153,973	8.5	10.8	80,862	72,019
2-O-M5/29-3	3/30/2011	12:29-14:41	183.2	300	160,588	8.5	11.0	84,360	75,499
2-O-M13B-1	3/29/2011	13:21-14:30	175.8	301	168,795	8.8	10.7	87,853	76,224
2-O-M13B-2	3/29/2011	14:49-15:57	188.0	299	151,842	7.9	11.7	79,346	74,151
2-O-M13B-3	3/29/2011	16:11-17:23	182.4	299	163,572	8.8	10.9	84,398	73,651
		Average	183.1	300	158,525	8.4	11.1	82,769	74,228
3-O-M5/29-1	3/28/2011	07:31-9:43	184.0	297	152,807	9.3	10.1	80,977	67,811
3-O-M5/29-2	3/28/2011	10:05-12:19	183.4	296	155,363	9.2	10.2	82,430	69,206
3-O-M5/29-3	3/28/2011	12:43-14:55	184.0	297	159,073	8.9	10.7	84,028	72,784
3-O-M13B-1	3/30/2011	11:40-12:47	183.7	297	152,902	8.0	11.4	80,364	74,582
3-O-M13B-2	3/30/2011	13:04-14:12	178.7	297	171,013	9.2	10.4	89,857	75,765
3-O-M13B-3	3/30/2011	14:26-15:30	185.5	298	158,120	8.3	11.3	82,508	74,851
3-O-M23-1	3/28/2011	10:05-14:25	183.6	297	168,907	9.0	10.5	89,718	77,067
3-O-M23-2	3/29/2011	07:41-11:59	182.2	295	175,303	9.1	10.3	92,797	79,111
3-O-M23-3	3/29/2011	12:38-16:59	182.4	296	176,406	9.0	10.6	92,049	78,871
		Average	183.1	297	163,322	8.9	10.6	86,081	74,450
Facility Average			182.9	299	164,498	8.9	10.6	86,085	74,411

RESULTS

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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	93.7	94.4	97.8	99.5	99.6	95.8	94
Unit 3 FF Outlet-Field Blank	88.1	88.7	94.5	95.6	97.9	93.5	90.2
Unit 3 FF Outlet-Run 1	95.1	93.6	99	98.6	99.1	97.5	96.8
Unit 3 FF Outlet-Run 2	90.2	88.3	98.3	101	103	98.8	97.4
Unit 3 FF Outlet-Run 3	93.8	89.6	98.6	97.1	96.1	97.2	92.7

Average	92	91	98	98	99	97	94
SD	3	3	2	2	3	2	3
Min	88.1	88.3	94.5	95.6	96.1	93.5	90.2
Max	95.1	94.4	99	101	103	98.8	97.4
Within M23 QC	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE

Sample Number	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	95.1	96.6	96	99.3	98.1	98.3	100	98.9	99.7	93.6
Unit 3 FF Outlet-Field Blank	87.4	91.1	91.4	96	94.3	94.6	96.6	95.9	95.8	89.2
Unit 3 FF Outlet-Run 1	94.9	95	95.7	98.7	98.1	97.5	101	97.8	100	96.3
Unit 3 FF Outlet-Run 2	91.3	92.2	92.4	99.4	98.9	98.3	101	101	100	96.3
Unit 3 FF Outlet-Run 3	92.8	93.6	93.2	97.4	96.9	97.3	97.8	98.1	98.2	91.9

Average	92	94	94	98	97	97	99	98	99	93
SD	3	2	2	1	2	2	2	2	2	3
Min	87.4	91.1	91.4	96	94.3	94.6	96.6	95.9	95.8	89.2
Max	95.1	96.6	96	99.4	98.9	98.3	101	101	100	96.3
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	93.5	98.9	91.7	95.7	91
Unit 3 FF Outlet-Field B	93.4	91.8	89.4	94.4	92.5
Unit 3 FF Outlet-Run 1	92.6	96.3	91.9	93.4	92.6
Unit 3 FF Outlet-Run 2	93.1	104	92.1	94.8	92.7
Unit 3 FF Outlet-Run 3	91.7	104	93.1	95.5	92.4

Average	93	99	92	95	92
SD	1	5	1	1	1
Min	91.7	91.8	89.4	93.4	91
Max	93.5	104	93.1	95.7	92.7
Min within M23 QC	TRUE	TRUE	TRUE	TRUE	TRUE

WHEELABRATOR SOUTH BROWARD, INC.
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RESULTS

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

Run Number	RPD RESULTS				
	FH Front Half	BH H ₂ O ₂ /HNO ₄	A Empty Impinger	B KMnO ₄	C HCl
U1 FF Outlet R1	0.8%	6.9%	NA	NA	NA
U1 FF Outlet R2	NA	0.5%	NA	NA	NA
U1 FF Outlet R3	NA	1.5%	NA	NA	NA
U2 FF Outlet R1	NA	4.6%	NA	NA	NA
U2 FF Outlet R2	NA	2.2%	NA	NA	NA
U2 FF Outlet R3	NA	0.7%	1.0%	0.9%	NA
U3 FF Outlet R1	NA	0.8%	NA	NA	NA
U3 FF Outlet R2	NA	2.3%	NA	NA	NA
U3 FF Outlet R3	NA	0.1%	NA	NA	NA
Field Blank	NA	NA	NA	NA	-----
Reagent Blank	NA	NA	NA	NA	NA

Element	U1 FF-O-R2	U2 FF-O-R2	U3 FF-O-R2
	RPD	RPD	RPD
-----	-----	-----	-----
	16423-2	16423-5	16423-8
Beryllium	NA	NA	NA
Cadmium	NA	2.2%	NA
Lead	0.6%	0.5%	1.2%

RESULTS

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

Sample Spike and Recovery						
		FH	BH	A	B	C
		Front		Empty		
Run Number		Half	H ₂ O ₂ /HNO ₄	Impinger	KMnO ₄	HCl
-----	----	-----	-----	-----	-----	-----
U1 FF Outlet R3	#1	113%	118%	89%	79%	93%
	#2	113%	118%	88%	79%	92%
U2 FF Outlet R3	#1	108%	100%	77%	86%	104%
	#2	108%	98%	79%	84%	104%
U3 FF Outlet R3	#1	99%	96%	86%	113%	95%
	#2	99%	97%	87%	113%	93%
			U1 FF-O-R3	U2 FF-O-R3	U3 FF-O-R3	
		Element	Recovery	Recovery	Recovery	
		-----	-----	-----	-----	
			16423-3	16423-6	16423-9	
		Beryllium	65%	66%	69%	
		Beryllium ¹	82%	82%	80%	
		Cadmium	84%	91%	87%	
Second Source Calibration Verification						
Element		.25 ppb	1 ppb	50 ppb	100 ppb	250 ppb
-----		-----	-----	-----	-----	-----
		QC Std 8	QC Std 2	QC Std 5	QC Std 4	QC Std 3
Beryllium		95%	97%	103%	104%	102%
Cadmium			104%	99%	101%	100%
Lead			108%	101%	103%	102%

¹ The initial recovery did not meet method requirements. The recoveries were reanalyzed at a two-fold dilution which met the method requirements.

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

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

Method 29		Total Catch ug	Front Half	H ₂ O ₂ /HNO ₄	Empty Impinger	KMnO ₄	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
			Field Blank Total ug	Reagent Blank Total ug			
	Element		16423-10	13423-11			
	Beryllium		< 0.05	< 0.05			
	Cadmium		< 0.2	< 0.2			
	Lead		0.573	0.678			

Method 23	Method Blank pg	Unit 3 FF Outlet- Field Blank pg
2,3,7,8-TCDD	(1.19)	[0.664]
1,2,3,7,8-PeCDD	(0.926)	(1.19)
1,2,3,4,7,8-HxCDD	(0.975)	(1.03)
1,2,3,6,7,8-HxCDD	(1.03)	(1)
1,2,3,7,8,9-HxCDD	1.96	[1.32]
1,2,3,4,6,7,8-HpCDD	1.38	[1.87]
OCDD	[6.67]	9.46
2,3,7,8-TCDF	(0.885)	(0.96)
1,2,3,7,8-PeCDF	(0.734)	(0.849)
2,3,4,7,8-PeCDF	(0.702)	(0.785)
1,2,3,4,7,8-HxCDF	(0.586)	[1.5]
1,2,3,6,7,8-HxCDF	(0.584)	(0.72)
2,3,4,6,7,8-HxCDF	(0.588)	(0.714)
1,2,3,7,8,9-HxCDF	(0.764)	(0.919)
1,2,3,4,6,7,8-HpCDF	(0.733)	5.06
1,2,3,4,7,8,9-HpCDF	(1.15)	(1.01)
OCDF	(2.55)	8.45
ITEF TEQ (ND=0; EMPC=0)	0.210	0.0685
ITEF TEQ (ND=0; EMPC=EMPC)	0.217	1.03
ITEF TEQ (ND=DL/2; EMPC=0)	1.51	1.52
ITEF TEQ (ND=DL/2; EMPC=EMPC)	1.52	1.82
ITEF TEQ (ND=DL; EMPC=EMPC)	2.82	2.61

RESULTS

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Table 2-19:
Quality Control and Quality Assurance - Miscellaneous

Blanks	Result	
Acetone (g)	<0.0001	
HCl DI H ₂ O (mg/l)	<0.078	
HCl 0.1 N H ₂ SO ₄ (mg/l)	<0.078	
HF DI H ₂ O (mg/l)	<0.047	
Meters - Post Cal	Result	Limit
61-5	-1.1%	≤ ± 5%
61-6	-0.6%	≤ ± 5%
66-4	-1.7%	≤ ± 5%
66-7	-1.1%	≤ ± 5%
66-21	-1.9%	≤ ± 5%
66-24	-1.0%	≤ ± 5%

End of Section 2 – Results

DESCRIPTION OF INSTALLATION**3-1****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 an SDA for acid gas removal, followed by an FF baghouse for the control of particulate emissions and selective non-catalytic reduction for nitrogen oxide (NO_x) control. The control equipment is manufactured by Wheelabrator Air Pollution Control, Inc.

A carbon injection system was recently installed at South Broward for mercury control. All pertinent equipment for the carbon injection system was supplied by Chemco Systems of Monongahela, Pennsylvania, with the carbon rate scales being supplied by Merrick Industries of Lynn Haven, Florida. Each FF baghouse is followed by an induced draft fan that directs the flue gas to a dedicated flue in a common stack.

Figure 3-1 shows a general schematic of the facility. The general sampling locations for the Units 1, 2 and 3 SDA Inlets and FF Outlets are shown in Figure 3-2 on page 3-2.

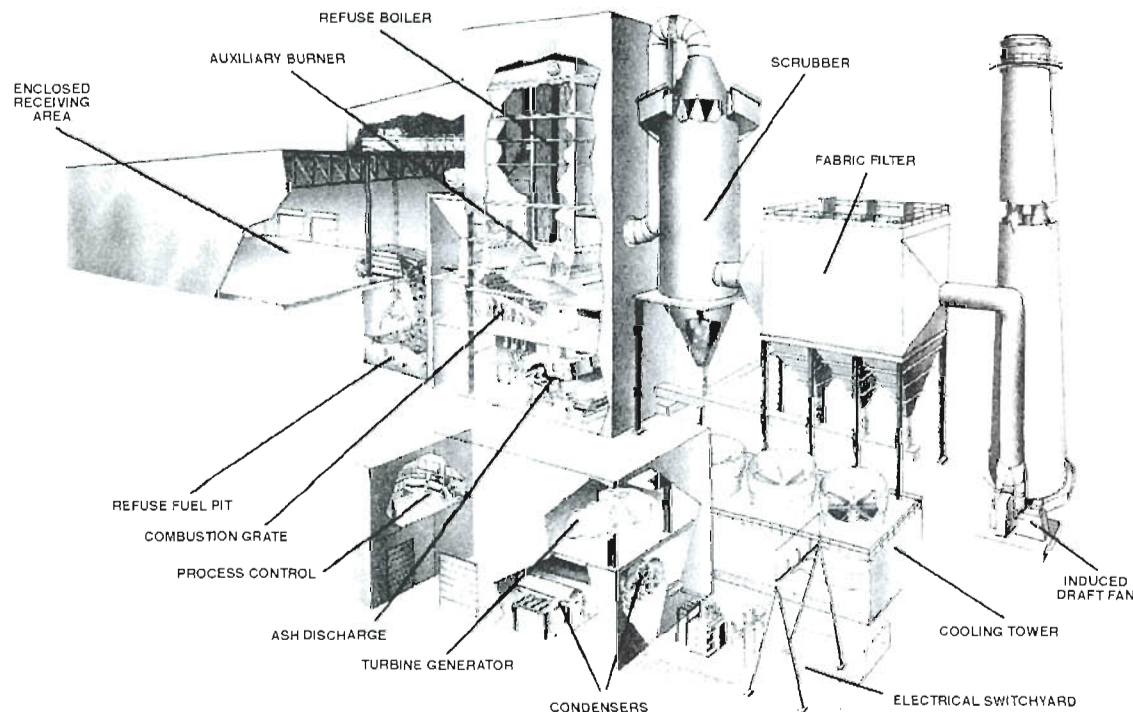


Figure 3-1: General Process Schematic

DESCRIPTION OF INSTALLATION

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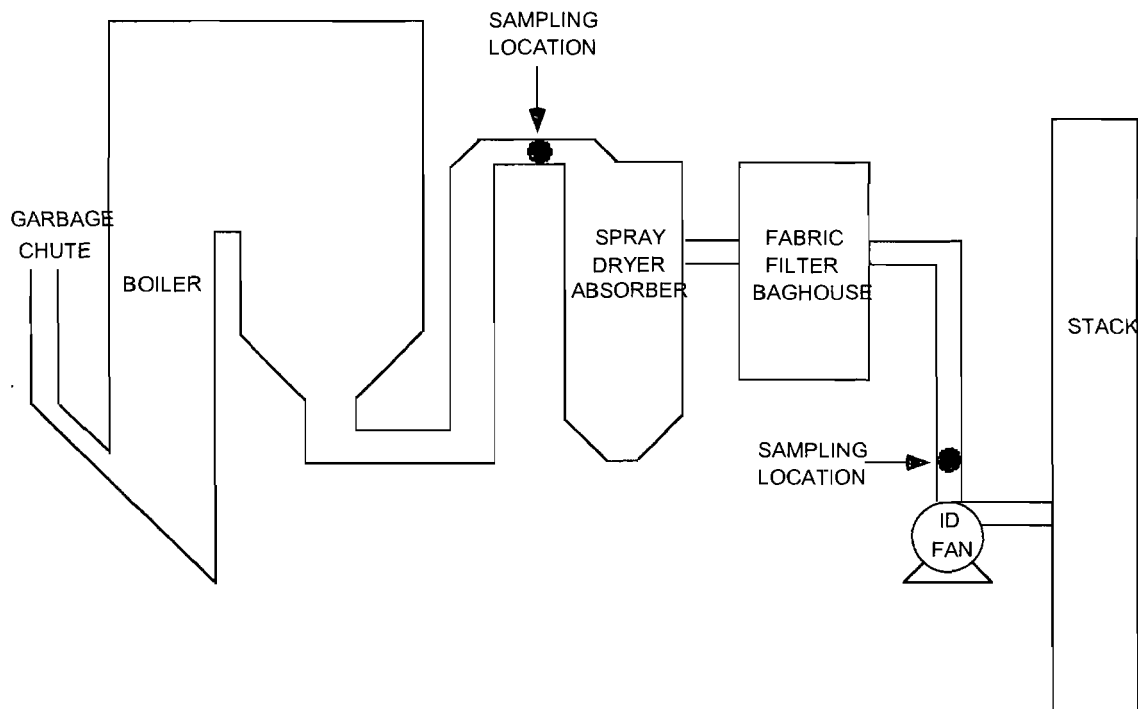


Figure 3-2: Process Schematic

DESCRIPTION OF INSTALLATION

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CleanAir

Table 3-1:
Unit 1 Compliance Test Process Data

PLANT NAME: SOUTH BROWARD 2011						Data from DCS Printouts						Calculated		Lime Feed Rate			Carbon Feed	
						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	CaO Density lb/gal	CaO Flow lbs/hr		
M-26A	1	1	3/28/2011	0748	0848	185.4	314.9	7.0	486.9	35.4	28.1	7.3	20.7	1.089	0.931	410.0	7	All times based on CEMS time
HCI		2	3/28/2011	0911	1011	182.8	315.1	7.1	486.8	35.3	27.4	7.9	22.4	1.084	0.880	416.1	7	
		3	3/28/2011	1035	1135	185.2	314.9	6.9	485.8	34.3	26.1	8.3	24.1	1.081	0.846	418.8	7	
					Avg	184.5	314.9	7.0	486.5	35.0	27.2	7.8	22.4	1.085	0.886	414.9	7	
M-29/5	1	1	03/29/11	0741	0953	182.2	315.1	6.9	487.1	36.0	27.8	8.2	19.2	1.092	0.968	476.3	6	All times based on CEMS time
Metals		2	03/29/11	1015	**	180.3	315.0	6.7	480.0	33.2	23.4	9.8	23.2	1.087	0.904	531.0	6	
PM		3	03/29/11	1516	1727	184.0	315.2	7.0	496.4	38.3	31.0	7.3	17.7	1.094	0.984	430.4	6	
					Avg	182.2	315.1	6.9	487.8	35.8	27.4	8.4	20.0	1.091	0.952	479.2	6	
M-13B	1	1	3/28/2011	1203	1312	182.6	315.0	7.3	493.1	37.6	29.4	8.1	22.7	1.080	0.830	404.9	7	All times based on CEMS time
HF		2	3/28/2011	1333	1444	181.2	316.1	7.4	496.2	39.0	32.7	6.3	22.5	1.078	0.811	304.6	7	
		3	3/28/2011	1502	1611	184.0	315.0	7.2	497.4	38.6	30.4	8.2	23.6	1.075	0.779	380.9	6	
						Avg	182.6	315.4	7.3	495.6	38.4	30.9	7.5	22.9	1.078	0.807	363.5	

** Start 1015, Stop 1102, Restart 1142, Stop 1216, Restart 1410, Stop 1500

DESCRIPTION OF INSTALLATION

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**Table 3-2:
Unit 2 Compliance Test Process Data**

PLANT NAME: SOUTH BROWARD 2011						Data From DCS Printouts						Calculated		Lime Feed Rate			Carbon Feed	Test Run Comments
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	CaO Density lb/gal	CaO Flow lbs/hr	lb/hr	
M-26A HCl	2	1	3/29/2011	0750	0850	171.1	314.8	6.5	473.8	29.9	21.4	8.6	22.4	1.094	0.985	505.3	6	All times based on CEMS time
		2	3/29/2011	0923	1023	175.8	314.9	6.7	476.4	31.2	14.9	16.3	23.6	1.089	0.930	906.8	6	
		3	3/29/2011	1039	1139	182.8	315.3	6.6	471.1	29.0	19.4	9.6	26.0	1.087	0.911	523.6	6	
		4	3/29/2011	1154	1254	183.1	315.6	6.4	472.0	24.5	15.7	8.8	27.1	1.094	0.930	489.4	6	
		Avg				178.2	315.2	6.6	473.3	28.7	17.9	11.5	24.8	1.091	0.939	645.2	6	
M-29/5 Metals PM	2	1	03/30/11	0731	0942	185.2	314.0	6.3	461.1	26.3	15.4	10.9	32.7	1.079	0.825	537.1	6	All times based on CEMS time
		2	03/30/11	0959	1210	184.2	315.0	6.4	464.4	26.4	17.5	8.9	29.3	1.086	0.897	479.0	6	
		3	03/30/11	1229	1455	183.2	315.2	6.6	472.4	28.6	20.2	8.5	22.8	1.095	1.000	508.8	6	
		Avg				184.2	314.7	6.4	466.0	27.1	17.7	9.4	28.3	1.087	0.907	508.3	6	
M-13B HF	2	1	03/29/11	1321	1430	175.8	314.6	6.3	477.8	30.8	22.6	8.2	25.8	1.085	0.885	435.4	6	All times based on CEMS time
		2	03/29/11	1449	1557	188.0	314.7	6.4	465.5	25.4	18.4	6.9	27.8	1.091	0.951	396.0	6	
		3	03/29/11	1611	1723	182.4	315.3	6.5	480.7	31.7	22.5	9.2	20.7	1.095	0.996	552.2	6	
		Avg				182.1	314.9	6.4	474.7	29.3	21.2	8.1	24.8	1.090	0.944	461.2	6	

DESCRIPTION OF INSTALLATION

3-5

CleanAir

**Table 3-3:
Unit 3 Compliance Test Process Data**

PLANT NAME: SOUTH BROWARD 2011						Data From DCS Printouts						Calculated		Lime Feed Rate			Carbon Feed	Test Run Comments
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	CaO Density lb/gal	CaO Flow lbs/hr	lb/hr	
M-26A HCI	3	1	03/30/11	0747	0847	184.3	314.7	5.5	475.0	33.5	25.8	7.8	25.6	1.080	0.832	387.4	6	All times based on CEMS time
		2	03/30/11	0906	1006	184.0	315.0	2.1	467.8	31.0	14.8	16.3	28.2	1.078	0.815	795.1	6	
		3	03/30/11	1022	1122	184.2	315.0	2.1	467.8	30.6	18.9	11.7	26.6	1.085	0.885	620.7	6	
		Avg				184.2	314.9	3.2	470.2	31.7	19.8	11.9	26.8	1.081	0.844	601.1	6	
M-29/5 Metals PM	3	1	3/28/2011	0731	0943	184.0	315.0	2.6	469.6	34.0	21.8	12.2	23.2	1.088	0.916	668.9	6	All times based on CEMS time
		2	3/28/2011	1005	1219	183.4	314.9	3.5	476.0	36.0	26.8	9.1	23.6	1.081	0.845	463.4	6	
		3	3/28/2011	1243	1455	184.0	315.4	3.7	478.0	35.3	23.7	11.7	24.9	1.078	0.814	569.5	6	
		Avg				183.8	315.1	3.3	474.5	35.1	24.1	11.0	23.9	1.082	0.858	567.2	6	
M-23 dioxins	3	1	03/28/11	1005	1425	183.6	315.1	3.4	476.3	35.7	25.5	10.2	24.1	1.080	0.834	509.9	6	All times based on CEMS time
		2	03/29/11	0741	1159	182.2	315.0	4.9	483.7	37.1	26.8	10.4	20.7	1.090	0.939	583.7	6	
		3	03/29/11	1238	1659	182.4	315.0	5.8	484.9	37.7	29.7	8.0	20.8	1.088	0.924	441.3	6	
		Avg				182.7	315.1	4.7	481.6	36.8	27.3	9.5	21.9	1.086	0.899	511.6	6	
M-13B HF	3	1	03/30/11	1140	1247	183.7	315.1	3.0	470.3	32.1	20.5	11.7	23.4	1.092	0.958	669.6	6	All times based on CEMS time
		2	03/30/11	1304	1412	178.7	315.0	4.7	480.9	36.6	30.0	6.6	19.7	1.095	1.001	394.0	6	
		3	03/30/11	1426	1536	185.5	314.8	2.7	484.4	36.7	30.1	6.6	18.9	1.098	1.028	407.7	6	
		Avg				182.6	315.0	3.5	478.6	35.1	26.9	8.3	20.7	1.095	0.996	490.4	6	

DESCRIPTION OF INSTALLATION

3-6

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 and 3-4 (on pages 3-7 and 3-8) 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
<u>Units 1, 2 and 3 SDA Inlets</u>								
Hydrogen Chloride		26A ¹	1-3/4 ³	1	1	60	60	3-3
<u>Units 1, 2 and 3 FF Outlets</u>								
Particulate, Be, Cd, Pb and Hg		5/29 ²	1-3	5	5	5	125	3-4
Hydrogen Chloride		26A ¹	1-3/4 ³	1	1	60	60	NA
Fluorides		13B	1-3	5	5	2.5	62.5	3-4
PCDDs/PCDFs (Unit 3 only)		23	1-3	5	5	10	250	3-4

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 was performed on Unit 2 due to a low load during Run 1.

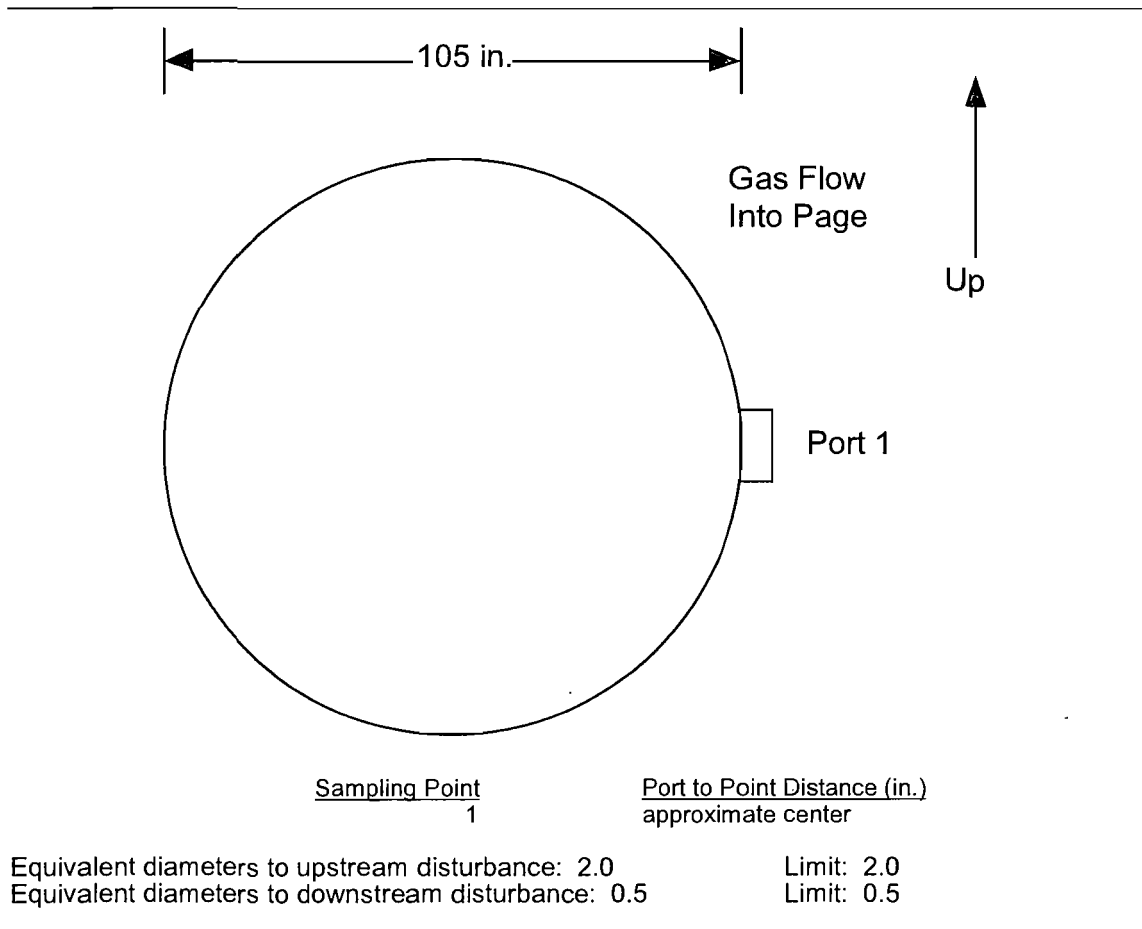
DESCRIPTION OF INSTALLATION**3-7**

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

DESCRIPTION OF INSTALLATION

3-8

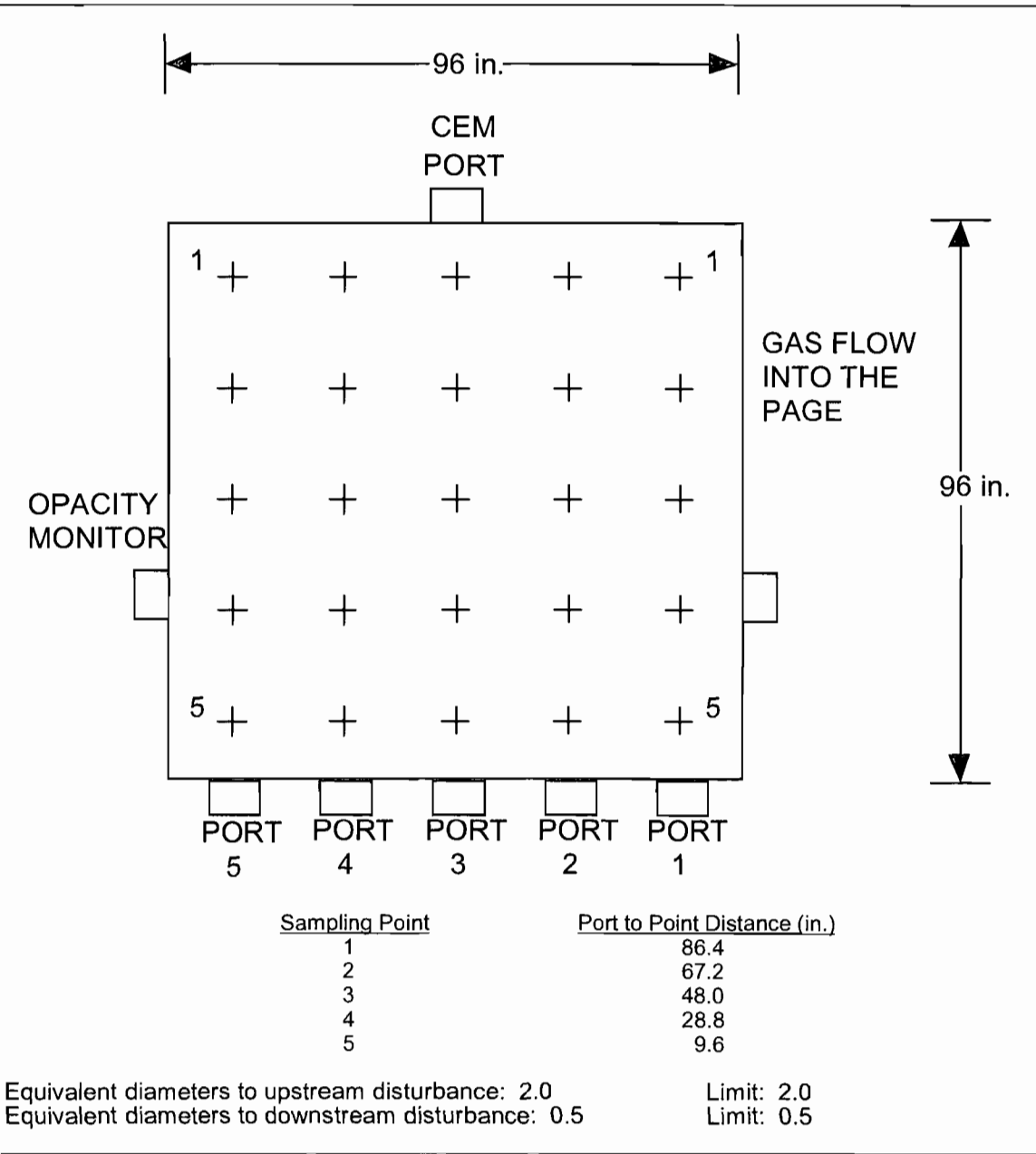


Figure 3-4: FF Outlets - Sampling Point Determination
(Units 1, 2 and 3 are identical)

METHODOLOGY

Clean Air Engineering followed procedures as detailed in EPA Methods 1, 2, 3, 3A, 3B, 4, 5, 9, 13B, 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 13B	"Determination of Total Fluoride Emissions from Stationary Sources (Specific Ion Electrode Method)"
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.

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 E.

End of Section 4 – Methodology

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

APPENDIX

5-1

TEST METHOD SPECIFICATIONS	A
SAMPLE CALCULATIONS	B
PLANT DATA	C
PARAMETERS	D
QA/QC DATA	E
FIELD DATA	F
FIELD DATA PRINTOUTS	G
LABORATORY DATA	H
PERTINENT CERTIFICATIONS.....	I
CORRESPONDENCE AND CLARIFICATIONS	J

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

TEST METHOD SPECIFICATIONS

A

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

QA/QC Initials: WA

Date: 5/9/18



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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

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

0.83

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

Impinger Train Description

Type of Glassware Connections
Connection to Probe or Filter by
Number of Impingers
Impinger Stem Types

Impinger 1
Impinger 2
Impinger 3
Impinger 4
Impinger 5
Impinger 6
Impinger 7
Impinger 8

Standard Method Specification

Ground Glass or Equivalent
Direct Glass Connection
7

Modified Greenburg-Smith
Modified Greenburg-Smith
Greenburg-Smith
Modified Greenburg-Smith
Modified Greenburg-Smith
Modified Greenburg-Smith
Modified Greenburg-Smith

Actual Specification Used

Screw Joint with Silicone Gasket
Direct Glass Connection
7

Modified Greenburg-Smith
Modified Greenburg-Smith
Greenburg-Smith
Modified Greenburg-Smith
Modified Greenburg-Smith
Modified Greenburg-Smith
Modified Greenburg-Smith

Gas Density Determination

Sample Collection
Sample Collection Medium
Sample Analysis

Multi-point integrated
Flexible Gas Bag
Orsat or Fyrite Analyzer

Multi-Point Integrated
Vinyl Bag
CEM

Sample Recovery Information

Probe Brush Material
Probe Rinse Reagent
Probe Rinse Wash Bottle Material
Probe Rinse Storage Container
Filter Recovered?
Filter Storage Container
Impinger Contents Recovered?
Impinger Rinse Reagent
Impinger Wash Bottle
Impinger Storage Container

Non-metallic swab or bristle
Acetone/0.1N Nitric Acid
Glass or Teflon
See Method 29 Recovery Flow Chart
Yes
Petri Dish - Glass or Polystyrene
Yes
See Method 29 Recovery Flow Chart
Glass or Teflon
See Recovery Flow Chart

Teflon Mat
Acetone/0.1N. Nitric Acid
Teflon
See Recovery Flow Chart
Yes
Glass
Yes
See Recovery Flow Chart
Teflon
See Recovery Flow Chart

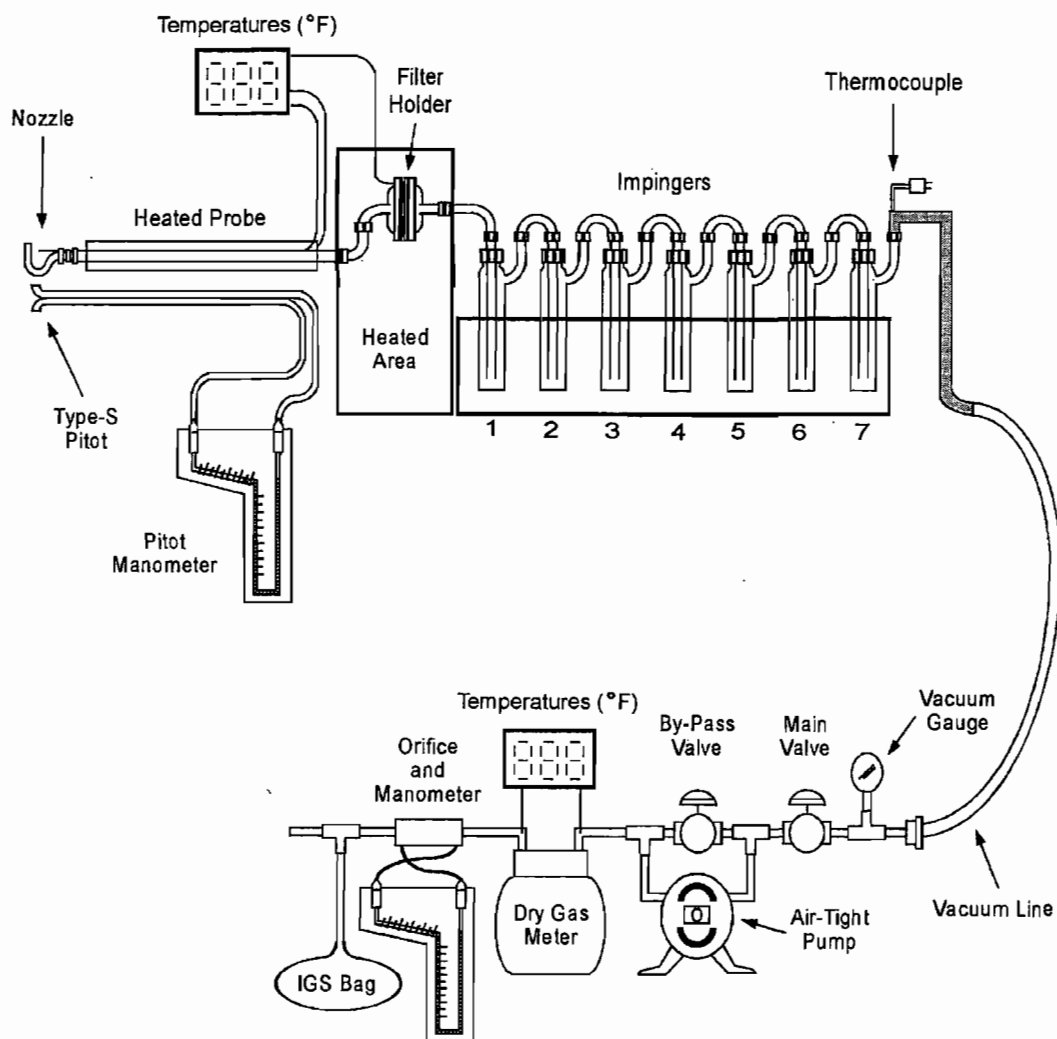
Analytical Information

Method 4 H₂O Determination by
Filter Preparation Conditions
Front-Half Rinse Preparation
Back-Half Analysis
Additional Analysis

Volumetric or Gravimetric
See Method 29 Analytical Flow Chart
See Method 29 Analytical Flow Chart
See Method 29 Analytical Flow Chart
Gravimetric (EPA Method 5)

Gravimetric and Volumetric
For Metals Analysis
See Analytical Flow Chart
See Analytical Flow Chart
Gravimetric (EPA Method 5)

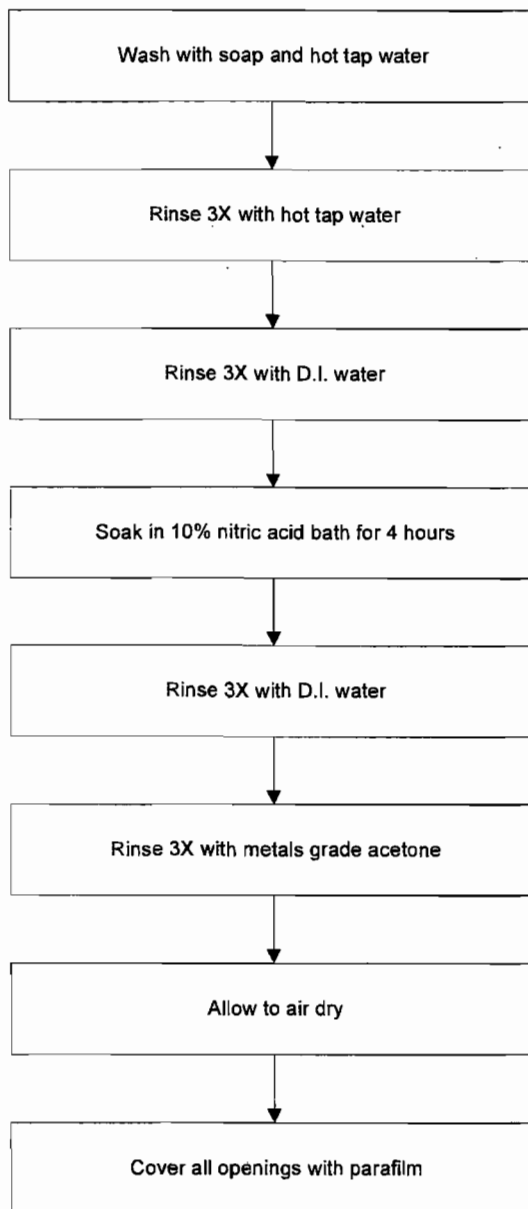
EPA Method 5/29 Sampling Train Configuration



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

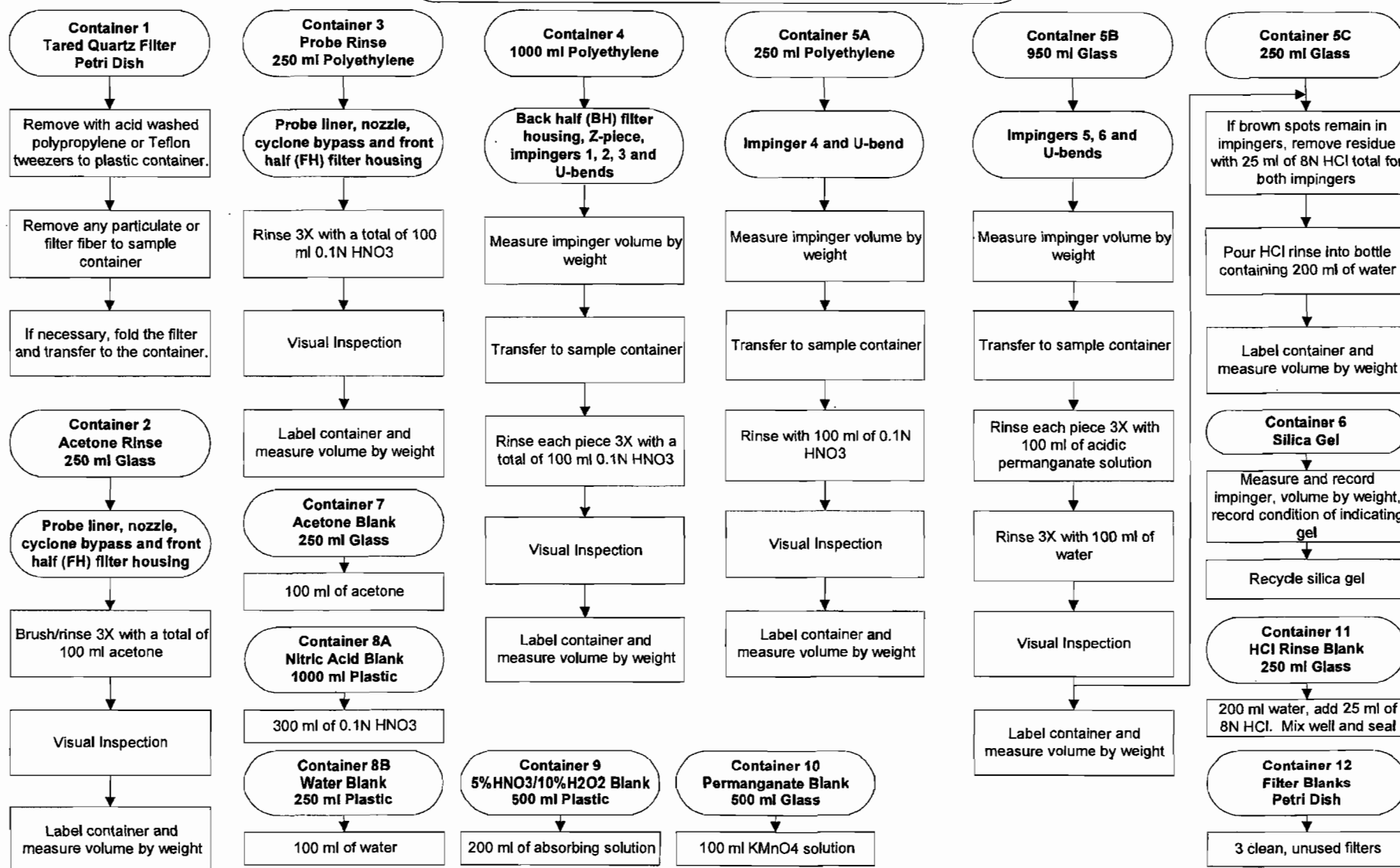
EPA Method 29 Glassware Preparation Procedures



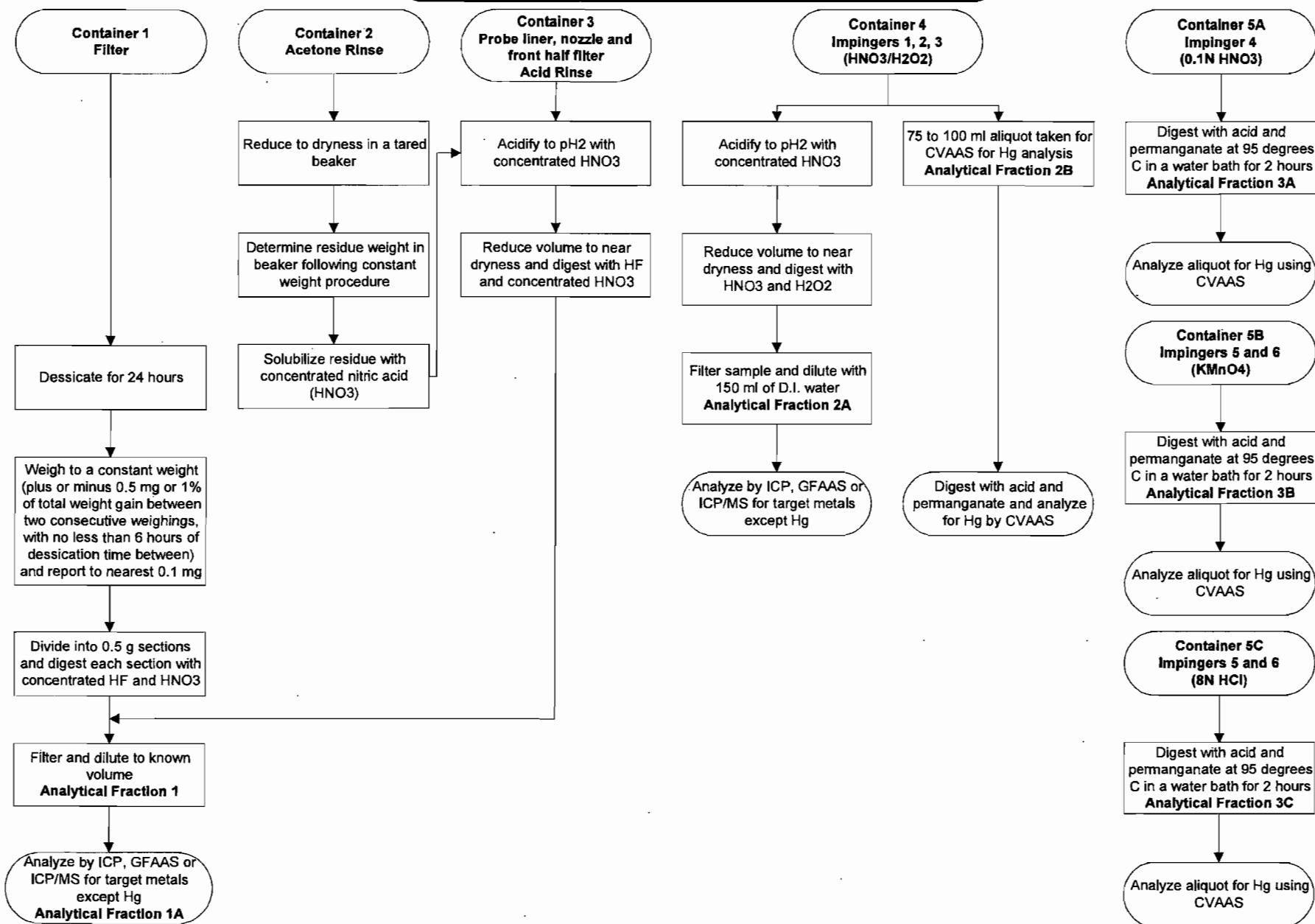
EPA Method 29 Sample Recovery Flowchart (Includes Mercury and Particulate Matter)

- 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

A-7



EPA Method 29
Analytical Flowchart
 (includes Mercury and Particulate Matter)



Specification Sheet for

EPA Method 13B

Source Location Name(s) Units 1 ,2 and 3 FF Outlets
 Pollutant(s) to be Determined Total Fluoride (F)
 Other Parameters to be Determined from Trai Gas Density, Moisture, Flow Rate

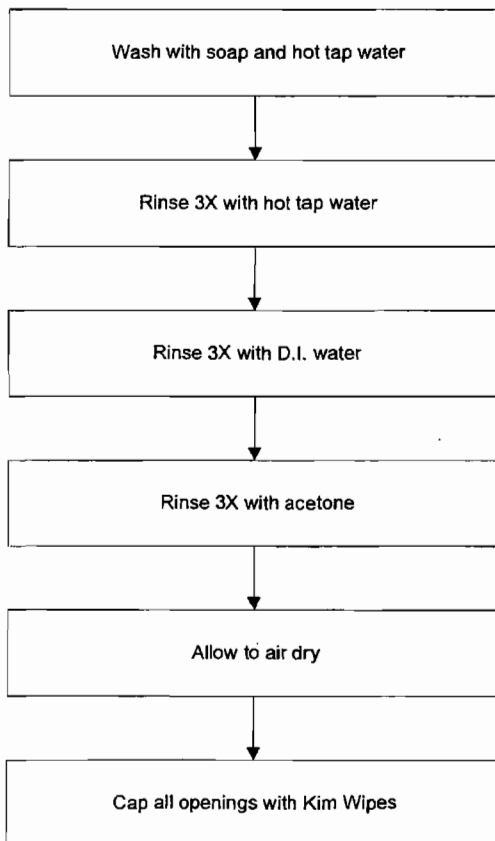
	Standard Method Specification	Actual Specification Used
Pollutant Sampling Information		
Duration of Run	N/A	62.5 minutes
No. of Sample Traverse Points	N/A	25
Sample Time per Point	N/A	2.5 minutes
Sampling Rate	Isokinetic (90-110%) 1 cfm maximum	Isokinetic (90-110%) 1 cfm maximum
Sampling Probe		
Nozzle Material	Stainless Steel or Glass	Borosilicate Glass
Nozzle Design	Button-Hook or Elbow	Button-Hook
Probe Liner Material	Stainless Steel or Glass	Borosilicate Glass
Effective Probe Length	N/A	8 feet
Probe Temperature Set-Point	248°F±25°F (optional)	248°F±25°F
Velocity Measuring Equipment		
Pitot Tube Design	Type S	Type S
Pitot Tube Coefficient	N/A	0.817
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	Exit of Probe or Between 3rd and 4th impingers	Exit of Probe
Filter Holder Material	Borosilicate Glass or Stainless Steel	Borosilicate Glass
Filter Support Material	Stainless Steel if filter at probe exit; Glass Frit if filter after 3rd impinger	Teflon
Cyclone Material	N/A	None
Filter Heater Set-Point	248°F±25°F if after probe, unheated if after 3rd imp.	248°F±25°F
Filter Material	Low F filter with >95% Collection Eff. if after probe, Whatman No. 1 if after 3rd impinger	Teflon Mat
Other Components		
Description	N/A	N/A
Location	N/A	N/A
Operating Temperature	N/A	N/A

Specification Sheet for

EPA Method 13B

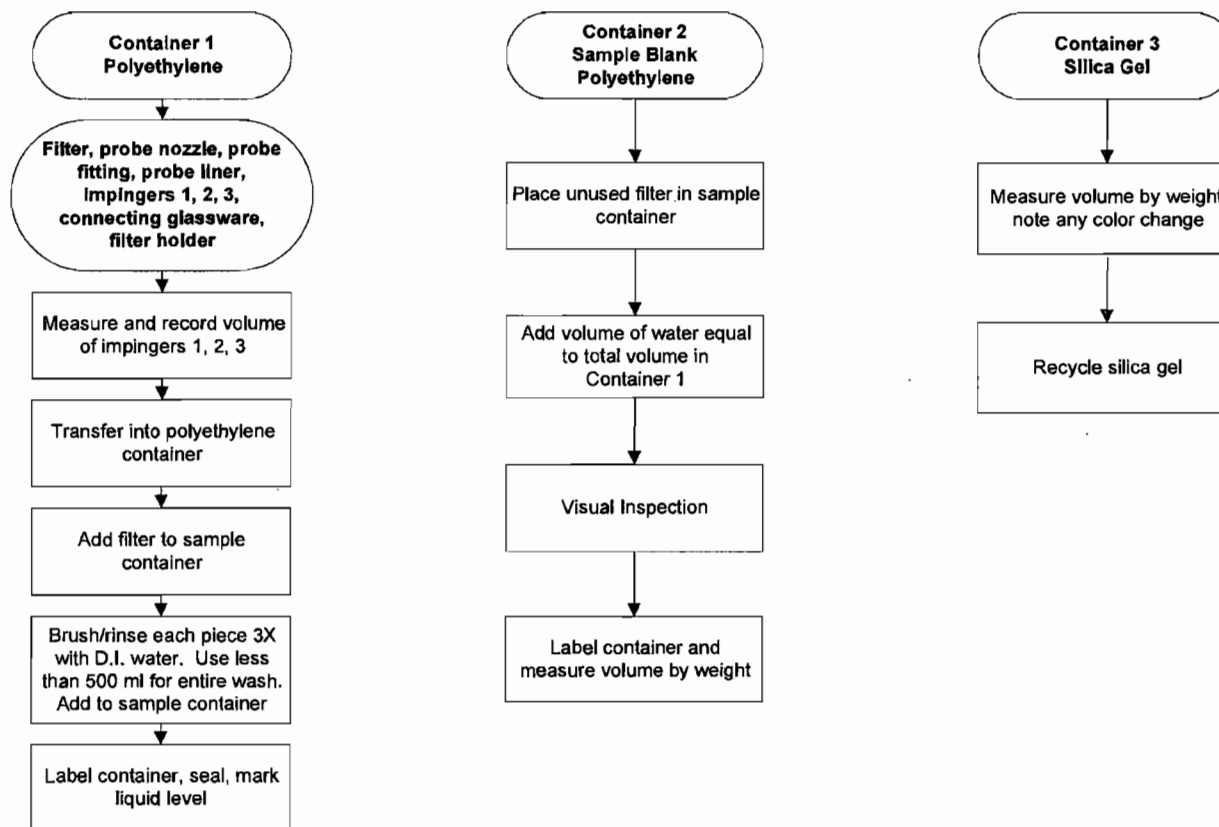
	Standard Method Specification	Actual Specification Used
Impinger Train Description		
Type of Glassware Connections	Ground Glass or Equivalent	Screw Joint with Silicone Gasket
Connection to Probe or Filter by	Direct Glass Connection	Direct Glass Connection
Number of Impingers	4	4
Impinger Stem Types		
Impinger 1	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 2	Greenburg-Smith	Greenburg-Smith
Impinger 3	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 4	Modified Greenburg-Smith	Modified Greenburg-Smith
Impinger 5		
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	Nylon Bristle	Nylon Bristle
Probe Rinse Reagent	Deionized distilled water	Deionized Distilled Water
Probe Rinse Wash Bottle Material	Glass or Polyethylene	Teflon
Probe Rinse Storage Container	Polyethylene	Polyethylene
Filter Recovered?	Yes	Yes
Filter Storage Container	Polyethylene	Polyethylene
Impinger Contents Recovered?	Yes	Yes
Impinger Rinse Reagent	Deionized Distilled Water	Deionized Distilled Water
Impinger Wash Bottle	Glass or Polyethylene	Teflon
Impinger Storage Container	Polyethylene	Polyethylene
Analytical Information		
Method 4 H ₂ O Determination by	Volumetric or Gravimetric	Gravimetric and Volumetric
Filter Preparation Conditions	See analytical flow chart	See Analytical Flow Chart
Front-Half Rinse Preparation	See analytical flow chart	See Analytical Flow Chart
Back-Half Analysis	Ion Specific Electrode	Ion Chromatography
Additional Analysis	N/A	None

EPA Method 13B Glassware Preparation Procedures

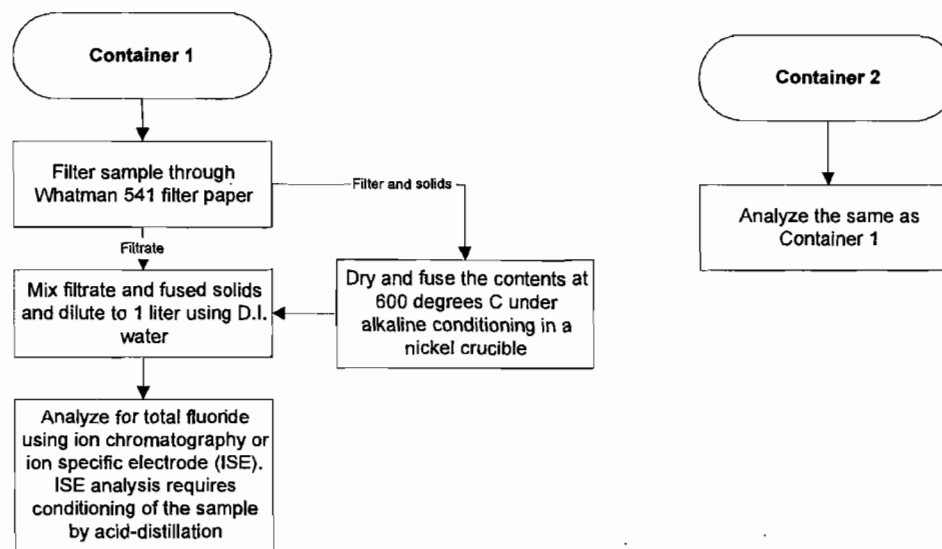


EPA Method 13B Sample Recovery Flowchart

- 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)



EPA Method 13B Analytical Flowchart



Specification Sheet for**EPA Method 23**

Source Location Name(s) Unit 3 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

Pollutant Sampling Information

	Standard Method Specification	Actual Specification Used
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	0.822
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

Impinger Train Description

Type of Glassware Connections
Connection to Probe or Filter by
Number of Impingers
Impinger Stem Types

Impinger 1
Impinger 2
Impinger 3
Impinger 4
Impinger 5
Impinger 6
Impinger 7
Impinger 8

Standard Method Specification

Ground Glass or Equivalent
Direct Glass Connection
5

Modified Greenburg-Smith
Modified Greenburg-Smith
Greenburg-Smith
Modified Greenburg-Smith
Modified Greenburg-Smith

Actual Specification Used

Screw Joint with Silicone Gasket
Direct Glass Connection
5

Shortened Stem (open tip)
Modified Greenburg-Smith
Greenburg-Smith
Modified Greenburg-Smith
Modified Greenburg-Smith

Gas Density Determination

Sample Collection
Sample Collection Medium
Sample Analysis

Multi-point integrated
Flexible Gas Bag
Orsat or Fyrite Analyzer

Multi-Point Integrated
Vinyl Bag
CEM

Sample Recovery Information

Probe Brush Material
Probe Rinse Reagent
Probe Rinse Wash Bottle Material
Probe Rinse Storage Container
Filter Recovered?
Filter Storage Container
Impinger Contents Recovered?
Impinger Rinse Reagent
Impinger Wash Bottle
Impinger Storage Container

Inert Bristle
Acetone/Methylene Chloride/Toluene
Glass or Teflon
Glass
Yes
Petri Dish - Glass or Polystyrene
No
N/A
N/A
N/A

Teflon Mat
Acetone/Toluene (see Appendix J)
Teflon
Glass
Yes
Glass
Archived
HPLC Water
Teflon
Polyethylene

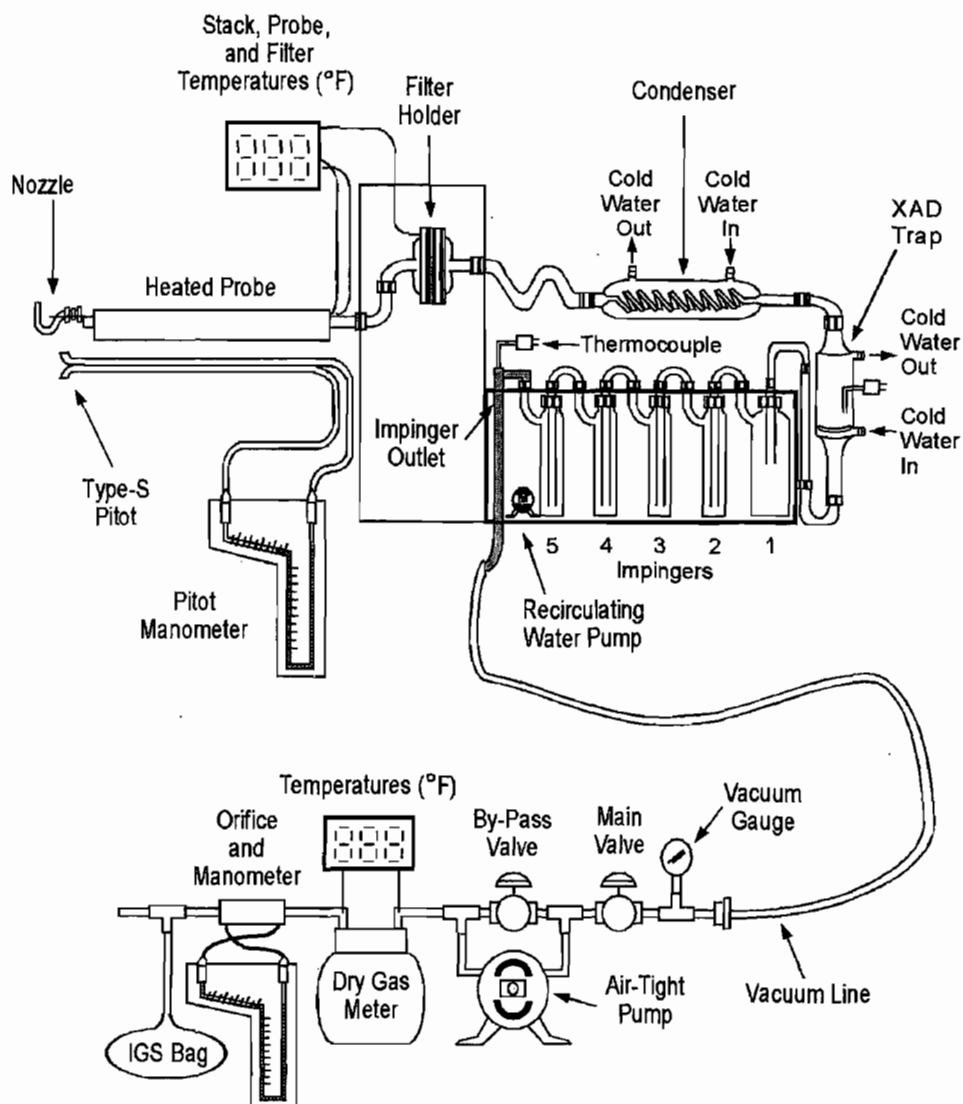
Analytical Information

Method 4 H₂O Determination by
Filter Preparation Conditions
Front-Half Rinse Preparation
Back-Half Analysis
Additional Analysis

Volumetric or Gravimetric
See Method 23 Analytical Flow Chart
See Method 23 Analytical Flow Chart
N/A
None

Gravimetric
For Organic Analysis
Organic Analysis
Archive
None

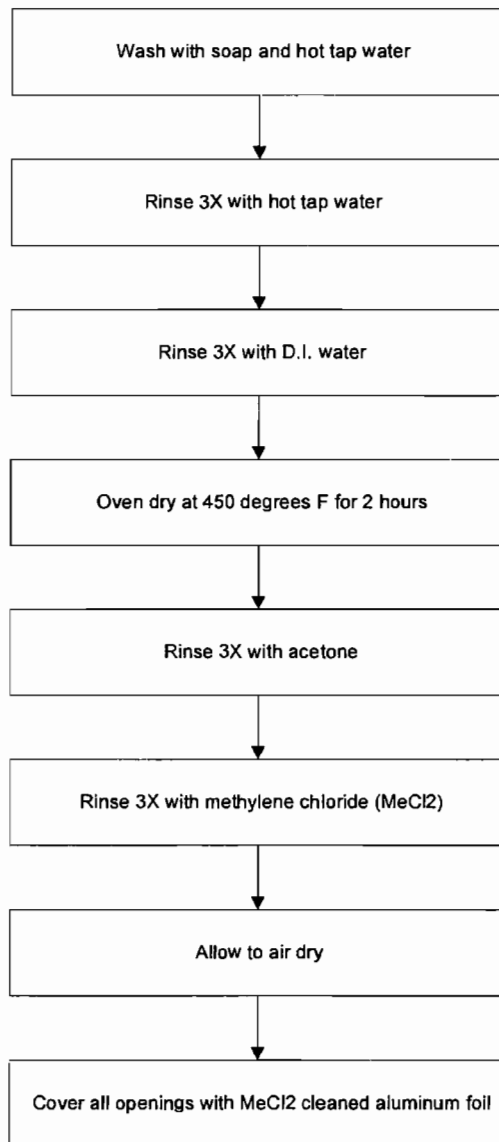
EPA Method 23 Sampling Train Configuration



Impinger Contents

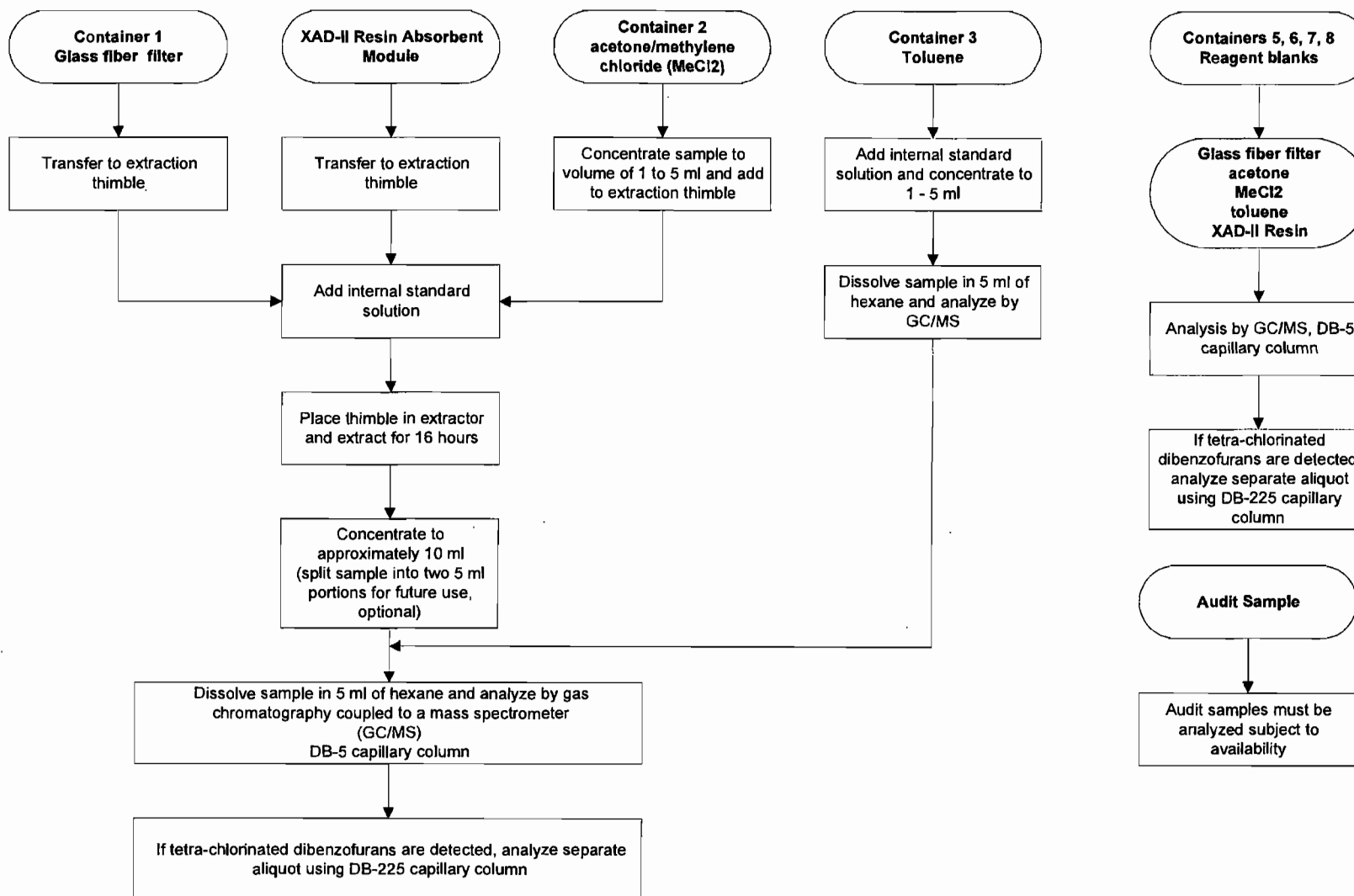
Impinger 1	Empty
Impinger 2	100 ml HPLC H ₂ O
Impinger 3	100 ml HPLC H ₂ O
Impinger 4	Empty
Impinger 5	Silica Gel

EPA Method 23 Glassware Preparation Procedures



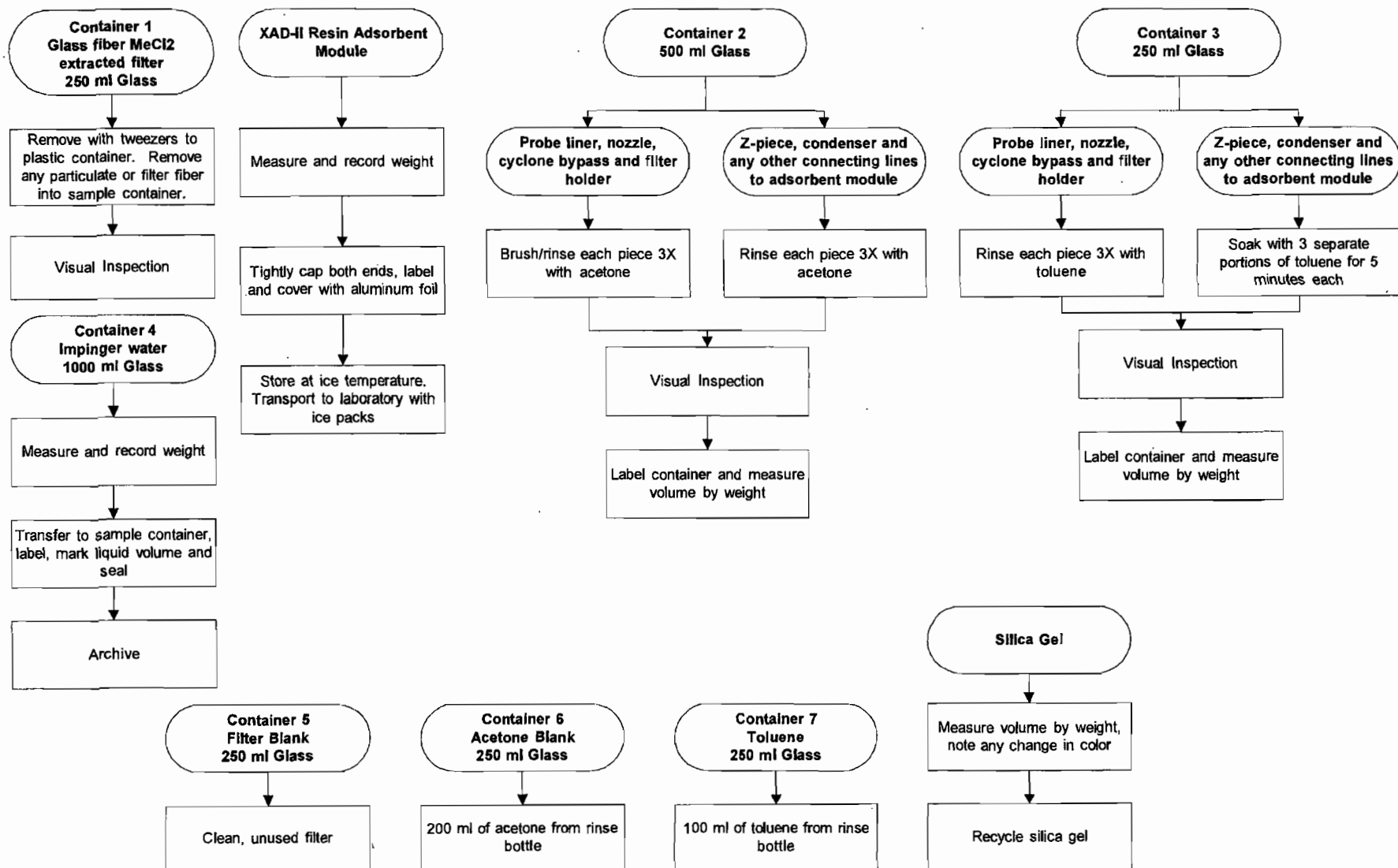
EPA Method 23 Analytical Flowchart

- 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"



EPA Method 23 Sample Recovery Flowchart

- 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)



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

Pollutant Sampling Information

	Standard Method Specification	Actual Specification Used
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 ($\pm 10\%$)	Constant Rate ($\pm 10\%$)

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	$\pm 2\%$	$\pm 1\%$
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)

Impinger Train Description

Type of Glassware Connections

Connection to Probe or Filter by

Number of Impingers

Impinger Stem Types

Impinger 1

Impinger 2

Impinger 3

Impinger 4

Impinger 5

Impinger 6

Impinger 7

Impinger 8

Standard Method Specification

Ground Glass or Equivalent

Direct Glass Connection

5 or 6 (Midget Impingers)

Shortened Stem

Greenburg-Smith

Greenburg-Smith

Modified Greenburg-Smith

Modified Greenburg-Smith

Actual Specification Used

Screw Joint with Silicone Gasket

Direct Glass Connection

5

Shortened Stem (open tip)

Greenburg-Smith

Greenburg-Smith

Modified Greenburg-Smith

Modified Greenburg-Smith

Gas Density Determination

Sample Collection

Sample Collection Medium

Sample Analysis

N/A

N/A

N/A

Single Point Integrated

Vinyl Bag

CEM

Sample Recovery Information

Probe Brush Material

Probe Rinse Reagent

Probe Rinse Wash Bottle Material

Probe Rinse Storage Container

Filter Recovered?

Filter Storage Container

Impinger Contents Recovered?

Impinger Rinse Reagent

Impinger Wash Bottle

Impinger Storage Container

N/A

N/A

N/A

N/A

No

N/A

Yes

Deionized Distilled Water

Polyethylene or glass

Polyethylene

N/A

N/A

N/A

N/A

No

N/A

Yes

Deionized Distilled Water

Polyethylene

Polyethylene

Analytical Information

Method 4 H₂O Determination by

Filter Preparation Conditions

Front-Half Rinse Preparation

Back-Half Analysis

Additional Analysis

N/A

N/A

N/A

Ion Chromatography

None

Gravimetric

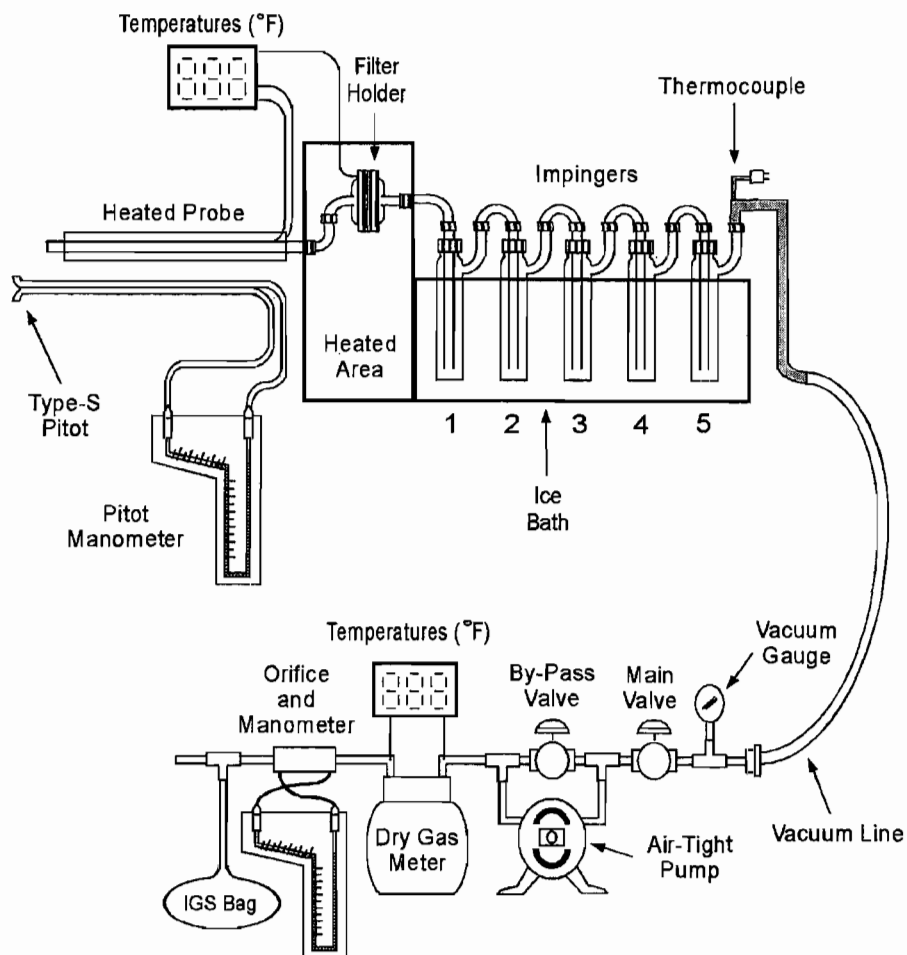
N/A

N/A

Ion Chromatography

None

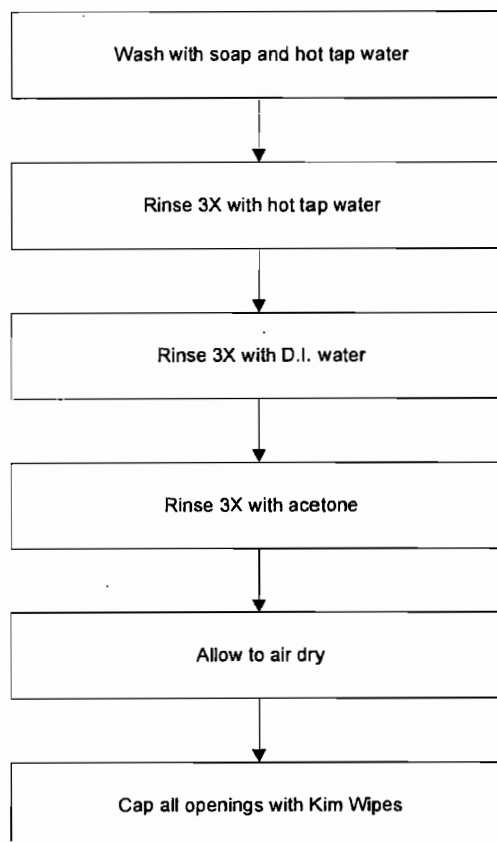
Modified EPA Method 26A Sampling Train Configuration



Impinger Contents

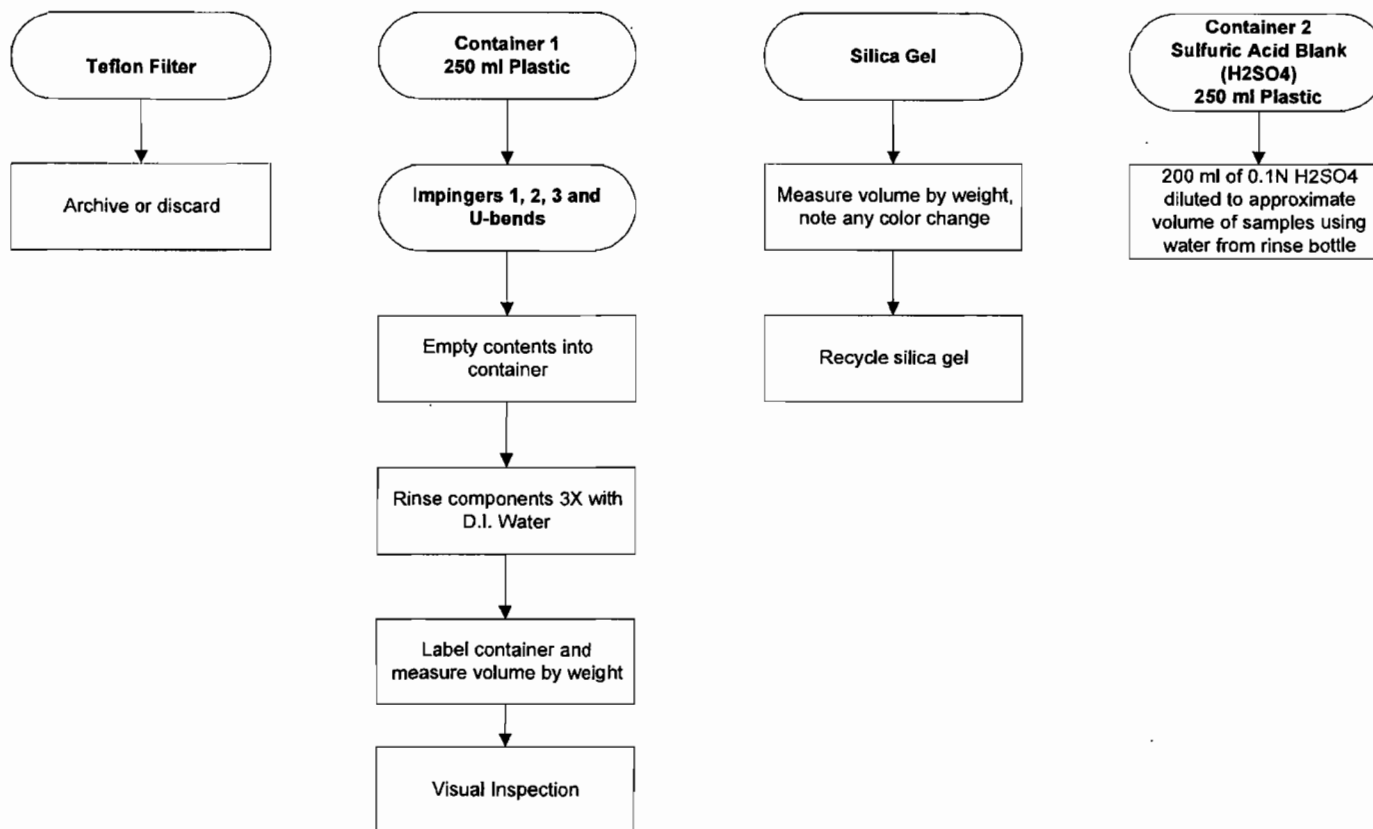
Impinger 1	50 ml 0.1 N H_2SO_4
Impinger 2	100 ml 0.1 N H_2SO_4
Impinger 3	100 ml 0.1 N H_2SO_4
Impinger 4	Empty
Impinger 5	Silica Gel

EPA Method 26A Glassware Preparation Procedures



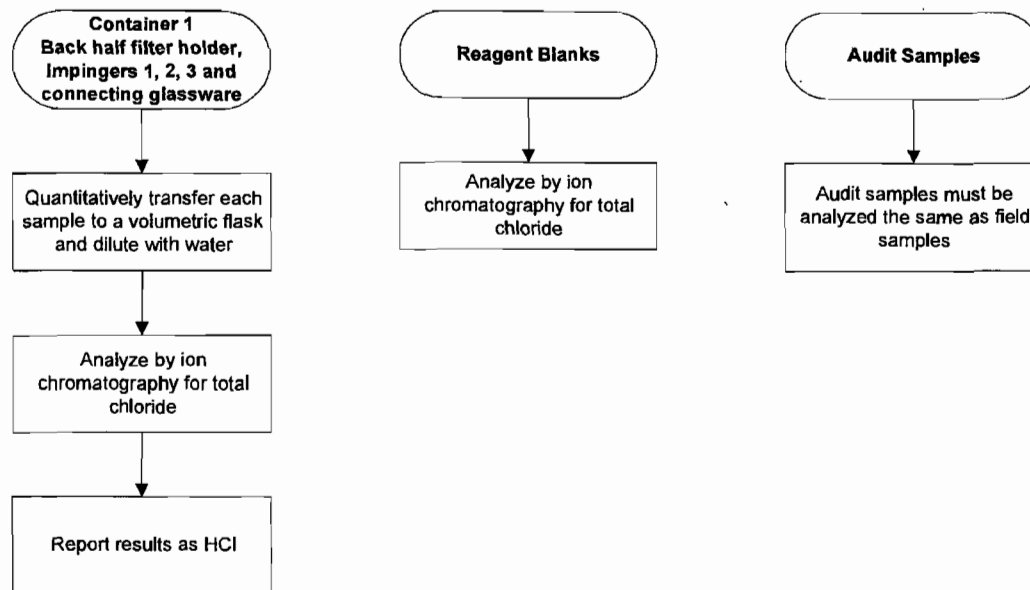
EPA Method 26
Sample Recovery Flowchart
(without Cl₂)
(Modified)

- 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)



EPA Method 26
Analytical Flowchart
(without Cl₂)
(Modified)

- 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



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WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11 182-3

SAMPLE CALCULATIONS

B

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

QA/QC Initials:

Date:



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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)	=	438.7	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)	=	20.65	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)	=	30.00	in. Hg
T_m	= average dry gas meter temperature (°F)	=	81.78	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	69.53	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9961	
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	0.98	in. H ₂ O
17.64	= standard temperature to pressure ratio (°R/in. Hg)	=	17.64	°R/in. Hg
13.6	= conversion factor (in. H ₂ O/in. Hg)	=	13.6	in. H ₂ O/in. Hg
460	= °F to °R conversion constant	=	460	
V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	67.814	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)	=	30.00	in. Hg
P_g	= sample gas static pressure (in. H ₂ O)	=	-11.30	in. H ₂ O
13.6	= conversion factor (in. H ₂ O/in. Hg)	=	13.6	in. H ₂ O/in. Hg
P_s	= absolute sample gas pressure (in. Hg)	=	29.17	in. Hg

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

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

Where:

T_s	= average sample gas temperature (°F)	=	301.12	°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)	=	29.17	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)	=	29.17	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.17	in. Hg

6. Moisture measured in sample (% by volume)

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

Where:

V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	67.814	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	20.65	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2334	%

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.17	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.17	in. Hg
B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions	=	1.0000	%

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

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

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	=	0.2334	
B_w	= actual water vapor in gas	=	0.2334	
		=	23.34	%

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 (%)	=	10.1	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.0	%
100	= conversion factor (%)	=	100	%
$N_2 + CO$	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.96	%

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

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

Where:

M_{CO_2}	= molecular weight of carbon dioxide (lb/lb-mole)	=	44.00	lb/lb-mole
M_{O_2}	= molecular weight of oxygen (lb/lb-mole)	=	32.00	lb/lb-mole
M_{N_2+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 (%)	=	10.1	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.0	%
$N_2 + CO$	= proportion of nitrogen and CO in the gas stream by volume (%)	=	81.0	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.97	lb/lb-mole

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

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

Where:

B_w	= proportion of water vapor in the gas stream by volume	=	0.2334	
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.97	lb/lb-mole
M_{H_2O}	= 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)

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

Where:

K_p	= velocity pressure constant	=	85.49	
C_p	= pitot tube coefficient	=	0.83	
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)	=	29.17	in. Hg
T_s	= average sample gas temperature (°F)	=	301.12	°F
$\sqrt{\Delta P}$	= average square roots of velocity heads of sample gas (in. H ₂ O)	=	0.628	in. H ₂ O
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	43.66	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)	=	43.66	ft/sec
60	= conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	167,669	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)	=	167,669	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.17	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	301.1	°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)	=	113,395	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	=	0.2334	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	113,395	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	86,930	dscfm

16. Dry flow of sample gas corrected to 7%O₂ (dscfm)

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

Where:

Q _{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	86,930	dscfm
O ₂	= proportion of oxygen in the gas stream by volume (%)	=	9.0	%
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)	=	74,610	dscfm

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

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

Where

Q _{std-min}	= volumetric flow rate, english units (ft ³ /min)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr

Q _{std-hr}	= volumetric flow rate, hourly basis (dscf/hr)	=	5,215,818	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-english}	= volumetric flow rate, english units (ft ³ /min)	=	86,930	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-metric}	= volumetric flow rate, metric units (m ³ /hr)	=	147,715	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-metric}	= volumetric flow rate, metric units (dry std m ³ /hr)	=	147,715	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)	=	137,644	dry Nm ³ /hr

20. Percent isokinetic (%)

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

Where:

D_n	= diameter of nozzle (in)	=	0.270	in.
B_w	= proportion of water vapor in the gas stream by volume	=	0.2334	
P_s	= absolute sample gas pressure (in. Hg)	=	29.17	in. Hg
T_s	= average sample gas temperature (°F)	=	301.1	°F
V_{mstd}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	67.814	dscf
V_s	= sample gas velocity (ft/sec)	=	43.66	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 (%)	=	100.51	%

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)	=	69.53	dcf
T_m	= average dry gas meter temperature (°F)	=	81.78	°F
$\Delta H_{@}$	= dry gas meter orifice coefficient	=	1.7697	
P_{bar}	= barometric pressure (in. Hg)	=	30.00	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	0.985	in. H ₂ O
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.97	lb/lb-mole
$\sqrt{\Delta H}_{avg}$	= average of square root of pressure drop across meter orifice	=	0.989	$\sqrt{\text{in. H}_2\text{O}}$
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 ₂ O/in. Hg)	=	13.6	in. H ₂ O/in. Hg
460	= °F to °R conversion constant	=	460	
Y_{qa}	= alternative Method 5 post-test meter calibration factor	=	0.9961	

**USEPA Method 5 (FPM)
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

$$m_{f1-calc} = m_{f1} \quad \text{if } m_{f1} \geq MDL_f$$

$$m_{f1-calc} = (MDL_f)(F_r) \quad \text{if } m_{f1} < MDL_f$$

Where:

m_{f1}	= reported mass of filter "1" from gravimetric analysis (g)	= 0.00030 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)	= 0.00030 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)	= 0.00030 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)	= 0.00030 g

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

$$r_{ai-blank-calc} = r_{ai-blank} \quad \text{if } r_{ai-blank} \geq MDL_s$$

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

Where:

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

$$r_{ai-calc} = r_{ai} \quad \text{if } r_{ai} \geq MDL_s$$

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

Where:

r_{ai}	= aliquot residue mass of run sample for solvent "i" (g)	= 0.00270 g
MDL_s	= reported minimum gravimetric detection limit for solvent rinse (g)	= 0.00010 g
F_r	= fraction of MDL applied to non-detectable run sample (g)	= 0.00
$r_{ai-calc}$	= aliquot residue mass of run sample for solvent "i" used in calculation (g)	= 0.00270 g

5. Residue mass of run sample (g)

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

Where:

$r_{ai-calc}$	= aliquot residue mass of run sample for solvent "i" used in calculation (g)	= 0.00270 g
v_{si}	= liquid volume of run sample for solvent rinse "i" (mL)	= 100 mL
v_{ai}	= aliquot volume use for solvent rinse "i" (mL) used in gravimetric analysis (mL)	= 100 mL
r_{si}	= residue mass of run sample for solvent rinse "i" (g)	= 0.00270 g

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

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

Where:

$r_{ai-blank-calc}$	= 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)	= 100.0 mL
$v_{ai-blank}$	= liquid volume of blank sample for solvent rinse "i" (mL)	= 146.0 mL
0.00001	= EPA M-5 fraction of total rinse that can be subtracted (g)	= 0.00001
ρ_i	= density of solvent rinse "i" (g/mL)	= 0.7845 g/mL
r_{si}	= residue mass of run sample for solvent rinse "i" (g)	= 0.00270 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)

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

Where:

r_{si}	= residue mass of run sample for solvent rinse "i" (g)	= 0.00270 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)	= 0.00270 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)	= 0.00270 g
m_2	= net residue mass of solvent rinse "2" (g)	= N/A g
m_3	= net residue mass of solvent rinse "3" (g)	= N/A g
m_s	= total solvent residue (g)	= 0.00270 g

9. Total gravimetric result (g)

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

Where:

m_{filter}	= total particulate collected on filters (g)	= 0.00030 g
m_s	= total solvent residue (g)	= 0.00270 g
m_T	= total gravimetric result (g)	= 0.00300 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)

$$m_n = \text{MAXIMUM}[m_T \text{ or } m_D]$$

Where:

m _T	= total gravimetric result (g)	= 0.00300 g
m _D	= total gravimetric detection limit (g)	= 0.00020 g
m _n	= total filterable particulate matter (g)	= 0.00300 g

USEPA Method 5 (FPM) 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)

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

Where:

m_n	= total filterable particulate matter (g)	= 0.00030	g
V_{mstd}	= volume metered, standard (dscf)	= 67.8139	dscf
2.205×10^{-3}	= conversion factor (lb/g)	= 2.205E-03	lb/g
C_{sd}	= filterable particulate matter concentration (lb/dscf)	= 9.755E-08	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)	= 0.00030	g
V_{mstd}	= volume metered, standard (dscf)	= 67.8139	dscf
15.43	= conversion factor (gr/g)	= 15.43	gr/g
C_{sd}	= filterable particulate matter concentration (gr/dscf)	= 0.00068	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)	= 0.00030	g
V_{mstd}	= volume metered, standard (dscf)	= 67.8139	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)	= 1.56207	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)	= 0.00030	g
V_{mstd}	= volume metered, standard (dscf)	= 67.8139	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/Nm ³ dry)	= 1.67637	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)	=	0.00068	gr/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.0	%
20.9	= oxygen content of ambient air (%)	=	20.9	%

C_{sdx}	= filterable particulate matter concentration corrected to x%O ₂ (gr/dscf)	=	0.00080	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)	=	0.00068	gr/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.1	%
C_{sdy}	= filterable particulate matter concentration corrected to y%CO ₂ (gr/dscf)	=	0.00081	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)	=	0.00068	gr/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	86,930	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	167,669	acfm
C_a	= filterable particulate matter concentration at actual gas conditions (gr/acf)	=	0.00035	gr/acf

8. Filterable particulate matter rate (lb/hr)

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

Where:

m_n	= total filterable particulate matter (g)	=	0.00030	g
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr

$E_{lb/hr}$	= filterable particulate matter rate (lb/hr)	=	0.5088	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)	=	0.00030	g
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	86,930	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)	=	0.2307	kg/hr

10. Filterable particulate matter rate (Ton/yr)

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

Where:

m_n	= total filterable particulate matter (g)	=	0.00030	g
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	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)	=	2.2285	Ton/yr

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

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

Where:

m_n	= total filterable particulate matter (g)	=	0.00030	g
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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 (%)	=	9.0	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= filterable particulate matter rate - Fd-based (lb/MMBtu)	=	0.00164	lb/MMBtu

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

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

Where:

m_n	= total filterable particulate matter (g)	=	0.00030	g
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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 (%)	=	10.1	%
100	= conversion factor	=	100	
E_{Fc}	= filterable particulate matter rate - Fc-based (lb/MMBtu)	=	0.00176	lb/MMBtu

13. Filterable particulate matter rate - Heat input-based (lb/MMBtu)

$$E_{Hi} = \left(\frac{m_n}{V_{mstd}} \right) (2.205 \times 10^{-3}) \left(\frac{(Q_{std})(60)}{H_i} \right)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00030	g
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
H_i	= actual heat input (MMBtu/hr)	=		MMBtu/hr
E_{Hi}	= filterable particulate matter rate - heat input-based (lb/MMBtu)	=	N/A	lb/MMBtu

14. Filterable particulate matter rate - Production-based (lb/Klbs)

$$E_{Rp} = \left(\frac{m_n}{V_{mstd}} \right) (2.205 \times 10^{-3}) \left(\frac{(Q_{std})(60)}{R_p} \right)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00030	g
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
R_p	= production rate (Klbs/hr)	=	182	Klbs/hr
E_{Rp}	= filterable particulate matter rate - production-based (lb/Klbs)	=	0.00279	lb/Klbs

15. Filterable particulate matter rate - Production-based (kg/Klbs)

$$E_{Rp} = \left(\frac{m_n}{V_{mstd}} \right) \left(\frac{(Q_{std})(60)}{(1000)(R_p)} \right)$$

Where:

m_n	= total filterable particulate matter (g)	=	0.00030	g
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	dscf
1000	= conversion factor (g/kg)	=	1000	g/kg
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
R_p	= production rate (Klbs/hr)	=	182	Klbs/hr
E_{Rp}	= filterable particulate matter rate - production-based (kg/Klbs)	=	0.00127	kg/Klbs

LOGIC FOR TREATING DETECTION LIMITS

(mercury only)

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

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

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

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

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

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

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

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

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

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 5/29 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.

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L

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	=	0.1015	µg
m_{2b-S}	= mercury amount in sample for Fraction 2b	=	2.0538	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	=	2.1553	µg

3. Allowable blank correction (µg)

$$m_{T-B-allow} = m_{total-B} \text{ if } m_{total-B} \leq 0.6$$

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

Where:

$m_{total-B}$	= total amount of mercury in blank	=	<1.4000	µg
$m_{total-S}$	= total amount of mercury in sample	=	2.1553	µg
$0.05 \times m_{total-S}$	= 5% of $m_{total-S}$	=	0.1078	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	=	2.1553	µg
$m_{T-B-allow}$	= total allowable blank correction	=	0.0000	µg
m_n	= total mercury in sample corrected for allowable blank	=	2.1553	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	=	2.1553	µg
m_{1b-S}	= mercury amount in sample for Fraction 1b	=	0.1015	µg
m_{2b-S}	= mercury amount in sample for Fraction 2b	=	2.0538	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	=	2.1553	µg
m_{n-1b}	= mercury corrected for blank - prorated for Fraction 1b	=	0.1015	µg
m_{n-2b}	= mercury corrected for blank - prorated for Fraction 2b	=	2.0538	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

USEPA Method 5/29 Mercury Sample Calculations

Sample data taken from Run 1

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R_L

1. Mercury concentration (lb/dscf)

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

Where:

m_n	= mercury collected in sample (total µg)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	7.0081E-11	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)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= mercury concentration (µg/dscm)	=	1.1222E+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)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	1.1222E-03	mg/dscm

4. Mercury concentration ($\mu\text{g}/\text{Nm}^3$ 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)	=	2.1553	μg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
68	= standard temperature ($^{\circ}\text{F}$)	=	68	$^{\circ}\text{F}$
32	= normal temperature ($^{\circ}\text{F}$)	=	32	$^{\circ}\text{F}$
460	= $^{\circ}\text{F}$ to $^{\circ}\text{R}$ conversion constant	=	460	

$$C_{sd} = \text{mercury concentration } (\mu\text{g}/\text{Nm}^3 \text{ dry}) = 1.2044\text{E}+00 \mu\text{g}/\text{Nm}^3 \text{ dry}$$

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)	=	7.0081E-11	lb/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.0	%
20.9	= oxygen content of ambient air (%)	=	20.9	%

$$C_{sdx} = \text{mercury concentration corrected to x\% oxygen (lb/dscf)} = 8.1653\text{E}-11 \text{ lb/dscf @ } x\%O_2$$

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)	=	7.0081E-11	lb/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.1	%

$$C_{sdy} = \text{mercury conc. corrected to y\% carbon dioxide (lb/dscf)} = 8.3513\text{E}-11 \text{ lb/dscf @ } y\%CO_2$$

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)	=	7.0081E-11	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	86,930	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	167,669	acfm

$$C_a = \text{mercury concentration at actual gas conditions (lb/acf)} = 3.6334\text{E}-11 \text{ lb/acf}$$

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)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= mercury emission rate (lb/hr)	=	3.6553E-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)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	86,930	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)	=	4.6048E-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)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	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)	=	1.6010E-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)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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 (%)	=	9.0	%
20.9	= oxygen content of ambient air (%)	=	20.9	%

E_{Fd}	= mercury emission rate - Fd-based (lb/MMBtu)	=	1.1749E-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)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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 (%)	=	10.1	%
100	= conversion factor	=	100	

E_{Fc}	= mercury emission rate - Fc-based (lb/MMBtu)	=	1.2666E-06	lb/MMBtu

13. Mercury emission rate - Heat Input-based (lb/MMBtu)

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

Where:

m_n	= mercury collected in sample (total µg)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
H_i	= actual heat input (MMBtu/hr)	=		MMBtu/hr

E_{Hi}	= mercury emission rate - Heat Input-based (lb/MMBtu)	=	N/A	lb/MMBtu

14. Mercury Emission Rate - Production-based (lb/unit)

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

Where:

m_n	= mercury collected in sample (total µg)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
R_p	= production rate (units/hr)	=	182	units/hour
E_{RP}	= mercury emission rate - production-based (lb/xxxxx)	=	2.0062E-06	lb/unit

15. Mercury Emission Rate - Production-based (g/unit)

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

Where:

m_n	= mercury collected in sample (total µg)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	dscf
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
R_p	= production rate (units/hr)	=	182	units/hour
E_{RP}	= mercury emission rate - production-based (g/xxxxx)	=	9.0984E-04	g/unit

LOGIC FOR TREATING DETECTION LIMITS

(all metals except mercury)

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

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

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

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

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

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

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

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

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

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

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.

If Front and Back-Half fractions are combined, then only Items 1 and 2 are used.

USEPA Method 5/29 Beryllium 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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L

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)

$$m_{FB-allow} = m_{FB} \text{ if } m_{FB} \leq A + 1$$

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

Where:

m _{FB}	= beryllium amount in combined front- and back-half blank	=	<0.0500	µg
m _{FS}	= beryllium amount in combined front- and back-half sample	=	<0.0500	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	=	<0.0025	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 Beryllium 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}	= beryllium amount in combined front- and back-half sample	=	<0.0500	µg
m _{FB-allow}	= allowable combined beryllium blank correction	=	0.0000	µg
m _n	= blank-corrected beryllium in combined sample	=	<0.0500	µg

USEPA Method 5/29 Beryllium 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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R_L

1. Beryllium concentration (lb/dscf)

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

Where:

m_n	= beryllium collected in sample (total μg)	=	<0.0500	μg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
10^6	= conversion factor ($\mu\text{g/g}$)	=	1.0E+06	$\mu\text{g/g}$
C_{sd}	= beryllium concentration (lb/dscf)	=	<1.6258E-12	lb/dscf

2. Beryllium concentration ($\mu\text{g/dscm}$)

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

Where:

m_n	= beryllium collected in sample (total μg)	=	<0.0500	μg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= beryllium concentration ($\mu\text{g/dscm}$)	=	<2.6034E-02	$\mu\text{g/dscm}$

3. Beryllium concentration (mg/dscm)

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

Where:

m_n	= beryllium collected in sample (total μg)	=	<0.0500	μg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
1000	= conversion factor ($\mu\text{g/mg}$)	=	1000	$\mu\text{g/mg}$
C_{sd}	= beryllium concentration (mg/dscm)	=	<2.6034E-05	mg/dscm

4. Beryllium concentration ($\mu\text{g}/\text{Nm}^3$ dry)

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

Where:

m_n	= beryllium collected in sample (total μg)	=	<0.0500	μg
V_{std}	= volume metered, standard (dscf)	=	67.8139	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
68	= standard temperature ($^{\circ}\text{F}$)	=	68	$^{\circ}\text{F}$
32	= normal temperature ($^{\circ}\text{F}$)	=	32	$^{\circ}\text{F}$
460	= $^{\circ}\text{F}$ to $^{\circ}\text{R}$ conversion constant	=	460	

$$C_{sd} = \text{beryllium concentration } (\mu\text{g}/\text{Nm}^3 \text{ dry}) = <2.7939\text{E-}02 \mu\text{g}/\text{Nm}^3 \text{ dry}$$

5. Beryllium 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}	= beryllium concentration (lb/dscf)	=	<1.6258E-12	lb/dscf
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.0	%
20.9	= oxygen content of ambient air (%)	=	20.9	%

$$C_{sdx} = \text{beryllium concentration corrected to x\% oxygen (lb/dscf)} = <1.8942\text{E-}12 \text{ lb/dscf @ x\%O}_2$$

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

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

Where:

C_{sd}	= beryllium concentration (lb/dscf)	=	<1.6258E-12	lb/dscf
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO_2	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.1	%

$$C_{sdy} = \text{beryllium conc. corrected to y\% carbon dioxide (lb/dscf)} = <1.9374\text{E-}12 \text{ lb/dscf @ y\%CO}_2$$

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

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

Where:

C_{sd}	= beryllium concentration (lb/dscf)	=	<1.6258E-12	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	86,930	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	167,669	acfm

$$C_a = \text{beryllium concentration at actual gas conditions (lb/acf)} = <8.4290\text{E-}13 \text{ lb/acf}$$

8. Beryllium 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	= beryllium collected in sample (total µg)	=	<0.0500	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= beryllium emission rate (lb/hr)	=	<8.4797E-06	lb/hr

9. Beryllium 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	= beryllium collected in sample (total µg)	=	<0.0500	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	86,930	dscfm
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
60	= conversion factor (sec/min)	=	60	sec/min
$E_{g/s}$	= beryllium emission rate (g/s)	=	<1.0682E-06	g/s

10. Beryllium 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	= beryllium collected in sample (total µg)	=	<0.0500	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	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
$E_{Ton/yr}$	= beryllium emission rate (Ton/yr)	=	<3.7141E-05	Ton/yr

11. Beryllium 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	= beryllium collected in sample (total µg)	=	<0.0500	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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 (%)	=	9.0	%
20.9	= oxygen content of ambient air (%)	=	20.9	%

$$E_{Fd} = \text{beryllium emission rate - Fd-based (lb/MMBtu)} = <2.7257\text{E-08 lb/MMBtu}$$

12. Beryllium 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	= beryllium collected in sample (total µg)	=	<0.0500	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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 (%)	=	10.1	%
100	= conversion factor	=	100	

$$E_{Fc} = \text{beryllium emission rate - Fc-based (lb/MMBtu)} = <2.9383\text{E-08 lb/MMBtu}$$

13. Beryllium emission rate - Heat Input-based (lb/MMBtu)

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

Where:

m_n	= beryllium collected in sample (total µg)	=	<0.0500	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
H_i	= actual heat input (MMBtu/hr)	=		MMBtu/hr

$$E_{Hi} = \text{beryllium emission rate - Heat Input-based (lb/MMBtu)} = \text{N/A lb/MMBtu}$$

14. Beryllium emission rate - Production-based (lb/unit)

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

Where:

m_n	= beryllium collected in sample (total µg)	=	<0.0500	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	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)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
R_p	= production rate (units/hr)	=	182	units/hour
E_{RP}	= beryllium emission rate - production-based (lb/xxxxx)	=	#REF!	lb/unit

15. Beryllium emission rate - Production-based (g/unit)

$$E_{RP} = \left(\frac{m_{CPM}}{V_{mstd}} \right) \left(\frac{(Q_{std})(60)}{(10^6)(R_p)} \right)$$

Where:

m_n	= beryllium collected in sample (total µg)	=	2.1553	µg
V_{mstd}	= volume metered, standard (dscf)	=	67.8139	dscf
10^6	= conversion factor (µg/g)	=	1.0E+06	µg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	86,930	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
R_p	= production rate (units/hr)	=	182	units/hour
E_{RP}	= beryllium emission rate - production-based (g/xxxxx)	=	#REF!	g/unit

USEPA Method 13B (Total Fluorides) 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)	=	238.4	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)	=	11.22	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)	=	29.95	in. Hg
T_m	= average dry gas meter temperature (°F)	=	82.22	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	39.49	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9837	
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.25	in. H ₂ O
17.64	= standard temperature to pressure ratio (°R/in. Hg)	=	17.64	°R/in. Hg
13.6	= conversion factor (in. H ₂ O/in. Hg)	=	13.6	in. H ₂ O/in. Hg
460	= °F to °R conversion constant	=	460	
V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	37.966	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)	=	29.95	in. Hg
P_g	= sample gas static pressure (in. H ₂ O)	=	-11.30	in. H ₂ O
13.6	= conversion factor (in. H ₂ O/in. Hg)	=	13.6	in. H ₂ O/in. Hg
P_s	= absolute sample gas pressure (in. Hg)	=	29.12	in. Hg

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

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

Where:

T_s	= average sample gas temperature (°F)	=	297.04	°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)	=	29.12	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)	=	29.12	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.12	in. Hg

6. Moisture measured in sample (% by volume)

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

Where:

V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	37.966	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	11.22	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2281	%

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.12	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.12	in. Hg
B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions	=	1.0000	%

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

$$B_w = \text{MINIMUM} [B_{w0}, B_{ws}]$$

Where:

B_{ws}	= proportion of water vapor in the gas stream by volume at saturated conditions	=	1.0000	
B_{w0}	= proportion of water measured in the gas stream by volume	=	0.2281	
B_w	= actual water vapor in gas	=	0.2281	
		=	22.81	%

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 (%)	=	10.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.6	%
100	= conversion factor (%)	=	100	%
$N_2 + CO$	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.35	%

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

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

Where:

M_{CO_2}	= molecular weight of carbon dioxide (lb/lb-mole)	=	44.00	lb/lb-mole
M_{O_2}	= molecular weight of oxygen (lb/lb-mole)	=	32.00	lb/lb-mole
M_{N_2+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 (%)	=	10.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.6	%
$N_2 + CO$	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.4	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.99	lb/lb-mole

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

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

Where:

B_w	= proportion of water vapor in the gas stream by volume	=	0.2281	
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.99	lb/lb-mole
M_{H_2O}	= molecular weight of water (lb/lb-mole)	=	18.00	lb/lb-mole
M_s	= molecular weight of sample gas, wet basis (lb/lb-mole)	=	27.26	lb/lb-mole

12. Velocity of sample gas (ft/sec)

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

Where:

K_p	= velocity pressure constant	=	85.49	
C_p	= pitot tube coefficient	=	0.81	
M_s	= wet molecular weight of sample gas, wet basis (lb/lb-mole)	=	27.26	lb/lb-mole
P_s	= absolute sample gas pressure (in. Hg)	=	29.12	in. Hg
T_s	= average sample gas temperature (°F)	=	297.04	°F
$\sqrt{\Delta P}$	= average square roots of velocity heads of sample gas (in. H ₂ O)	=	0.682	√in. H ₂ O
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	46.25	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)	=	46.25	ft/sec
60	conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	177,613	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)	=	177,613	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.12	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	297.0	°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)	=	120,561	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	=	0.2281	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	120,561	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	93,061	dscfm

16. Dry flow of sample gas corrected to 7%O₂ (dscfm)

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

Where:

Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	93,061	dscfm
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.6	%
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)	=	75,587	dscfm

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

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

Where

$Q_{std-min}$	= volumetric flow rate, english units (ft ³ /min)	=	93,061	dscfm
60	= conversion factor (min/hr)	=	60	min/hr

Q_{std-hr}	= volumetric flow rate, hourly basis (dscf/hr)	=	5,583,676	dscf/hr

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

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

Where:

$Q_{std-english}$	= volumetric flow rate, english units (ft ³ /min)	=	93,061	dscfm
35.31	= conversion factor (ft ³ /m ³)	=	35.31	ft ³ /m ³
60	= conversion factor (min/hr)	=	60	min/hr

$Q_{std-metric}$	= volumetric flow rate, metric units (m ³ /hr)	=	158,133	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:

$Q_{std-metric}$	= volumetric flow rate, metric units (dry std m ³ /hr)	=	158,133	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)	=	147,351	dry Nm ³ /hr

20. Percent isokinetic (%)

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

Where:

D_n	= diameter of nozzle (in)	=	0.274	in.
B_w	= proportion of water vapor in the gas stream by volume	=	0.2281	
P_s	= absolute sample gas pressure (in. Hg)	=	29.12	in. Hg
T_s	= average sample gas temperature (°F)	=	297.0	°F
V_{std}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	37.966	dscf
V_s	= sample gas velocity (ft/sec)	=	46.25	ft/sec
Θ	= total sampling time (min)	=	63	min
0.0945	= conversion constant	=	0.0945	
460	= °F to °R conversion constant	=	460	
I	= percent of isokinetic sampling (%)	=	102.08	%

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)	=	63	min
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	39.49	dcf
T_m	= average dry gas meter temperature (°F)	=	82.22	°F
$\Delta H_{@}$	= dry gas meter orifice coefficient	=	1.8252	
P_{bar}	= barometric pressure (in. Hg)	=	29.95	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.246	in. H ₂ O
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.99	lb/lb-mole
$\sqrt{\Delta H}_{avg}$	= average of square root of pressure drop across meter orifice	=	1.113	$\sqrt{\text{in. H}_2\text{O}}$
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 ₂ O/in. Hg)	=	13.6	in. H ₂ O/in. Hg
460	= °F to °R conversion constant	=	460	
Y_{qa}	= alternative Method 5 post-test meter calibration factor	=	0.9724	

USEPA Method 13B HF Analyte Calculations

Sample data taken from Run 1

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1. Fluoride to HF conversion factor

$$K_{HF} = \frac{MW_{HF}}{n \times MW_{F^-}}$$

Where:

MW_{HF}	= molecular weight of HF (mg/mg-mole)	=	20.006	mg/mg-mole
MW_{F^-}	= molecular weight of fluoride ion (mg/mg-mole)	=	18.998	mg/mg-mole
n	= molar ratio of fluoride to HF	=	1.0	mole F/mole HF

$$K_{HF} = \text{conversion factor to convert mass F}^- \text{ to mass HF} = 1.053$$

2. Total HF collected (mg)

$$m_{HF} = K_{HF} \times \frac{(S_{F-1} v_1 + S_{F-2} v_2)}{1000}$$

Where:

K_{HF}	= conversion factor to convert mass F ⁻ to mass HF	=	1.053	
S_{F-1}	= fluoride concentration of sample fraction 1 (mg/liter)	=	<0.0470	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	873.0	ml
S_{F-2}	= fluoride 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

$$m_{HF} = \text{total HF collected in sample (mg)} = <0.0432 \text{ mg}$$

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)

$$m_b = K_{HF} \times B_F \times \frac{(v_1 + v_2)}{1000}$$

$$m_b = 0 \text{ if } B_F < MDL$$

Where:

K_{HF}	= conversion factor to convert mass F ⁻ to mass HF	=	1.053	
B_F	= fluoride concentration of blank (mg/liter)	=	<0.0470	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	873.0	ml
v_2	= liquid volume of sample fraction 2 (ml)	=	0.0	ml
1000	= conversion factor (ml/liter)	=	1000	ml/liter

$$m_b = \text{allowable blank subtraction (mg)} = 0.0000 \text{ mg}$$

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

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

Where:

m_{HF}	= total HF collected in sample (mg)	=	<0.0432	mg
m_b	= allowable blank subtraction (mg)	=	0.0000	mg
m_{nb}	= total HF collected, corrected for blank (mg)	=	<0.0432	mg

5. Minimum detectable HF (mg)

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

Where:

K_{HF}	= conversion factor to convert mass F to mass HF	=	1.053	
MDL	= minimum detectable fluoride concentration	=	0.009	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	873.0	ml
v_2	= liquid volume of sample fraction 2 (ml)	=	0.0	ml
1000	= conversion factor (ml/liter)	=	1000	ml/liter
m_{MDL}	= minimum detectable HF (mg)	=	0.0083	mg

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

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

Where:

m_{nb}	= total HF collected, corrected for blank (mg)	=	<0.0432	mg
m_{MDL}	= minimum detectable HF (mg)	=	0.0083	mg
m_n	= total HF value used in emission calculations (mg)	=	<0.0432	mg

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

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

Where:

K_{HF}	= conversion factor to convert mass F to mass HF	=	1.053	
S_{F-2}	= fluoride concentration of sample fraction 2 (mg/liter)	=	0.0000	mg/liter
v_2	= liquid volume of sample fraction 2 (ml)	=	0.0	ml
m_{HF}	= total HF collected in sample (mg)	=	<0.0432	mg
1000	= conversion factor (ml/liter)	=	1000	ml/liter
100	= conversion factor	=	100	%
EFF	= Collection QC check (% mass collected in second fraction)	=	0.00	%

USEPA Method 13B HF Sample Calculations

Sample data taken from Run 1

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1. HF concentration (lb/dscf)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}} \right) \left(\frac{2.205 \times 10^{-3}}{1000} \right)$$

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	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}	= HF concentration (lb/dscf)	=	<2.5093E-09	lb/dscf

2. HF 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 HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	dscf
MW	= molecular weight of HF (g/g-mole)	=	20.006	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}	= HF concentration (ppmdv)	=	<0.0484	ppmdv

3. HF concentration (ppmwv)

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

Where:

C_{sd}	= HF concentration (ppmdv)	=	<0.0484	ppmdv
B_w	= actual water vapor in gas (% v/v)	=	22.8099	% v/v
100	= conversion factor (%)	=	100	%
C_w	= HF concentration (ppmwv)	=	<0.0373	ppmwv

4. HF concentration (mg/dscm)

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

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= HF concentration (mg/dscm)	=	<0.0402	mg/dscm

5. HF concentration (mg/Nm³ dry)

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

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	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}	= HF concentration (mg/Nm ³ dry)	=	<0.0431	mg/Nm ³ dry

6. HF concentration corrected to x% O₂ (ppmdv example)

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

Where:

C_{sd}	= HF concentration (ppmdv)	=	<0.0484	ppmdv
x	= oxygen content of corrected gas (%)	=	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.6	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= HF concentration corrected to x%O ₂ (ppmdv)	=	<0.0595	ppmdv @ x%O ₂

7. HF concentration corrected to y% CO₂ (ppmdv example)

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

Where:

C_{sd}	= HF concentration (ppmdv)	=	<0.0484	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}	= HF concentration corrected to y%CO ₂ (ppmdv)	=	<0.0578	ppmdv @ y%CO ₂

8. HF concentration at actual gas conditions (lb/acf example)

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

Where:

C_{sd}	= HF concentration (lb/dscf)	=	<2.5093E-09	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	93,061	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	=	177,613	acfm
C_a	= HF concentration at actual gas conditions (lb/acf)	=	<1.3148E-09	lb/acf

9. HF rate (lb/hr)

$$E_{lb/hr} = \left(\frac{m_n}{V_{mstd}} \right) \left(\frac{2.205 \times 10^{-3}}{1000} \right) (Q_{std})(60)$$

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
1000	= conversion factor (mg/g)	=	1,000	mg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	93,061	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
$E_{lb/hr}$	= HF rate (lb/hr)	=	<0.0140	lb/hr

10. HF rate (kg/hr)

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

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	93,061	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
10^6	= conversion factor (mg/kg)	=	10^6	g/kg
$E_{kg/hr}$	= HF rate (kg/hr)	=	<0.0064	kg/hr

11. HF rate (Ton/yr)

$$E_{T/yr} = \left(\frac{m_n}{V_{mstd}} \right) \left(\frac{2.205 \times 10^{-3}}{1000} \right) (Q_{std})(60) \left(\frac{Cap}{2000} \right)$$

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
1000	= conversion factor (mg/g)	=	1,000	mg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	93,061	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)	=	2,000	lb/Ton
$E_{T/yr}$	= HF rate (Ton/yr)	=	<0.0614	Ton/yr

12. HF 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 HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	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 (%)	=	9.6	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= HF rate (lb/MMBtu)	=	<4.5291E-05	lb/MMBtu

13. HF 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 HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	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}	= HF rate (lb/MMBtu)	=	<4.5487E-05	lb/MMBtu

14. HF rate - Heat Input-based (lb/MMBtu)

$$E_{Hi} = \left(\frac{m_n}{V_{mstd}} \right) \left(\frac{2.205 \times 10^{-3}}{1000} \right) \left(\frac{(Q_{std})(60)}{H_i} \right)$$

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
1000	= conversion factor (mg/g)	=	1,000	mg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	93,061	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
H_i	= actual heat input (MMBtu/hr)	=		MMBtu/hr
E_{Hi}	= HF rate (lb/MMBtu)	=	N/A	lb/MMBtu

15. HF rate - Production-based (lb/unit)

$$E_{RP} = \left(\frac{m_n}{V_{mstd}} \right) \left(2.205 \times 10^{-3} \right) \left(\frac{Q_{std} \times 60}{1000 \times R_p} \right)$$

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	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)	=	93,061	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
1000	= conversion factor (mg/g)	=	1000	mg/g
R_p	= production rate (units/hr)	=	183	units/hour
E_{RP}	= HF rate - production based(lb/xxxx)	=	<7.6731E-05	lb/unit

16. HF rate - Production-based (kg/unit)

$$E_{RP} = \left(\frac{m_n}{V_{mstd}} \right) \left(\frac{Q_{std} \times 60}{10^6 \times R_p} \right)$$

Where:

m_n	= total HF collected, corrected for applicable blank (mg)	=	<0.0432	mg
V_{mstd}	= volume metered, standard (dscf)	=	37.9661	dscf
10^6	= conversion factor (mg/kg)	=	1,000,000	mg/kg
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	93,061	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
R_p	= production rate (units/hr)	=	183	units/hour
E_{RP}	= HF rate - production based(kg/xxxx)	=	<3.4799E-05	kg/unit

USEPA Method 23 (PCDD/F) 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)	=	890.8	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)	=	41.92	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)	=	29.95	in. Hg
T_m	= average dry gas meter temperature (°F)	=	89.40	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	151.01	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9936	
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.09	in. H ₂ O
17.64	= standard temperature to pressure ratio (°R/in. Hg)	=	17.64	°R/in. Hg
13.6	= conversion factor (in. H ₂ O/in. Hg)	=	13.6	in. H ₂ O/in. Hg
460	= °F to °R conversion constant	=	460	
V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	144.671	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)	=	29.95	in. Hg
P_g	= sample gas static pressure (in. H ₂ O)	=	-7.50	in. H ₂ O
13.6	= conversion factor (in. H ₂ O/in. Hg)	=	13.6	in. H ₂ O/in. Hg
P_s	= absolute sample gas pressure (in. Hg)	=	29.40	in. Hg

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

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

Where:

T_s	= average sample gas temperature (°F)	=	297.28	°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)	=	29.40	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)	=	29.40	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.40	in. Hg

6. Moisture measured in sample (% by volume)

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

Where:

V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	144.671	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	41.92	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2247	%
		=	22.47	%

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.40	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.40	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)

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

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	=	0.2247	
B_w	= actual water vapor in gas	=	0.2247	
		=	22.47	%

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 (%)	=	10.5	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.0	%
100	= conversion factor (%)	=	100	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.51	%

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

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

Where:

M_{CO_2}	= molecular weight of carbon dioxide (lb/lb-mole)	=	44.00	lb/lb-mole
M_{O_2}	= molecular weight of oxygen (lb/lb-mole)	=	32.00	lb/lb-mole
M_{N_2+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 (%)	=	10.5	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.0	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.5	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	30.04	lb/lb-mole

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

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

Where:

B_w	= proportion of water vapor in the gas stream by volume	=	0.2247	
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	30.04	lb/lb-mole
M_{H_2O}	= molecular weight of water (lb/lb-mole)	=	18.00	lb/lb-mole
M_s	= molecular weight of sample gas, wet basis (lb/lb-mole)	=	27.34	lb/lb-mole

12. Velocity of sample gas (ft/sec)

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

Where:

K_p	= velocity pressure constant	=	85.49	
C_p	= pitot tube coefficient	=	0.82	
M_s	= wet molecular weight of sample gas, wet basis (lb/lb-mole)	=	27.34	lb/lb-mole
P_s	= absolute sample gas pressure (in. Hg)	=	29.40	in. Hg
T_s	= average sample gas temperature (°F)	=	297.28	°F
$\sqrt{\Delta P}$	= average square roots of velocity heads of sample gas (in. H ₂ O)	=	0.645	√in. H ₂ O
460	= °F to °R conversion constant	=	460	
V_s	= sample gas velocity (ft/sec)	=	43.99	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)	=	43.99	ft/sec
60	= conversion factor (sec/min)	=	60	sec/min
Q_a	= volumetric flow rate at actual conditions (acfm)	=	168,907	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)	=	168,907	acfm
P_s	= absolute sample gas pressure (in. Hg)	=	29.40	in. Hg
29.92	= standard pressure (in. Hg)	=	29.92	in. Hg
T_s	= average sample gas temperature (°F)	=	297.3	°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)	=	115,715	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	=	0.2247	
Q_s	= volumetric flow rate at standard conditions, wet basis (scfm)	=	115,715	scfm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	89,718	dscfm

16. Dry flow of sample gas corrected to 7%O₂ (dscfm)

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

Where:

Q _{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	89,718	dscfm
O ₂	= proportion of oxygen in the gas stream by volume (%)	=	9.0	%
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)	=	77,067	dscfm

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

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

Where

Q _{std-min}	= volumetric flow rate, english units (ft ³ /min)	=	89,718	dscfm
60	= conversion factor (min/hr)	=	60	min/hr

Q _{std-hr}	= volumetric flow rate, hourly basis (dscf/hr)	=	5,383,061	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-english}	= volumetric flow rate, english units (ft ³ /min)	=	89,718	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-metric}	= volumetric flow rate, metric units (m ³ /hr)	=	152,451	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-metric}	= volumetric flow rate, metric units (dry std m ³ /hr)	=	152,451	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)	=	142,057	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)	=	0.271	in.
B_w	= proportion of water vapor in the gas stream by volume	=	0.2247	
P_s	= absolute sample gas pressure (in. Hg)	=	29.40	in. Hg
T_s	= average sample gas temperature (°F)	=	297.3	°F
V_{mstd}	= volume of gas sample through the dry gas meter at standard conditions (dscf)	=	144.671	dscf
V_s	= sample gas velocity (ft/sec)	=	43.99	ft/sec
Θ	= total sampling time (min)	=	250	min
0.0945	= conversion constant	=	0.0945	
460	= °F to °R conversion constant	=	460	
I	= percent of isokinetic sampling (%)	=	103.12	%

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)	=	250	min
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	151.01	dcf
T_m	= average dry gas meter temperature (°F)	=	89.40	°F
$\Delta H_{@}$	= dry gas meter orifice coefficient	=	1.7676	
P_{bar}	= barometric pressure (in. Hg)	=	29.95	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.087	in. H ₂ O
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	30.04	lb/lb-mole
$\sqrt{\Delta H}_{avg}$	= average of square root of pressure drop across meter orifice	=	1.040	$\sqrt{\text{in. H}_2\text{O}}$
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 ₂ O/in. Hg)	=	13.6	in.H ₂ O/in. Hg
460	= °F to °R conversion constant	=	460	
Y_{qa}	= alternative Method 5 post-test meter calibration factor	=	0.9714	

USEPA Method 23 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.

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1. TEQ concentration (ng/dscm)

$$C_{sd} = \left(\frac{m_{n-TEQ}}{V_{mstd}} \right) \times 35.31$$

Where:

m_{n-TEQ}	= total TEQ mass for PCDDs and PCDFs (ng)	= 7.1800E-03	ng	1.1000E-02	ng
V_{mstd}	= volume metered, standard (dscf)	= 144.6711	dscf	144.6711	dscf
35.31	= conversion factor (dscf/dscm)	= 35.31	dscf/dscm	35.31	dscf/dscm
C_{sd}	= PCDD/F TEQ concentration (ng/dscm)	= 1.7524E-03	ng/dscm	2.6848E-03	ng/dscm

2. TEQ concentration (ng/Nm³ dry)

$$C_{sd} = \left(\frac{m_{n-TEQ}}{V_{mstd}} \right) (35.31) \left(\frac{68 + 460}{32 + 460} \right)$$

Where:

m_{n-TEQ}	= total TEQ mass for PCDDs and PCDFs (ng)	= 7.1800E-03	ng	1.1000E-02	ng
V_{mstd}	= volume metered, standard (dscf)	= 144.6711	dscf	144.6711	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 TEQ concentration (ng/Nm ³ dry)	= 1.8807E-03	ng/Nm ³ dry	2.8812E-03	ng/Nm ³ dry

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

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

Where:

C_{sd}	= PCDD/F TEQ concentration (ng/dscm)	= 1.7524E-03	ng/dscm	2.6848E-03	ng/dscm
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscm/h)	= 152,451	dry std m ³ /hr	152,451	dry std m ³ /hr
Q_a	= volumetric flow rate at actual conditions (acm/h)	= 287,013	actual m ³ /hr	287,013	actual m ³ /hr
C_a	= PCDD/F TEQ concentration at actual gas conditions (ng/acm)	= 9.3083E-04	ng/acm	1.4261E-03	ng/acm

4. TEQ 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 TEQ concentration (ng/dscm)	=	1.7524E-03	ng/dscm	2.6848E-03	ng/dscm
x	= oxygen content of corrected gas (%)	=	7.0	%	7.0	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.0	%	9.0	%
20.9	= oxygen content of ambient air (%)	=	20.9	%	20.9	%
C_{sdx}	= PCDD/F TEQ concentration (ng/dscm corrected to x% O ₂)	=	2.0401E-03	ng/dscm @ x% O ₂	3.1255E-03	ng/dscm @ x% O ₂

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

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

Where:

C_{sd}	= PCDD/F TEQ concentration (ng/dscm)	=	1.7524E-03	ng/dscm	2.6848E-03	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 (%)	=	10.5	%	10.5	%
C_{sdy}	= PCDD/F TEQ concentration (ng/dscm corrected to y% CO ₂)	=	1.9971E-03	ng/dscm @ y% CO ₂	3.0596E-03	ng/dscm @ y% CO ₂

6. TEQ Emission rate (lb/hr)

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

Where:

m_{n_TEQ}	= total TEQ mass for PCDDs and PCDFs (ng)	=	7.1800E-03	ng	1.1000E-02	ng
V_{mstd}	= volume metered, standard (dscf)	=	144.6711	dscf	144.6711	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)	=	89,718	dscfm	89,718	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 TEQ Emission rate (lb/hr)	=	5.8909E-10	lb/hr	9.0250E-10	lb/hr

7. TEQ Emission rate (g/sec)

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

Where:

m_{n_TEQ}	= total TEQ mass for PCDDs and PCDFs (ng)	=	7.1800E-03	ng	1.1000E-02	ng
V_{mstd}	= volume metered, standard (dscf)	=	144.6711	dscf	144.6711	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	89,718	dscfm	89,718	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 TEQ Emission rate (g/sec)	=	7.4211E-11	g/sec	1.1369E-10	g/sec

8. TEQ emission rate (Ton/yr)

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

Where:

m_{n_TEQ}	= total TEQ mass for PCDDs and PCDFs (ng)	= 7.1800E-03	ng	1.1000E-02	ng
V_{mstd}	= volume metered, standard (dscf)	= 144.6711	dscf	144.6711	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)	= 89,718	dscfm	89,718	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 TEQ Emission rate (Ton/yr)	= 2.5802E-09	Ton/yr	3.9530E-09	Ton/yr

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

$$E_{Fd} = \left(\frac{m_{n\_TEQ}}{V_{mstd}} \right) \left(\frac{2.205 \times 10^{-3}}{10^9} \right) (F_d) \left(\frac{20.9}{20.9 - O_2} \right)$$

Where:

m_{n_TEQ}	= total TEQ mass for PCDDs and PCDFs (ng)	= 7.1800E-03	ng	1.1000E-02	ng
V_{mstd}	= volume metered, standard (dscf)	= 144.6711	dscf	144.6711	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)	= 9,750	dscf/MMBtu	9,750	dscf/MMBtu
O_2	= proportion of oxygen in the gas stream by volume (%)	= 9.0	%	9.0	%
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 TEQ Emission rate (lb/MMBtu)	= 1.8677E-12	lb/MMBtu	2.8613E-12	lb/MMBtu

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

$$E_{Fc} = \left(\frac{m_{n\_TEQ}}{V_{mstd}} \right) \left(\frac{2.205 \times 10^{-3}}{10^9} \right) (F_c) \left(\frac{100}{CO_2} \right)$$

Where:

m_{n_TEQ}	= total TEQ mass for PCDDs and PCDFs (ng)	= 7.1800E-03	ng	1.1000E-02	ng
V_{mstd}	= volume metered, standard (dscf)	= 144.6711	dscf	144.6711	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 (%)	= 10.5	%	10.5	%
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 TEQ Emission rate (lb/MMBtu)	= 1.8914E-12	lb/MMBtu	2.8978E-12	lb/MMBtu

USEPA Modified Method 26A (HCl) Sampling 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)	=	253.5	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)	=	11.93	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)	=	29.95	in. Hg
T_m	= average dry gas meter temperature (°F)	=	84.92	°F
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	41.86	dcf
Y_d	= gas meter correction factor (dimensionless)	=	0.9961	
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.50	in. H ₂ O
17.64	= standard temperature to pressure ratio (°R/in. Hg)	=	17.64	°R/in. Hg
13.6	= conversion factor (in. H ₂ O/in. Hg)	=	13.6	in. H ₂ O/in. Hg
460	= °F to °R conversion constant	=	460	
V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	40.575	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)	=	29.95	in. Hg
P_g	= sample gas static pressure (in. H ₂ O)	=	-11.00	in. H ₂ O
13.6	= conversion factor (in. H ₂ O/in. Hg)	=	13.6	in. H ₂ O/in. Hg
P_s	= absolute sample gas pressure (in. Hg)	=	29.14	in. Hg

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

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

Where:

T_s	= average sample gas temperature (°F)	=	300.75	°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)	=	29.14	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)	=	29.14	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.14	in. Hg

6. Moisture measured in sample (% by volume)

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

Where:

V_{mstd}	= volume of gas sampled through the dry gas meter at standard conditions (dscf)	=	40.575	dscf
V_{wstd}	= volume of water collected at standard conditions (scf)	=	11.93	scf
B_{wo}	= proportion of water measured in the gas stream by volume	=	0.2272	%
		=	22.72	%

7. Saturated moisture content (% by volume)

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

Where:

P_s	= absolute sample gas pressure (in. Hg)	=	29.14	in. Hg
P_v	= water vapor pressure, actual (in. Hg)	=	29.14	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)

$$B_w = \text{MINIMUM} [B_{wO}, B_{ws}]$$

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	=	0.2272	
B_w	= actual water vapor in gas	=	0.2272	
		=	22.72	%

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 (%)	=	10.1	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.5	%
100	= conversion factor (%)	=	100	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.48	%

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

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

Where:

M_{CO_2}	= molecular weight of carbon dioxide (lb/lb-mole)	=	44.00	lb/lb-mole
M_{O_2}	= molecular weight of oxygen (lb/lb-mole)	=	32.00	lb/lb-mole
M_{N_2+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 (%)	=	10.1	%
O_2	= proportion of oxygen in the gas stream by volume (%)	=	9.5	%
N_2+CO	= proportion of nitrogen and CO in the gas stream by volume (%)	=	80.5	%
100	= conversion factor (%)	=	100	%
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.99	lb/lb-mole

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

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

Where:

B_w	= proportion of water vapor in the gas stream by volume	=	0.2272	
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.99	lb/lb-mole
M_{H_2O}	= molecular weight of water (lb/lb-mole)	=	18.00	lb/lb-mole
M_s	= molecular weight of sample gas, wet basis (lb/lb-mole)	=	27.26	lb/lb-mole

12. Alternative Method 5 Post-Test Meter Calibration Factor

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

Where:

Θ	= total sampling time (min)	=	60	min
V_m	= volume of gas sample through the dry gas meter at meter conditions (dcf)	=	41.86	dcf
T_m	= average dry gas meter temperature (°F)	=	84.92	°F
$\Delta H_{@}$	= dry gas meter orifice coefficient	=	1.7697	
P_{bar}	= barometric pressure (in. Hg)	=	29.95	in. Hg
ΔH	= average pressure drop across meter box orifice (in. H ₂ O)	=	1.500	in. H ₂ O
M_d	= dry molecular weight of sample gas (lb/lb-mole)	=	29.99	lb/lb-mole
$\sqrt{\Delta H}_{avg}$	= average of square root of pressure drop across meter orifice	=	1.225	$\sqrt{\text{in. H}_2\text{O}}$
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 ₂ O/in. Hg)	=	13.6	in.H ₂ O/in. Hg
460	= °F to °R conversion constant	=	460	
Y_{ga}	= alternative Method 5 post-test meter calibration factor	=	0.9862	

USEPA Modified Method 26A HCl Analyte Calculations

Sample data taken from Run 1

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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)

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

Where:

K_{HCl}	= conversion factor to convert mass Cl^- to mass HCl	=	1.028	
S_{Cl-1}	= chloride concentration of sample fraction 1 (mg/liter)	=	17.9100	mg/liter
v_1	= liquid volume of sample fraction 1 (ml)	=	842.0	ml
S_{Cl-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)	=	15.5025	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)	=	842.0	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

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

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

Where:

m_{HCl}	= total HCl collected in sample (mg)	=	15.5025	mg
m_b	= allowable blank subtraction (mg)	=	0.0000	mg
m_{nb}	= total HCl collected, corrected for blank (mg)	=	15.50246616	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)	=	842.0	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)	=	0.013849216	mg

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

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

Where:

m_{nb}	= total HCl collected, corrected for blank (mg)	=	15.5025	mg
m_{MDL}	= minimum detectable HCl (mg)	=	0.013849216	mg
m_n	= total HCl value used in emission calculations (mg)	=	15.50246616	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	%

USEPA Modified Method 26A HCl Sample Calculations

Sample data taken from Run 1

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1. HCl concentration (lb/dscf)

$$C_{sd} = \left(\frac{m_n}{V_{mstd}} \right) \left(\frac{2.205 \times 10^{-3}}{1000} \right)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.5755	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)	=	8.4245E-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)	=	15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.5755	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)	=	8.9069	ppmdv

3. HCl concentration (ppmwv)

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

Where:

C_{sd}	= HCl concentration (ppmdv)	=	8.9069	ppmdv
B_w	= actual water vapor in gas (% v/v)	=	22.7210	% v/v
100	= conversion factor (%)	=	100	%
C_w	= HCl concentration (ppmwv)	=	6.8832	ppmwv

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)	=	15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.5755	dscf
35.31	= conversion factor (dscf/dscm)	=	35.31	dscf/dscm
C_{sd}	= HCl concentration (mg/dscm)	=	13.4907	mg/dscm

5. HCl concentration (mg/Nm³ 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)	=	15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.5755	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)	=	14.4778	mg/Nm ³ dry

6. HCl concentration corrected to x% O₂ (ppmdv example)

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

Where:

C_{sd}	= HCl concentration (ppmdv)	=	8.9069	ppmdv
x	= oxygen content of corrected gas (%)	=	7.0	%
O ₂	= proportion of oxygen in the gas stream by volume (%)	=	9.5	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
C_{sdx}	= HCl concentration corrected to x%O ₂ (ppmdv)	=	10.8317	ppmdv @ x%O ₂

7. HCl concentration corrected to y% CO₂ (ppmdv example)

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

Where:

C_{sd}	= HCl concentration (ppmdv)	=	8.9069	ppmdv
y	= carbon dioxide content of corrected gas (%)	=	12.0	%
CO ₂	= proportion of carbon dioxide in the gas stream by volume (%)	=	10.1	%
C_{sdy}	= HCl concentration corrected to y%CO ₂ (ppmdv)	=	10.6351	ppmdv @ y%CO ₂

8. HCl concentration at actual gas conditions (lb/acf example)

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

Where:

C_{sd}	= HCl concentration (lb/dscf)	= 8.4245E-07	lb/dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	= #VALUE!	dscfm
Q_a	= volumetric flow rate at actual conditions (acfm)	= #VALUE!	acfm
C_a	= HCl concentration at actual gas conditions (lb/acf)	= #VALUE!	lb/acf

9. HCl rate (lb/hr)

$$E_{lb/hr} = \left(\frac{m_n}{V_{mstd}} \right) \left(\frac{2.205 \times 10^{-3}}{1000} \right) (Q_{std}) (60)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	= 15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	= 40.5755	dscf
2.205×10^{-3}	= conversion factor (lb/g)	= 2.205E-03	lb/g
1000	= conversion factor (mg/g)	= 1,000	mg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	= #VALUE!	dscfm
60	= conversion factor (min/hr)	= 60	min/hr

$E_{lb/hr}$	= HCl rate (lb/hr)	= #VALUE!	lb/hr

10. HCl rate (kg/hr)

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

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	= 15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	= 40.5755	dscf
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	= #VALUE!	dscfm
60	= conversion factor (min/hr)	= 60	min/hr
10^6	= conversion factor (mg/kg)	= 10^6	g/kg

$E_{kg/hr}$	= HCl rate (kg/hr)	= #VALUE!	kg/hr

11. HCl rate (Ton/yr)

$$E_{T/yr} = \left(\frac{m_n}{V_{mstd}} \right) \left(\frac{2.205 \times 10^{-3}}{1000} \right) (Q_{std}) (60) \left(\frac{Cap}{2000} \right)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	= 15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	= 40.5755	dscf
2.205×10^{-3}	= conversion factor (lb/g)	= 2.205E-03	lb/g
1000	= conversion factor (mg/g)	= 1,000	mg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	= #VALUE!	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)	= 2,000	lb/Ton

$E_{T/yr}$	= HCl rate (Ton/yr)	= #VALUE!	Ton/yr

12. 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)	=	15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.5755	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 (%)	=	9.5	%
20.9	= oxygen content of ambient air (%)	=	20.9	%
E_{Fd}	= HCl rate (lb/MMBtu)	=	1.5019E-02	lb/MMBtu

13. 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)	=	15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.5755	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 (%)	=	10.1	%
100	= conversion factor	=	100	
E_{Fc}	= HCl rate (lb/MMBtu)	=	1.5256E-02	lb/MMBtu

14. HCl rate - Heat Input-based (lb/MMBtu)

$$E_{Hi} = \left(\frac{m_n}{V_{mstd}} \right) \left(\frac{2.205 \times 10^{-3}}{1000} \right) \left(\frac{(Q_{std})(60)}{H_i} \right)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.5755	dscf
2.205×10^{-3}	= conversion factor (lb/g)	=	2.205E-03	lb/g
1000	= conversion factor (mg/g)	=	1,000	mg/g
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	#VALUE!	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
H_i	= actual heat input (MMBtu/hr)	=		MMBtu/hr
E_{Hi}	= HCl rate (lb/MMBtu)	=	N/A	lb/MMBtu

15. HCl rate - Production-based (lb/unit)

$$E_{RP} = \left(\frac{m_n}{V_{mstd}} \right) \left(2.205 \times 10^{-3} \right) \left(\frac{Q_{std} \times 60}{1000 \times R_p} \right)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.5755	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)	=	#VALUE!	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
1000	= conversion factor (mg/g)	=	1000	mg/g
R_p	= production rate (units/hr)	=	185	units/hour
E_{RP}	= HCl rate - production based(lb/xxxx)	=	#VALUE!	lb/unit

16. HCl rate - Production-based (kg/unit)

$$E_{RP} = \left(\frac{m_n}{V_{mstd}} \right) \left(\frac{Q_{std} \times 60}{10^6 \times R_p} \right)$$

Where:

m_n	= total HCl collected, corrected for applicable blank (mg)	=	15.5025	mg
V_{mstd}	= volume metered, standard (dscf)	=	40.5755	dscf
10^6	= conversion factor (mg/kg)	=	1,000,000	mg/kg
Q_{std}	= volumetric flow rate at standard conditions, dry basis (dscfm)	=	#VALUE!	dscfm
60	= conversion factor (min/hr)	=	60	min/hr
R_p	= production rate (units/hr)	=	185	units/hour
E_{RP}	= HCl rate - production based(kg/xxxx)	=	#VALUE!	kg/unit

CEM IGS Sample Calculations for O2

Sample data taken from **Run 1**
and **Channel 2**

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.

042811 102209

1. Average Concentration for an entire Run

U1 R1 in 26A

$$C = \frac{\sum_{i=1}^N C_i}{N}$$

Where:

C_i	= All concentration readings for the entirety of Run 1 for the monitor looking for O2 on channel 2	=	$i=1$ 8.401	%dv
N	= total number of readings in Run 1	=	1	
C	= average O2 concentration for Run 1	=	8.401	%dv

2. Drift-Corrected Average Concentration for an entire Run

$$C_{DC} = \left(C - \frac{C_{oi} + C_{of}}{2} \right) \left(\frac{C_{ma}}{\frac{C_{mi} + C_{mf}}{2} - \frac{C_{oi} + C_{of}}{2}} \right)$$

C_{ma}	= concentration of actual calibration gas value	=	14.100	%dv
C	= average O2 concentration for Run 1	=	8.401	%dv
C_{mf}	= calibration error response concentration for Cal01 (final)	=	14.159	%dv
C_{mi}	= calibration error response concentration for Cal00 (initial)	=	14.080	%dv
C_{of}	= calibration error response concentration for Cal01 (final) for zero gas	=	-0.009	%dv
C_{oi}	= calibration error response concentration for Cal00 (initial) for zero gas	=	-0.012	%dv
C_{DC}	= drift corrected average concentration for Run 1	=	8.393	%dv

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

PLANT DATA

C

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

QA/QC Initials: *WV*

Date: 5/9/11



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Stack Test Process Data

PLANT NAME: SOUTH BROWARD 2011						Data from DCS Printouts						Calculated		Lime Feed Rate			Carbon Feed	
						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		
Unit No.	Run No.	Date	Time Start	Time Stop	Test												Test Run Comments	
M-26A	1	1	3/28/2011	0748	0848	185.4	314.9	7.0	486.9	35.4	28.1	7.3	20.7	1.089	0.931	410.0	7	All times based on CEMS time
HCI		2	3/28/2011	0911	1011	182.8	315.1	7.1	486.8	35.3	27.4	7.9	22.4	1.084	0.880	416.1	7	
		3	3/28/2011	1035	1135	185.2	314.9	6.9	485.8	34.3	26.1	8.3	24.1	1.081	0.846	418.8	7	
		Avg				184.5	314.9	7.0	486.5	35.0	27.2	7.8	22.4	1.085	0.886	414.9	7	
M-29/5	1	1	03/29/11	0741	0953	182.2	315.1	6.9	487.1	36.0	27.8	8.2	19.2	1.092	0.968	476.3	6	All times based on CEMS time
Metals		2	03/29/11	1015	**	180.3	315.0	6.7	480.0	33.2	23.4	9.8	23.2	1.087	0.904	531.0	6	
PM		3	03/29/11	1516	1727	184.0	315.2	7.0	496.4	38.3	31.0	7.3	17.7	1.094	0.984	430.4	6	
		Avg				182.2	315.1	6.9	487.8	35.8	27.4	8.4	20.0	1.091	0.952	479.2	6	
M-13B	1	1	3/28/2011	1203	1312	182.6	315.0	7.3	493.1	37.6	29.4	8.1	22.7	1.080	0.830	404.9	7	All times based on CEMS time
HF		2	3/28/2011	1333	1444	181.2	316.1	7.4	496.2	39.0	32.7	6.3	22.5	1.078	0.811	304.6	7	
		3	3/28/2011	1502	1611	184.0	315.0	7.2	497.4	38.6	30.4	8.2	23.6	1.075	0.779	380.9	6	
		Avg				182.6	315.4	7.3	495.6	38.4	30.9	7.5	22.9	1.078	0.807	363.5	7	

C-3

Stack Test Process Data

PLANT NAME: SOUTH BROWARD 2011						Data From DCS Printouts						Calculated		Lime Feed Rate			Carbon Feed	Test Run Comments
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	
M-26A HCl	2	1	3/29/2011	0750	0850	171.1	314.8	6.5	473.8	29.9	21.4	8.6	22.4	1.094	0.985	505.3	6	All times based on CEMS time
		2	3/29/2011	0923	1023	175.8	314.9	6.7	476.4	31.2	14.9	16.3	23.6	1.089	0.930	906.8	6	
		3	3/29/2011	1039	1139	182.8	315.3	6.6	471.1	29.0	19.4	9.6	26.0	1.087	0.911	523.6	6	
		4	3/29/2011	1154	1254	183.1	315.6	6.4	472.0	24.5	15.7	8.8	27.1	1.094	0.930	489.4	6	
		Avg				178.2	315.2	6.6	473.3	28.7	17.9	11.5	24.8	1.091	0.939	645.2	6	
M-29/5 Metals PM	2	1	03/30/11	0731	0942	185.2	314.0	6.3	461.1	26.3	15.4	10.9	32.7	1.079	0.825	537.1	6	All times based on CEMS time
		2	03/30/11	0959	1210	184.2	315.0	6.4	464.4	26.4	17.5	8.9	29.3	1.086	0.897	479.0	6	
		3	03/30/11	1229	1455	183.2	315.2	6.6	472.4	28.6	20.2	8.5	22.8	1.095	1.000	508.8	6	
		Avg				184.2	314.7	6.4	466.0	27.1	17.7	9.4	28.3	1.087	0.907	508.3	6	
M-13B HF	2	1	03/29/11	1321	1430	175.8	314.6	6.3	477.8	30.8	22.6	8.2	25.8	1.085	0.885	435.4	6	All times based on CEMS time
		2	03/29/11	1449	1557	188.0	314.7	6.4	465.5	25.4	18.4	6.9	27.8	1.091	0.951	396.0	6	
		3	03/29/11	1611	1723	182.4	315.3	6.5	480.7	31.7	22.5	9.2	20.7	1.095	0.996	552.2	6	
		Avg				182.1	314.9	6.4	474.7	29.3	21.2	8.1	24.8	1.090	0.944	461.2	6	

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Stack Test Process Data

PLANT NAME: SOUTH BROWARD 2011						Data From DCS Printouts						Calculated		Lime Feed Rate			Carbon Feed	Test Run Comments
Test	Unit No.	Run No.	Date	Start	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	CaO Density lb/gal	CaO Flow lbs/hr	lb/hr	
M-26A HCI	3	1	03/30/11	0747	0847	184.3	314.7	5.5	475.0	33.5	25.8	7.8	25.6	1.080	0.832	387.4	6	All times based on CEMS time
		2	03/30/11	0906	1006	184.0	315.0	2.1	467.8	31.0	14.8	16.3	28.2	1.078	0.815	795.1	6	
		3	03/30/11	1022	1122	184.2	315.0	2.1	467.8	30.6	18.9	11.7	26.6	1.085	0.885	620.7	6	
		Avg				184.2	314.9	3.2	470.2	31.7	19.8	11.9	26.8	1.081	0.844	601.1	6	
M-29/5 Metals PM	3	1	3/28/2011	0731	0943	184.0	315.0	2.6	469.6	34.0	21.8	12.2	23.2	1.088	0.916	668.9	6	All times based on CEMS time
		2	3/28/2011	1005	1219	183.4	314.9	3.5	476.0	36.0	26.8	9.1	23.6	1.081	0.845	463.4	6	
		3	3/28/2011	1243	1455	184.0	315.4	3.7	478.0	35.3	23.7	11.7	24.9	1.078	0.814	569.5	6	
		Avg				183.8	315.1	3.3	474.5	35.1	24.1	11.0	23.9	1.082	0.858	567.2	6	
M-23 dioxins	3	1	03/28/11	1005	1425	183.6	315.1	3.4	476.3	35.7	25.5	10.2	24.1	1.080	0.834	509.9	6	All times based on CEMS time
		2	03/29/11	0741	1159	182.2	315.0	4.9	483.7	37.1	26.8	10.4	20.7	1.090	0.939	583.7	6	
		3	03/29/11	1238	1659	182.4	315.0	5.8	484.9	37.7	29.7	8.0	20.8	1.088	0.924	441.3	6	
		Avg				182.7	315.1	4.7	481.6	36.8	27.3	9.5	21.9	1.086	0.899	511.6	6	
M-13B HF	3	1	03/30/11	1140	1247	183.7	315.1	3.0	470.3	32.1	20.5	11.7	23.4	1.092	0.958	669.6	6	All times based on CEMS time
		2	03/30/11	1304	1412	178.7	315.0	4.7	480.9	36.6	30.0	6.6	19.7	1.095	1.001	394.0	6	
		3	03/30/11	1426	1536	185.5	314.8	2.7	484.4	36.7	30.1	6.6	18.9	1.098	1.028	407.7	6	
		Avg				182.6	315.0	3.5	478.6	35.1	26.9	8.3	20.7	1.095	0.996	490.4	6	

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**WHEELABRATOR SOUTH BROWARD
TONS OF REFUSE PROCESSED PER STACK TEST RUN LOG (2011)**

UNIT #1						
Date	Test	Method #	Run #	Steam (klb/hr)	Run Length (hr)	Trash Processed (tons)
3/28/2011	HCl	26A	1	185.4	1.00	35.4
3/28/2011	HCl	26A	2	182.8	1.00	34.9
3/28/2011	HCl	26A	3	185.2	1.00	35.3
3/29/2011	Particulate/Metals	5/29	1	182.2	2.20	76.5
3/29/2011	Particulate/Metals	5/29	2	180.3	2.18	75.0
3/29/2011	Particulate/Metals	5/29	3	184.0	2.18	76.5
3/28/2011	Fluorides	13B	1	182.6	1.15	40.1
3/28/2011	Fluorides	13B	2	181.2	1.18	40.8
3/28/2011	Fluorides	13B	3	184.0	1.15	40.4
NA	Dioxins/Furans	23	1	NA	NA	NA
NA	Dioxins/Furans	23	2	NA	NA	NA
NA	Dioxins/Furans	23	3	NA	NA	NA

UNIT #2						
Date	Test	Method #	Run #	Steam (klb/hr)	Run Length (hr)	Trash Processed (tons)
3/29/2011	HCl	26A	1	171.1	1.00	32.7
3/29/2011	HCl	26A	2	175.8	1.00	33.5
3/29/2011	HCl	26A	3	182.8	1.00	34.9
3/29/2011	HCl	26A	4	183.1	1.00	34.9
3/30/2011	Particulate/Metals	5/29	1	185.2	2.18	77.0
3/30/2011	Particulate/Metals	5/29	2	184.2	2.18	76.6
3/30/2011	Particulate/Metals	5/29	3	183.2	2.43	85.0
3/29/2011	Fluorides	13B	1	175.8	1.15	38.6
3/29/2011	Fluorides	13B	2	188.0	1.13	40.5
3/29/2011	Fluorides	13B	3	182.4	1.18	41.1
NA	Dioxins/Furans	23	1	NA	NA	NA
NA	Dioxins/Furans	23	2	NA	NA	NA
NA	Dioxins/Furans	23	3	NA	NA	NA

UNIT #3						
Date	Test	Method #	Run #	Steam (klb/hr)	Run Length (hr)	Trash Processed (tons)
3/30/2011	HCl	26A	1	184.3	1.00	35.2
3/30/2011	HCl	26A	2	184.0	1.00	35.1
3/30/2011	HCl	26A	3	184.2	1.00	35.2
3/28/2011	Particulate/Metals	5/29	1	184.0	2.20	77.2
3/28/2011	Particulate/Metals	5/29	2	183.4	2.23	78.0
3/28/2011	Particulate/Metals	5/29	3	184.0	2.20	77.2
3/30/2011	Fluorides	13B	1	183.7	1.20	42.1
3/30/2011	Fluorides	13B	2	178.7	1.23	41.9
3/30/2011	Fluorides	13B	3	185.5	1.20	42.5
3/28/2011	Dioxins/Furans	23	1	183.6	4.33	151.7
3/29/2011	Dioxins/Furans	23	2	182.2	4.30	149.5
3/29/2011	Dioxins/Furans	23	3	182.4	4.35	151.4

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

CONTROL ROOM STACK TEST LOG 2011

UNIT #1					
Date	Test	Method #	Run #	Start Time	End Time
03/28/11	HCl	26A	1	0748	0848
03/28/11	HCl	26A	2	0911	1011
03/28/11	HCl	26A	3	1035	1135
03/29/11	Metals & Particulate*	5/29	1	0741	0953
03/29/11	Metals & Particulate*	5/29	2	1015	** See Below
03/29/11	Metals & Particulate*	5/29	3	1516	1727
03/28/11	Fluorides	13B	1	1203	1312
03/28/11	Fluorides	13B	2	1333	1444
03/28/11	Fluorides	13B	3	1502	1611
NA	Dioxins/Furans	23	1	NA	NA
NA	Dioxins/Furans	23	2	NA	NA
NA	Dioxins/Furans	23	3	NA	NA

UNIT #2					
Date	Test	Method #	Run #	Start Time	End Time
03/29/11	HCl	26A	1	0750	0850
03/29/11	HCl	26A	2	0923	1023
03/29/11	HCl	26A	3	1039	1139
03/29/11	HCl	26A	4	1154	1254
03/30/11	Metals & Particulate*	5/29	1	0731	0942
03/30/11	Metals & Particulate*	5/29	2	0959	1210
03/30/11	Metals & Particulate*	5/29	3	1229	1455
03/29/11	Fluorides	13B	1	1321	1430
03/29/11	Fluorides	13B	2	1449	1557
03/29/11	Fluorides	13B	3	1611	1723
NA	Dioxins/Furans	23	1	NA	NA
NA	Dioxins/Furans	23	2	NA	NA
NA	Dioxins/Furans	23	3	NA	NA

UNIT #3					
Date	Test	Method #	Run #	Start Time	End Time
03/30/11	HCl	26A	1	0747	0847
03/30/11	HCl	26A	2	0906	1006
03/30/11	HCl	26A	3	1022	1122
03/28/11	Metals & Particulate*	5/29	1	0731	0943
03/28/11	Metals & Particulate*	5/29	2	1005	1219
03/28/11	Metals & Particulate*	5/29	3	1243	1455
03/30/11	Fluorides	13B	1	1140	1247
03/30/11	Fluorides	13B	2	1304	1412
03/30/11	Fluorides	13B	3	1426	1536
03/28/11	Dioxins/Furans	23	1	1005	1425
03/29/11	Dioxins/Furans	23	2	0741	1159
03/29/11	Dioxins/Furans	23	3	1238	1659

* Metals include Cd (cadmium) Hg (mercury) Be (beryllium) Pb (lead)

** Start 1015, Stop 1102, Restart 1142, Stop 1216, Restart 1410, Stop 1500

General Average Report

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT1

Data Averaging Type: 6m

Time of Report: 04/18/11 14:02

Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/29/11	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
	09:30	0
	09:36	0
	09:42	0
	09:48	0

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

* - excluded values (missing, COC, 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

General Average Report

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT1

Time of Report: 04/18/11 14:02

Data Averaging Type: 6m

Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/29/11	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
	09:30	0
	09:36	0
	09:42	0
	09:48	0

Average =	0
Geometric 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

Page: 1

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT1

Data Averaging Type: 6m

Time of Report: 04/18/11 14:05

Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/29/11	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
	12:12	0
	12:18	0
	12:24	0
	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
	14:42	0
	14:48	0
	14:54	0
	15:00	0

Average =	0
Geometric Avg. =	
Maximum =	0
Minimum =	0
Possible Values =	48
Included Values =	48
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

General Average Report

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT1

Data Averaging Type: 6m

Time of Report: 04/18/11 14:00

Rolling Average Interval: 1

Date	Time	OPACITY1 (PERCENT)
03/29/11	15:18	0
	15:24	0
	15:30	0
	15:36	0
	15:42	0
	15:48	0
	15:54	0
	16:00	0
	16:06	0
	16:12	0
	16:18	0
	16:24	0
	16:30	0
	16:36	0
	16:42	0
	16:48	0
	16:54	0
	17:00	0
	17:06	0
	17:12	0
	17:18	0
	17:24	0

Average =	0
Geometric 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

Page: 1

General Average Report

Reporting Period: 03/30/2011 to 03/30/2011

Site Name: UNIT2

Data Averaging Type: 6m

Time of Report: 04/18/11 14:05

Rolling Average Interval: 1

Date	Time	OPACITY2 (PERCENT)
03/30/11	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
	09:30	0
	09:36	0
	09:42	0

Average =	0
Geometric Avg. =	0
Maximum =	0
Minimum =	0
Possible Values =	22
Included Values =	22
Total =	6

* - 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

Page: 1

Reporting Period: 03/30/2011 to 03/30/2011

Site Name: UNIT2

Time of Report: 04/18/11 14:05

Data Averaging Type: 6m

Rolling Average Interval: 1

OPACITY2		
Date	Time	(PERCENT)
03/30/11	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 =	22
Included Values =	22
Total =	6

* - 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

Page: 1

Reporting Period: 03/30/2011 to 03/30/2011

Site Name: UNIT2

Data Averaging Type: 6m

Time of Report: 04/18/11 14:06

Rolling Average Interval: 1

Date	Time	OPACITY2 (PERCENT)
03/30/11	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	1
	14:42	1
	14:48	0
	14:54	1

Average =	0
Geometric Avg. =	0
Maximum =	1
Minimum =	0
Possible Values =	25
Included Values =	25
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

Page: 1

Reporting Period: 03/28/2011 to 03/28/2011

Site Name: UNIT3

Data Averaging Type: 6m

Time of Report: 04/18/11 14:00

Rolling Average Interval: 1

Date	Time	OPACITY3 (PERCENT)
03/28/11	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
	09:30	0
	09:36	0
	09:42	0

Average =	0
Geometric 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

Page: 1

Reporting Period: 03/28/2011 to 03/28/2011

Site Name: UNIT3

Data Averaging Type: 6m

Time of Report: 04/18/11 14:07

Rolling Average Interval: 1

Date	Time	OPACITY3 (PERCENT)
03/28/11	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
	12:12	0
	12:18	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
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

Page: 1

Reporting Period: 03/28/2011 to 03/28/2011

Site Name: UNIT3

Data Averaging Type: 6m

Time of Report: 04/18/11 14:00

Rolling Average Interval: 1

Date	Time	OPACITY3 (PERCENT)
03/28/11	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
	14:42	0
	14:48	0
	14:54	0

Average =	0
Geometric 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

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/28/2011
 Start Time: 6:48
 End Time: 7:48:00
 TEST 26A

Unit 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
486.91	314.86	35.42	28.08	7.34	296.77	7.02	-11.08	185.42	409.67

Unit 1

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	%	%
189.91	899.58	821.54	73.60	-0.09	433.36	1077.92	9.41	6.23	9.22

Lime Slurry 3/28/2011
 S.G. 1.089
 Lb/gal 0.931

Specific Gravity	CaO lb/gal	Lime Conc %
1.089	0.931	20.685

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Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/28/2011
 Start Time: 8:11
 End Time: 9:11:00
 TEST 26A

Unit 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
486.84	315.07	35.32	27.44	7.89	299.06	7.12	-11.21	182.81	416.29

Unit 1

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	%	%
187.94	899.59	825.66	73.80	-0.10	431.79	1099.21	9.46	6.46	9.32

Lime Slurry 3/28/2011
 S.G. 1.084
 Lb/gal 0.880

Specific Gravity	CaO lb/gal	Lime Conc %
1.084	0.880	22.376

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/28/2011
Start Time: 9:35
End Time: 10:35:00
TEST 26A

Unit 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
485.79	314.90	34.32	26.07	8.25	297.39	6.93	-10.95	185.18	418.68

Unit 1

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	%	%
190.77	900.40	827.60	70.98	-0.10	430.29	1102.52	5.21	5.75	8.74

Lime Slurry 3/28/2011
S.G. 1.081
Lb/gal 0.846

Specific Gravity	CaO lb/gal	Lime Conc %
1.081	0.846	24.083

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Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/29/2011
Start Time: 6:41
End Time: 8:53:00
TEST 5/29

Unit 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
487.09	315.10	35.99	27.79	8.20	295.73	6.92	-10.93	182.19	476.02

Unit 1

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	%	%
188.34	891.64	825.22	71.68	-0.10	430.88	1096.59	7.31	6.01	8.99

Lime Slurry 3/29/2011
S.G. 1.092
Lb/gal 0.968

Specific Gravity	CaO lb/gal	Lime Conc. %
1.092	0.968	19.166

C - 22

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/29/2011
Start Time: 9:15
End Time: 10:02:00
TEST 5/29

Unit 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
487.31	314.57	34.99	24.45	10.54	297.57	6.66	-10.67	175.91	580.81

Unit 1

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	%	%
182.82	890.98	823.44	71.72	-0.10	431.75	1077.71	5.47	6.43	9.48

Lime Slurry 3/29/2011
S.G. 1.088
Lb/gal 0.918

Specific Gravity	CaO lb/gal	Lime Conc %
1.088	0.918	21.615

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Wheelabrator SOUTH BROWARD Emission Test Log

Date: 3/29/2011
Start Time: 10:42
End Time: 11:16:00
TEST 5/29

Unit 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
475.88	315.32	33.03	21.74	11.28	297.57	6.74	-10.69	177.78	597.29

Unit 1

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	%	%
181.30	894.27	819.36	71.28	-0.11	427.63	1081.95	2.27	5.32	8.43

Lime Slurry 3/29/2011
S.G. 1.085
Lb/gal 0.882

Specific Gravity	CaO lb/gal	Lime Conc %
1.085	0.882	24.209

**Wheelabrator
SOUTH BROWARD
Emission Test Log**

Date: 3/29/2011
Start Time: 13:10
End Time: 14:00:00
TEST 5/29

Unit 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
476.92	315.10	31.64	24.09	7.55	296.58	6.73	-10.56	187.33	413.33

Unit 1

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	%	%
193.29	896.80	824.67	66.93	-0.11	419.70	1126.52	5.95	5.35	8.30

Lime Slurry 3/29/2011
S.G. 1.087
Lb/gal 0.913

Specific Gravity	CaO lb/gal	Lime Conc %
1.087	0.913	23.852

Wheelabrator SOUTH BROWARD Emission Test Log

Date: 3/29/2011
Start Time: 14:16
End Time: 16:27:00
TEST 5/29

Unit 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
496.37	315.17	38.33	31.04	7.29	298.10	6.97	-11.22	183.99	430.42

Unit 1

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	%	%
188.76	897.39	822.61	73.25	-0.10	431.30	1135.47	9.07	6.24	9.32

Lime Slurry 3/29/2011
S.G. 1.094
Lb/gal 0.984

Specific Gravity	CaO lb/gal	Lime Conc %
1.094	0.984	17.689

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/28/2011
Start Time: 11:03
End Time: 12:12:00
TEST 13B

Unit 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
493.12	315.04	37.57	29.44	8.14	295.55	7.28	-11.40	182.63	405.10

Unit 1

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	%	%
186.98	897.38	823.91	74.71	-0.11	434.09	1099.87	7.64	6.52	9.43

Lime Slurry 3/28/2011
S.G. 1.080
Lb/gal 0.830

Specific Gravity	CaO lb/gal	Lime Conc %
1.080	0.830	22.694

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**Wheelabrator
SOUTH BROWARD
Emission Test Log**

Date: 3/28/2011
Start Time: 12:33
End Time: 13:44:00
TEST 13B

Unit 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
496.24	316.10	38.95	32.69	6.26	299.51	7.35	-11.62	181.22	304.34

Unit 1

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	%	%
185.75	897.75	821.12	76.49	-0.10	435.44	1094.49	6.78	6.81	9.57

Lime Slurry 3/28/2011
S.G. 1.078
Lb/gal 0.811

Specific Gravity	CaO lb/gal	Lime Conc %
1.078	0.811	22.485

**Wheelabrator
SOUTH BROWARD
Emission Test Log**

Date: 3/28/2011
Start Time: 14:02
End Time: 15:11:00
TEST 13B

Unit 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
497.39	314.96	38.58	30.43	8.14	300.04	7.16	-11.43	184.03	380.42

Unit 1

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	%	%
189.14	899.25	826.26	74.61	-0.10	435.62	1108.78	7.74	6.33	9.15

Lime Slurry 3/28/2011
S.G. 1.075
Lb/gal 0.779

Specific Gravity	CaO lb/gal	Lime Conc %
1.075	0.779	23.551

Wheelabrator SOUTH BROWARD Emission Test Log

Date: 3/29/2011
Start Time: 6:50:00
End Time: 7:50
TEST 26A

Unit 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
473.82	314.82	29.94	21.39	8.5470	301.33	6.54	-10.38	171.12	504.90

Unit 2

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNGR CHEM FLOW	FURNACE O2	OUTLET O2
KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
182.26	895.79	833.33	82.27	-0.11	403.54	986.29	2.59	6.96	9.35

Lime Slurry 3/29/2011
S.G. 1.094
Lb/gal 0.985

Specific Gravity	Cao lb/gal	Lime Conc %
1.094	0.985	22.425

**Wheelabrator
SOUTH BROWARD
Emission Test Log**

Date: 3/29/2011
Start Time: 8:23:00
End Time: 9:23
TEST 26A

Unit 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
476.38	314.88	31.19	14.94	16.2517	300.46	6.71	-10.58	175.75	906.43

Unit 2

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	%	%
181.23	895.70	826.40	80.95	-0.10	404.30	956.93	2.50	6.09	9.17

Lime Slurry 3/29/2011
S.G. 1.089
Lb/gal 0.930

Specific Gravity	Cao lb/gal	Lime Conc %
1.089	0.930	23.619

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**Wheelabrator
SOUTH BROWARD
Emission Test Log**

Date: 3/29/2011
Start Time: 9:39:00
End Time: 10:39
TEST 26A

Unit 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
471.07	315.31	28.99	19.41	9.5756	300.34	6.59	-10.32	182.84	523.32

Unit 2

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	%	%
189.33	894.14	815.73	78.98	-0.10	394.96	977.40	2.47	5.73	8.91

Lime Slurry 3/29/2011
S.G. 1.087
Lb/gal 0.911

Specific Gravity	Cao lb/gal	Lime Conc %
1.087	0.911	25.975

**Wheelabrator
South Broward
Emission Test Log**

Date: 3/29/2011
Start Time: 10:54:00
End Time: 11:54

TEST 26A
Unit 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
472.05	315.62	24.5	17.7	8.77	304.26	6.42	-10.32	183.1	489.4

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	%	%
190.46	894.4	825.11	79.46	-0.10	398.12	976.33	2.49	6.02	9.02

Unit 2

Lime Slurry 3/29/2011
S.G. 1.094
Lb/gal 0.930

Specific Gravity	CaO lb/gal	Lime Conc %
1.094	0.930	27.1

Wheelabrator SOUTH BROWARD Emission Test Log

Date: 3/30/2011
 Start Time: 6:31:00
 End Time: 8:42
 TEST 5/29

Unit 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
461.08	313.99	26.28	15.43	10.8523	301.79	6.27	-9.66	185.19	537.32

Unit 2

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	%	%
192.01	903.58	815.45	74.26	-0.10	392.10	985.36	18.47	4.94	7.70

Lime Slurry 3/30/2011
 S.G. 1.079
 Lb/gal 0.825

Specific Gravity	Cao lb/gal	Lime Conc %
1.079	0.825	32.690

**Wheelabrator
SOUTH BROWARD
Emission Test Log**

Date: 3/30/2011
Start Time: 8:59:00
End Time: 11:10
TEST 5/29

Unit 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
464.42	315.04	26.37	17.47	8.9024	300.31	6.36	-9.74	184.18	478.94

Unit 2

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNGR CHEM FLOW	FURNACE O2	OUTLET O2
KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
190.66	905.62	813.97	72.36	-0.10	390.30	1002.74	19.07	5.08	8.13

Lime Slurry 3/30/2011
S.G. 1.086
Lb/gal 0.897

Specific Gravity	Cao lb/gal	Lime Conc %
1.086	0.897	29.254

**Wheelabrator
SOUTH BROWARD
Emission Test Log**

Date: 3/30/2011
Start Time: 11:29:00
End Time: 13:55
TEST 5/29

Unit 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
472.35	315.16	28.63	20.15	8.4819	301.58	6.55	-10.08	183.24	509.14

Unit 2

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	%	%
189.85	905.94	816.30	75.53	-0.10	392.94	1008.30	9.02	5.29	8.42

Lime Slurry 3/30/2011
S.G. 1.095
Lb/gal 1.000

Specific Gravity	Cao lb/gal	Lime Conc %
1.095	1.000	22.841

**Wheelabrator
SOUTH BROWARD
Emission Test Log**

Date: 3/29/2011
Start Time: 12:21:00
End Time: 13:30
TEST 13B

Unit 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
477.81	314.57	30.76	22.56	8.1947	301.21	6.30	-10.09	175.77	435.15

Unit 2

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	%	%
182.53	898.72	816.86	79.78	-0.10	399.84	973.68	6.16	6.00	8.92

Lime Slurry 3/29/2011
S.G. 1.085
Lb/gal 0.885

Specific Gravity	Cao lb/gal	Lime Conc %
1.085	0.885	25.772

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Wheelabrator SOUTH BROWARD Emission Test Log

Date: 3/29/2011
Start Time: 13:49:00
End Time: 14:57
TEST 13B

Unit 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
465.53	314.70	25.38	18.44	6.9416	300.07	6.40	-9.64	187.96	396.24

Unit 2

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNGR CHEM FLOW	FURNACE O2	OUTLET O2
KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
192.04	904.57	802.35	69.82	-0.10	388.43	983.54	19.63	4.61	7.61

Lime Slurry 3/29/2011
S.G. 1.091
Lb/gal 0.951

Specific Gravity	Cao lb/gal	Lime Conc %
1.091	0.951	27.777

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/29/2011
Start Time: 15:11:00
End Time: 16:23
TEST 13B

Unit 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
480.73	315.30	31.69	22.45	9.2404	298.55	6.51	-10.32	182.44	552.47

Unit 2

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNGR CHEM FLOW	FURNACE O2	OUTLET O2
KLBS/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
189.45	903.27	818.62	79.03	-0.09	399.48	979.63	10.62	5.50	8.53

Lime Slurry 3/29/2011
S.G. 1.095
Lb/gal 0.996

Specific Gravity	Cao lb/gal	Lime Conc %
1.095	0.996	20.703

**Wheelabrator
SOUTH BROWARD
Emission Test Log**

Date: 3/30/2011
Start Time: 6:47:00
End Time: 7:47:00
TEST 26A

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
474.98	314.73	33.52	25.76	7.75	297.57	5.45	0.20	184.29	387.19

Unit 3

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	EGONO 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	%	%
188.59	894.92	822.55	73.88	-0.11	381.91	1112.87	7.66	5.23	8.43

Lime Slurry 3/30/2011
S.G. 1.080
Lb/gal 0.832

Specific Gravity	CaO lb/gal	Lime Conc %
1.080	0.832	25.570

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/30/2011
Start Time: 8:06:00
End Time: 9:06:00
TEST 26A

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
467.82	315.03	31.03	14.77	16.26	299.48	2.09	0.20	184.02	795.05

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	%	%
189.47	894.64	828.63	68.92	-0.11	374.89	1115.22	3.88	4.64	7.81

Lime Slurry 3/30/2011
S.G. 1.078
Lb/gal 0.815

Specific Gravity	CaO lb/gal	Lime Conc %
1.078	0.815	28.189

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Wheelabrator **SOUTH BROWARD** **Emission Test Log**

Date: 3/30/2011
 Start Time: 9:22:00
 End Time: 10:22:00
 TEST 26A

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
467.80	314.96	30.61	18.92	11.69	298.01	2.12	0.20	184.21	620.20

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	%	%
188.88	896.24	825.63	67.34	-0.10	373.22	1137.60	3.49	4.52	7.80

Lime Slurry 3/30/2011
 S.G. 1.085
 Lb/gal 0.885

Specific Gravity	CaO lb/gal	Lime Conc %
1.085	0.885	26.599

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/28/2011
Start Time: 6:31:00
End Time: 8:43:00
TEST 5/29

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
469.59	315.03	33.97	21.80	12.17	300.27	2.60	0.20	183.99	668.78

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	%	%
188.56	897.14	825.50	74.69	-0.10	382.15	1078.47	6.62	5.50	8.78

Lime Slurry 3/28/2011
S.G. 1.088
Lb/gal 0.916

Specific Gravity	CaO lb/gal	Lime Conc %
1.088	0.916	23.171

Wheelabrator **SOUTH BROWARD** **Emission Test Log**

Date: 3/28/2011
 Start Time: 9:05:00
 End Time: 11:19:00
 TEST 5/29

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
475.98	314.93	35.96	26.82	9.15	299.56	3.53	0.20	183.35	463.75

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	%	%
187.98	895.62	824.07	76.29	-0.11	384.28	1074.69	5.87	6.02	9.08

Lime Slurry 3/28/2011
S.G. 1.081
Lb/gal 0.845

Specific Gravity	CaO lb/gal	Lime Conc %
1.081	0.845	23.609

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/28/2011
Start Time: 11:43:00
End Time: 13:55:00
TEST 5/29

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
478.01	315.35	35.34	23.68	11.66	300.28	3.66	0.20	183.98	569.98

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	%	%
188.43	895.96	824.53	75.77	-0.10	382.64	1077.73	6.89	5.87	9.00

Lime Slurry 3/28/2011
S.G. 1.078
Lb/gal 0.814

Specific Gravity	CaO lb/gal	Lime Conc %
1.078	0.814	24.940

**Wheelabrator
SOUTH BROWARD
Emission Test Log**

Date: 3/28/2011
Start Time: 9:05:00
End Time: 13:25:00
TEST 23

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
476.27	315.14	35.73	25.54	10.19	299.73	3.40	0.20	183.63	509.43

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	%	%
187.97	895.68	823.77	75.96	-0.10	383.30	1077.17	6.08	5.91	9.03

Lime Slurry 3/28/2011
S.G. 1.080
Lb/gal 0.834

Specific Gravity	CaO lb/gal	Lime Conc %
1.080	0.834	24.076

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/29/2011
Start Time: 6:41:00
End Time: 10:59:00
TEST 23

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
483.67	315.04	37.12	26.76	10.36	297.89	4.93	0.20	182.15	583.36

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	%	%
186.86	888.94	823.10	78.90	-0.10	386.34	1076.31	5.93	6.03	9.22

Lime Slurry 3/29/2011
S.G. 1.090
Lb/gal 0.939

Specific Gravity	CaO lb/gal	Lime Conc %
1.090	0.939	20.690

Wheelabrator SOUTH BROWARD Emission Test Log

Date: 3/29/2011
Start Time: 11:38:00
End Time: 15:59:00
TEST 23

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
484.86	314.99	37.66	29.70	7.95	297.23	5.78	0.20	182.41	441.15

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	%	%
187.17	892.46	824.72	77.63	-0.10	385.13	1097.18	7.41	5.73	9.03

Lime Slurry 3/29/2011
S.G. 1.088
Lb/gal 0.924

Specific Gravity	CaO lb/gal	Lime Conc %
1.088	0.924	20.785

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/30/2011
 Start Time: 10:40:00
 End Time: 11:47:00
 TEST 13B

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
470.32	315.06	32.11	20.46	11.64	297.62	3.00	0.20	183.70	669.19

Unit 3

FEED H2O FLOW	SH OUT STM PRESS	FINAL STM TEMP	TOT AIR FLOW	FURNACE DRAFT	ECONO OUT TEMP	SH ROLL AVG	SNGR CHEM FLOW	FURNACE O2	OUTLET O2
KLBs/hr	DEG F	DEG F	KSCFM	" H2O	DEG F	DEG F	GPH	%	%
187.97	897.98	823.69	68.29	-0.09	375.55	1112.90	3.08	4.82	8.13

Lime Slurry 3/30/2011
 S.G. 1.092
 Lb/gal 0.958

Specific Gravity	CaO lb/gal	Lime Conc %
1.092	0.958	23.423

Wheelabrator SOUTH BROWARD Emission Test Log

Date: 3/30/2011
Start Time: 12:04:00
End Time: 13:12:00
TEST 13B

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
480.92	314.99	36.60	30.04	6.56	297.18	4.74	0.20	178.66	394.05

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	%	%
182.04	894.98	820.77	77.09	-0.19	383.91	1100.01	6.42	6.48	9.49

Lime Slurry 3/30/2011
S.G. 1.095
Lb/gal 1.001

Specific Gravity	CaO lb/gal	Lime Conc %
1.095	1.001	19.701

Wheelabrator
SOUTH BROWARD
Emission Test Log

Date: 3/30/2011
Start Time: 13:26:00
End Time: 14:36:00
TEST 13B

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
484.44	314.82	36.70	30.09	6.61	299.38	2.67	0.20	185.46	407.99

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	%	%
189.86	899.25	827.54	74.89	-0.10	384.03	1096.21	9.65	5.29	8.40

Lime Slurry 3/30/2011
S.G. 1.098
Lb/gal 1.028

Specific Gravity	CaO lb/gal	Lime Conc %
1.098	1.028	18.853

C - 51

Wheelabrator South Broward

Carbon Feeder Calibration

Feeder	A	B	C	D
Boiler #		3	2	1
Time		06:40	06:30	07:00
Old Zero		164.85	138.85	162.60
New Zero		169.91	143.12	162.60
Difference %	#VALUE!	8.436 #VALUE!	7.113 #DIV/0!	-6.173 #VALUE!
Calibration Weight		49.26	49.26	49.26
Scale Factor Old		4403.6006	4284.0059	4177.3975
Scale Factor New		4379.8428	4331.6147	4201.7388
Difference %	#VALUE!	.443 #VALUE!	.912 #DIV/0!	0.478 #VALUE!
Calibrated by:	LR/12			
Date	03/28/11			

Wheelabrator South Broward

Carbon Feeder Calibration				
Feeder	A	B	C	D
Boiler #		3	2	
Time		17:40	17:50	
Old Zero		170.83	141.55	
New Zero		171.10	141.88	
		0.448	0.551	
Difference %	#VALUE!	~~#VALUE!~~	~~#DIV/0!~~	#VALUE!
Calibration Weight		49.26	49.26	
Scale Factor Old		4379.8428	4331.6147	
Scale Factor New		4374.7212	4324.4653	
		0.096	0.135%	
Difference %	#VALUE!	~~#VALUE!~~	~~#DIV/0!~~	#VALUE!
Calibrated by:	IL			
Date	3.28.11			

* FEEDER - D WAS PLACED IN SERVICE BY OPERATIONS. COULD NOT CALIBRATE D-FEEDER.

Wheelabrator South Broward

Carbon Feeder Calibration				
Feeder	A	B	C	D
Boiler #		3	2	1
Time		6.28	6.29	6.31
Old Zero		171.30	142.11	157.97
New Zero		171.69	143.95	157.43
Difference %	#VALUE!	#VALUE!	#DIV/0!	#VALUE!
Calibration Weight		49.26	49.26	49.26
Scale Factor Old		4374.7212	4324.4653	4201.7346
Scale Factor New		4390.4677	4247.3433	4141.3735
Difference %	#VALUE!	#VALUE!	#DIV/0!	#VALUE!
Calibrated by:	RM / MP			
Date	3/29/11			

Wheelabrator South Broward

Carbon Feeder Calibration				
Feeder	A	B	C	D
Boiler #		3	2	1
Time		21:14	21:09	21:13
Old Zero		171.26	145.20	159.72
New Zero		171.61	145.49	160.13
Difference %	#VALUE!	#VALUE!	#DIV/0!	#VALUE!
Calibration Weight		49.26	49.26	49.26
Scale Factor Old		4390.4677	4287.3433	4141.3735
Scale Factor New		4356.1313	4249.0161	4139.7222
Difference %	#VALUE!	#VALUE!	#DIV/0!	#VALUE!
Calibrated by:	J. MARTINEZ			
Date	3-29-11			

Wheelabrator South Broward

Carbon Feeder Calibration

Feeder	A	B	C	D
Boiler #		3	2	L
Time		06:25	06:28	06:31
Old Zero		172.90	145.43	160.20
New Zero		173.05	144.66	159.01
		0.250 %	-1.279 %	-1.969 %
Difference %	#VALUE!	#VALUE!	#DIV/0!	#VALUE!
Calibration Weight		49.26	49.26	49.26
Scale Factor Old		4358.1313	4289.0161	4139.7222
Scale Factor New		4379.9668	4319.7231	4171.6836
		0.411 %	0.588 %	0.634 %
Difference %	#VALUE!	#VALUE!	#DIV/0!	#VALUE!
Calibrated by:	12/LR			
Date	3/30/11			

Wheelabrator South Broward

Carbon Feeder Calibration				
Feeder	A	B	C	D
Boiler #		3	2	
Time		5:20 PM	5:35 P.M	5:45 P.M
Old Zero		172.19 lb	143.63 lb	157.80
New Zero		172.21 lb	142.68 lb	157.40
		-1.638 %	-1.584 %	-0.606 %
Difference %	#VALUE!	~~#VALUE!~~	~~#VALUE!~~	#VALUE!
Calibration Weight		49.25 lb	49.26	49.26
Scale Factor Old		4379.9668	4319.7231	4171.6836
Scale Factor New		4372.4785	4323.5777	4177.9995
		-0.140 %	0.073 %	0.124 %
Difference %	#VALUE!	~~#VALUE!~~	~~#VALUE!~~	#VALUE!
Calibrated by:	IL/LR			
Date	3/30/11			

3-29-11

1800-0600

Bahaw, Jagmann, Velazquez, Rivers, Smith, Armstrong
Leckert, Burton

Blr 1, 2, 3 at 184K, T/G 62 MW's, Vac 25.5"

#13 ACC fan down - bad gearbox

Feeding 45 hrs B & trench to all blr

1835 B skker secured

1900 Changed Pre-Filter on Just Air chiller

Visual on #3-1 thru #35 F.F. hopper - cleared
#3-3 + #3-5 hopper

2110 ETI on site to Cal carbon system

2131 Carbon system back 1/5 - 6 CTS/HR

2138 MRS down - O speed on magnet - 2150 back 1/5

2205 VC-1 Vibe alarm - MRS down - drive belt came off

2215 MRS back 1/5

2220 blew soot on all blr

2225 pulled 1-3 SDA lance

3-29-11 0600-1800 Wendy

Zagada, Reichmuth, Flores, Svejnov, Pango, Sillars, Young, Givster

BLE #1 at 110K #2 #3 at 184K T.G. 55.1 M.W. Vac. 26.5

#13 ACC Fan Down Bad Gearbox

Feed BLES FROM Trench

2210 Recalibrate Carbon Feeders

2220 Vison Delivery (Start at 1112Q to 16102)

2230 STEVE clean Sump Bin, Bottom Feeder

2240 Run out F.A.T.C. 4, 5, 6 pellets, old Pignelli

2250 Start Stack Test Done at 15:36

2305 ASH System Down Mount Work BCI "Stacket" ^{345 at 1030} ~~Remove one~~

2315 Enter overvoltage "Adjust P.F. Above clean"

2315 On Line Test

2320 Airstream on site work A.C. Units by Lab, P.A.C. Room

2330 Remove Filters #1 #2 P.A. Fans.

2340 B skker 1/5 115 SG. at 191°

2350 Start Take Line Delivery "Clean Air Inspect For Fugitive Det"

2350 Mount Work #3 S.D.A. Back Wash Station Replace Butterfly

2400 Valve for Utility Water

2410 Done with Puddle Line Delivery

2423 B skker secure



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

Reprint
Ticket# 50497
Ph: (954) 581-6606

Customer Name CHEMICALLIME CHEMICAL LIME Carrier LIME CHEMICAL LIME
Ticket Date 03/30/2011 Vehicle# LIME2 Volume
Payment Type Credit Account Container
Manual Ticket# Driver
Route Check#
Hauling Ticket# Billing#
Destination Grid
PO# 2766644

	Time	Scale	Operator	Inbound	Gross	
In	03/30/2011 11:37:12	1	jtate1		Tare	78020 1
Out	03/30/2011 14:19:01	3	jtate1		Net	27260 1
					Tons	50760 1
						25.3

Comments

Product	LDX	Qty	UOM	Rate	Tax	Amount	Origin
1 LIME-LIME	100	25.38	Tons	0.00			WSB

Total Tax
Total Ticket

RECEIVED - SIGNATURE

Plant Name: SBWD
General Average Report

Page: 1

Reporting Period: 03/28/2011 to 03/28/2011

Site Name: UNIT1

Data Averaging Type: 15m

Time of Report: 04/21/11 13:14

Rolling Average Interval: 1

CARFED1

Date	Time	(LBS/HR)
03/28/11	08:00	6
	08:15	8
	08:30	7
	08:45	7

Average =	7
Geometric Avg. =	7
Maximum =	8
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	28

* - 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: SEWD

Page: 1

General Average Report

Reporting Period: 03/28/2011 to 03/28/2011

Site Name: UNIT1

Data Averaging Type: 15m

Time of Report: 04/21/11 13:15

Rolling Average Interval: 1

CARFEED1

Date	Time	(LBS/HR)
03/28/11	09:15	7
	09:30	7
	09:45	7
	10:00	7

Average =	7
Geometric Avg. =	7
Maximum =	7
Minimum =	7
Possible Values =	4
Included Values =	4
Total =	28



* - 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

Page: 1

Reporting Period: 03/28/2011 to 03/28/2011

Site Name: UNIT1

Data Averaging Type: 15m

Time of Report: 04/21/11 13:15

Rolling Average Interval: 1

Date	Time	CARFRED1 (LBS/HR)
03/28/11	10:45	7
	11:00	6
	11:15	6
	11:30	8

Average =	7
Geometric Avg. =	7
Maximum =	8
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	27

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

0

Plant Name: SEWD

Page: 1

General Average Report

Reporting Period: 03/28/2011 to 03/28/2011

Site Name: UNIT1

Data Averaging Type: 15m

Time of Report: 04/21/11 13:15

Rolling Average Interval: 1

Date	Time	CARFEED1 (LBS/MR)
03/28/11	10:45	7
	11:00	6
	11:15	6
	11:30	8

Average =	7
Geometric Avg. =	7
Maximum =	8
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	27



* - excluded values (missing, OOC, invalid, suspect)
< - missing
T - out-of-control
I - invalid
S - suspect
E - exceedance
P - 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

Page: 1

Reporting Period: 03/28/2011 to 03/28/2011

Site Name: UNIT1

Data Averaging Type: 15m

Time of Report: 04/21/11 13:15

Rolling Average Interval: 1

Date	Time	CARFEED1 (LBS/HR)
03/28/11	12:15	7
	12:30	7
	12:45	8
	13:00	6

Average =	7
Geometric Avg. =	7
Maximum =	8
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	29

al

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

Plant Name: SBWD

Page: 1

General Average Report

Reporting Period: 03/28/2011 to 03/28/2011

Site Name: UNIT1

Time of Report: 04/21/11 13:17

Data Averaging Type: 15m

Rolling Average Interval: 1

CARFEED1

Date	Time	(LBS/HR)
03/28/11	13:45	7
	14:00	8
	14:15	7
	14:30	7

Average =	7
Geometric Avg. =	7
Maximum =	8
Minimum =	7
Possible Values =	4
Included Values =	4
Total =	29



* - 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

Page: 1

General Average Report

Reporting Period: 03/28/2011 to 03/28/2011

Site Name: UNIT1

Time of Report: 04/21/11 13:17

Data Averaging Type: 15m

Rolling Average Interval: 1

CARFEED1

Date	Time	(LBS/HR)
03/28/11	15:15	7
	15:30	7
	15:45	6
	16:00	6

Average =	6
Geometric Avg. =	6
Maximum =	7
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	25



* - 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: SEWD

Page: 1

General Average Report

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT2

Data Averaging Type: 15m

Time of Report: 04/21/11 13:18

Rolling Average Interval: 1

CARFEED2

Date	Time	(LBS/HR)
03/29/11	08:00	6
	08:15	6
	08:30	6
	08:45	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	25

al

* - 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

Page: 1

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT2

Data Averaging Type: 15m

Time of Report: 04/21/11 13:19

Rolling Average Interval: 1

Date	Time	CARFEED2 (LBS/HR)
03/29/11	09:30	6
	09:45	6
	10:00	6
	10:15	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	25

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

Page: 1

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT2
Data Averaging Type: 15m

Time of Report: 04/21/11 13:19
Rolling Average Interval: 1

Date	Time	CARFEED2 (LBS/HR)
03/29/11	10:45	6
	11:00	6
	11:15	6
	11:30	6

Average =	6
Geometric Avg. =	6.
Maximum =	6
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	25



* - 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

Page: 1

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT2
Data Averaging Type: 15m

Time of Report: 04/21/11 13:20
Rolling Average Interval: 1

Date	Time	CARFEED2 (LBS/KR)
03/29/11	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 =	5
Included Values =	5
Total =	31

al

* - 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

Page: 1

General Average Report

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT2

Data Averaging Type: 15m

Time of Report: 04/21/11 13:20

Rolling Average Interval: 1

CARFEED2

Date	Time	(LBS/HR)
03/29/11	15:00	6
	15:15	6
	15:30	6
	15:45	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	25



* - 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

Page: 1

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT2

Data Averaging Type: 15m

Time of Report: 04/21/11 13:21

Rolling Average Interval: 1

Date	Time	CARFEEED2 (LBS/HR)
03/29/11	16:15	5
	16:30	6
	16:45	6
	17:00	6
	17:15	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	5
Possible Values =	5
Included Values =	5
Total =	30



* - 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

Page: 1

Reporting Period: 03/30/2011 to 03/30/2011

Site Name: UNIT3
Data Averaging Type: 15m

Time of Report: 04/21/11 13:21
Rolling Average Interval: 1

Date	Time	CARFEED3 (LBS/HR)
03/30/11	08:00	6
	08:15	6
	08:30	6
	08:45	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	24



* - 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

Page: 1

Reporting Period: 03/30/2011 to 03/30/2011

Site Name: UNIT3

Data Averaging Type: 15m

Time of Report: 04/21/11 13:22

Rolling Average Interval: 1

Date	Time	CARFEED3 (LBS/HR)
03/30/11	09:15	6
	09:30	6
	09:45	6
	10:00	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	24



* - 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

Page: 1

General Average Report

Reporting Period: 03/30/2011 to 03/30/2011

Site Name: UNIT3

Time of Report: 04/21/11 13:22

Data Averaging Type: 15m

Rolling Average Interval: 1

CARFEED3

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

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	4
Included Values =	4
Total =	24



* - 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

Page: 1

Reporting Period: 03/28/2011 to 03/28/2011

Site Name: UNIT3

Data Averaging Type: 15m

Time of Report: 04/21/11 13:23

Rolling Average Interval: 1

Date	Time	CARFEED3 (LBS/HR)
03/28/11	10:15	6
	10:30	6
	10:45	6
	11:00	6
	11:15	6
	11:30	6
	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

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	17
Included Values =	17
Total =	104



* - 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

Page: 1

General Average Report

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT3

Data Averaging Type: 15m

Time of Report: 04/21/11 13:24

Rolling Average Interval: 1

CARFEED3

Date	Time	(LBS/HR)
03/29/11	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
	11:15	6
	11:30	6
	11:45	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	17
Included Values =	17
Total =	104



* - 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

Page: 1

Reporting Period: 03/29/2011 to 03/29/2011

Site Name: UNIT3

Data Averaging Type: 15m

Time of Report: 04/21/11 13:24

Rolling Average Interval: 1

Date	Time	CARFEED3 (LBS/HR)
03/29/11	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	6
	15:45	6
	16:00	6
	16:15	6
	16:30	6
	16:45	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	17
Included Values =	17
Total =	103



* - 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

Page: 1

Reporting Period: 03/30/2011 to 03/30/2011

Site Name: UNIT3
Data Averaging Type: 15m

Time of Report: 04/21/11 13:25
Rolling Average Interval: 1

Date	Time	CARFEED3 (LBS/HR)
03/30/11	11:45	6
	12:00	6
	12:15	6
	12:30	6
	12:45	6

Average =	6
Geometric Avg. =	6
Maximum =	6
Minimum =	6
Possible Values =	5
Include: Values =	5
Total =	30



* - 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

Page: 1

Reporting Period: 03/30/2011 to 03/30/2011

Site Name: UNIT3

Data Averaging Type: 15m

Time of Report: 04/21/11 13:25

Rolling Average Interval: 1

Date	Time	CARFEED3 (LBS/HR)
03/30/11	14:30	6
	14:45	6
	15:00	6
	15:15	6
	15:30	7

Average =	6
Geometric Avg. =	6
Maximum =	7
Minimum =	6
Possible Values =	5
Included Values =	5
Total =	31



* - 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, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

PARAMETERS

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

QA/QC Initials: MR

Date: 5/1/14



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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:41	10:15	15:16	
Stop Time (approx.)	09:53	15:00	17:27	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9961	0.9961	0.9961	
C _p Pitot tube coefficient	0.8300	0.8300	0.8300	
P _g Static pressure (in. H ₂ O)	-11.3000	-10.3000	-10.0000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	30.00	30.00	30.00	30.0000
D _n Nozzle diameter (in.)	0.2700	0.2700	0.2700	
O ₂ Oxygen (dry volume %)	8.9700	8.9600	9.4300	9.1200
CO ₂ Carbon dioxide (dry volume %)	10.0700	10.4900	10.2900	10.2833
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.9600	80.5500	80.2800	80.5967
V _{lc} Total Liquid collected (ml)	438.70	421.60	455.80	
V _m Volume metered, meter conditions (ft ³)	69.5300	67.4000	72.4580	
T _m Dry gas meter temperature (°F)	81.7800	83.8600	82.1600	
T _s Sample temperature (°F)	301.1200	300.7600	302.2400	301.3733
ΔH Meter box orifice pressure drop (in. H ₂ O)	0.9848	0.9288	1.0652	
θ Total sampling time (min)	125.0	125.0	125.0	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	20.6452	19.8405	21.4499	20.6452
V _{mstd} Volume metered, standard (dscf)	67.8139	65.4761	70.6340	67.9747
P _s Sample gas pressure, absolute (in. Hg)	29.1691	29.2426	29.2647	29.2255
P _v Vapor pressure, actual (in. Hg)	29.1691	29.2426	29.2647	29.2255
B _{wo} Moisture measured in sample (% by volume)	23.3387	23.2551	23.2939	23.2959
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	23.3387	23.2551	23.2939	23.2959
√ΔP Velocity head (√in. H ₂ O)	0.6280	0.6034	0.6474	0.6263
M _d MW of sample gas, dry (lb/lb-mole)	29.9700	30.0368	30.0236	30.0101
M _s MW of sample gas, wet (lb/lb-mole)	27.1764	27.2376	27.2228	27.2123
V _s Velocity of sample (ft/sec)	43.6638	41.8437	44.9364	43.4813
%I Isokinetic sampling (%)	100.5121	100.8560	101.4846	100.9509
Q _a Volumetric flow rate, actual (acfm)	167,669	160,680	172,556	166,968
Q _s Volumetric flow rate, standard (scfm)	113,395	108,994	116,911	113,100
Q _{std} Volumetric flow rate, dry standard (dscfm)	86,930	83,647	89,678	86,752
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	74,610	71,852	74,000	73,488
Q _a Volumetric flow rate, actual (acf/hr)	10,060,134	9,640,780	10,353,353	10,018,089
Q _s Volumetric flow rate, standard (scf/hr)	6,803,717	6,539,635	7,014,646	6,786,000
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,215,818	5,018,835	5,380,662	5,205,105
Q _a Volumetric flow rate, actual (m ³ /hr)	284,909	273,033	293,213	283,718
Q _s Volumetric flow rate, standard (m ³ /hr)	192,685	185,206	198,659	192,184
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	147,715	142,136	152,384	147,412
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	126,780	122,094	125,744	124,873
Q _s Volumetric flow rate, normal (Nm ³ /hr)	179,548	172,579	185,114	179,080
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	137,644	132,445	141,994	137,361
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	118,136	113,770	117,170	116,359

Comments:

Average includes 3 runs.

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USEPA Method 5 (FPM) Emission Parameters for FPM

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:41	10:15	15:16	
Stop Time (approx.)	09:53	15:00	17:27	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	182	180	184	182
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
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 %)	8.9700	8.9600	9.4300	9.1200
CO ₂ Carbon dioxide (dry volume %)	10.0700	10.4900	10.2900	10.2833
T _s Sample temperature (°F)	301.1200	300.7600	302.2400	301.3733
B _w Actual water vapor in gas (% by volume)	23.3387	23.2551	23.2939	23.2959
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	167,669	160,680	172,556	166,968
Q _s Volumetric flow rate, standard (scfm)	113,395	108,994	116,911	113,100
Q _{std} Volumetric flow rate, dry standard (dscfm)	86,930	83,647	89,678	86,752
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	74,610	71,852	74,000	73,488
Q _a Volumetric flow rate, actual (acfh)	10,060,134	9,640,780	10,353,353	10,018,089
Q _s Volumetric flow rate, standard (scfh)	6,803,717	6,539,635	7,014,646	6,786,000
Q _{std} Volumetric flow rate, dry standard (dscfh)	5,215,818	5,018,835	5,380,662	5,205,105
Q _a Volumetric flow rate, actual (m ³ /hr)	284,909	273,033	293,213	283,718
Q _s Volumetric flow rate, standard (m ³ /hr)	192,685	185,206	198,659	192,184
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	147,715	142,136	152,384	147,412
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	126,780	122,094	125,744	124,873
Q _a Volumetric flow rate, normal (Nm ³ /hr)	179,548	172,579	185,114	179,080
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	137,644	132,445	141,994	137,361
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	118,136	113,770	117,170	116,359
Sampling Data				
V _{std} Volume metered, standard (dscf)	67.8139	65.4761	70.6340	67.9747
%I Isokinetic sampling (%)	100.5121	100.8560	101.4846	100.9509
Laboratory Data				
m _{filter} Matter collected on filter(s) (g)	0.00030	0.00100	0.00050	
m _s Matter collected in solvent rinse(s) (g)	0.00270	0.00180	0.00170	
m _n Total filterable particulate matter (g)	0.00300	0.00280	0.00220	
n _{NDL} 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)	9.7546E-08	9.4294E-08	6.8678E-08	8.6839E-08
C _{sd7} Particulate Concentration @7% O ₂ (lb/dscf)	1.1365E-07	1.0977E-07	8.3228E-08	1.0222E-07
C _{sd12} Particulate Concentration @12% CO ₂ (lb/dscf)	1.1624E-07	1.0787E-07	8.0091E-08	1.0140E-07
C _a Particulate Concentration (lb/acf)	5.0574E-08	4.9088E-08	3.5692E-08	4.5118E-08
C _{sd} Particulate Concentration (gr/dscf)	0.0007	0.0007	0.0005	0.0006
C _{sd7} Particulate Concentration @7% O ₂ (gr/dscf)	0.0008	0.0008	0.0006	0.0007
C _{sd12} Particulate Concentration @12% CO ₂ (gr/dscf)	0.0008	0.0008	0.0006	0.0007
C _a Particulate Concentration (gr/acf)	0.0004	0.0003	0.0002	0.0003
C _{sd} Particulate Concentration (mg/dscm)	1.5621	1.5100	1.0998	1.3906
C _{sd7} Particulate Concentration @7% O ₂ (mg/dscm)	1.8200	1.7579	1.3328	1.6369
C _{sd12} Particulate Concentration @12% CO ₂ (mg/dscm)	1.8615	1.7273	1.2825	1.6238
C _a Particulate Concentration (mg/m ³ (actual, wet))	0.8099	0.7861	0.5716	0.7225
C _{sd} Particulate Concentration (mg/Nm ³ dry)	1.6764	1.6205	1.1803	1.4924
C _{sd7} Particulate Concentration @7% O ₂ (mg/Nm ³ dry)	1.9532	1.8865	1.4303	1.7567
C _{sd12} Particulate Concentration @12% CO ₂ (mg/Nm ³ dry)	1.9977	1.8537	1.3764	1.7426
E _{lb/hr} Particulate Rate (lb/hr)	0.5088	0.4732	0.3695	0.4505
E _{kg/hr} Particulate Rate (kg/hr)	0.2307	0.2146	0.1676	0.2043
E _{Tyr} Particulate Rate (Ton/yr)	2.2285	2.0728	1.6186	1.9733
E _{Fd} Particulate Rate - F _d -based (lb/MMBtu)	0.0016	0.0016	0.0012	0.0015
E _{Fc} Particulate Rate - F _c -based (lb/MMBtu)	0.0018	0.0016	0.0012	0.0015

Comments:

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: 11182
Unit 1 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Emission Parameters**

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:41	10:15	15:16	
Stop Time (approx.)	09:53	15:00	17:27	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	182.2	180.3	184.0	182.2
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	8.9700	8.9600	9.4300	9.1200
CO ₂ Carbon dioxide (dry volume %)	10.0700	10.4900	10.2900	10.2833
T _s Sample temperature (°F)	301.1200	300.7600	302.2400	301.3733
B _w Actual water vapor in gas (% by volume)	23.3387	23.2551	23.2939	23.2959
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	167,669	160,680	172,556	166,968
Q _s Volumetric flow rate, standard (scfm)	113,395	108,994	116,911	113,100
Q _{std} Volumetric flow rate, dry standard (dscfm)	86,930	83,647	89,678	86,752
Sampling Data				
V _{std} Volume metered, standard (dscf)	67.8139	65.4761	70.6340	67.9747
%I Isokinetic sampling (%)	100.5121	100.8560	101.4846	100.9509
Laboratory Data				
m _{n-1b} Fraction 1B (µg)	0.1015	<0.1000	<0.1000	
m _{n-2b} Fraction 2B (µg)	2.0538	1.8062	2.0364	
m _{n-3a} Fraction 3A (µg)	<0.2000	<0.2000	<0.2000	
m _{n-3b} Fraction 3B (µg)	<0.5000	<0.5000	<0.5000	
m _{n-3c} Fraction 3C (µg)	<0.4000	<0.4000	<0.4000	
m _n Total matter corrected for allowable blanks (µg)	2.1553	1.8062	2.0364	
Mercury Results - Total				
C _{sd} Concentration (lb/dscf)	7.0081E-11	6.0828E-11	6.3570E-11	6.4826E-11
C _{sd7} Concentration @7% O ₂ (lb/dscf)	8.1653E-11	7.0813E-11	7.7037E-11	7.6501E-11
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	8.3513E-11	6.9584E-11	7.4134E-11	7.5743E-11
C _a Concentration (lb/acf)	3.6334E-11	3.1666E-11	3.3037E-11	3.3679E-11
C _{sd} Concentration (µg/dscm)	1.1222E+00	9.7407E-01	1.0180E+00	1.0381E+00
C _{sd7} Concentration @7% O ₂ (µg/dscm)	1.3076E+00	1.1340E+00	1.2336E+00	1.2251E+00
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	1.3373E+00	1.1143E+00	1.1871E+00	1.2129E+00
C _{sd} Concentration (mg/dscm)	1.1222E-03	9.7407E-04	1.0180E-03	1.0381E-03
C _{sd7} Concentration @7% O ₂ (mg/dscm)	1.3076E-03	1.1340E-03	1.2336E-03	1.2251E-03
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	1.3373E-03	1.1143E-03	1.1871E-03	1.2129E-03
C _a Concentration (µg/m ³ (actual,wet))	5.8185E-01	5.0709E-01	5.2905E-01	5.3933E-01
C _{sd} Concentration (µg/Nm ³ dry)	1.2044E+00	1.0453E+00	1.0925E+00	1.1141E+00
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	1.4032E+00	1.2169E+00	1.3239E+00	1.3147E+00
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	1.4352E+00	1.1958E+00	1.2740E+00	1.3017E+00
E _{lb/hr} Rate (lb/hr)	3.6553E-04	3.0528E-04	3.4205E-04	3.3762E-04
E _{g/s} Rate (g/s)	4.6048E-05	3.8459E-05	4.3090E-05	4.2532E-05
E _{1/yr} Rate (Ton/yr)	1.6010E-03	1.3371E-03	1.4982E-03	1.4788E-03
E _{Fd} Rate - Fd-based (lb/MMBtu)	1.1749E-06	1.0190E-06	1.1085E-06	1.1008E-06
E _{Fc} Rate - Fc-based (lb/MMBtu)	1.2666E-06	1.0554E-06	1.1244E-06	1.1488E-06

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Front Half Results**

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:41	10:15	15:16	
Stop Time (approx.)	09:53	15:00	17:27	

Mercury Results - Front Half

C _{sd}	Concentration (lb/dscf)	3.3018E-12	<3.3676E-12	<3.1217E-12	<3.2637E-12
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	3.8471E-12	<3.9205E-12	<3.7831E-12	<3.8502E-12
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	3.9347E-12	<3.8524E-12	<3.6405E-12	<3.8092E-12
C _a	Concentration (lb/acf)	1.7119E-12	<1.7531E-12	<1.6224E-12	<1.6958E-12
C _{sd}	Concentration (µg/dscm)	5.2874E-02	<5.3928E-02	<4.9990E-02	<5.2264E-02
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	6.1605E-02	<6.2781E-02	<6.0581E-02	<6.1656E-02
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	6.3008E-02	<6.1691E-02	<5.8297E-02	<6.0999E-02
C _{sd}	Concentration (mg/dscm)	5.2874E-05	<5.3928E-05	<4.9990E-05	<5.2264E-05
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	6.1605E-05	<6.2781E-05	<6.0581E-05	<6.1656E-05
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	6.3008E-05	<6.1691E-05	<5.8297E-05	<6.0999E-05
C _a	Concentration (µg/m ³ (actual,wet))	2.7413E-02	<2.8074E-02	<2.5980E-02	<2.7156E-02
C _{sd}	Concentration (µg/Nm ³ dry)	5.6743E-02	<5.7874E-02	<5.3648E-02	<5.6088E-02
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	6.6113E-02	<6.7374E-02	<6.5014E-02	<6.6167E-02
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	6.7618E-02	<6.6205E-02	<6.2563E-02	<6.5462E-02
E _{lb/hr}	Rate (lb/hr)	1.7222E-05	<1.6902E-05	<1.6797E-05	<1.6973E-05
E _{g/s}	Rate (g/s)	2.1695E-06	<2.1292E-06	<2.1160E-06	<2.1383E-06
E _{T/yr}	Rate (Ton/yr)	7.5431E-05	<7.4029E-05	<7.3571E-05	<7.4344E-05
E _{Fd}	Rate - Fd-based (lb/MMBtu)	5.5357E-08	<5.6413E-08	<5.4436E-08	<5.5402E-08
E _{Fc}	Rate - Fc-based (lb/MMBtu)	5.9676E-08	<5.8428E-08	<5.5214E-08	<5.7773E-08

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 1-3 Results**

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:41	10:15	15:16	
Stop Time (approx.)	09:53	15:00	17:27	

Mercury Results - Impingers 1-3 Solution

C _{sd}	Concentration (lb/dscf)	6.6779E-11	6.0828E-11	6.3570E-11	6.3725E-11
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	7.7806E-11	7.0813E-11	7.7037E-11	7.5219E-11
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	7.9578E-11	6.9584E-11	7.4134E-11	7.4432E-11
C _a	Concentration (lb/acf)	3.4623E-11	3.1666E-11	3.3037E-11	3.3109E-11
C _{sd}	Concentration (µg/dscm)	1.0694E+00	9.7407E-01	1.0180E+00	1.0205E+00
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	1.2460E+00	1.1340E+00	1.2336E+00	1.2045E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	1.2743E+00	1.1143E+00	1.1871E+00	1.1919E+00
C _{sd}	Concentration (mg/dscm)	1.0694E-03	9.7407E-04	1.0180E-03	1.0205E-03
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	1.2460E-03	1.1340E-03	1.2336E-03	1.2045E-03
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	1.2743E-03	1.1143E-03	1.1871E-03	1.1919E-03
C _a	Concentration (µg/m ³ (actual,wet))	5.5443E-01	5.0709E-01	5.2905E-01	5.3019E-01
C _{sd}	Concentration (µg/Nm ³ dry)	1.1476E+00	1.0453E+00	1.0925E+00	1.0951E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	1.3371E+00	1.2169E+00	1.3239E+00	1.2927E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	1.3676E+00	1.1958E+00	1.2740E+00	1.2791E+00
E _{lb/hr}	Rate (lb/hr)	3.4831E-04	3.0528E-04	3.4205E-04	3.3188E-04
E _{g/s}	Rate (g/s)	4.3879E-05	3.8459E-05	4.3090E-05	4.1809E-05
E _{T/yr}	Rate (Ton/yr)	1.5256E-03	1.3371E-03	1.4982E-03	1.4536E-03
E _{Fd}	Rate - Fd-based (lb/MMBtu)	1.1196E-06	1.0190E-06	1.1085E-06	1.0824E-06
E _{Fc}	Rate - Fc-based (lb/MMBtu)	1.2069E-06	1.0554E-06	1.1244E-06	1.1289E-06

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 4 Results**

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:41	10:15	15:16	
Stop Time (approx.)	09:53	15:00	17:27	

Mercury Results - Impinger 4 Solution

C _{sd}	Concentration (lb/dscf)	<6.5031E-12	<6.7353E-12	<6.2434E-12	<6.4939E-12
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	<7.5769E-12	<7.8409E-12	<7.5662E-12	<7.6613E-12
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	<7.7495E-12	<7.7048E-12	<7.2810E-12	<7.5784E-12
C _a	Concentration (lb/acf)	<3.3716E-12	<3.5063E-12	<3.2447E-12	<3.3742E-12
C _{sd}	Concentration (µg/dscm)	<1.0414E-01	<1.0786E-01	<9.9980E-02	<1.0399E-01
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	<1.2133E-01	<1.2556E-01	<1.2116E-01	<1.2269E-01
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	<1.2410E-01	<1.2338E-01	<1.1659E-01	<1.2136E-01
C _{sd}	Concentration (mg/dscm)	<1.0414E-04	<1.0786E-04	<9.9980E-05	<1.0399E-04
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	<1.2133E-04	<1.2556E-04	<1.2116E-04	<1.2269E-04
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	<1.2410E-04	<1.2338E-04	<1.1659E-04	<1.2136E-04
C _a	Concentration (µg/m ³ (actual,wet))	<5.3992E-02	<5.6148E-02	<5.1960E-02	<5.4033E-02
C _{sd}	Concentration (µg/Nm ³ dry)	<1.1176E-01	<1.1575E-01	<1.0730E-01	<1.1160E-01
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	<1.3021E-01	<1.3475E-01	<1.3003E-01	<1.3166E-01
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	<1.3318E-01	<1.3241E-01	<1.2513E-01	<1.3024E-01
E _{lb/hr}	Rate (lb/hr)	<3.3919E-05	<3.3803E-05	<3.3594E-05	<3.3772E-05
E _{g/s}	Rate (g/s)	<4.2730E-06	<4.2584E-06	<4.2320E-06	<4.2545E-06
E _{T/yr}	Rate (Ton/yr)	<1.4856E-04	<1.4806E-04	<1.4714E-04	<1.4792E-04
E _{Fd}	Rate - Fd-based (lb/MMBtu)	<1.0903E-07	<1.1283E-07	<1.0887E-07	<1.1024E-07
E _{Fc}	Rate - Fc-based (lb/MMBtu)	<1.1753E-07	<1.1686E-07	<1.1043E-07	<1.1494E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:41	10:15	15:16	
Stop Time (approx.)	09:53	15:00	17:27	

Mercury Results - Filtered Permanganate Solution

C _{sd}	Concentration (lb/dscf)	<1.6258E-11	<1.6838E-11	<1.5609E-11	<1.6235E-11
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	<1.8942E-11	<1.9602E-11	<1.8915E-11	<1.9153E-11
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	<1.9374E-11	<1.9262E-11	<1.8202E-11	<1.8946E-11
C _a	Concentration (lb/acf)	<8.4290E-12	<8.7657E-12	<8.1118E-12	<8.4355E-12
C _{sd}	Concentration (µg/dscm)	<2.6034E-01	<2.6964E-01	<2.4995E-01	<2.5998E-01
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	<3.0334E-01	<3.1390E-01	<3.0290E-01	<3.0671E-01
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	<3.1024E-01	<3.0845E-01	<2.9149E-01	<3.0339E-01
C _{sd}	Concentration (mg/dscm)	<2.6034E-04	<2.6964E-04	<2.4995E-04	<2.5998E-04
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	<3.0334E-04	<3.1390E-04	<3.0290E-04	<3.0671E-04
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	<3.1024E-04	<3.0845E-04	<2.9149E-04	<3.0339E-04
C _a	Concentration (µg/m ³ (actual,wet))	<1.3498E-01	<1.4037E-01	<1.2990E-01	<1.3508E-01
C _{sd}	Concentration (µg/Nm ³ dry)	<2.7939E-01	<2.8937E-01	<2.6824E-01	<2.7900E-01
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	<3.2553E-01	<3.3687E-01	<3.2507E-01	<3.2916E-01
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	<3.3294E-01	<3.3102E-01	<3.1282E-01	<3.2559E-01
E _{lb/hr}	Rate (lb/hr)	<8.4797E-05	<8.4508E-05	<8.3985E-05	<8.4430E-05
E _{g/s}	Rate (g/s)	<1.0682E-05	<1.0646E-05	<1.0580E-05	<1.0636E-05
E _{T/yr}	Rate (Ton/yr)	<3.7141E-04	<3.7015E-04	<3.6785E-04	<3.6980E-04
E _{Fd}	Rate - Fd-based (lb/MMBtu)	<2.7257E-07	<2.8207E-07	<2.7218E-07	<2.7561E-07
E _{Fc}	Rate - Fc-based (lb/MMBtu)	<2.9383E-07	<2.9214E-07	<2.7607E-07	<2.8735E-07

Mercury Results - HCl Rinse + HCl/MnO₂ Precipitate

C _{sd}	Concentration (lb/dscf)	<1.3006E-11	<1.3471E-11	<1.2487E-11	<1.2988E-11
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	<1.5154E-11	<1.5682E-11	<1.5132E-11	<1.5323E-11
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	<1.5499E-11	<1.5410E-11	<1.4562E-11	<1.5157E-11
C _a	Concentration (lb/acf)	<6.7432E-12	<7.0126E-12	<6.4895E-12	<6.7484E-12
C _{sd}	Concentration (µg/dscm)	<2.0828E-01	<2.1571E-01	<1.9996E-01	<2.0798E-01
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	<2.4267E-01	<2.5112E-01	<2.4232E-01	<2.4537E-01
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	<2.4819E-01	<2.4676E-01	<2.3319E-01	<2.4272E-01
C _{sd}	Concentration (mg/dscm)	<2.0828E-04	<2.1571E-04	<1.9996E-04	<2.0798E-04
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	<2.4267E-04	<2.5112E-04	<2.4232E-04	<2.4537E-04
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	<2.4819E-04	<2.4676E-04	<2.3319E-04	<2.4272E-04
C _a	Concentration (µg/m ³ (actual,wet))	<1.0798E-01	<1.1230E-01	<1.0392E-01	<1.0807E-01
C _{sd}	Concentration (µg/Nm ³ dry)	<2.2352E-01	<2.3150E-01	<2.1459E-01	<2.2320E-01
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	<2.6042E-01	<2.6950E-01	<2.6005E-01	<2.6333E-01
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	<2.6635E-01	<2.6482E-01	<2.5025E-01	<2.6048E-01
E _{lb/hr}	Rate (lb/hr)	<6.7838E-05	<6.7606E-05	<6.7188E-05	<6.7544E-05
E _{g/s}	Rate (g/s)	<8.5460E-06	<8.5168E-06	<8.4641E-06	<8.5089E-06
E _{T/yr}	Rate (Ton/yr)	<2.9713E-04	<2.9612E-04	<2.9428E-04	<2.9584E-04
E _{Fd}	Rate - Fd-based (lb/MMBtu)	<2.1806E-07	<2.2565E-07	<2.1775E-07	<2.2048E-07
E _{Fc}	Rate - Fc-based (lb/MMBtu)	<2.3507E-07	<2.3371E-07	<2.2086E-07	<2.2988E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Method 5/29 Beryllium (Be) Emission Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:41	10:15	15:16	
Stop Time (approx.)	09:53	15:00	17:27	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	182.2	180.3	184.0	182.2
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	8.9700	8.9600	9.4300	9.1200
CO ₂ Carbon dioxide (dry volume %)	10.0700	10.4900	10.2900	10.2833
T _s Sample temperature (°F)	301.1200	300.7600	302.2400	301.3733
B _w Actual water vapor in gas (% by volume)	23.3387	23.2551	23.2939	23.2959
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	167,669	160,680	172,556	166,968
Q _s Volumetric flow rate, standard (scfm)	113,395	108,994	116,911	113,100
Q _{std} Volumetric flow rate, dry standard (dscfm)	86,930	83,647	89,678	86,752
Sampling Data				
V _{std} Volume metered, standard (dscf)	67.8139	65.4761	70.6340	67.9747
%I Isokinetic sampling (%)	100.5121	100.8560	101.4846	100.9509
Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.0500	<0.0500	<0.0500	
Beryllium Results - Total				
C _{sd} Concentration (lb/dscf)	<1.6258E-12	<1.6838E-12	<1.5609E-12	<1.6235E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	<1.8942E-12	<1.9602E-12	<1.8915E-12	<1.9153E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	<1.9374E-12	<1.9262E-12	<1.8202E-12	<1.8946E-12
C _a Concentration (lb/acf)	<8.4290E-13	<8.7657E-13	<8.1118E-13	<8.4355E-13
C _{sd} Concentration (µg/dscm)	<2.6034E-02	<2.6964E-02	<2.4995E-02	<2.5998E-02
C _{sd7} Concentration @7% O ₂ (µg/dscm)	<3.0334E-02	<3.1390E-02	<3.0290E-02	<3.0671E-02
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	<3.1024E-02	<3.0845E-02	<2.9149E-02	<3.0339E-02
C _{sd} Concentration (mg/dscm)	<2.6034E-05	<2.6964E-05	<2.4995E-05	<2.5998E-05
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<3.0334E-05	<3.1390E-05	<3.0290E-05	<3.0671E-05
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	<3.1024E-05	<3.0845E-05	<2.9149E-05	<3.0339E-05
C _a Concentration (µg/m ³ (actual,wet))	<1.3498E-02	<1.4037E-02	<1.2990E-02	<1.3508E-02
C _{sd} Concentration (µg/Nm ³ dry)	<2.7939E-02	<2.8937E-02	<2.6824E-02	<2.7900E-02
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	<3.2553E-02	<3.3687E-02	<3.2507E-02	<3.2916E-02
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	<3.3294E-02	<3.3102E-02	<3.1282E-02	<3.2559E-02
E _{lb/hr} Rate (lb/hr)	<8.4797E-06	<8.4508E-06	<8.3985E-06	<8.4430E-06
E _{g/s} Rate (g/s)	<1.0682E-06	<1.0646E-06	<1.0580E-06	<1.0636E-06
E _{T/yr} Rate (Ton/yr)	<3.7141E-05	<3.7015E-05	<3.6785E-05	<3.6980E-05
E _{Fd} Rate - Fd-based (lb/MMBtu)	<2.7257E-08	<2.8207E-08	<2.7218E-08	<2.7561E-08
E _{Fc} Rate - Fc-based (lb/MMBtu)	<2.9383E-08	<2.9214E-08	<2.7607E-08	<2.8735E-08

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Method 5/29 Cadmium (Cd) Emission Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:41	10:15	15:16	
Stop Time (approx.)	09:53	15:00	17:27	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	182.2	180.3	184.0	182.2
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	8.9700	8.9600	9.4300	9.1200
CO ₂ Carbon dioxide (dry volume %)	10.0700	10.4900	10.2900	10.2833
T _s Sample temperature (°F)	301.1200	300.7600	302.2400	301.3733
B _w Actual water vapor in gas (% by volume)	23.3387	23.2551	23.2939	23.2959
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	167,669	160,680	172,556	166,968
Q _s Volumetric flow rate, standard (scfm)	113,395	108,994	116,911	113,100
Q _{std} Volumetric flow rate, dry standard (dscfm)	86,930	83,647	89,678	86,752
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	67.8139	65.4761	70.6340	67.9747
%I Isokinetic sampling (%)	100.5121	100.8560	101.4846	100.9509
Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2000	0.3149	
Cadmium Results - Total				
C _{sd} Concentration (lb/dscf)	<6.5031E-12	<6.7353E-12	9.8291E-12	<7.6892E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	<7.5769E-12	<7.8409E-12	1.1911E-11	<9.1098E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	<7.7495E-12	<7.7048E-12	1.1463E-11	<8.9723E-12
C _a Concentration (lb/acf)	<3.3716E-12	<3.5063E-12	5.1082E-12	<3.9954E-12
C _{sd} Concentration (µg/dscm)	<1.0414E-01	<1.0786E-01	1.5740E-01	<1.2313E-01
C _{sd7} Concentration @7% O ₂ (µg/dscm)	<1.2133E-01	<1.2556E-01	1.9075E-01	<1.4588E-01
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	<1.2410E-01	<1.2338E-01	1.8356E-01	<1.4368E-01
C _{sd} Concentration (mg/dscm)	<1.0414E-04	<1.0786E-04	1.5740E-04	<1.2313E-04
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<1.2133E-04	<1.2556E-04	1.9075E-04	<1.4588E-04
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	<1.2410E-04	<1.2338E-04	1.8356E-04	<1.4368E-04
C _a Concentration (µg/m ³ (actual,wet))	<5.3992E-02	<5.6148E-02	8.1801E-02	<6.3980E-02
C _{sd} Concentration (µg/Nm ³ dry)	<1.1176E-01	<1.1575E-01	1.6892E-01	<1.3214E-01
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	<1.3021E-01	<1.3475E-01	2.0470E-01	<1.5655E-01
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	<1.3318E-01	<1.3241E-01	1.9699E-01	<1.5419E-01
E _{lb/hr} Rate (lb/hr)	<3.3919E-05	<3.3803E-05	5.2887E-05	<4.0203E-05
E _{g/s} Rate (g/s)	<4.2730E-06	<4.2584E-06	6.6625E-06	<5.0646E-06
E _{T/yr} Rate (Ton/yr)	<1.4856E-04	<1.4806E-04	2.3165E-04	<1.7609E-04
E _{Fd} Rate - Fd-based (lb/MMBtu)	<1.0903E-07	<1.1283E-07	1.7140E-07	<1.3108E-07
E _{Fc} Rate - Fc-based (lb/MMBtu)	<1.1753E-07	<1.1686E-07	1.7385E-07	<1.3608E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Method 5/29 Lead (Pb) Emission Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:41	10:15	15:16	
Stop Time (approx.)	09:53	15:00	17:27	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	182.2	180.3	184.0	182.2
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	8.9700	8.9600	9.4300	9.1200
CO ₂ Carbon dioxide (dry volume %)	10.0700	10.4900	10.2900	10.2833
T _s Sample temperature (°F)	301.1200	300.7600	302.2400	301.3733
B _w Actual water vapor in gas (% by volume)	23.3387	23.2551	23.2939	23.2959
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	167,669	160,680	172,556	166,968
Q _s Volumetric flow rate, standard (scfm)	113,395	108,994	116,911	113,100
Q _{std} Volumetric flow rate, dry standard (dscfm)	86,930	83,647	89,678	86,752
Sampling Data				
V _{std} Volume metered, standard (dscf)	67.8139	65.4761	70.6340	67.9747
%I Isokinetic sampling (%)	100.5121	100.8560	101.4846	100.9509
Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	1.2360	0.2977	0.5696	
Lead Results - Total				
C _{sd} Concentration (lb/dscf)	4.0188E-11	1.0026E-11	1.7782E-11	2.2665E-11
C _{sd7} Concentration @7% O ₂ (lb/dscf)	4.6824E-11	1.1672E-11	2.1549E-11	2.6681E-11
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	4.7890E-11	1.1469E-11	2.0736E-11	2.6699E-11
C _a Concentration (lb/acf)	2.0836E-11	5.2194E-12	9.2411E-12	1.1765E-11
C _{sd} Concentration (µg/dscm)	6.4355E-01	1.6055E-01	2.8475E-01	3.6295E-01
C _{sd7} Concentration @7% O ₂ (µg/dscm)	7.4982E-01	1.8691E-01	3.4507E-01	4.2727E-01
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	7.6689E-01	1.8366E-01	3.3207E-01	4.2754E-01
C _{sd} Concentration (mg/dscm)	6.4355E-04	1.6055E-04	2.8475E-04	3.6295E-04
C _{sd7} Concentration @7% O ₂ (mg/dscm)	7.4982E-04	1.8691E-04	3.4507E-04	4.2727E-04
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	7.6689E-04	1.8366E-04	3.3207E-04	4.2754E-04
C _a Concentration (µg/m ³ (actual, wet))	3.3366E-01	8.3581E-02	1.4798E-01	1.8841E-01
C _{sd} Concentration (µg/Nm ³ dry)	6.9064E-01	1.7230E-01	3.0558E-01	3.8951E-01
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	8.0469E-01	2.0058E-01	3.7032E-01	4.5853E-01
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	8.2301E-01	1.9710E-01	3.5636E-01	4.5882E-01
E _{lb/hr} Rate (lb/hr)	2.0961E-04	5.0319E-05	9.5676E-05	1.1854E-04
E _{g/s} Rate (g/s)	2.6406E-05	6.3390E-06	1.2053E-05	1.4933E-05
E _{T/yr} Rate (Ton/yr)	9.1810E-04	2.2040E-04	4.1906E-04	5.1919E-04
E _{Fd} Rate - Fd-based (lb/MMBtu)	6.7377E-07	1.6795E-07	3.1007E-07	3.8393E-07
E _{Fc} Rate - Fc-based (lb/MMBtu)	7.2633E-07	1.7395E-07	3.1450E-07	4.0493E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

**USEPA Method 13B (Total Fluorides)
Sampling, Velocity and Moisture Parameters**

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	12:03	13:33	15:02	
Stop Time (approx.)	13:12	14:44	16:11	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9837	0.9837	0.9837	
C _p Pitot tube coefficient	0.8120	0.8120	0.8120	
P _g Static pressure (in. H ₂ O)	-11.3000	-11.3000	-11.3000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	29.95	29.95	29.95	29.9500
D _n Nozzle diameter (in.)	0.2740	0.2740	0.2740	
O ₂ Oxygen (dry volume %)	9.6100	9.5400	9.2900	9.4800
CO ₂ Carbon dioxide (dry volume %)	10.0400	10.0800	10.3300	10.1500
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.3500	80.3800	80.3800	80.3700
V _{lc} Total Liquid collected (ml)	238.40	239.60	233.10	
V _m Volume metered, meter conditions (ft ³)	39.4900	39.9750	39.0400	
T _m Dry gas meter temperature (°F)	82.2200	90.4200	90.5800	
T _s Sample temperature (°F)	297.0400	299.6400	300.3600	299.0133
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.2460	1.2488	1.1872	
θ Total sampling time (min)	62.5	62.5	62.5	
Flow Results				
V _{watd} Volume of water collected (ft ³)	11.2191	11.2756	10.9697	11.1548
V _{mstd} Volume metered, standard (dscf)	37.9661	37.8601	36.9583	37.5948
P _s Sample gas pressure, absolute (in. Hg)	29.1191	29.1191	29.1191	29.1191
P _v Vapor pressure, actual (in. Hg)	29.1191	29.1191	29.1191	29.1191
B _{wv} Moisture measured in sample (% by volume)	22.8099	22.9478	22.8879	22.8819
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	22.8099	22.9478	22.8879	22.8819
√ΔP Velocity head (√in. H ₂ O)	0.6822	0.6806	0.6664	0.6764
M _d MW of sample gas, dry (lb/lb-mole)	29.9908	29.9944	30.0244	30.0032
M _s MW of sample gas, wet (lb/lb-mole)	27.2557	27.2419	27.2723	27.2566
V _s Velocity of sample (ft/sec)	46.2535	46.2363	45.2634	45.9177
%I Isokinetic sampling (%)	102.0832	102.3685	102.0954	102.1823
Q _a Volumetric flow rate, actual (acfm)	177,613	177,548	173,811	176,324
Q _s Volumetric flow rate, standard (scfm)	120,561	120,104	117,465	119,377
Q _{std} Volumetric flow rate, dry standard (dscfm)	93,061	92,543	90,580	92,061
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	75,587	75,632	75,657	75,625
Q _a Volumetric flow rate, actual (acf/hr)	10,656,802	10,652,853	10,428,685	10,579,447
Q _s Volumetric flow rate, standard (scf/hr)	7,233,669	7,206,239	7,047,918	7,162,608
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,583,676	5,552,563	5,434,799	5,523,679
Q _a Volumetric flow rate, actual (m ³ /hr)	301,807	301,695	295,346	299,616
Q _s Volumetric flow rate, standard (m ³ /hr)	204,862	204,085	199,601	202,849
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	158,133	157,252	153,917	156,434
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	128,440	128,517	128,559	128,505
Q _s Volumetric flow rate, normal (Nm ³ /hr)	190,894	190,170	185,992	189,019
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	147,351	146,530	143,422	145,768
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	119,683	119,754	119,794	119,744

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Method 13B HF Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	12:03	13:33	15:02	
Stop Time (approx.)	13:12	14:44	16:11	
Process Conditions				
R _p Production rate (Klbs/hour)	182.6	181.2	184.0	182.6
P ₁ Fabric Filter Inlet Temperature (°F)	315	316	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 %)	9.6100	9.5400	9.2900	9.4800
CO ₂ Carbon dioxide (dry volume %)	10.0400	10.0800	10.3300	10.1500
T _s Sample temperature (°F)	297.0400	299.6400	300.3600	299.0133
B _w Actual water vapor in gas (% by volume)	22.8099	22.9478	22.8879	22.8819
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	177,613	177,548	173,811	176,324
Q _s Volumetric flow rate, standard (scfm)	120,561	120,104	117,465	119,377
Q _{std} Volumetric flow rate, dry standard (dscfm)	93,061	92,543	90,580	92,061
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	75,587	75,632	75,657	75,625
Q _a Volumetric flow rate, actual (acf/hr)	10,656,802	10,652,853	10,428,685	10,579,447
Q _s Volumetric flow rate, standard (scf/hr)	7,233,669	7,206,239	7,047,918	7,162,608
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,583,676	5,552,563	5,434,799	5,523,679
Q _a Volumetric flow rate, actual (m ³ /hr)	301,807	301,695	295,346	299,616
Q _s Volumetric flow rate, standard (m ³ /hr)	204,862	204,085	199,601	202,849
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	158,133	157,252	153,917	156,434
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	128,440	128,517	128,559	128,505
Q _s Volumetric flow rate, normal (Nm ³ /hr)	190,894	190,170	185,992	189,019
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	147,351	146,530	143,422	145,768
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	119,683	119,754	119,794	119,744
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	37.9661	37.8601	36.9583	37.5948
%I Isokinetic sampling (%)	102.0832	102.3685	102.0954	102.1823
Laboratory Data				
m _n Total HF collected (mg)	<0.0432	<0.0426	<0.0408	
Hydrogen Fluoride (HF) Results				
C _{sd} HF Concentration (lb/dscf)	<2.5093E-09	<2.4789E-09	<2.4360E-09	<2.4747E-09
C _{sd7} HF Concentration @7% O ₂ (lb/dscf)	<3.0894E-09	<3.0331E-09	<2.9165E-09	<3.0130E-09
C _{sd12} HF Concentration @12% CO ₂ (lb/dscf)	<2.9992E-09	<2.9510E-09	<2.8298E-09	<2.9267E-09
C _a HF Concentration (lb/acf)	<1.3148E-09	<1.2920E-09	<1.2695E-09	<1.2921E-09
C _{sd} HF Concentration (ppmdv)	<0.0484	<0.0478	<0.0469	<0.0477
C _{sd7} HF Concentration @7% O ₂ (ppmdv)	<0.0595	<0.0584	<0.0562	<0.0581
C _{sd12} HF Concentration @12% CO ₂ (ppmdv)	<0.0578	<0.0569	<0.0545	<0.0564
C _w HF Concentration (ppmwv)	<0.0373	<0.0368	<0.0362	<0.0368
C _{sd} HF Concentration (mg/dscm)	<0.0402	<0.0397	<0.0390	<0.0396
C _{sd7} HF Concentration @7% O ₂ (mg/dscm)	<0.0495	<0.0486	<0.0467	<0.0482
C _{sd12} HF Concentration @12% CO ₂ (mg/dscm)	<0.0480	<0.0473	<0.0453	<0.0469
C _a HF Concentration (mg/m ³ (actual,wet))	<0.0211	<0.0207	<0.0203	<0.0207
C _{sd} HF Concentration (mg/Nm ³ dry)	<0.0431	<0.0426	<0.0419	<0.0425
C _{sd7} HF Concentration @7% O ₂ (mg/Nm ³ dry)	<0.0531	<0.0521	<0.0501	<0.0518
C _{sd12} HF Concentration @12% CO ₂ (mg/Nm ³ dry)	<0.0515	<0.0507	<0.0486	<0.0503
E _{lb/hr} HF Rate (lb/hr)	<0.0140	<0.0138	<0.0132	<0.0137
E _{kg/hr} HF Rate (kg/hr)	<0.0064	<0.0062	<0.0060	<0.0062
E _{T/yr} HF Rate (Ton/yr)	<0.0614	<0.0603	<0.0580	<0.0599
E _{Fd} HF Rate - Fd-based (lb/MMBtu)	<0.000045	<0.000044	<0.000043	<0.000044
E _{Fc} HF Rate - Fc-based (lb/MMBtu)	<0.000045	<0.000045	<0.000043	<0.000044

Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 SDA Inlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:48	09:11	10:35	
Stop Time (approx.)	08:48	10:11	11:35	
Sampling Conditions				
Y_d Dry gas meter correction factor	0.9983	0.9983	0.9983	
P_g Static pressure (in. H_2O)	-2.1000	-1.9000	-2.0000	
A_s Sample location area (ft^2)	60.1320	60.1320	60.1320	
P_{bar} Barometric pressure (in. Hg)	29.95	29.95	29.95	29.9500
O_2 Oxygen (dry volume %)	8.3900	8.5000	7.9100	8.2667
CO_2 Carbon dioxide (dry volume %)	10.9000	10.8800	11.4100	11.0633
N_2+CO Nitrogen plus carbon monoxide (dry volume %)	80.7100	80.6200	80.6800	80.6700
V_{lc} Total Liquid collected (ml)	175.30	173.50	183.10	
V_m Volume metered, meter conditions (ft^3)	36.7000	37.1970	36.6040	
T_m Dry gas meter temperature ($^{\circ}F$)	90.3333	97.5417	86.5000	
T_s Sample temperature ($^{\circ}F$)	485.3333	484.4167	484.8333	484.8611
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)	8.2496	8.1649	8.6167	8.3437
V_{mstd} Volume metered, standard (dscf)	35.2756	35.2911	35.4301	35.3323
P_s Sample gas pressure, absolute (in. Hg)	29.7956	29.8103	29.8029	29.8029
P_v Vapor pressure, actual (in. Hg)	29.7956	29.8103	29.8029	29.8029
B_{wo} Moisture measured in sample (% by volume)	18.9537	18.7889	19.5626	19.1017
B_{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B_w Actual water vapor in gas (% by volume)	18.9537	18.7889	19.5626	19.1017
M_d MW of sample gas, dry (lb/lb-mole)	30.0796	30.0808	30.1420	30.1008
M_s MW of sample gas, wet (lb/lb-mole)	27.7901	27.8109	27.7667	27.7892

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 SDA Inlet

USEPA Modified Method 26A HCl Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:48	09:11	10:35	
Stop Time (approx.)	08:48	10:11	11:35	
Process Conditions				
R _p Production Rate (Klbs/hour)	185.4	182.8	185.2	184.5
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 %)	8.3900	8.5000	7.9100	8.2667
CO ₂ Carbon dioxide (dry volume %)	10.9000	10.8800	11.4100	11.0633
T _s Sample temperature (°F)	485.3333	484.4167	484.8333	484.8611
B _w Actual water vapor in gas (% by volume)	18.9537	18.7889	19.5626	19.1017
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	35.2756	35.2911	35.4301	35.3323
Laboratory Data				
m _n Total HCl collected (mg)	667.6829	648.8437	597.6021	
Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (lb/dscf)	4.1735E-05	4.0540E-05	3.7192E-05	3.9822E-05
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)	4.6373E-05	4.5444E-05	3.9797E-05	4.3871E-05
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)	4.5947E-05	4.4713E-05	3.9115E-05	4.3259E-05
C _{sd} HCl Concentration (ppmdv)	441.2516	428.6135	393.2149	421.0267
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	490.2796	480.4619	420.7612	463.8342
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)	485.7816	472.7355	413.5477	457.3549
C _w HCl Concentration (ppmwv)	357.6183	348.0816	316.2920	340.6640
C _{sd} HCl Concentration (mg/dscm)	668.3342	649.1920	595.5763	637.7008
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)	742.5935	727.7233	637.2987	702.5385
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)	735.7807	716.0206	626.3729	692.7248
C _{sd} HCl Concentration (mg/Nm ³ dry)	717.2367	696.6939	639.1550	684.3619
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)	796.9296	780.9714	683.9303	753.9438
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)	789.6184	768.4124	672.2051	743.4120
E _{Fd} HCl Rate - Fd-based (lb/MMBtu)	0.6798	0.6662	0.5834	0.6432
E _{Fc} HCl Rate - Fc-based (lb/MMBtu)	0.6969	0.6782	0.5932	0.6561

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:48	09:11	10:35	
Stop Time (approx.)	08:48	10:11	11:35	
Sampling Conditions				
Y_d Dry gas meter correction factor	0.9961	0.9961	0.9961	
P_g Static pressure (in. H ₂ O)	-11.0000	-12.3000	-11.2000	
A_s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P_{bar} Barometric pressure (in. Hg)	29.95	29.95	29.95	29.9500
O_2 Oxygen (dry volume %)	9.4700	9.7700	8.8200	9.3533
CO_2 Carbon dioxide (dry volume %)	10.0500	9.7600	10.5700	10.1267
N_2+CO Nitrogen plus carbon monoxide (dry volume %)	80.4800	80.4700	80.6100	80.5200
V_{lc} Total Liquid collected (ml)	253.50	245.20	260.50	
V_m Volume metered, meter conditions (ft ³)	41.8600	41.8250	41.2700	
T_m Dry gas meter temperature (°F)	84.9167	87.3750	82.4583	
T_s Sample temperature (°F)	300.7500	303.8333	301.5000	302.0278
ΔH Meter box orifice pressure drop (in. H ₂ O)	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)	11.9297	11.5391	12.2591	11.9093
V_{mstd} Volume metered, standard (dscf)	40.5755	40.3595	40.1849	40.3733
P_s Sample gas pressure, absolute (in. Hg)	29.1412	29.0456	29.1265	29.1044
P_v Vapor pressure, actual (in. Hg)	29.1412	29.0456	29.1265	29.1044
B_{wo} Moisture measured in sample (% by volume)	22.7210	22.2340	23.3756	22.7769
B_{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B_w Actual water vapor in gas (% by volume)	22.7210	22.2340	23.3756	22.7769
M_d MW of sample gas, dry (lb/lb-mole)	29.9868	29.9524	30.0440	29.9944
M_s MW of sample gas, wet (lb/lb-mole)	27.2633	27.2949	27.2286	27.2623

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Modified Method 26A HCl Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:48	09:11	10:35	
Stop Time (approx.)	08:48	10:11	11:35	
Process Conditions				
R _p Production Rate (Klbs/hour)	185.4	182.8	185.2	184.5
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 %)	9.4700	9.7700	8.8200	9.3533
CO ₂ Carbon dioxide (dry volume %)	10.0500	9.7600	10.5700	10.1267
T _s Sample temperature (°F)	300.7500	303.8333	301.5000	302.0278
B _w Actual water vapor in gas (% by volume)	22.7210	22.2340	23.3756	22.7769
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	40.5755	40.3595	40.1849	40.3733
Laboratory Data				
m _n Total HCl collected (mg)	15.5025	14.9859	13.0656	
Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (lb/dscf)	8.4245E-07	8.1874E-07	7.1693E-07	7.9271E-07
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)	1.0245E-06	1.0225E-06	8.2494E-07	9.5732E-07
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)	1.0059E-06	1.0066E-06	8.1392E-07	9.4216E-07
C _{sd} HCl Concentration (ppmdv)	8.9069	8.6562	7.5798	8.3810
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	10.8317	10.8106	8.7218	10.1213
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)	10.6351	10.6429	8.6052	9.9611
C _w HCl Concentration (ppmwv)	6.8832	6.7316	5.8079	6.4742
C _{sd} HCl Concentration (mg/dscm)	13.4907	13.1110	11.4806	12.6941
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)	16.4060	16.3740	13.2103	15.3301
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)	16.1083	16.1201	13.0338	15.0874
C _{sd} HCl Concentration (mg/Nm ³ dry)	14.4778	14.0703	12.3206	13.6229
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)	17.6065	17.5721	14.1769	16.4518
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)	17.2870	17.2996	13.9874	16.1913
E _{Fd} HCl Rate - F _d -based (lb/MMBtu)	0.0150	0.0150	0.0121	0.0140
E _{Fc} HCl Rate - F _c -based (lb/MMBtu)	0.0153	0.0153	0.0123	0.0143

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:31	09:59	12:29	
Stop Time (approx.)	09:42	12:10	14:41	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9960	0.9960	0.9960	
C _p Pitot tube coefficient	0.8300	0.8300	0.8300	
P _g Static pressure (in. H ₂ O)	-10.0000	-9.8000	-10.0000	
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.)	0.2700	0.2700	0.2700	
O ₂ Oxygen (dry volume %)	8.0400	8.5200	8.4600	8.3400
CO ₂ Carbon dioxide (dry volume %)	11.2800	10.7900	10.9900	11.0200
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.6800	80.6900	80.5500	80.6400
V _{lc} Total Liquid collected (ml)	392.20	398.30	419.10	
V _m Volume metered, meter conditions (ft ³)	63.1900	65.4150	69.1800	
T _m Dry gas meter temperature (°F)	82.1600	87.3200	88.0600	
T _s Sample temperature (°F)	300.3200	300.2000	300.2800	300.2667
ΔH Meter box orifice pressure drop (in. H ₂ O)	0.7992	0.8468	0.9432	
θ Total sampling time (min)	125.0	125.0	125.0	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	18.4569	18.7440	19.7228	18.9746
V _{mstd} Volume metered, standard (dscf)	61.6555	63.2321	66.7969	63.8948
P _s Sample gas pressure, absolute (in. Hg)	29.3147	29.3294	29.3147	29.3196
P _v Vapor pressure, actual (in. Hg)	29.3147	29.3294	29.3147	29.3196
B _{wo} Moisture measured in sample (% by volume)	23.0388	22.8652	22.7958	22.8999
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	23.0388	22.8652	22.7958	22.8999
√ΔP Velocity head (√in. H ₂ O)	0.5741	0.5800	0.6051	0.5864
M _d MW of sample gas, dry (lb/lb-mole)	30.1264	30.0672	30.0968	30.0968
M _s MW of sample gas, wet (lb/lb-mole)	27.3326	27.3080	27.3392	27.3266
V _s Velocity of sample (ft/sec)	39.6826	40.0971	41.8197	40.5332
%I Isokinetic sampling (%)	99.5582	100.7547	102.0208	100.7779
Q _a Volumetric flow rate, actual (acfm)	152,381	153,973	160,588	155,647
Q _s Volumetric flow rate, standard (scfm)	103,680	104,832	109,269	105,927
Q _{std} Volumetric flow rate, dry standard (dscfm)	79,793	80,862	84,360	81,672
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	73,823	72,019	75,499	73,781
Q _a Volumetric flow rate, actual (acf/hr)	9,142,879	9,238,378	9,635,268	9,338,841
Q _s Volumetric flow rate, standard (scf/hr)	6,220,774	6,289,897	6,556,138	6,355,603
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	4,787,583	4,851,699	5,061,615	4,900,299
Q _a Volumetric flow rate, actual (m ³ /hr)	258,932	261,636	272,876	264,481
Q _s Volumetric flow rate, standard (m ³ /hr)	176,176	178,134	185,674	179,994
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	135,587	137,403	143,348	138,779
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	125,443	122,378	128,291	125,370
Q _s Volumetric flow rate, normal (Nm ³ /hr)	164,164	165,988	173,014	167,722
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	126,343	128,035	133,574	129,317
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	116,890	114,034	119,544	116,822

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Method 5 (FPM) Emission Parameters for FPM

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:31	09:59	12:29	
Stop Time (approx.)	09:42	12:10	14:41	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	185.2	184.2	183.2	184.2
P ₁ Fabric Filter Inlet Temperature (°F)	314	315	315	315
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 %)	8.0400	8.5200	8.4600	8.3400
CO ₂ Carbon dioxide (dry volume %)	11.2800	10.7900	10.9900	11.0200
T _s Sample temperature (°F)	300.3200	300.2000	300.2800	300.2667
B _v Actual water vapor in gas (% by volume)	23.0388	22.8652	22.7958	22.8999
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,381	153,973	160,588	155,647
Q _s Volumetric flow rate, standard (scfm)	103,680	104,832	109,269	105,927
Q _{std} Volumetric flow rate, dry standard (dscfm)	79,793	80,862	84,360	81,672
Q _{stdT} Volumetric flow rate, dry std@7%O ₂ (dscfm)	73,823	72,019	75,499	73,781
Q _a Volumetric flow rate, actual (acf/hr)	9,142,879	9,238,378	9,635,268	9,338,841
Q _s Volumetric flow rate, standard (scf/hr)	6,220,774	6,289,897	6,556,138	6,355,603
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	4,787,583	4,851,699	5,061,615	4,900,299
Q _a Volumetric flow rate, actual (m ³ /hr)	258,932	261,636	272,876	264,481
Q _s Volumetric flow rate, standard (m ³ /hr)	176,176	178,134	185,674	179,994
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	135,587	137,403	143,348	138,779
Q _{stdT} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	125,443	122,378	128,291	125,370
Q _s Volumetric flow rate, normal (Nm ³ /hr)	164,164	165,988	173,014	167,722
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	126,343	128,035	133,574	129,317
Q _{stdT} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	116,890	114,034	119,544	116,822
Sampling Data				
V _{msld} Volume metered, standard (dscf)	61.6555	63.2321	66.7969	63.8948
%I Isokinetic sampling (%)	99.5582	100.7547	102.0208	100.7779
Laboratory Data				
m _{filter} Matter collected on filter(s) (g)	0.00090	0.00170	0.00110	
m _s Matter collected in solvent rinse(s) (g)	0.00030	0.00150	0.00100	
m _n Total filterable particulate matter (g)	0.00120	0.00320	0.00210	
n _{NDL} Number of non-detectable fractions	N/A	N/A	N/A	
DLC Detection level classification	ADL	ADL	ADL	
Filterable Particulate Matter Results				
C _{ad} Particulate Concentration (lb/dscf)	4.2916E-08	1.1159E-07	6.9322E-08	7.4609E-08
C _{adT} Particulate Concentration @7% O ₂ (lb/dscf)	4.6387E-08	1.2529E-07	7.7458E-08	8.3045E-08
C _{ad12} Particulate Concentration @12% CO ₂ (lb/dscf)	4.5655E-08	1.2410E-07	7.5693E-08	8.1817E-08
C _a Particulate Concentration (lb/acf)	2.2473E-08	5.8603E-08	3.6416E-08	3.9164E-08
C _{sd} Particulate Concentration (gr/dscf)	0.0003	0.0008	0.0005	0.0005
C _{sdT} Particulate Concentration @7% O ₂ (gr/dscf)	0.0003	0.0009	0.0005	0.0006
C _{sd12} Particulate Concentration @12% CO ₂ (gr/dscf)	0.0003	0.0009	0.0005	0.0006
C _a Particulate Concentration (gr/acf)	0.0002	0.0004	0.0003	0.0003
C _{sd} Particulate Concentration (mg/dscm)	0.6872	1.7869	1.1101	1.1948
C _{sdT} Particulate Concentration @7% O ₂ (mg/dscm)	0.7428	2.0063	1.2404	1.3298
C _{sd12} Particulate Concentration @12% CO ₂ (mg/dscm)	0.7311	1.9873	1.2121	1.3102
C _a Particulate Concentration (mg/m ³ (actual,wet))	0.3599	0.9384	0.5832	0.6272
C _{sd} Particulate Concentration (mg/Nm ³ dry)	0.7375	1.9177	1.1913	1.2822
C _{sdT} Particulate Concentration @7% O ₂ (mg/Nm ³ dry)	0.7972	2.1531	1.3311	1.4272
C _{sd12} Particulate Concentration @12% CO ₂ (mg/Nm ³ dry)	0.7846	2.1327	1.3008	1.4061
E _{h/hr} Particulate Rate (lb/hr)	0.2055	0.5414	0.3509	0.3659
E _{kg/hr} Particulate Rate (kg/hr)	0.0932	0.2455	0.1591	0.1659
E _{T/yr} Particulate Rate (Ton/yr)	0.8999	2.3713	1.5369	1.6027
E _{Fd} Particulate Rate - F _d -based (lb/MMBtu)	0.0007	0.0018	0.0011	0.0012
E _{Fc} Particulate Rate - F _c -based (lb/MMBtu)	0.0007	0.0019	0.0011	0.0012

Comments:

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: 11182
Unit 2 FF Outlet

USEPA Method 5/29 Mercury (Hg) Emission Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:31	09:59	12:29	
Stop Time (approx.)	09:42	12:10	14:41	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	185.2	184.2	183.2	184.2
P ₁ Fabric Filter Inlet Temperature (°F)	314	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	8.0400	8.5200	8.4600	8.3400
CO ₂ Carbon dioxide (dry volume %)	11.2800	10.7900	10.9900	11.0200
T _s Sample temperature (°F)	300.3200	300.2000	300.2800	300.2667
B _w Actual water vapor in gas (% by volume)	23.0388	22.8652	22.7958	22.8999
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,381	153,973	160,588	155,647
Q _s Volumetric flow rate, standard (scfm)	103,680	104,832	109,269	105,927
Q _{std} Volumetric flow rate, dry standard (dscfm)	79,793	80,862	84,360	81,672
Sampling Data				
V _{std} Volume metered, standard (dscf)	61.6555	63.2321	66.7969	63.8948
%I Isokinetic sampling (%)	99.5582	100.7547	102.0208	100.7779
Laboratory Data				
m _{n-1b} Fraction 1B (µg)	<0.1000	<0.1000	<0.1000	
m _{n-2b} Fraction 2B (µg)	1.6143	1.5609	1.9198	
m _{n-3a} Fraction 3A (µg)	<0.2000	<0.2000	0.6568	
m _{n-3b} Fraction 3B (µg)	<0.5000	<0.5000	0.5106	
m _{n-3c} Fraction 3C (µg)	<0.4000	<0.4000	<0.4000	
m _n Total matter corrected for allowable blanks (µg)	1.6143	1.5609	3.0872	
Mercury Results - Total				
C _{sd} Concentration (lb/dscf)	5.7732E-11	5.4430E-11	1.0191E-10	7.1357E-11
C _{sd7} Concentration @7% O ₂ (lb/dscf)	6.2400E-11	6.1113E-11	1.1387E-10	7.9127E-11
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	6.1417E-11	6.0534E-11	1.1127E-10	7.7742E-11
C _a Concentration (lb/acf)	3.0231E-11	2.8585E-11	5.3535E-11	3.7450E-11
C _{sd} Concentration (µg/dscm)	9.2449E-01	8.7162E-01	1.6319E+00	1.1427E+00
C _{sd7} Concentration @7% O ₂ (µg/dscm)	9.9926E-01	9.7863E-01	1.8235E+00	1.2671E+00
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	9.8350E-01	9.6936E-01	1.7819E+00	1.2449E+00
C _{sd} Concentration (mg/dscm)	9.2449E-04	8.7162E-04	1.6319E-03	1.1427E-03
C _{sd7} Concentration @7% O ₂ (mg/dscm)	9.9926E-04	9.7863E-04	1.8235E-03	1.2671E-03
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	9.8350E-04	9.6936E-04	1.7819E-03	1.2449E-03
C _a Concentration (µg/m ³ (actual, wet))	4.8410E-01	4.5774E-01	8.5729E-01	5.9971E-01
C _{sd} Concentration (µg/Nm ³ dry)	9.9214E-01	9.3539E-01	1.7513E+00	1.2263E+00
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	1.0724E+00	1.0502E+00	1.9569E+00	1.3598E+00
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	1.0555E+00	1.0403E+00	1.9123E+00	1.3360E+00
E _{lb/hr} Rate (lb/hr)	2.7639E-04	2.6408E-04	5.1582E-04	3.5210E-04
E _{g/s} Rate (g/s)	3.4819E-05	3.3267E-05	6.4981E-05	4.4356E-05
E _{T/yr} Rate (Ton/yr)	1.2106E-03	1.1567E-03	2.2593E-03	1.5422E-03
E _{Fd} Rate - Fd-based (lb/MMBtu)	8.9791E-07	8.7937E-07	1.6385E-06	1.1386E-06
E _{Fc} Rate - Fc-based (lb/MMBtu)	9.3149E-07	9.1809E-07	1.6877E-06	1.1791E-06

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Front Half Results**

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:31	09:59	12:29	
Stop Time (approx.)	09:42	12:10	14:41	

Mercury Results - Front Half

C _{sd}	Concentration (lb/dscf)	<3.5763E-12	<3.4872E-12	<3.3011E-12	<3.4548E-12
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	<3.8655E-12	<3.9153E-12	<3.6885E-12	<3.8231E-12
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	<3.8046E-12	<3.8782E-12	<3.6044E-12	<3.7624E-12
C _a	Concentration (lb/acf)	<1.8727E-12	<1.8313E-12	<1.7341E-12	<1.8127E-12
C _{sd}	Concentration (µg/dscm)	<5.7270E-02	<5.5842E-02	<5.2862E-02	<5.5325E-02
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	<6.1901E-02	<6.2698E-02	<5.9066E-02	<6.1222E-02
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	<6.0925E-02	<6.2104E-02	<5.7720E-02	<6.0250E-02
C _{sd}	Concentration (mg/dscm)	<5.7270E-05	<5.5842E-05	<5.2862E-05	<5.5325E-05
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	<6.1901E-05	<6.2698E-05	<5.9066E-05	<6.1222E-05
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	<6.0925E-05	<6.2104E-05	<5.7720E-05	<6.0250E-05
C _a	Concentration (µg/m ³ (actual,wet))	<2.9989E-02	<2.9326E-02	<2.7769E-02	<2.9028E-02
C _{sd}	Concentration (µg/Nm ³ dry)	<6.1460E-02	<5.9928E-02	<5.6730E-02	<5.9373E-02
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	<6.6431E-02	<6.7286E-02	<6.3388E-02	<6.5701E-02
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	<6.5383E-02	<6.6648E-02	<6.1943E-02	<6.4658E-02
E _{lb/hr}	Rate (lb/hr)	<1.7122E-05	<1.6919E-05	<1.6709E-05	<1.6916E-05
E _{g/s}	Rate (g/s)	<2.1570E-06	<2.1313E-06	<2.1049E-06	<2.1311E-06
E _{T/yr}	Rate (Ton/yr)	<7.4994E-05	<7.4104E-05	<7.3184E-05	<7.4094E-05
E _{Fd}	Rate - Fd-based (lb/MMBtu)	<5.5623E-08	<5.6339E-08	<5.3075E-08	<5.5012E-08
E _{Fc}	Rate - Fc-based (lb/MMBtu)	<5.7703E-08	<5.8819E-08	<5.4667E-08	<5.7063E-08

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 1-3 Results**

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:31	09:59	12:29	
Stop Time (approx.)	09:42	12:10	14:41	

Mercury Results - Impingers 1-3 Solution

C _{sd}	Concentration (lb/dscf)	5.7732E-11	5.4430E-11	6.3373E-11	5.8512E-11
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	6.2400E-11	6.1113E-11	7.0811E-11	6.4775E-11
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	6.1417E-11	6.0534E-11	6.9198E-11	6.3716E-11
C _a	Concentration (lb/acf)	3.0231E-11	2.8585E-11	3.3291E-11	3.0702E-11
C _{sd}	Concentration (µg/dscm)	9.2449E-01	8.7162E-01	1.0148E+00	9.3698E-01
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	9.9926E-01	9.7863E-01	1.1339E+00	1.0373E+00
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	9.8350E-01	9.6936E-01	1.1081E+00	1.0203E+00
C _{ed}	Concentration (mg/dscm)	9.2449E-04	8.7162E-04	1.0148E-03	9.3698E-04
C _{ed7}	Concentration @7% O ₂ (mg/dscm)	9.9926E-04	9.7863E-04	1.1339E-03	1.0373E-03
C _{ed12}	Concentration @12% CO ₂ (mg/dscm)	9.8350E-04	9.6936E-04	1.1081E-03	1.0203E-03
C _a	Concentration (µg/m ³ (actual,wet))	4.8410E-01	4.5774E-01	5.3312E-01	4.9165E-01
C _{sd}	Concentration (µg/Nm ³ dry)	9.9214E-01	9.3539E-01	1.0891E+00	1.0055E+00
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	1.0724E+00	1.0502E+00	1.2169E+00	1.1132E+00
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	1.0555E+00	1.0403E+00	1.1892E+00	1.0950E+00
E _{lb/hr}	Rate (lb/hr)	2.7639E-04	2.6408E-04	3.2077E-04	2.8708E-04
E _{g/s}	Rate (g/s)	3.4819E-05	3.3267E-05	4.0410E-05	3.6165E-05
E _{T/yr}	Rate (Ton/yr)	1.2106E-03	1.1567E-03	1.4050E-03	1.2574E-03
E _{Fd}	Rate - Fd-based (lb/MMBtu)	8.9791E-07	8.7937E-07	1.0189E-06	9.3207E-07
E _{Fc}	Rate - Fc-based (lb/MMBtu)	9.3149E-07	9.1809E-07	1.0495E-06	9.6636E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 4 Results**

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:31	09:59	12:29	
Stop Time (approx.)	09:42	12:10	14:41	

Mercury Results - Impinger 4 Solution

C _{sd}	Concentration (lb/dscf)	<7.1526E-12	<6.9743E-12	2.1681E-11	<1.1936E-11
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	<7.7311E-12	<7.8306E-12	2.4225E-11	<1.3262E-11
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	<7.6092E-12	<7.7564E-12	2.3673E-11	<1.3013E-11
C _a	Concentration (lb/acf)	<3.7454E-12	<3.6627E-12	1.1389E-11	<6.2658E-12
C _{sd}	Concentration (µg/dscm)	<1.1454E-01	<1.1168E-01	3.4719E-01	<1.9114E-01
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	<1.2380E-01	<1.2540E-01	3.8793E-01	<2.1238E-01
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	<1.2185E-01	<1.2421E-01	3.7909E-01	<2.0838E-01
C _{sd}	Concentration (mg/dscm)	<1.1454E-04	<1.1168E-04	3.4719E-04	<1.9114E-04
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	<1.2380E-04	<1.2540E-04	3.8793E-04	<2.1238E-04
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	<1.2185E-04	<1.2421E-04	3.7909E-04	<2.0838E-04
C _a	Concentration (µg/m ³ (actual,wet))	<5.9978E-02	<5.8653E-02	1.8239E-01	<1.0034E-01
C _{sd}	Concentration (µg/Nm ³ dry)	<1.2292E-01	<1.1966E-01	3.7259E-01	<2.0512E-01
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	<1.3286E-01	<1.3457E-01	4.1632E-01	<2.2792E-01
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	<1.3077E-01	<1.3330E-01	4.0683E-01	<2.2363E-01
E _{lb/hr}	Rate (lb/hr)	<3.4244E-05	<3.3837E-05	1.0974E-04	<5.9274E-05
E _{g/s}	Rate (g/s)	<4.3139E-06	<4.2627E-06	1.3825E-05	<7.4671E-06
E _{T/yr}	Rate (Ton/yr)	<1.4999E-04	<1.4821E-04	4.8066E-04	<2.5962E-04
E _{Fd}	Rate - Fd-based (lb/MMBtu)	<1.1125E-07	<1.1268E-07	3.4859E-07	<1.9084E-07
E _{Fc}	Rate - Fc-based (lb/MMBtu)	<1.1541E-07	<1.1764E-07	3.5905E-07	<1.9736E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:31	09:59	12:29	
Stop Time (approx.)	09:42	12:10	14:41	

Mercury Results - Filtered Permanganate Solution

C _{sd}	Concentration (lb/dscf)	<1.7882E-11	<1.7436E-11	1.6855E-11	<1.7391E-11
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	<1.9328E-11	<1.9577E-11	1.8833E-11	<1.9246E-11
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	<1.9023E-11	<1.9391E-11	1.8404E-11	<1.8939E-11
C _a	Concentration (lb/acf)	<9.3635E-12	<9.1567E-12	8.8541E-12	<9.1248E-12
C _{sd}	Concentration (µg/dscm)	<2.8635E-01	<2.7921E-01	2.6990E-01	<2.7849E-01
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	<3.0951E-01	<3.1349E-01	3.0158E-01	<3.0819E-01
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	<3.0463E-01	<3.1052E-01	2.9471E-01	<3.0328E-01
C _{sd}	Concentration (mg/dscm)	<2.8635E-04	<2.7921E-04	2.6990E-04	<2.7849E-04
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	<3.0951E-04	<3.1349E-04	3.0158E-04	<3.0819E-04
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	<3.0463E-04	<3.1052E-04	2.9471E-04	<3.0328E-04
C _a	Concentration (µg/m ³ (actual,wet))	<1.4994E-01	<1.4663E-01	1.4179E-01	<1.4612E-01
C _{sd}	Concentration (µg/Nm ³ dry)	<3.0730E-01	<2.9964E-01	2.8965E-01	<2.9886E-01
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	<3.3215E-01	<3.3643E-01	3.2365E-01	<3.3074E-01
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	<3.2692E-01	<3.3324E-01	3.1627E-01	<3.2548E-01
E _{lb/hr}	Rate (lb/hr)	<8.5610E-05	<8.4593E-05	8.5311E-05	<8.5171E-05
E _{g/s}	Rate (g/s)	<1.0785E-05	<1.0657E-05	1.0747E-05	<1.0730E-05
E _{T/yr}	Rate (Ton/yr)	<3.7497E-04	<3.7052E-04	3.7366E-04	<3.7305E-04
E _{Fd}	Rate - Fd-based (lb/MMBtu)	<2.7811E-07	<2.8169E-07	2.7099E-07	<2.7693E-07
E _{Fc}	Rate - Fc-based (lb/MMBtu)	<2.8852E-07	<2.9410E-07	2.7912E-07	<2.8724E-07

Mercury Results - HCl Rinse + HCl/MnO2 Precipitate

C _{sd}	Concentration (lb/dscf)	<1.4305E-11	<1.3949E-11	<1.3204E-11	<1.3819E-11
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	<1.5462E-11	<1.5661E-11	<1.4754E-11	<1.5292E-11
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	<1.5218E-11	<1.5513E-11	<1.4418E-11	<1.5050E-11
C _a	Concentration (lb/acf)	<7.4908E-12	<7.3254E-12	<6.9365E-12	<7.2509E-12
C _{sd}	Concentration (µg/dscm)	<2.2908E-01	<2.2337E-01	<2.1145E-01	<2.2130E-01
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	<2.4761E-01	<2.5079E-01	<2.3626E-01	<2.4489E-01
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	<2.4370E-01	<2.4842E-01	<2.3088E-01	<2.4100E-01
C _{sd}	Concentration (mg/dscm)	<2.2908E-04	<2.2337E-04	<2.1145E-04	<2.2130E-04
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	<2.4761E-04	<2.5079E-04	<2.3626E-04	<2.4489E-04
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	<2.4370E-04	<2.4842E-04	<2.3088E-04	<2.4100E-04
C _a	Concentration (µg/m ³ (actual,wet))	<1.1996E-01	<1.1731E-01	<1.1108E-01	<1.1611E-01
C _{sd}	Concentration (µg/Nm ³ dry)	<2.4584E-01	<2.3971E-01	<2.2692E-01	<2.3749E-01
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	<2.6572E-01	<2.6914E-01	<2.5355E-01	<2.6281E-01
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	<2.6153E-01	<2.6659E-01	<2.4777E-01	<2.5863E-01
E _{lb/hr}	Rate (lb/hr)	<6.8488E-05	<6.7674E-05	<6.6835E-05	<6.7666E-05
E _{g/s}	Rate (g/s)	<8.6278E-06	<8.5254E-06	<8.4196E-06	<8.5243E-06
E _{T/yr}	Rate (Ton/yr)	<2.9998E-04	<2.9641E-04	<2.9274E-04	<2.9638E-04
E _{Fd}	Rate - Fd-based (lb/MMBtu)	<2.2249E-07	<2.2536E-07	<2.1230E-07	<2.2005E-07
E _{Fc}	Rate - Fc-based (lb/MMBtu)	<2.3081E-07	<2.3528E-07	<2.1867E-07	<2.2825E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Method 5/29 Beryllium (Be) Emission Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:31	09:59	12:29	
Stop Time (approx.)	09:42	12:10	14:41	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	185.2	184.2	183.2	184.2
P ₁ Fabric Filter Inlet Temperature (°F)	314	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	8.0400	8.5200	8.4600	8.3400
CO ₂ Carbon dioxide (dry volume %)	11.2800	10.7900	10.9900	11.0200
T _s Sample temperature (°F)	300.3200	300.2000	300.2800	300.2667
B _w Actual water vapor in gas (% by volume)	23.0388	22.8652	22.7958	22.8999
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,381	153,973	160,588	155,647
Q _s Volumetric flow rate, standard (scfm)	103,680	104,832	109,269	105,927
Q _{std} Volumetric flow rate, dry standard (dscfm)	79,793	80,862	84,360	81,672
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	61.6555	63.2321	66.7969	63.8948
%I Isokinetic sampling (%)	99.5582	100.7547	102.0208	100.7779
Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.0500	<0.0500	<0.0500	
Beryllium Results - Total				
C _{sd} Concentration (lb/dscf)	<1.7882E-12	<1.7436E-12	<1.6505E-12	<1.7274E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	<1.9328E-12	<1.9577E-12	<1.8442E-12	<1.9116E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	<1.9023E-12	<1.9391E-12	<1.8022E-12	<1.8812E-12
C _a Concentration (lb/acf)	<9.3635E-13	<9.1567E-13	<8.6706E-13	<9.0636E-13
C _{sd} Concentration (µg/dscm)	<2.8635E-02	<2.7921E-02	<2.6431E-02	<2.7662E-02
C _{sd7} Concentration @7% O ₂ (µg/dscm)	<3.0951E-02	<3.1349E-02	<2.9533E-02	<3.0611E-02
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	<3.0463E-02	<3.1052E-02	<2.8860E-02	<3.0125E-02
C _{sd} Concentration (mg/dscm)	<2.8635E-05	<2.7921E-05	<2.6431E-05	<2.7662E-05
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<3.0951E-05	<3.1349E-05	<2.9533E-05	<3.0611E-05
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	<3.0463E-05	<3.1052E-05	<2.8860E-05	<3.0125E-05
C _a Concentration (µg/m ³ (actual,wet))	<1.4994E-02	<1.4663E-02	<1.3885E-02	<1.4514E-02
C _{sd} Concentration (µg/Nm ³ dry)	<3.0730E-02	<2.9964E-02	<2.8365E-02	<2.9686E-02
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	<3.3215E-02	<3.3643E-02	<3.1694E-02	<3.2851E-02
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	<3.2692E-02	<3.3324E-02	<3.0972E-02	<3.2329E-02
E _{24hr} Rate (lb/hr)	<8.5610E-06	<8.4593E-06	<8.3543E-06	<8.4582E-06
E _{3/s} Rate (g/s)	<1.0785E-06	<1.0657E-06	<1.0524E-06	<1.0655E-06
E _{7yr} Rate (Ton/yr)	<3.7497E-05	<3.7052E-05	<3.6592E-05	<3.7047E-05
E _{Fd} Rate - Fd-based (lb/MMBtu)	<2.7811E-08	<2.8169E-08	<2.6538E-08	<2.7506E-08
E _{Fc} Rate - Fc-based (lb/MMBtu)	<2.8852E-08	<2.9410E-08	<2.7334E-08	<2.8532E-08

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Method 5/29 Cadmium (Cd) Emission Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:31	09:59	12:29	
Stop Time (approx.)	09:42	12:10	14:41	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	185.2	184.2	183.2	184.2
P ₁ Fabric Filter Inlet Temperature (°F)	314	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	8.0400	8.5200	8.4600	8.3400
CO ₂ Carbon dioxide (dry volume %)	11.2800	10.7900	10.9900	11.0200
T _s Sample temperature (°F)	300.3200	300.2000	300.2800	300.2667
B _w Actual water vapor in gas (% by volume)	23.0388	22.8652	22.7958	22.8999
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,381	153,973	160,588	155,647
Q _s Volumetric flow rate, standard (scfm)	103,680	104,832	109,269	105,927
Q _{std} Volumetric flow rate, dry standard (dscfm)	79,793	80,862	84,360	81,672
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	61.6555	63.2321	66.7969	63.8948
%I Isokinetic sampling (%)	99.5582	100.7547	102.0208	100.7779
Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	0.3306	0.3264	0.4915	
Cadmium Results - Total				
C _{std} Concentration (lb/dscf)	1.1823E-11	1.1382E-11	1.6226E-11	1.3144E-11
C _{std7} Concentration @7% O ₂ (lb/dscf)	1.2780E-11	1.2780E-11	1.8130E-11	1.4563E-11
C _{std12} Concentration @12% CO ₂ (lb/dscf)	1.2578E-11	1.2659E-11	1.7717E-11	1.4318E-11
C _a Concentration (lb/acf)	6.1912E-12	5.9777E-12	8.5237E-12	6.8975E-12
C _{std} Concentration (µg/dscm)	1.8934E-01	1.8227E-01	2.5983E-01	2.1048E-01
C _{std7} Concentration @7% O ₂ (µg/dscm)	2.0465E-01	2.0465E-01	2.9033E-01	2.3321E-01
C _{std12} Concentration @12% CO ₂ (µg/dscm)	2.0142E-01	2.0271E-01	2.8371E-01	2.2928E-01
C _{std} Concentration (mg/dscm)	1.8934E-04	1.8227E-04	2.5983E-04	2.1048E-04
C _{std7} Concentration @7% O ₂ (mg/dscm)	2.0465E-04	2.0465E-04	2.9033E-04	2.3321E-04
C _{std12} Concentration @12% CO ₂ (mg/dscm)	2.0142E-04	2.0271E-04	2.8371E-04	2.2928E-04
C _a Concentration (µg/m ³ (actual, wet))	9.9144E-02	9.5724E-02	1.3650E-01	1.1045E-01
C _{std} Concentration (µg/Nm ³ dry)	2.0319E-01	1.9561E-01	2.7884E-01	2.2588E-01
C _{std7} Concentration @7% O ₂ (µg/Nm ³ dry)	2.1962E-01	2.1963E-01	3.1157E-01	2.5027E-01
C _{std12} Concentration @12% CO ₂ (µg/Nm ³ dry)	2.1616E-01	2.1755E-01	3.0447E-01	2.4606E-01
E _{lb/hr} Rate (lb/hr)	5.6605E-05	5.5224E-05	8.2128E-05	6.4653E-05
E _{g/s} Rate (g/s)	7.1310E-06	6.9569E-06	1.0346E-05	8.1447E-06
E _{Tyr} Rate (Ton/yr)	2.4793E-04	2.4188E-04	3.5972E-04	2.8318E-04
E _{Fd} Rate - Fd-based (lb/MMBtu)	1.8389E-07	1.8390E-07	2.6088E-07	2.0956E-07
E _{Fc} Rate - Fc-based (lb/MMBtu)	1.9077E-07	1.9199E-07	2.6871E-07	2.1716E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Method 5/29 Lead (Pb) Emission Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:31	09:59	12:29	
Stop Time (approx.)	09:42	12:10	14:41	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	185.2	184.2	183.2	184.2
P ₁ Fabric Filter Inlet Temperature (°F)	314	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	8.0400	8.5200	8.4600	8.3400
CO ₂ Carbon dioxide (dry volume %)	11.2800	10.7900	10.9900	11.0200
T _s Sample temperature (°F)	300.3200	300.2000	300.2800	300.2667
B _w Actual water vapor in gas (% by volume)	23.0388	22.8652	22.7958	22.8999
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,381	153,973	160,588	155,647
Q _s Volumetric flow rate, standard (scfm)	103,680	104,832	109,269	105,927
Q _{std} Volumetric flow rate, dry standard (dscfm)	79,793	80,862	84,360	81,672
Sampling Data				
V _{std} Volume metered, standard (dscf)	61.6555	63.2321	66.7969	63.8948
%I Isokinetic sampling (%)	99.5582	100.7547	102.0208	100.7779
Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	2.0036	2.0300	2.0770	
Lead Results - Total				
C _{sd} Concentration (lb/dscf)	7.1656E-11	7.0790E-11	6.8564E-11	7.0337E-11
C _{sd7} Concentration @7% O ₂ (lb/dscf)	7.7451E-11	7.9482E-11	7.6611E-11	7.7848E-11
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	7.6230E-11	7.8729E-11	7.4865E-11	7.6608E-11
C _a Concentration (lb/acf)	3.7522E-11	3.7177E-11	3.6018E-11	3.6906E-11
C _{sd} Concentration (µg/dscm)	1.1475E+00	1.1336E+00	1.0980E+00	1.1263E+00
C _{sd7} Concentration @7% O ₂ (µg/dscm)	1.2403E+00	1.2728E+00	1.2268E+00	1.2466E+00
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	1.2207E+00	1.2607E+00	1.1989E+00	1.2268E+00
C _{sd} Concentration (mg/dscm)	1.1475E-03	1.1336E-03	1.0980E-03	1.1263E-03
C _{sd7} Concentration @7% O ₂ (mg/dscm)	1.2403E-03	1.2728E-03	1.2268E-03	1.2466E-03
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	1.2207E-03	1.2607E-03	1.1989E-03	1.2268E-03
C _a Concentration (µg/m ³ (actual,wet))	6.0086E-01	5.9534E-01	5.7678E-01	5.9099E-01
C _{sd} Concentration (µg/Nm ³ dry)	1.2314E+00	1.2166E+00	1.1783E+00	1.2088E+00
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	1.3310E+00	1.3659E+00	1.3166E+00	1.3378E+00
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	1.3100E+00	1.3530E+00	1.2866E+00	1.3165E+00
E _{lb/hr} Rate (lb/hr)	3.4306E-04	3.4345E-04	3.4704E-04	3.4452E-04
E _{g/s} Rate (g/s)	4.3217E-05	4.3267E-05	4.3719E-05	4.3401E-05
E _{T/yr} Rate (Ton/yr)	1.5026E-03	1.5043E-03	1.5201E-03	1.5090E-03
E _{Fd} Rate - Fd-based (lb/MMBtu)	1.1145E-06	1.1437E-06	1.1024E-06	1.1202E-06
E _{Fc} Rate - Fc-based (lb/MMBtu)	1.1561E-06	1.1941E-06	1.1355E-06	1.1619E-06

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Method 13B (Total Fluorides) Sampling, Velocity and Moisture Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	13:21	14:49	16:11	
Stop Time (approx.)	14:30	15:57	17:23	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9960	0.9960	0.9960	
C _p Pitot tube coefficient	0.8120	0.8120	0.8120	
P _g Static pressure (in. H ₂ O)	-10.3000	-10.3000	-10.3000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	30.00	30.00	30.00	30.0000
D _n Nozzle diameter (in.)	0.2740	0.2740	0.2740	
O ₂ Oxygen (dry volume %)	8.8400	7.9100	8.7700	8.5067
CO ₂ Carbon dioxide (dry volume %)	10.6600	11.6500	10.9400	11.0833
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.5000	80.4400	80.2900	80.4100
V _{lc} Total Liquid collected (ml)	235.00	210.90	239.10	
V _m Volume metered, meter conditions (ft ³)	38.3800	34.5900	37.0200	
T _m Dry gas meter temperature (°F)	96.8400	94.5200	91.2200	
T _s Sample temperature (°F)	300.6000	298.9600	299.4000	299.6533
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.1420	0.9288	1.0764	
θ Total sampling time (min)	62.5	62.5	62.5	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	11.0591	9.9250	11.2520	10.7454
V _{mstd} Volume metered, standard (dscf)	36.4307	32.9534	35.4924	34.9588
P _s Sample gas pressure, absolute (in. Hg)	29.2426	29.2426	29.2426	29.2426
P _v Vapor pressure, actual (in. Hg)	29.2426	29.2426	29.2426	29.2426
B _{wc} Moisture measured in sample (% by volume)	23.2873	23.1468	24.0714	23.5018
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	23.2873	23.1468	24.0714	23.5018
√ΔP Velocity head (√in. H ₂ O)	0.6482	0.5849	0.6279	0.6203
M _d MW of sample gas, dry (lb/lb-mole)	30.0592	30.1804	30.1012	30.1136
M _s MW of sample gas, wet (lb/lb-mole)	27.2509	27.3610	27.1883	27.2667
V _s Velocity of sample (ft/sec)	43.9569	39.5422	42.5968	42.0320
%I Isokinetic sampling (%)	103.7614	103.9208	105.2276	104.3033
Q _a Volumetric flow rate, actual (acfm)	168,795	151,842	163,572	161,403
Q _s Volumetric flow rate, standard (scfm)	114,523	103,243	111,154	109,640
Q _{std} Volumetric flow rate, dry standard (dscfm)	87,853	79,346	84,398	83,866
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	76,224	74,151	73,651	74,675
Q _a Volumetric flow rate, actual (acf/hr)	10,127,676	9,110,523	9,814,306	9,684,169
Q _s Volumetric flow rate, standard (scf/hr)	6,871,357	6,194,603	6,669,266	6,578,408
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,271,203	4,760,752	5,063,878	5,031,944
Q _a Volumetric flow rate, actual (m ³ /hr)	286,822	258,015	277,947	274,261
Q _s Volumetric flow rate, standard (m ³ /hr)	194,601	175,435	188,878	186,304
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	149,284	134,827	143,412	142,508
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	129,522	126,000	125,150	126,891
Q _s Volumetric flow rate, normal (Nm ³ /hr)	181,333	163,473	176,000	173,602
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	139,105	125,635	133,634	132,791
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	120,691	117,410	116,617	118,239

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Method 13B HF Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	13:21	14:49	16:11	
Stop Time (approx.)	14:30	15:57	17:23	
Process Conditions				
R _p Production rate(Klbs/hour)	175.8	188.0	182.4	182.1
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 %)	8.8400	7.9100	8.7700	8.5067
CO ₂ Carbon dioxide (dry volume %)	10.6600	11.6500	10.9400	11.0833
T _s Sample temperature (°F)	300.6000	298.9600	299.4000	299.6533
B _w Actual water vapor in gas (% by volume)	23.2873	23.1468	24.0714	23.5018
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	168,795	151,842	163,572	161,403
Q _s Volumetric flow rate, standard (scfm)	114,523	103,243	111,154	109,640
Q _{std} Volumetric flow rate, dry standard (dscfm)	87,853	79,346	84,398	83,866
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	76,224	74,151	73,651	74,675
Q _a Volumetric flow rate, actual (acf/hr)	10,127,676	9,110,523	9,814,306	9,684,169
Q _s Volumetric flow rate, standard (scf/hr)	6,871,357	6,194,603	6,669,266	6,578,408
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,271,203	4,760,752	5,063,878	5,031,944
Q _a Volumetric flow rate, actual (m ³ /hr)	286,822	258,015	277,947	274,261
Q _s Volumetric flow rate, standard (m ³ /hr)	194,601	175,435	188,878	186,304
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	149,284	134,827	143,412	142,508
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	129,522	126,000	125,150	126,891
Q _s Volumetric flow rate, normal (Nm ³ /hr)	181,333	163,473	176,000	173,602
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	139,105	125,635	133,634	132,791
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	120,691	117,410	116,617	118,239
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	36.4307	32.9534	35.4924	34.9588
%I Isokinetic sampling (%)	103.7614	103.9208	105.2276	104.3033
Laboratory Data				
m _n Total HF collected (mg)	<0.0381	<0.0396	<0.0409	
Hydrogen Fluoride (HF) Results				
C _{pd} HF Concentration (lb/dscf)	<2.3065E-09	<2.6493E-09	<2.5428E-09	<2.4995E-09
C _{pd7} HF Concentration @7% O ₂ (lb/dscf)	<2.6584E-09	<2.8349E-09	<2.9138E-09	<2.8024E-09
C _{pd12} HF Concentration @12% CO ₂ (lb/dscf)	<2.5965E-09	<2.7289E-09	<2.7891E-09	<2.7048E-09
C _a HF Concentration (lb/acf)	<1.2005E-09	<1.3844E-09	<1.3120E-09	<1.2990E-09
C _{pd} HF Concentration (ppmdv)	<0.0444	<0.0510	<0.0490	<0.0482
C _{pd7} HF Concentration @7% O ₂ (ppmdv)	<0.0512	<0.0546	<0.0561	<0.0540
C _{pd12} HF Concentration @12% CO ₂ (ppmdv)	<0.0500	<0.0526	<0.0537	<0.0521
C _w HF Concentration (ppmwv)	<0.0341	<0.0392	<0.0372	<0.0368
C _{sd} HF Concentration (mg/dscm)	<0.0369	<0.0424	<0.0407	<0.0400
C _{pd7} HF Concentration @7% O ₂ (mg/dscm)	<0.0426	<0.0454	<0.0467	<0.0449
C _{pd12} HF Concentration @12% CO ₂ (mg/dscm)	<0.0416	<0.0437	<0.0447	<0.0433
C _a HF Concentration (mg/m ³ (actual,wet))	<0.0192	<0.0222	<0.0210	<0.0208
C _{sd} HF Concentration (mg/Nm ³ dry)	<0.0396	<0.0455	<0.0437	<0.0430
C _{pd7} HF Concentration @7% O ₂ (mg/Nm ³ dry)	<0.0457	<0.0487	<0.0501	<0.0482
C _{pd12} HF Concentration @12% CO ₂ (mg/Nm ³ dry)	<0.0446	<0.0469	<0.0479	<0.0465
E _{lb/hr} HF Rate (lb/hr)	<0.0122	<0.0126	<0.0129	<0.0125
E _{kg/hr} HF Rate (kg/hr)	<0.0055	<0.0057	<0.0058	<0.0057
E _{T/yr} HF Rate (Ton/yr)	<0.0533	<0.0552	<0.0564	<0.0550
E _{fd} HF Rate - Fd-based (lb/MMBtu)	<0.000039	<0.000042	<0.000043	<0.000041
E _{fc} HF Rate - Fc-based (lb/MMBtu)	<0.000039	<0.000041	<0.000042	<0.000041

Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 SDA Inlet

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

Run No.	1	2	3	4	Average
Date (2011)	Mar 29	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:50	09:23	10:39	11:54	
Stop Time (approx.)	08:50	10:23	11:39	12:54	
Sampling Conditions					
Y _d Dry gas meter correction factor	0.9983	0.9983	0.9983	0.9983	
P _g Static pressure (in. H ₂ O)	-1.7000	-1.7000	-1.6000	-1.8000	
A _s Sample location area (ft ²)	60.1320	60.1320	60.1320	60.1320	
P _{bar} Barometric pressure (in. Hg)	30.00	30.00	30.00	30.00	30.0000
O ₂ Oxygen (dry volume %)	8.4500	8.1100	8.3100	7.8500	8.1800
CO ₂ Carbon dioxide (dry volume %)	10.9100	11.2800	11.0900	11.5500	11.2075
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.6400	80.6100	80.6000	80.6000	80.6125
V _{lc} Total Liquid collected (ml)	166.80	182.00	171.20	182.00	
V _m Volume metered, meter conditions (ft ³)	35.9880	36.3610	36.8610	36.7050	
T _m Dry gas meter temperature (°F)	84.5000	90.8750	92.4167	88.5000	
T _s Sample temperature (°F)	478.3333	480.5000	475.9167	478.0833	478.2083
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.1708	1.1917	1.2000	1.2000	
θ Total sampling time (min)	60.0	60.0	60.0	60.0	
Flow Results					
V _{wstd} Volume of water collected (ft ³)	7.8496	8.5649	8.0567	8.5649	8.2590
V _{mstd} Volume metered, standard (dscf)	35.0175	34.9728	35.3555	35.4572	35.2008
P _s Sample gas pressure, absolute (in. Hg)	29.8750	29.8750	29.8824	29.8676	29.8750
P _v Vapor pressure, actual (in. Hg)	29.8750	29.8750	29.8824	29.8676	29.8750
B _{wO} Moisture measured in sample (% by volume)	18.3115	19.6724	18.5586	19.4559	18.9996
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)	18.3115	19.6724	18.5586	19.4559	18.9996
M _d MW of sample gas, dry (lb/lb-mole)	30.0836	30.1292	30.1068	30.1620	30.1204
M _s MW of sample gas, wet (lb/lb-mole)	27.8709	27.7431	27.8600	27.7958	27.8174

Comments:

Average includes 4 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 SDA Inlet

USEPA Modified Method 26A HCl Parameters

Run No.	1	2	3	4	Average
Date (2011)	Mar 29	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:50	09:23	10:39	11:54	
Stop Time (approx.)	08:50	10:23	11:39	12:54	
Process Conditions					
R _p Production Rate (Klbs/hour)	171.1	175.8	182.8	183.1	180.6
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	316	315
F _d Oxygen-based F-factor (dscf/MMBtu)	9,750	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	1,820
Cap Capacity factor (hours/year)	8,760	8,760	8,760	8,760	8,760
Gas Conditions					
O ₂ Oxygen (dry volume %)	8.4500	8.1100	8.3100	7.8500	8.0900
CO ₂ Carbon dioxide (dry volume %)	10.9100	11.2800	11.0900	11.5500	11.3067
T _s Sample temperature (°F)	478.3333	480.5000	475.9167	478.0833	478.1667
B _w Actual water vapor in gas (% by volume)	18.3115	19.6724	18.5586	19.4559	19.2290
Sampling Data					
V _{mstd} Volume metered, standard (dscf)	35.0175	34.9728	35.3555	35.4572	35.2618
Laboratory Data					
m _n Total HCl collected (mg)		588.6375	714.3153	792.6244	
Hydrogen Chloride (HCl) Results					
C _{sd} HCl Concentration (lb/dscf)		3.7113E-05	4.4549E-05	4.9291E-05	4.3651E-05
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)		4.0334E-05	4.9185E-05	5.2502E-05	4.7340E-05
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)		3.9482E-05	4.8205E-05	5.1212E-05	4.6300E-05
C _{sd} HCl Concentration (ppmdv)		392.3810	471.0029	521.1381	461.5073
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)		426.4344	520.0112	555.0819	500.5092
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)		417.4266	509.6515	541.4422	489.5068
C _w HCl Concentration (ppmw)		315.1902	383.5915	419.7458	372.8425
C _{sd} HCl Concentration (mg/dscm)		594.3132	713.3965	789.3328	699.0142
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)		645.8916	787.6260	840.7453	758.0876
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)		632.2481	771.9349	820.0861	741.4230
C _{sd} HCl Concentration (mg/Nm ³ dry)		637.7995	765.5962	847.0889	750.1616
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)		693.1520	845.2572	902.2633	813.5575
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)		678.5102	828.4179	880.0924	795.6735
E _{fd} HCl Rate - Fd-based (lb/MMBtu)		0.5913	0.7211	0.7697	0.6940
E _{fc} HCl Rate - Fc-based (lb/MMBtu)		0.5988	0.7311	0.7767	0.7022

Run 1 is not included in the averages. Steam flow less than 10% of boiler rating.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

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

Run No.	1*	2	3	4	Average
Date (2011)	Mar 29	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:50	09:23	10:39	11:54	
Stop Time (approx.)	08:50	10:23	11:39	12:54	
Sampling Conditions					
Y _d Dry gas meter correction factor	0.9960	0.9960	0.9960	0.9960	
P _g Static pressure (in. H ₂ O)	-10.4000	-10.4000	-10.1000	-10.1000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	30.00	30.00	30.00	30.00	30.0000
O ₂ Oxygen (dry volume %)	9.5600	9.3600	9.0800	8.6900	9.0433
CO ₂ Carbon dioxide (dry volume %)	9.8800	10.0600	10.3900	10.8700	10.4400
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.5600	80.5800	80.5300	80.4400	80.5167
V _{lc} Total Liquid collected (ml)	239.80	250.80	242.80	255.00	
V _m Volume metered, meter conditions (ft ³)	42.1300	42.4550	42.4950	42.4450	
T _m Dry gas meter temperature (°F)	81.0000	91.7917	96.8750	97.3333	
T _s Sample temperature (°F)	300.0000	299.9167	300.4167	300.9167	300.4167
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.5000	1.5000	1.5000	1.5000	
θ Total sampling time (min)	60.0	60.0	60.0	60.0	
Flow Results					
V _{wstd} Volume of water collected (ft ³)	11.2850	11.8026	11.4262	12.0003	11.7430
V _{mstd} Volume metered, standard (dscf)	41.1971	40.7030	40.3695	40.2888	40.4538
P _s Sample gas pressure, absolute (in. Hg)	29.2353	29.2353	29.2574	29.2574	29.2500
P _v Vapor pressure, actual (in. Hg)	29.2353	29.2353	29.2574	29.2574	29.2500
B _{w0} Moisture measured in sample (% by volume)	21.5025	22.4788	22.0601	22.9499	22.4963
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)	21.5025	22.4788	22.0601	22.9499	22.4963
M _d MW of sample gas, dry (lb/lb-mole)	29.9632	29.9840	30.0256	30.0868	30.0321
M _s MW of sample gas, wet (lb/lb-mole)	27.3908	27.2901	27.3727	27.3129	27.3253

Comments:

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

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Modified Method 26A HCl Parameters

Run No.	1	2	3	4	Average
Date (2011)	Mar 29	Mar 29	Mar 29	Mar 29	
Start Time (approx.)	07:50	09:23	10:39	11:54	
Stop Time (approx.)	08:50	10:23	11:39	12:54	
Process Conditions					
R _p Production Rate (Klbs/hour)	171.1	175.8	182.8	183.1	180.6
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	316	315
F _d Oxygen-based F-factor (dscf/MMBtu)	9,750	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	1,820
Cap Capacity factor (hours/year)	8,760	8,760	8,760	8,760	8,760
Gas Conditions					
O ₂ Oxygen (dry volume %)	9.5600	9.3600	9.0800	8.6900	9.0433
CO ₂ Carbon dioxide (dry volume %)	9.8800	10.0600	10.3900	10.8700	10.4400
T _s Sample temperature (°F)	300.0000	299.9167	300.4167	300.9167	300.4167
B _w Actual water vapor in gas (% by volume)	21.5025	22.4788	22.0601	22.9499	22.4963
Sampling Data					
V _{mstd} Volume metered, standard (dscf)	41.1971	40.7030	40.3695	40.2888	40.4538
Laboratory Data					
m _n Total HCl collected (mg)		4.5885	6.1805	5.1140	
Hydrogen Chloride (HCl) Results					
C _{sd} HCl Concentration (lb/dscf)		2.4857E-07	3.3758E-07	2.7989E-07	2.8868E-07
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)		2.9941E-07	3.9699E-07	3.1863E-07	3.3834E-07
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)		2.9651E-07	3.8989E-07	3.0899E-07	3.3180E-07
C _{sd} HCl Concentration (ppmdv)		2.6281	3.5691	2.9592	3.0521
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)		3.1655	4.1972	3.3688	3.5771
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)		3.1349	4.1222	3.2668	3.5079
C _w HCl Concentration (ppmwv)		2.0373	2.7818	2.2800	2.3664
C _{sd} HCl Concentration (mg/dscm)		3.9805	5.4059	4.4821	4.6228
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)		4.7946	6.3572	5.1024	5.4181
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)		4.7482	6.2436	4.9480	5.3132
C _{sd} HCl Concentration (mg/Nm ³ dry)		4.2718	5.8015	4.8100	4.9611
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)		5.1454	6.8224	5.4758	5.8145
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)		5.0956	6.7004	5.3100	5.7020
E _{fd} HCl Rate - Fd-based (lb/MMBtu)		0.0044	0.0058	0.0047	0.0050
E _{fc} HCl Rate - Fc-based (lb/MMBtu)		0.0045	0.0059	0.0047	0.0050

Run 1 is not included in the averages. Steam flow less than 10% of boiler rating.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:31	10:05	12:43	
Stop Time (approx.)	09:43	12:19	14:55	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9847	0.9847	0.9847	
C _p Pitot tube coefficient	0.8300	0.8300	0.8300	
P _g Static pressure (in. H ₂ O)	-6.0000	-7.5000	-8.0000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	29.95	29.95	29.95	29.9500
D _n Nozzle diameter (in.)	0.2700	0.2700	0.2700	
O ₂ Oxygen (dry volume %)	9.2600	9.2300	8.8600	9.1167
CO ₂ Carbon dioxide (dry volume %)	10.1300	10.2300	10.6600	10.3400
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.6100	80.5400	80.4800	80.5433
V _{lc} Total Liquid collected (ml)	401.40	399.70	405.40	
V _m Volume metered, meter conditions (ft ³)	65.9850	66.7900	67.9850	
T _m Dry gas meter temperature (°F)	82.9000	83.3200	88.8200	
T _s Sample temperature (°F)	297.0000	295.9600	297.2400	296.7333
ΔH Meter box orifice pressure drop (in. H ₂ O)	0.8712	0.8928	0.9388	
θ Total sampling time (min)	125.0	125.0	125.0	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	18.8899	18.8099	19.0781	18.9260
V _{mstd} Volume metered, standard (dscf)	63.3655	64.0923	64.5925	64.0168
P _s Sample gas pressure, absolute (in. Hg)	29.5088	29.3985	29.3618	29.4230
P _v Vapor pressure, actual (in. Hg)	29.5088	29.3985	29.3618	29.4230
B _{wv} Moisture measured in sample (% by volume)	22.9649	22.6892	22.8015	22.8185
B _{wv} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	22.9649	22.6892	22.8015	22.8185
√ΔP Velocity head (√in. H ₂ O)	0.5779	0.5873	0.6008	0.5887
M _d MW of sample gas, dry (lb/lb-mole)	29.9912	30.0060	30.0600	30.0191
M _s MW of sample gas, wet (lb/lb-mole)	27.2374	27.2819	27.3101	27.2765
V _s Velocity of sample (ft/sec)	39.7935	40.4591	41.4252	40.5593
%I Isokinetic sampling (%)	100.8238	100.1820	99.0437	100.0165
Q _a Volumetric flow rate, actual (acfm)	152,807	155,363	159,073	155,748
Q _s Volumetric flow rate, standard (scfm)	105,117	106,622	108,847	106,862
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,977	82,430	84,028	82,478
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	67,811	69,206	72,784	69,934
Q _a Volumetric flow rate, actual (acf/hr)	9,168,417	9,321,782	9,544,363	9,344,854
Q _s Volumetric flow rate, standard (scf/hr)	6,306,998	6,397,320	6,530,823	6,411,714
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	4,858,601	4,945,816	5,041,700	4,948,706
Q _a Volumetric flow rate, actual (m ³ /hr)	259,655	263,998	270,302	264,652
Q _s Volumetric flow rate, standard (m ³ /hr)	178,618	181,176	184,957	181,584
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	137,598	140,068	142,784	140,150
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	115,226	117,597	123,678	118,834
Q _s Volumetric flow rate, normal (Nm ³ /hr)	166,439	168,823	172,346	169,203
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	128,217	130,518	133,049	130,595
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	107,370	109,579	115,245	110,731

Comments:

Average includes 3 runs.

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USEPA Method 5 (FPM) Emission Parameters for FPM

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:31	10:05	12:43	
Stop Time (approx.)	09:43	12:19	14:55	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.0	183.4	184.0	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
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 %)	9.2600	9.2300	8.8600	9.1167
CO ₂ Carbon dioxide (dry volume %)	10.1300	10.2300	10.6600	10.3400
T _s Sample temperature (°F)	297.0000	295.9600	297.2400	296.7333
B _w Actual water vapor in gas (% by volume)	22.9649	22.6892	22.8015	22.8185
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,807	155,363	159,073	155,748
Q _s Volumetric flow rate, standard (scfm)	105,117	106,622	108,847	106,862
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,977	82,430	84,028	82,478
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	67,811	69,206	72,784	69,934
Q _a Volumetric flow rate, actual (acfh)	9,168,417	9,321,782	9,544,363	9,344,854
Q _s Volumetric flow rate, standard (scfh)	6,306,998	6,397,320	6,530,823	6,411,714
Q _{std} Volumetric flow rate, dry standard (dscfh)	4,858,601	4,945,816	5,041,700	4,948,706
Q _a Volumetric flow rate, actual (m ³ /hr)	259,655	263,998	270,302	264,652
Q _s Volumetric flow rate, standard (m ³ /hr)	178,618	181,176	184,957	181,584
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	137,598	140,068	142,784	140,150
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	115,226	117,597	123,678	118,834
Q _a Volumetric flow rate, normal (Nm ³ /hr)	166,439	168,823	172,346	169,203
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	128,217	130,518	133,049	130,595
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	107,370	109,579	115,245	110,731
Sampling Data				
V _{std} Volume metered, standard (dscf)	63.3655	64.0923	64.5925	64.0168
%I Isokinetic sampling (%)	100.8238	100.1820	99.0437	100.0165
Laboratory Data				
m _{filter} Matter collected on filter(s) (g)	0.00100	0.00000	0.00130	
m _s Matter collected in solvent rinse(s) (g)	0.00140	0.00170	0.00220	
m _n Total filterable particulate matter (g)	0.00240	0.00170	0.00350	
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 _d Particulate Concentration (lb/dscf)	8.3516E-08	5.8486E-08	1.1948E-07	8.7160E-08
C _{std} Particulate Concentration @7% O ₂ (lb/dscf)	9.9731E-08	6.9662E-08	1.3794E-07	1.0244E-07
C _{std12} Particulate Concentration @12% CO ₂ (lb/dscf)	9.8933E-08	6.8605E-08	1.3450E-07	1.0068E-07
C _a Particulate Concentration (lb/acfh)	4.4257E-08	3.1031E-08	6.3114E-08	4.6134E-08
C _{std} Particulate Concentration (gr/dscf)	0.0006	0.0004	0.0008	0.0006
C _{std7} Particulate Concentration @7% O ₂ (gr/dscf)	0.0007	0.0005	0.0010	0.0007
C _{std12} Particulate Concentration @12% CO ₂ (gr/dscf)	0.0007	0.0005	0.0009	0.0007
C _a Particulate Concentration (gr/acfh)	0.0003	0.0002	0.0004	0.0003
C _{std} Particulate Concentration (mg/dscm)	1.3374	0.9366	1.9133	1.3958
C _{std7} Particulate Concentration @7% O ₂ (mg/dscm)	1.5970	1.1155	2.2089	1.6405
C _{std12} Particulate Concentration @12% CO ₂ (mg/dscm)	1.5843	1.0986	2.1538	1.6122
C _a Particulate Concentration (mg/m ³ (actual, wet))	0.7087	0.4969	1.0107	0.7388
C _{std} Particulate Concentration (mg/Nm ³ dry)	1.4352	1.0051	2.0533	1.4979
C _{std7} Particulate Concentration @7% O ₂ (mg/Nm ³ dry)	1.7139	1.1972	2.3705	1.7605
C _{std12} Particulate Concentration @12% CO ₂ (mg/Nm ³ dry)	1.7002	1.1790	2.3114	1.7302
E _{std/hr} Particulate Rate (lb/hr)	0.4058	0.2893	0.6024	0.4325
E _{std/hr} Particulate Rate (kg/hr)	0.1840	0.1312	0.2732	0.1961
E _{tyr} Particulate Rate (Ton/yr)	1.7773	1.2670	2.6384	1.8942
E _{pd} Particulate Rate - F _d -based (lb/MMBtu)	0.0014	0.0010	0.0020	0.0015
E _{pc} Particulate Rate - F _c -based (lb/MMBtu)	0.0015	0.0010	0.0020	0.0015

Comments:

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: 11182
Unit 3 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Emission Parameters**

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:31	10:05	12:43	
Stop Time (approx.)	09:43	12:19	14:55	
Process Conditions				
R _P Steam Production Rate (Klbs/hr)	184.0	183.4	184.0	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	9.2600	9.2300	8.8600	9.1167
CO ₂ Carbon dioxide (dry volume %)	10.1300	10.2300	10.6600	10.3400
T _s Sample temperature (°F)	297.0000	295.9600	297.2400	296.7333
B _w Actual water vapor in gas (% by volume)	22.9649	22.6892	22.8015	22.8185
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,807	155,363	159,073	155,748
Q _s Volumetric flow rate, standard (scfm)	105,117	106,622	108,847	106,862
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,977	82,430	84,028	82,478
Sampling Data				
V _{std} Volume metered, standard (dscf)	63.3655	64.0923	64.5925	64.0168
%I Isokinetic sampling (%)	100.8238	100.1820	99.0437	100.0165
Laboratory Data				
m _{n-1b} Fraction 1B (µg)	<0.1000	<0.1000	<0.1000	
m _{n-2b} Fraction 2B (µg)	2.3159	2.6142	2.5786	
m _{n-3a} Fraction 3A (µg)	<0.2000	<0.2000	<0.2000	
m _{n-3b} Fraction 3B (µg)	<0.5000	<0.5000	<0.5000	
m _{n-3c} Fraction 3C (µg)	<0.4000	<0.4000	<0.4000	
m _n Total matter corrected for allowable blanks (µg)	2.3159	2.6142	2.5786	
Mercury Results - Total				
C _{sd} Concentration (lb/dscf)	8.0588E-11	8.9938E-11	8.8025E-11	8.6184E-11
C _{sd7} Concentration @7% O ₂ (lb/dscf)	9.6234E-11	1.0712E-10	1.0162E-10	1.0166E-10
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	9.5464E-11	1.0550E-10	9.9090E-11	1.0002E-10
C _a Concentration (lb/acf)	4.2706E-11	4.7718E-11	4.6498E-11	4.5641E-11
C _{sd} Concentration (µg/dscm)	1.2905E+00	1.4402E+00	1.4096E+00	1.3801E+00
C _{sd7} Concentration @7% O ₂ (µg/dscm)	1.5411E+00	1.7154E+00	1.6274E+00	1.6280E+00
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	1.5287E+00	1.6894E+00	1.5868E+00	1.6016E+00
C _{sd} Concentration (mg/dscm)	1.2905E-03	1.4402E-03	1.4096E-03	1.3801E-03
C _{sd7} Concentration @7% O ₂ (mg/dscm)	1.5411E-03	1.7154E-03	1.6274E-03	1.6280E-03
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	1.5287E-03	1.6894E-03	1.5868E-03	1.6016E-03
C _a Concentration (µg/m ³ (actual,wet))	6.8387E-01	7.6414E-01	7.4461E-01	7.3087E-01
C _{sd} Concentration (µg/Nm ³ dry)	1.3849E+00	1.5456E+00	1.5127E+00	1.4811E+00
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	1.6538E+00	1.8410E+00	1.7464E+00	1.7471E+00
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	1.6406E+00	1.8130E+00	1.7029E+00	1.7188E+00
E _{lb/hr} Rate (lb/hr)	3.9154E-04	4.4482E-04	4.4380E-04	4.2672E-04
E _{g/s} Rate (g/s)	4.9325E-05	5.6036E-05	5.5908E-05	5.3756E-05
E _{T/yr} Rate (Ton/yr)	1.7150E-03	1.9483E-03	1.9438E-03	1.8690E-03
E _{Fd} Rate - Fd-based (lb/MMBtu)	1.3848E-06	1.5415E-06	1.4623E-06	1.4628E-06
E _{Fc} Rate - Fc-based (lb/MMBtu)	1.4479E-06	1.6001E-06	1.5029E-06	1.5169E-06

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Front Half Results**

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:31	10:05	12:43	
Stop Time (approx.)	09:43	12:19	14:55	

Mercury Results - Front Half

C _{sd}	Concentration (lb/dscf)	<3.4798E-12	<3.4403E-12	<3.4137E-12	<3.4446E-12
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	<4.1554E-12	<4.0978E-12	<3.9411E-12	<4.0648E-12
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	<4.1222E-12	<4.0356E-12	<3.8428E-12	<4.0002E-12
C _a	Concentration (lb/acf)	<1.8441E-12	<1.8253E-12	<1.8033E-12	<1.8242E-12
C _{sd}	Concentration (µg/dscm)	<5.5724E-02	<5.5092E-02	<5.4666E-02	<5.5161E-02
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	<6.6544E-02	<6.5620E-02	<6.3111E-02	<6.5091E-02
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	<6.6011E-02	<6.4625E-02	<6.1537E-02	<6.4058E-02
C _{sd}	Concentration (mg/dscm)	<5.5724E-05	<5.5092E-05	<5.4666E-05	<5.5161E-05
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	<6.6544E-05	<6.5620E-05	<6.3111E-05	<6.5091E-05
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	<6.6011E-05	<6.4625E-05	<6.1537E-05	<6.4058E-05
C _a	Concentration (µg/m ³ (actual,wet))	<2.9530E-02	<2.9230E-02	<2.8877E-02	<2.9212E-02
C _{sd}	Concentration (µg/Nm ³ dry)	<5.9802E-02	<5.9124E-02	<5.8666E-02	<5.9197E-02
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	<7.1413E-02	<7.0421E-02	<6.7729E-02	<6.9854E-02
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	<7.0841E-02	<6.9353E-02	<6.6040E-02	<6.8745E-02
E _{lb/hr}	Rate (lb/hr)	<1.6907E-05	<1.7015E-05	<1.7211E-05	<1.7044E-05
E _{g/s}	Rate (g/s)	<2.1299E-06	<2.1435E-06	<2.1682E-06	<2.1472E-06
E _{T/yr}	Rate (Ton/yr)	<7.4053E-05	<7.4527E-05	<7.5384E-05	<7.4655E-05
E _{Fd}	Rate - Fd-based (lb/MMBtu)	<5.9794E-08	<5.8964E-08	<5.6710E-08	<5.8490E-08
E _{Fc}	Rate - Fc-based (lb/MMBtu)	<6.2520E-08	<6.1207E-08	<5.8283E-08	<6.0670E-08

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 1-3 Results**

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:31	10:05	12:43	
Stop Time (approx.)	09:43	12:19	14:55	

Mercury Results - Impingers 1-3 Solution

C _{ad}	Concentration (lb/dscf)	8.0588E-11	8.9938E-11	8.8025E-11	8.6184E-11
C _{ed7}	Concentration @7% O ₂ (lb/dscf)	9.6234E-11	1.0712E-10	1.0162E-10	1.0166E-10
C _{ed12}	Concentration @12% CO ₂ (lb/dscf)	9.5464E-11	1.0550E-10	9.9090E-11	1.0002E-10
C _a	Concentration (lb/acf)	4.2706E-11	4.7718E-11	4.6498E-11	4.5641E-11
C _{ed}	Concentration (µg/dscm)	1.2905E+00	1.4402E+00	1.4096E+00	1.3801E+00
C _{ed7}	Concentration @7% O ₂ (µg/dscm)	1.5411E+00	1.7154E+00	1.6274E+00	1.6280E+00
C _{ed12}	Concentration @12% CO ₂ (µg/dscm)	1.5287E+00	1.6894E+00	1.5868E+00	1.6016E+00
C _{ad}	Concentration (mg/dscm)	1.2905E-03	1.4402E-03	1.4096E-03	1.3801E-03
C _{ed7}	Concentration @7% O ₂ (mg/dscm)	1.5411E-03	1.7154E-03	1.6274E-03	1.6280E-03
C _{ed12}	Concentration @12% CO ₂ (mg/dscm)	1.5287E-03	1.6894E-03	1.5868E-03	1.6016E-03
C _a	Concentration (µg/m ³ (actual,wet))	6.8387E-01	7.6414E-01	7.4461E-01	7.3087E-01
C _{ad}	Concentration (µg/Nm ³ dry)	1.3849E+00	1.5456E+00	1.5127E+00	1.4811E+00
C _{ed7}	Concentration @7% O ₂ (µg/Nm ³ dry)	1.6538E+00	1.8410E+00	1.7464E+00	1.7471E+00
C _{ed12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	1.6406E+00	1.8130E+00	1.7029E+00	1.7188E+00
E _{lb/hr}	Rate (lb/hr)	3.9154E-04	4.4482E-04	4.4380E-04	4.2672E-04
E _{g/s}	Rate (g/s)	4.9325E-05	5.6036E-05	5.5908E-05	5.3756E-05
E _{T/yr}	Rate (Ton/yr)	1.7150E-03	1.9483E-03	1.9438E-03	1.8690E-03
E _{Fd}	Rate - Fd-based (lb/MMBtu)	1.3848E-06	1.5415E-06	1.4623E-06	1.4628E-06
E _{Fc}	Rate - Fc-based (lb/MMBtu)	1.4479E-06	1.6001E-06	1.5029E-06	1.5169E-06

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Emission Parameters (continued)
Separate Impinger 4 Results**

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:31	10:05	12:43	
Stop Time (approx.)	09:43	12:19	14:55	
Mercury Results - Impinger 4 Solution				
C _{sd} Concentration (lb/dscf)	<6.9596E-12	<6.8807E-12	<6.8274E-12	<6.8892E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	<8.3109E-12	<8.1955E-12	<7.8821E-12	<8.1295E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	<8.2444E-12	<8.0712E-12	<7.6856E-12	<8.0004E-12
C _a Concentration (lb/acf)	<3.6881E-12	<3.6507E-12	<3.6065E-12	<3.6484E-12
C _{sd} Concentration (µg/dscm)	<1.1145E-01	<1.1018E-01	<1.0933E-01	<1.1032E-01
C _{sd7} Concentration @7% O ₂ (µg/dscm)	<1.3309E-01	<1.3124E-01	<1.2622E-01	<1.3018E-01
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	<1.3202E-01	<1.2925E-01	<1.2307E-01	<1.2812E-01
C _{sd} Concentration (mg/dscm)	<1.1145E-04	<1.1018E-04	<1.0933E-04	<1.1032E-04
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<1.3309E-04	<1.3124E-04	<1.2622E-04	<1.3018E-04
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	<1.3202E-04	<1.2925E-04	<1.2307E-04	<1.2812E-04
C _a Concentration (µg/m ³ (actual,wet))	<5.9060E-02	<5.8460E-02	<5.7753E-02	<5.8424E-02
C _{sd} Concentration (µg/Nm ³ dry)	<1.1960E-01	<1.1825E-01	<1.1733E-01	<1.1839E-01
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	<1.4283E-01	<1.4084E-01	<1.3546E-01	<1.3971E-01
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	<1.4168E-01	<1.3871E-01	<1.3208E-01	<1.3749E-01
E _{lb/hr} Rate (lb/hr)	<3.3814E-05	<3.4031E-05	<3.4422E-05	<3.4089E-05
E _{g/s} Rate (g/s)	<4.2598E-06	<4.2871E-06	<4.3363E-06	<4.2944E-06
E _{T/yr} Rate (Ton/yr)	<1.4811E-04	<1.4905E-04	<1.5077E-04	<1.4931E-04
E _{Fd} Rate - Fd-based (lb/MMBtu)	<1.1959E-07	<1.1793E-07	<1.1342E-07	<1.1698E-07
E _{Fc} Rate - Fc-based (lb/MMBtu)	<1.2504E-07	<1.2241E-07	<1.1657E-07	<1.2134E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:31	10:05	12:43	
Stop Time (approx.)	09:43	12:19	14:55	

Mercury Results - Filtered Permanganate Solution

C _{sd}	Concentration (lb/dscf)	<1.7399E-11	<1.7202E-11	<1.7069E-11	<1.7223E-11
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	<2.0777E-11	<2.0489E-11	<1.9705E-11	<2.0324E-11
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	<2.0611E-11	<2.0178E-11	<1.9214E-11	<2.0001E-11
C _a	Concentration (lb/acf)	<9.2203E-12	<9.1267E-12	<9.0163E-12	<9.1211E-12
C _{sd}	Concentration (µg/dscm)	<2.7862E-01	<2.7546E-01	<2.7333E-01	<2.7580E-01
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	<3.3272E-01	<3.2810E-01	<3.1555E-01	<3.2546E-01
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	<3.3006E-01	<3.2312E-01	<3.0769E-01	<3.2029E-01
C _{sd}	Concentration (mg/dscm)	<2.7862E-04	<2.7546E-04	<2.7333E-04	<2.7580E-04
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	<3.3272E-04	<3.2810E-04	<3.1555E-04	<3.2546E-04
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	<3.3006E-04	<3.2312E-04	<3.0769E-04	<3.2029E-04
C _a	Concentration (µg/m ³ (actual,wet))	<1.4765E-01	<1.4615E-01	<1.4438E-01	<1.4606E-01
C _{sd}	Concentration (µg/Nm ³ dry)	<2.9901E-01	<2.9562E-01	<2.9333E-01	<2.9599E-01
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	<3.5706E-01	<3.5211E-01	<3.3864E-01	<3.4927E-01
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	<3.5421E-01	<3.4677E-01	<3.3020E-01	<3.4372E-01
E _{lb/hr}	Rate (lb/hr)	<8.4535E-05	<8.5077E-05	<8.6054E-05	<8.5222E-05
E _{g/s}	Rate (g/s)	<1.0649E-05	<1.0718E-05	<1.0841E-05	<1.0736E-05
E _{T/yr}	Rate (Ton/yr)	<3.7026E-04	<3.7264E-04	<3.7692E-04	<3.7327E-04
E _{Fd}	Rate - Fd-based (lb/MMBtu)	<2.9897E-07	<2.9482E-07	<2.8355E-07	<2.9245E-07
E _{Fc}	Rate - Fc-based (lb/MMBtu)	<3.1260E-07	<3.0603E-07	<2.9141E-07	<3.0335E-07

Mercury Results - HCl Rinse + HCl/MnO2 Precipitate

C _{sd}	Concentration (lb/dscf)	<1.3919E-11	<1.3761E-11	<1.3655E-11	<1.3778E-11
C _{sd7}	Concentration @7% O ₂ (lb/dscf)	<1.6622E-11	<1.6391E-11	<1.5764E-11	<1.6259E-11
C _{sd12}	Concentration @12% CO ₂ (lb/dscf)	<1.6489E-11	<1.6142E-11	<1.5371E-11	<1.6001E-11
C _a	Concentration (lb/acf)	<7.3762E-12	<7.3013E-12	<7.2130E-12	<7.2968E-12
C _{sd}	Concentration (µg/dscm)	<2.2290E-01	<2.2037E-01	<2.1866E-01	<2.2064E-01
C _{sd7}	Concentration @7% O ₂ (µg/dscm)	<2.6617E-01	<2.6248E-01	<2.5244E-01	<2.6037E-01
C _{sd12}	Concentration @12% CO ₂ (µg/dscm)	<2.6404E-01	<2.5850E-01	<2.4615E-01	<2.5623E-01
C _{sd}	Concentration (mg/dscm)	<2.2290E-04	<2.2037E-04	<2.1866E-04	<2.2064E-04
C _{sd7}	Concentration @7% O ₂ (mg/dscm)	<2.6617E-04	<2.6248E-04	<2.5244E-04	<2.6037E-04
C _{sd12}	Concentration @12% CO ₂ (mg/dscm)	<2.6404E-04	<2.5850E-04	<2.4615E-04	<2.5623E-04
C _a	Concentration (µg/m ³ (actual,wet))	<1.1812E-01	<1.1692E-01	<1.1551E-01	<1.1685E-01
C _{sd}	Concentration (µg/Nm ³ dry)	<2.3921E-01	<2.3649E-01	<2.3466E-01	<2.3679E-01
C _{sd7}	Concentration @7% O ₂ (µg/Nm ³ dry)	<2.8565E-01	<2.8169E-01	<2.7091E-01	<2.7942E-01
C _{sd12}	Concentration @12% CO ₂ (µg/Nm ³ dry)	<2.8336E-01	<2.7741E-01	<2.6416E-01	<2.7498E-01
E _{lb/hr}	Rate (lb/hr)	<6.7628E-05	<6.8061E-05	<6.8844E-05	<6.8178E-05
E _{g/s}	Rate (g/s)	<8.5195E-06	<8.5741E-06	<8.6727E-06	<8.5888E-06
E _{T/yr}	Rate (Ton/yr)	<2.9621E-04	<2.9811E-04	<3.0153E-04	<2.9862E-04
E _{Fd}	Rate - Fd-based (lb/MMBtu)	<2.3918E-07	<2.3586E-07	<2.2684E-07	<2.3396E-07
E _{Fc}	Rate - Fc-based (lb/MMBtu)	<2.5008E-07	<2.4483E-07	<2.3313E-07	<2.4268E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 5/29 Beryllium (Be) Emission Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:31	10:05	12:43	
Stop Time (approx.)	09:43	12:19	14:55	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.0	183.4	184.0	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	9.2600	9.2300	8.8600	9.1167
CO ₂ Carbon dioxide (dry volume %)	10.1300	10.2300	10.6600	10.3400
T _s Sample temperature (°F)	297.0000	295.9600	297.2400	296.7333
B _w Actual water vapor in gas (% by volume)	22.9649	22.6892	22.8015	22.8185
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,807	155,363	159,073	155,748
Q _g Volumetric flow rate, standard (scfm)	105,117	106,622	108,847	106,862
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,977	82,430	84,028	82,478
Sampling Data				
V _{std} Volume metered, standard (dscf)	63.3655	64.0923	64.5925	64.0168
%I Isokinetic sampling (%)	100.8238	100.1820	99.0437	100.0165
Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.0500	<0.0500	<0.0500	
Beryllium Results - Total				
C _{sd} Concentration (lb/dscf)	<1.7399E-12	<1.7202E-12	<1.7069E-12	<1.7223E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	<2.0777E-12	<2.0489E-12	<1.9705E-12	<2.0324E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	<2.0611E-12	<2.0178E-12	<1.9214E-12	<2.0001E-12
C _a Concentration (lb/acf)	<9.2203E-13	<9.1267E-13	<9.0163E-13	<9.1211E-13
C _{sd} Concentration (µg/dscm)	<2.7862E-02	<2.7546E-02	<2.7333E-02	<2.7580E-02
C _{sd7} Concentration @7% O ₂ (µg/dscm)	<3.3272E-02	<3.2810E-02	<3.1555E-02	<3.2546E-02
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	<3.3006E-02	<3.2312E-02	<3.0769E-02	<3.2029E-02
C _{sd} Concentration (mg/dscm)	<2.7862E-05	<2.7546E-05	<2.7333E-05	<2.7580E-05
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<3.3272E-05	<3.2810E-05	<3.1555E-05	<3.2546E-05
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	<3.3006E-05	<3.2312E-05	<3.0769E-05	<3.2029E-05
C _a Concentration (µg/m ³ (actual,wet))	<1.4765E-02	<1.4615E-02	<1.4438E-02	<1.4606E-02
C _{sd} Concentration (µg/Nm ³ dry)	<2.9901E-02	<2.9562E-02	<2.9333E-02	<2.9599E-02
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	<3.5706E-02	<3.5211E-02	<3.3864E-02	<3.4927E-02
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	<3.5421E-02	<3.4677E-02	<3.3020E-02	<3.4372E-02
E _{lb/hr} Rate (lb/hr)	<8.4535E-06	<8.5077E-06	<8.6054E-06	<8.5222E-06
E _{g/s} Rate (g/s)	<1.0649E-06	<1.0718E-06	<1.0841E-06	<1.0736E-06
E _{T/yr} Rate (Ton/yr)	<3.7026E-05	<3.7264E-05	<3.7692E-05	<3.7327E-05
E _{Fd} Rate - Fd-based (lb/MMBtu)	<2.9897E-08	<2.9482E-08	<2.8355E-08	<2.9245E-08
E _{Fc} Rate - Fc-based (lb/MMBtu)	<3.1260E-08	<3.0603E-08	<2.9141E-08	<3.0335E-08

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 5/29 Cadmium (Cd) Emission Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:31	10:05	12:43	
Stop Time (approx.)	09:43	12:19	14:55	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.0	183.4	184.0	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	9.2600	9.2300	8.8600	9.1167
CO ₂ Carbon dioxide (dry volume %)	10.1300	10.2300	10.6600	10.3400
T _s Sample temperature (°F)	297.0000	295.9600	297.2400	296.7333
B _w Actual water vapor in gas (% by volume)	22.9649	22.6892	22.8015	22.8185
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,807	155,363	159,073	155,748
Q _s Volumetric flow rate, standard (scfm)	105,117	106,622	108,847	106,862
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,977	82,430	84,028	82,478
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	63.3655	64.0923	64.5925	64.0168
%I Isokinetic sampling (%)	100.8238	100.1820	99.0437	100.0165
Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2000	<0.2000	
Cadmium Results - Total				
C _{sd} Concentration (lb/dscf)	<6.9596E-12	<6.8807E-12	<6.8274E-12	<6.8892E-12
C _{sd7} Concentration @7% O ₂ (lb/dscf)	<8.3109E-12	<8.1955E-12	<7.8821E-12	<8.1295E-12
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	<8.2444E-12	<8.0712E-12	<7.6856E-12	<8.0004E-12
C _a Concentration (lb/acfm)	<3.6881E-12	<3.6507E-12	<3.6065E-12	<3.6484E-12
C _{sd} Concentration (µg/dscm)	<1.1145E-01	<1.1018E-01	<1.0933E-01	<1.1032E-01
C _{sd7} Concentration @7% O ₂ (µg/dscm)	<1.3309E-01	<1.3124E-01	<1.2622E-01	<1.3018E-01
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	<1.3202E-01	<1.2925E-01	<1.2307E-01	<1.2812E-01
C _{sd} Concentration (mg/dscm)	<1.1145E-04	<1.1018E-04	<1.0933E-04	<1.1032E-04
C _{sd7} Concentration @7% O ₂ (mg/dscm)	<1.3309E-04	<1.3124E-04	<1.2622E-04	<1.3018E-04
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	<1.3202E-04	<1.2925E-04	<1.2307E-04	<1.2812E-04
C _a Concentration (µg/m ³ (actual,wet))	<5.9060E-02	<5.8460E-02	<5.7753E-02	<5.8424E-02
C _{sd} Concentration (µg/Nm ³ dry)	<1.1960E-01	<1.1825E-01	<1.1733E-01	<1.1839E-01
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	<1.4283E-01	<1.4084E-01	<1.3546E-01	<1.3971E-01
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	<1.4168E-01	<1.3871E-01	<1.3208E-01	<1.3749E-01
E _{lb/hr} Rate (lb/hr)	<3.3814E-05	<3.4031E-05	<3.4422E-05	<3.4089E-05
E _{g/s} Rate (g/s)	<4.2598E-06	<4.2871E-06	<4.3363E-06	<4.2944E-06
E _{T/yr} Rate (Ton/yr)	<1.4811E-04	<1.4905E-04	<1.5077E-04	<1.4931E-04
E _{Fd} Rate - F _d -based (lb/MMBtu)	<1.1959E-07	<1.1793E-07	<1.1342E-07	<1.1698E-07
E _{Fc} Rate - F _c -based (lb/MMBtu)	<1.2504E-07	<1.2241E-07	<1.1657E-07	<1.2134E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 5/29 Lead (Pb) Emission Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 28	Mar 28	
Start Time (approx.)	07:31	10:05	12:43	
Stop Time (approx.)	09:43	12:19	14:55	
Process Conditions				
R _p Steam Production Rate (Klbs/hr)	184.0	183.4	184.0	183.8
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/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 %)	9.2600	9.2300	8.8600	9.1167
CO ₂ Carbon dioxide (dry volume %)	10.1300	10.2300	10.6600	10.3400
T _a Sample temperature (°F)	297.0000	295.9600	297.2400	296.7333
B _w Actual water vapor in gas (% by volume)	22.9649	22.6892	22.8015	22.8185
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,807	155,363	159,073	155,748
Q _s Volumetric flow rate, standard (scfm)	105,117	106,622	108,847	106,862
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,977	82,430	84,028	82,478
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	63.3655	64.0923	64.5925	64.0168
%I Isokinetic sampling (%)	100.8238	100.1820	99.0437	100.0165
Laboratory Data				
m _n Total matter corrected for allowable blanks (µg)	0.4387	0.4188	0.1294	
Lead Results - Total				
C _{sd} Concentration (lb/dscf)	1.5266E-11	1.4408E-11	4.4188E-12	1.1364E-11
C _{sd7} Concentration @7% O ₂ (lb/dscf)	1.8230E-11	1.7161E-11	5.1014E-12	1.3497E-11
C _{sd12} Concentration @12% CO ₂ (lb/dscf)	1.8084E-11	1.6900E-11	4.9742E-12	1.3320E-11
C _a Concentration (lb/acf)	8.0898E-12	7.6441E-12	2.3342E-12	6.0227E-12
C _{sd} Concentration (µg/dscm)	2.4446E-01	2.3072E-01	7.0760E-02	1.8198E-01
C _{sd7} Concentration @7% O ₂ (µg/dscm)	2.9193E-01	2.7480E-01	8.1692E-02	2.1614E-01
C _{sd12} Concentration @12% CO ₂ (µg/dscm)	2.8959E-01	2.7064E-01	7.9655E-02	2.1329E-01
C _{sd} Concentration (mg/dscm)	2.4446E-04	2.3072E-04	7.0760E-05	1.8198E-04
C _{sd7} Concentration @7% O ₂ (mg/dscm)	2.9193E-04	2.7480E-04	8.1692E-05	2.1614E-04
C _{sd12} Concentration @12% CO ₂ (mg/dscm)	2.8959E-04	2.7064E-04	7.9655E-05	2.1329E-04
C _a Concentration (µg/m ³ (actual,wet))	1.2955E-01	1.2241E-01	3.7378E-02	9.6445E-02
C _{sd} Concentration (µg/Nm ³ dry)	2.6235E-01	2.4760E-01	7.5938E-02	1.9530E-01
C _{sd7} Concentration @7% O ₂ (µg/Nm ³ dry)	3.1329E-01	2.9491E-01	8.7669E-02	2.3196E-01
C _{sd12} Concentration @12% CO ₂ (µg/Nm ³ dry)	3.1078E-01	2.9044E-01	8.5484E-02	2.2890E-01
E _{lb/hr} Rate (lb/hr)	7.4171E-05	7.1257E-05	2.2278E-05	5.5902E-05
E _{g/s} Rate (g/s)	9.3438E-06	8.9767E-06	2.8065E-06	7.0423E-06
E _{T/yr} Rate (Ton/yr)	3.2487E-04	3.1211E-04	9.7578E-05	2.4485E-04
E _{Fd} Rate - Fd-based (lb/MMBtu)	2.6232E-07	2.4693E-07	7.3406E-08	1.9422E-07
E _{Fc} Rate - Fc-based (lb/MMBtu)	2.7427E-07	2.5632E-07	7.5442E-08	2.0201E-07

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 13B (Total Fluorides) Sampling, Velocity and Moisture Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	11:40	13:04	14:26	
Stop Time (approx.)	12:47	14:12	15:30	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9936	0.9936	0.9936	
C _p Pitot tube coefficient	0.8120	0.8120	0.8120	
P _g Static pressure (in. H ₂ O)	-5.8000	-8.2000	-6.5000	
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.)	0.2740	0.2740	0.2740	
O ₂ Oxygen (dry volume %)	8.0000	9.1800	8.2900	8.4900
CO ₂ Carbon dioxide (dry volume %)	11.4400	10.3800	11.3100	11.0433
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.5600	80.4400	80.4000	80.4667
V _{lc} Total Liquid collected (ml)	221.10	243.20	233.80	
V _m Volume metered, meter conditions (ft ³)	34.3800	38.8600	35.7760	
T _m Dry gas meter temperature (°F)	87.7800	88.4800	88.9200	
T _s Sample temperature (°F)	296.9200	297.3600	297.8000	297.3600
ΔH Meter box orifice pressure drop (in. H ₂ O)	0.9332	1.1620	0.9968	
θ Total sampling time (min)	62.5	62.5	62.5	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	10.4050	11.4450	11.0026	10.9509
V _{mstd} Volume metered, standard (dscf)	33.1318	37.4222	34.4108	34.9883
P _s Sample gas pressure, absolute (in. Hg)	29.6235	29.4471	29.5721	29.5475
P _v Vapor pressure, actual (in. Hg)	29.6235	29.4471	29.5721	29.5475
B _{wc} Moisture measured in sample (% by volume)	23.8993	23.4206	24.2277	23.8492
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	23.8993	23.4206	24.2277	23.8492
√ΔP Velocity head (√in. H ₂ O)	0.5923	0.6599	0.6111	0.6211
M _d MW of sample gas, dry (lb/lb-mole)	30.1504	30.0280	30.1412	30.1065
M _s MW of sample gas, wet (lb/lb-mole)	27.2465	27.2110	27.1997	27.2191
V _s Velocity of sample (ft/sec)	39.8182	44.5347	41.1772	41.8434
%I Isokinetic sampling (%)	103.1599	104.2084	104.3577	103.9087
Q _a Volumetric flow rate, actual (acfm)	152,902	171,013	158,120	160,679
Q _s Volumetric flow rate, standard (scfm)	105,602	117,339	108,890	110,610
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,364	89,857	82,508	84,243
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	74,582	75,765	74,851	75,066
Q _a Volumetric flow rate, actual (acf/hr)	9,174,111	10,260,799	9,487,225	9,640,711
Q _s Volumetric flow rate, standard (scf/hr)	6,336,116	7,040,331	6,533,388	6,636,612
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	4,821,831	5,391,444	4,950,500	5,054,592
Q _a Volumetric flow rate, actual (m ³ /hr)	259,816	290,592	268,684	273,031
Q _s Volumetric flow rate, standard (m ³ /hr)	179,443	199,386	185,029	187,953
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	136,557	152,689	140,201	143,149
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	126,733	128,742	127,190	127,555
Q _s Volumetric flow rate, normal (Nm ³ /hr)	167,208	185,792	172,414	175,138
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	127,246	142,278	130,642	133,389
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	118,092	119,964	118,518	118,858

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 13B HF Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	11:40	13:04	14:26	
Stop Time (approx.)	12:47	14:12	15:30	
Process Conditions				
R _p Production rate (Klbs/hour)	183.7	178.7	185.5	182.6
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 %)	8.0000	9.1800	8.2900	8.4900
CO ₂ Carbon dioxide (dry volume %)	11.4400	10.3800	11.3100	11.0433
T _a Sample temperature (°F)	296.9200	297.3600	297.8000	297.3600
B _w Actual water vapor in gas (% by volume)	23.8993	23.4206	24.2277	23.8492
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	152,902	171,013	158,120	160,679
Q _s Volumetric flow rate, standard (scfm)	105,602	117,339	108,890	110,610
Q _{std} Volumetric flow rate, dry standard (dscfm)	80,364	89,857	82,508	84,243
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	74,582	75,765	74,851	75,066
Q _a Volumetric flow rate, actual (acf/hr)	9,174,111	10,260,799	9,487,225	9,640,711
Q _s Volumetric flow rate, standard (scf/hr)	6,336,116	7,040,331	6,533,388	6,636,612
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	4,821,831	5,391,444	4,950,500	5,054,592
Q _a Volumetric flow rate, actual (m ³ /hr)	259,816	290,592	268,684	273,031
Q _s Volumetric flow rate, standard (m ³ /hr)	179,443	199,386	185,029	187,953
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	136,557	152,689	140,201	143,149
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	126,733	128,742	127,190	127,555
Q _a Volumetric flow rate, normal (Nm ³ /hr)	167,208	185,792	172,414	175,138
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	127,246	142,278	130,642	133,389
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	118,092	119,964	118,518	118,858
Sampling Data				
V _{msd} Volume metered, standard (dscf)	33.1318	37.4222	34.4108	34.9883
%I Isokinetic sampling (%)	103.1599	104.2084	104.3577	103.9087
Laboratory Data				
m _n Total HF collected (mg)	<0.0389	<0.0400	<0.0411	
Hydrogen Fluoride (HF) Results				
C _{sd} HF Concentration (lb/dscf)	<2.5856E-09	<2.3591E-09	<2.6322E-09	<2.5256E-09
C _{sd7} HF Concentration @7% O ₂ (lb/dscf)	<2.7860E-09	<2.7980E-09	<2.9015E-09	<2.8285E-09
C _{sd12} HF Concentration @12% CO ₂ (lb/dscf)	<2.7122E-09	<2.7273E-09	<2.7928E-09	<2.7441E-09
C _a HF Concentration (lb/acf)	<1.3590E-09	<1.2396E-09	<1.3735E-09	<1.3240E-09
C _{sd} HF Concentration (ppmdv)	<0.0498	<0.0455	<0.0507	<0.0487
C _{sd7} HF Concentration @7% O ₂ (ppmdv)	<0.0537	<0.0539	<0.0559	<0.0545
C _{sd12} HF Concentration @12% CO ₂ (ppmdv)	<0.0523	<0.0526	<0.0538	<0.0529
C _w HF Concentration (ppmwv)	<0.0379	<0.0348	<0.0384	<0.0371
C _{sd} HF Concentration (mg/dscm)	<0.0414	<0.0378	<0.0422	<0.0404
C _{sd7} HF Concentration @7% O ₂ (mg/dscm)	<0.0446	<0.0448	<0.0465	<0.0453
C _{sd12} HF Concentration @12% CO ₂ (mg/dscm)	<0.0434	<0.0437	<0.0447	<0.0439
C _a HF Concentration (mg/m ³ (actual,wet))	<0.0218	<0.0199	<0.0220	<0.0212
C _{sd} HF Concentration (mg/Nm ³ dry)	<0.0444	<0.0405	<0.0452	<0.0434
C _{sd7} HF Concentration @7% O ₂ (mg/Nm ³ dry)	<0.0479	<0.0481	<0.0499	<0.0486
C _{sd12} HF Concentration @12% CO ₂ (mg/Nm ³ dry)	<0.0466	<0.0469	<0.0480	<0.0472
E _{lb/hr} HF Rate (lb/hr)	<0.0125	<0.0127	<0.0130	<0.0127
E _{kg/hr} HF Rate (kg/hr)	<0.0057	<0.0058	<0.0059	<0.0058
E _{T/yr} HF Rate (Ton/yr)	<0.0546	<0.0557	<0.0571	<0.0558
E _{Fd} HF Rate - Fd-based (lb/MMBtu)	<0.000041	<0.000041	<0.000043	<0.000041
E _{Fc} HF Rate - Fc-based (lb/MMBtu)	<0.000041	<0.000041	<0.000042	<0.000042

Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 28	Mar 29	Mar 29	
Start Time (approx.)	10:05	07:41	12:38	
Stop Time (approx.)	14:25	11:59	16:59	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9936	0.9936	0.9936	
C _p Pitot tube coefficient	0.8220	0.8220	0.8220	
P _g Static pressure (in. H ₂ O)	-7.5000	-7.3000	-9.2000	
A _s Sample location area (ft ²)	64.0000	64.0000	64.0000	
P _{bar} Barometric pressure (in. Hg)	29.95	30.00	30.00	29.9833
D _n Nozzle diameter (in.)	0.2710	0.2710	0.2710	
O ₂ Oxygen (dry volume %)	8.9600	9.0500	8.9900	9.0000
CO ₂ Carbon dioxide (dry volume %)	10.5300	10.2900	10.5700	10.4633
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.5100	80.6600	80.4400	80.5367
V _{lc} Total Liquid collected (ml)	890.80	929.10	982.80	
V _m Volume metered, meter conditions (ft ³)	151.0100	151.0650	154.5100	
T _m Dry gas meter temperature (°F)	89.4000	87.2600	89.8400	
T _s Sample temperature (°F)	297.2800	295.3200	295.8000	296.1333
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.0872	1.1280	1.1620	
θ Total sampling time (min)	250.0	250.0	250.0	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	41.9210	43.7234	46.2506	43.9650
V _{mstd} Volume metered, standard (dscf)	144.6711	145.5461	148.1791	146.1321
P _s Sample gas pressure, absolute (in. Hg)	29.3985	29.4632	29.3235	29.3951
P _v Vapor pressure, actual (in. Hg)	29.3985	29.4632	29.3235	29.3951
B _{wc} Moisture measured in sample (% by volume)	22.4667	23.1012	23.7878	23.1185
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	22.4667	23.1012	23.7878	23.1185
√ΔP Velocity head (√in. H ₂ O)	0.6448	0.6696	0.6714	0.6619
M _d MW of sample gas, dry (lb/lb-mole)	30.0432	30.0084	30.0508	30.0341
M _s MW of sample gas, wet (lb/lb-mole)	27.3375	27.2343	27.1842	27.2520
V _s Velocity of sample (ft/sec)	43.9863	45.6519	45.9391	45.1924
%I Isokinetic sampling (%)	103.1177	100.2993	102.9430	102.1200
Q _a Volumetric flow rate, actual (acfm)	168,907	175,303	176,406	173,539
Q _s Volumetric flow rate, standard (scfm)	115,715	120,674	120,780	119,056
Q _{std} Volumetric flow rate, dry standard (dscfm)	89,718	92,797	92,049	91,521
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	77,067	79,111	78,871	78,349
Q _a Volumetric flow rate, actual (acf/hr)	10,134,433	10,518,203	10,584,359	10,412,332
Q _s Volumetric flow rate, standard (scf/hr)	6,942,900	7,240,413	7,246,800	7,143,371
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,383,061	5,567,794	5,522,944	5,491,266
Q _a Volumetric flow rate, actual (m ³ /hr)	287,013	297,882	299,755	294,883
Q _s Volumetric flow rate, standard (m ³ /hr)	196,627	205,053	205,234	202,304
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	152,451	157,683	156,413	155,516
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	130,955	134,428	134,020	133,134
Q _s Volumetric flow rate, normal (Nm ³ /hr)	183,221	191,072	191,240	188,511
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	142,057	146,932	145,749	144,913
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	122,026	125,262	124,882	124,057

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 23 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 (2011)	Mar 28	Mar 29	Mar 29	
Start Time (approx.)	10:05	07:41	12:38	
Stop Time (approx.)	14:25	11:59	16:59	
Process Conditions				
R _p Production Rate (Klbs/hour)	183.6	182.2	182.4	182.7
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/hr)	6	6	6	6
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 %)	8.9600	9.0500	8.9900	9.0000
CO ₂ Carbon dioxide (dry volume %)	10.5300	10.2900	10.5700	10.4633
T _s Sample temperature (°F)	297.3	295.3	295.8	296.1
B _w Actual water vapor in gas (% by volume)	22.4667	23.1012	23.7878	23.1185
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	168,907	175,303	176,406	173,539
Q _s Volumetric flow rate, standard (scfm)	115,715	120,674	120,780	119,056
Q _{std} Volumetric flow rate, dry standard (dscfm)	89,718	92,797	92,049	91,521
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	77,067	79,111	78,871	78,349
Q _a Volumetric flow rate, actual (acfm)	10,134,433	10,518,203	10,584,359	10,412,332
Q _s Volumetric flow rate, standard (scf/hr)	6,942,900	7,240,413	7,246,800	7,143,371
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,383,061	5,567,794	5,522,944	5,491,266
Q _a Volumetric flow rate, actual (m ³ /hr)	287,013	297,882	299,755	294,883
Q _s Volumetric flow rate, standard (m ³ /hr)	196,627	205,053	205,234	202,304
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	152,451	157,683	156,413	155,516
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	130,955	134,428	134,020	133,134
Q _s Volumetric flow rate, normal (Nm ³ /hr)	183,221	191,072	191,240	188,511
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	142,057	146,932	145,749	144,913
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	122,026	125,262	124,882	124,057
Sampling Data				
V _{std} Volume metered, standard (dscf)	144.6711	145.5461	148.1791	146.1321
%I Isokinetic sampling (%)	103.1177	100.2993	102.9430	102.1200
Laboratory Data from USEPA Method 23				
m _n Total PCDDs & PCDFs (ng)	1.09000	0.81600	1.15000	
m _{n,TEQ} Total TEQ PCDDs & PCDFs (ng)	0.00718	0.00621	0.00922	
Total PCDD/F Results (TEF=1)				
C _{sd} PCDD/F Concentration (ng/dscm)	2.6604E-01	1.9796E-01	2.7404E-01	2.4601E-01
C _{sd7} PCDD/F Concentration @7% O ₂ (ng/dscm)	3.0971E-01	2.3221E-01	3.1982E-01	2.8725E-01
C _{sd12} PCDD/F Concentration @12% CO ₂ (ng/dscm)	3.0318E-01	2.3086E-01	3.1111E-01	2.8172E-01
C _{sd} PCDD/F Concentration (ng/Nm ³ dry)	2.8550E-01	2.1245E-01	2.9409E-01	2.6401E-01
C _{sd7} PCDD/F Concentration @7% O ₂ (ng/Nm ³ dry)	3.3237E-01	2.4920E-01	3.4323E-01	3.0827E-01
C _{sd12} PCDD/F Concentration @12% CO ₂ (ng/Nm ³ dry)	3.2536E-01	2.4775E-01	3.3387E-01	3.0233E-01
E _{b/hr} PCDD/F Rate (lb/hr)	8.9430E-08	6.8831E-08	9.4513E-08	8.4258E-08
E _{g/s} PCDD/F Rate (g/s)	1.1266E-08	8.6710E-09	1.1906E-08	1.0614E-08
E _{T/yr} PCDD/F Rate (Ton/yr)	3.9170E-07	3.0148E-07	4.1397E-07	3.6905E-07
E _{Fd} PCDD/F Rate - F _d -based (lb/MMBtu)	2.8353E-10	2.1258E-10	2.9279E-10	2.6297E-10
E _{Fc} PCDD/F Rate - F _c -based (lb/MMBtu)	2.8714E-10	2.1865E-10	2.9466E-10	2.6682E-10
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)				
C _{sdTEQ} TEQ Concentration (ng/dscm)	1.7524E-03	1.5066E-03	2.1971E-03	1.8187E-03
C _{sd7TEQ} TEQ Concentration @7% O ₂ (ng/dscm)	2.0401E-03	1.7672E-03	2.5642E-03	2.1238E-03
C _{sd12TEQ} TEQ Concentration @12% CO ₂ (ng/dscm)	1.9971E-03	1.7589E-03	2.4943E-03	2.0828E-03
C _{sdTEQ} TEQ Concentration (ng/Nm ³ dry)	1.8807E-03	1.6168E-03	2.3578E-03	1.9518E-03
C _{sd7TEQ} TEQ Concentration @7% O ₂ (ng/Nm ³ dry)	2.1894E-03	1.8965E-03	2.7518E-03	2.2792E-03
C _{sd12TEQ} TEQ Concentration @12% CO ₂ (ng/Nm ³ dry)	2.1432E-03	1.8855E-03	2.6768E-03	2.2352E-03
E _{b/hrTEQ} TEQ Rate (lb/hr)	5.8909E-10	5.2382E-10	7.5775E-10	6.2355E-10
E _{g/sTEQ} TEQ Rate (g/sec)	7.4211E-11	6.5989E-11	9.5458E-11	7.8553E-11
E _{T/yrTEQ} TEQ Rate (Ton/yr)	2.5802E-09	2.2943E-09	3.3189E-09	2.7312E-09
E _{FdTEQ} TEQ Rate - F _d -based (lb/MMBtu)	1.8677E-12	1.6178E-12	2.3474E-12	1.9443E-12
E _{FcTEQ} TEQ Rate - F _c -based (lb/MMBtu)	1.8914E-12	1.6640E-12	2.3624E-12	1.9726E-12

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USEPA Method 23 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 (2011)	Mar 28	Mar 29	Mar 29	
Start Time (approx.)	10:05	07:41	12:38	
Stop Time (approx.)	14:25	11:59	16:59	
Process Conditions				
R _p Production Rate (Klbs/hour)	183.6	182.2	182.4	182.7
P ₁ Fabric Filter Inlet Temperature (°F)	315	315	315	315
P ₂ Carbon Injection Rate (lb/hr)	6	6	6	6
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 %)	8.9600	9.0500	8.9900	9.0000
CO ₂ Carbon dioxide (dry volume %)	10.5300	10.2900	10.5700	10.4633
T _s Sample temperature (°F)	297.3	295.3	295.8	296.1
B _w Actual water vapor in gas (% by volume)	22.4667	23.1012	23.7878	23.1185
Gas Flow Rate				
Q _a Volumetric flow rate, actual (acfm)	168,907	175,303	176,406	173,539
Q _s Volumetric flow rate, standard (scfm)	115,715	120,674	120,780	119,056
Q _{std} Volumetric flow rate, dry standard (dscfm)	89,718	92,797	92,049	91,521
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dscfm)	77,067	79,111	78,871	78,349
Q _a Volumetric flow rate, actual (acf/hr)	10,134,433	10,518,203	10,584,359	10,412,332
Q _s Volumetric flow rate, standard (scf/hr)	6,942,900	7,240,413	7,246,800	7,143,371
Q _{std} Volumetric flow rate, dry standard (dscf/hr)	5,383,061	5,567,794	5,522,944	5,491,266
Q _a Volumetric flow rate, actual (m ³ /hr)	287,013	297,882	299,755	294,883
Q _s Volumetric flow rate, standard (m ³ /hr)	196,627	205,053	205,234	202,304
Q _{std} Volumetric flow rate, dry standard (dry m ³ /hr)	152,451	157,683	156,413	155,516
Q _{std7} Volumetric flow rate, dry std@7%O ₂ (dry m ³ /hr)	130,955	134,428	134,020	133,134
Q _s Volumetric flow rate, normal (Nm ³ /hr)	183,221	191,072	191,240	188,511
Q _{std} Volumetric flow rate, dry normal (Nm ³ /hr)	142,057	146,932	145,749	144,913
Q _{std7} Volumetric flow rate, dry normal @7%O ₂ (Nm ³ /hr)	122,026	125,262	124,882	124,057
Sampling Data				
V _{std} Volume metered, standard (dscf)	144.6711	145.5461	148.1791	146.1321
%I Isokinetic sampling (%)	103.1177	100.2993	102.9430	102.1200
Laboratory Data from USEPA Method 23, including NDs and EMPCs				
m _n Total PCDDs & PCDFs (ng)	1.15000	0.85500	1.18000	
m _{n,TEQ} Total TEQ PCDDs & PCDFs (ng)	0.01100	0.00875	0.01030	
Total PCDD/F Results (TEF=1)				
C _{ad} PCDD/F Concentration (ng/dscm)	2.8068E-01	2.0743E-01	2.8119E-01	2.5643E-01
C _{ad7} PCDD/F Concentration @7% O ₂ (ng/dscm)	3.2676E-01	2.4331E-01	3.2817E-01	2.9941E-01
C _{ad12} PCDD/F Concentration @12% CO ₂ (ng/dscm)	3.1987E-01	2.4190E-01	3.1923E-01	2.9366E-01
C _{sd} PCDD/F Concentration (ng/Nm ³ dry)	3.0122E-01	2.2260E-01	3.0176E-01	2.7519E-01
C _{sd7} PCDD/F Concentration @7% O ₂ (ng/Nm ³ dry)	3.5067E-01	2.6111E-01	3.5218E-01	3.2132E-01
C _{sd12} PCDD/F Concentration @12% CO ₂ (ng/Nm ³ dry)	3.4327E-01	2.5960E-01	3.4258E-01	3.1515E-01
E _{lb/hr} PCDD/F Rate (lb/hr)	9.4353E-08	7.2120E-08	9.6978E-08	8.7817E-08
E _{g/s} PCDD/F Rate (g/s)	1.1886E-08	9.0854E-09	1.2217E-08	1.1063E-08
E _{tyr} PCDD/F Rate (Ton/yr)	4.1326E-07	3.1589E-07	4.2476E-07	3.8464E-07
E _{fd} PCDD/F - F _d -based (lb/MMBtu)	2.9914E-10	2.2274E-10	3.0043E-10	2.7410E-10
E _{fc} PCDD/F Rate - F _c -based (lb/MMBtu)	3.0295E-10	2.2910E-10	3.0234E-10	2.7813E-10
Total PCDD/F TEQ Results (using USEPA/INTL 2005 TEFs)				
C _{adTEQ} TEQ Concentration (ng/dscm)	2.8848E-03	2.1228E-03	2.4544E-03	2.4207E-03
C _{sd7TEQ} TEQ Concentration @7% O ₂ (ng/dscm)	3.1255E-03	2.4900E-03	2.8645E-03	2.8267E-03
C _{sd12TEQ} TEQ Concentration @12% CO ₂ (ng/dscm)	3.0598E-03	2.4755E-03	2.7865E-03	2.7739E-03
C _{sdTEQ} TEQ Concentration (ng/Nm ³ dry)	2.8812E-03	2.2781E-03	2.8340E-03	2.5978E-03
C _{sd7TEQ} TEQ Concentration @7% O ₂ (ng/Nm ³ dry)	3.3542E-03	2.6722E-03	3.0741E-03	3.0335E-03
C _{sd12TEQ} TEQ Concentration @12% CO ₂ (ng/Nm ³ dry)	3.2834E-03	2.6567E-03	2.9904E-03	2.9768E-03
E _{lb/hrTEQ} TEQ Rate (lb/hr)	9.0250E-10	7.3807E-10	8.4651E-10	8.2903E-10
E _{g/sTEQ} TEQ Rate (g/sec)	1.1369E-10	9.2980E-11	1.0664E-10	1.0444E-10
E _{tyrTEQ} TEQ Rate (Ton/yr)	3.9530E-09	3.2328E-09	3.7077E-09	3.6311E-09
E _{fdTEQ} TEQ Rate - F _d -based (lb/MMBtu)	2.8613E-12	2.2795E-12	2.6224E-12	2.5878E-12
E _{fcTEQ} TEQ Rate - F _c -based (lb/MMBtu)	2.8978E-12	2.3446E-12	2.6391E-12	2.6272E-12

Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 SDA Inlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:47	09:06	10:22	
Stop Time (approx.)	08:47	10:06	11:22	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9983	0.9983	0.9983	
P _g Static pressure (in. H ₂ O)	-1.5000	-1.4000	-1.3000	
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 %)	7.9900	8.0000	6.9800	7.6567
CO ₂ Carbon dioxide (dry volume %)	11.5300	11.6200	12.5000	11.8833
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.4800	80.3800	80.5200	80.4600
V _{lc} Total Liquid collected (ml)	196.10	191.40	197.00	
V _m Volume metered, meter conditions (ft ³)	37.1470	37.2090	36.5920	
T _m Dry gas meter temperature (°F)	88.8750	91.3333	92.3333	
T _s Sample temperature (°F)	475.3333	468.9167	468.6667	470.9722
ΔH Meter box orifice pressure drop (in. H ₂ O)	1.2000	1.2000	1.1733	
θ Total sampling time (min)	60.0	60.0	60.0	
Flow Results				
V _{wstd} Volume of water collected (ft ³)	9.2285	9.0073	9.2708	9.1689
V _{mstd} Volume metered, standard (dscf)	35.9193	35.8188	35.1588	35.6323
P _s Sample gas pressure, absolute (in. Hg)	29.9397	29.9471	29.9544	29.9471
P _v Vapor pressure, actual (in. Hg)	29.9397	29.9471	29.9544	29.9471
B _{wo} Moisture measured in sample (% by volume)	20.4406	20.0938	20.8663	20.4669
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	20.4406	20.0938	20.8663	20.4669
M _d MW of sample gas, dry (lb/lb-mole)	30.1644	30.1792	30.2792	30.2076
M _s MW of sample gas, wet (lb/lb-mole)	27.6779	27.7319	27.7170	27.7089

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 SDA Inlet

USEPA Modified Method 26A HCl Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:47	09:06	10:22	
Stop Time (approx.)	08:47	10:06	11:22	
Process Conditions				
R _P Production Rate (Klbs/hour)	184.3	184.0	184.2	184.2
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 %)	7.9900	8.0000	6.9800	7.6567
CO ₂ Carbon dioxide (dry volume %)	11.5300	11.6200	12.5000	11.8833
T _s Sample temperature (°F)	475.3333	468.9167	468.6667	470.9722
B _w Actual water vapor in gas (% by volume)	20.4406	20.0938	20.8663	20.4669
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	35.9193	35.8188	35.1588	35.6323
Laboratory Data				
m _n Total HCl collected (mg)	622.1637	645.3518	729.9421	
Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (lb/dscf)	3.8193E-05	3.9728E-05	4.5779E-05	4.1233E-05
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)	4.1122E-05	4.2807E-05	4.5713E-05	4.3214E-05
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)	3.9750E-05	4.1027E-05	4.3947E-05	4.1575E-05
C _{sd} HCl Concentration (ppmdv)	403.8009	420.0255	483.9992	435.9419
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	434.7662	452.5856	483.3038	456.8852
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)	420.2611	433.7613	464.6392	439.5539
C _w HCl Concentration (ppmwv)	321.2616	335.6263	383.0065	346.6314
C _{sd} HCl Concentration (mg/dscm)	611.6101	636.1844	733.0811	660.2919
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)	658.5112	685.5011	732.0278	692.0134
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)	636.5413	656.9891	703.7578	665.7627
C _{sd} HCl Concentration (mg/Nm ³ dry)	656.3620	682.7345	786.7212	708.6059
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)	706.6950	735.6597	785.5908	742.6485
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)	683.1174	705.0615	755.2523	714.4771
E _{Fd} HCl Rate - F _d -based (lb/MMBtu)	0.6029	0.6276	0.6702	0.6335
E _{Fc} HCl Rate - F _c -based (lb/MMBtu)	0.6029	0.6222	0.6665	0.6306

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

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

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:47	09:06	10:22	
Stop Time (approx.)	08:47	10:06	11:22	
Sampling Conditions				
Y _d Dry gas meter correction factor	0.9936	0.9936	0.9936	
P _g Static pressure (in. H ₂ O)	-9.1000	-5.8000	-5.8000	
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 %)	8.3400	7.5900	7.7300	7.8867
CO ₂ Carbon dioxide (dry volume %)	11.0600	11.2200	11.7700	11.3500
N ₂ +CO Nitrogen plus carbon monoxide (dry volume %)	80.6000	81.1900	80.5000	80.7633
V _{lc} Total Liquid collected (ml)	276.00	275.60	273.90	
V _m Volume metered, meter conditions (ft ³)	41.8700	41.8950	41.9200	
T _m Dry gas meter temperature (°F)	83.1250	86.1667	88.9167	
T _s Sample temperature (°F)	298.6667	299.9167	298.1667	298.9167
ΔH Meter box orifice pressure drop (in. H ₂ O)	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)	12.9886	12.9697	12.8897	12.9493
V _{mstd} Volume metered, standard (dscf)	40.7520	40.5492	40.3702	40.5571
P _s Sample gas pressure, absolute (in. Hg)	29.3809	29.6235	29.6235	29.5426
P _v Vapor pressure, actual (in. Hg)	29.3809	29.6235	29.6235	29.5426
B _{wo} Moisture measured in sample (% by volume)	24.1690	24.2339	24.2016	24.2015
B _{ws} Saturated moisture content (% by volume)	100.0000	100.0000	100.0000	100.0000
B _w Actual water vapor in gas (% by volume)	24.1690	24.2339	24.2016	24.2015
M _d MW of sample gas, dry (lb/lb-mole)	30.1032	30.0988	30.1924	30.1315
M _s MW of sample gas, wet (lb/lb-mole)	27.1780	27.1668	27.2416	27.1955

Comments:

Average includes 3 runs.

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Modified Method 26A HCl Parameters

Run No.	1	2	3	Average
Date (2011)	Mar 30	Mar 30	Mar 30	
Start Time (approx.)	07:47	09:06	10:22	
Stop Time (approx.)	08:47	10:06	11:22	
Process Conditions				
R _P Production Rate (Klbs/hour)	184.3	184.0	184.2	184.2
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 %)	8.3400	7.5900	7.7300	7.8867
CO ₂ Carbon dioxide (dry volume %)	11.0600	11.2200	11.7700	11.3500
T _s Sample temperature (°F)	298.6667	299.9167	298.1667	298.9167
B _w Actual water vapor in gas (% by volume)	24.1690	24.2339	24.2016	24.2015
Sampling Data				
V _{mstd} Volume metered, standard (dscf)	40.7520	40.5492	40.3702	40.5571
Laboratory Data				
m _n Total HCl collected (mg)	18.4573	11.7229	9.9685	
Hydrogen Chloride (HCl) Results				
C _{sd} HCl Concentration (lb/dscf)	9.9868E-07	6.3747E-07	5.4447E-07	7.2688E-07
C _{sd7} HCl Concentration @7% O ₂ (lb/dscf)	1.1052E-06	6.6573E-07	5.7465E-07	7.8187E-07
C _{sd12} HCl Concentration @12% CO ₂ (lb/dscf)	1.0836E-06	6.8179E-07	5.5511E-07	7.7349E-07
C _{sd} HCl Concentration (ppmdv)	10.5587	6.7397	5.7565	7.6850
C _{sd7} HCl Concentration @7% O ₂ (ppmdv)	11.6852	7.0385	6.0756	8.2664
C _{sd12} HCl Concentration @12% CO ₂ (ppmdv)	11.4561	7.2083	5.8690	8.1778
C _w HCl Concentration (ppmwv)	8.0067	5.1064	4.3633	5.8255
C _{sd} HCl Concentration (mg/dscm)	15.9925	10.2082	8.7190	11.6399
C _{sd7} HCl Concentration @7% O ₂ (mg/dscm)	17.6987	10.6607	9.2023	12.5206
C _{sd12} HCl Concentration @12% CO ₂ (mg/dscm)	17.3517	10.9179	8.8894	12.3863
C _{sd} HCl Concentration (mg/Nm ³ dry)	17.1627	10.9552	9.3570	12.4916
C _{sd7} HCl Concentration @7% O ₂ (mg/Nm ³ dry)	18.9937	11.4408	9.8756	13.4367
C _{sd12} HCl Concentration @12% CO ₂ (mg/Nm ³ dry)	18.6214	11.7168	9.5398	13.2926
E _{Fd} HCl Rate - Fd-based (lb/MMBtu)	0.0162	0.0098	0.0084	0.0115
E _{Fc} HCl Rate - Fc-based (lb/MMBtu)	0.0164	0.0103	0.0084	0.0117

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Wheelabrator North Broward, Inc.
CleanAir Project No. 11182
Lime Silo

Visible Emission Parameters

Run 1
Date (2011) Mar 30
Start Time 11:50

Time (min)	Time (sec)			
	15	30	45	60
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0

Time (min)	Time (sec)			
	15	30	45	60
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	0	0	0	0
42	0	0	0	0
43	0	0	0	0
44	0	0	0	0
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0

Time (min)	Time (sec)			
	15	30	45	60
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16				
17				
18				
19				
20				
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56				
57				
58				
59				

Average Opacity 0
Minimum Reading 0
Maximum Reading 0
No. of Readings >5% 0



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

RECEIVED

MAY 13 2011

**DEPT. OF
AIR REGULATION**

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: 11182-3
Revision 0: May 11, 2011

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

QA/QC DATA

E

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

QA/QC Initials: W

Date: 5/9/11



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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Method 5/29 (Particulate/Metals) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 29	Mar 29	Mar 29
Start Time (approx.)	07:41	10:15	15:16
Stop Time (approx.)	09:53	15:00	17:27
Total Duration of Test Run (min.)	132	285	131
Net Sampling Time (min.)	125	125	125

Sampling System Calibration Summary

	Nozzle ID No:	270-2	270-2	270-2
D _n	Nozzle Diameter (in):	0.270	0.270	0.270
	Probe ID No:	67-8-3	67-8-3	67-8-3
C _p	Pitot Coefficient:	0.8300	0.8300	0.8300
	Meter Box ID. No:	66-7	66-7	66-7
Y _d	Meter Box Yd - Field Sheet	0.9961	0.9961	0.9961
	Meter Box Yd - Database	0.9961	0.9961	0.9961
	Meter Box ΔH@ - Field Sheet	1.7697	1.7697	1.7697
	Meter Box ΔH@ - Database	1.7697	1.7697	1.7697

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0222	0.0216	0.0232
(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	0.0050	0.0040

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	67.814	65.476	70.634

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	0.9891	0.9570	1.0280
Y _{qa}	Alternative Meter Calibration Factor	0.9961	0.9951	0.9928
	Variation from full-test Y _d (average ≤ ±5%)	0.0%	-0.1%	-0.3%

Average
-0.1%

Mean Isokinetic Sampling Rate Variation

	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	100.51	100.86	101.48

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: 11182
Unit 1 FF Outlet

USEPA Method 13B (Total Fluorides) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 28	Mar 28	Mar 28
Start Time (approx.)	12:03	13:33	15:02
Stop Time (approx.)	13:12	14:44	16:11
Total Duration of Test Run (min.)	69	71	69
Net Sampling Time (min.)	63	63	63

Sampling System Calibration Summary

	Nozzle ID No:	274-1	274-1	274-1
D _n	Nozzle Diameter (in):	0.274	0.274	0.274
	Probe ID No:	67-8-14	67-8-14	67-8-14
C _p	Pitot Coefficient:	0.8120	0.8120	0.8120
	Meter Box ID. No:	66-21	66-21	66-21
Y _d	Meter Box Yd - Field Sheet	0.9837	0.9837	0.9837
	Meter Box Yd - Database	0.9837	0.9837	0.9837
	Meter Box ΔH@ - Field Sheet	1.8252	1.8252	1.8252
	Meter Box ΔH@ - Database	1.8252	1.8252	1.8252

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0253	0.0256	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	0.0040	0.0020

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	37.966	37.860	36.958

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.1132	1.1132	1.0861
Y _{qa}	Alternative Meter Calibration Factor	0.9724	0.9678	0.9666
	Variation from full-test Y _d (average ≤ ±5%)	-1.2%	-1.6%	-1.7%

**Average
-1.5%**

Mean Isokinetic Sampling Rate Variation

	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	102.08	102.37	102.10

Point-by-Point Isokinetic Variation

	Number of points <90%	1	0	0
	Number of points >110%	1	1	2
	Number of points <80%	0	0	0
	Number of points >120%	1	0	0

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 SDA Inlet

USEPA Modified Method 26A (HCl) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 28	Mar 28	Mar 28
Start Time (approx.)	07:48	09:11	10:35
Stop Time (approx.)	08:48	10:11	11:35
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:	67-4-5	67-4-5	67-4-5
C _p	Pitot Coefficient:	NA	NA	NA
	Meter Box ID. No:	66-4	66-4	66-4
Y _d	Meter Box Yd - Field Sheet	0.9983	0.9983	0.9983
	Meter Box Yd - Database	0.9983	0.9983	0.9983
	Meter Box ΔH@ - Field Sheet	1.6979	1.6979	1.6979
	Meter Box ΔH@ - Database	1.6979	1.6979	1.6979

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0245	0.0248	0.0244
(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)	0.0050	0.0030	0.0030

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	35.276	35.291	35.430

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.0954	1.0954	1.0954
Y _{qa}	Alternative Meter Calibration Factor	1.0310	1.0238	1.0290
	Variation from full-test Y _d (average ≤ ±5%)	3.3%	2.6%	3.1%

Average
3.0%

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Modified Method 26A (HCl) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 28	Mar 28	Mar 28
Start Time (approx.)	07:48	09:11	10:35
Stop Time (approx.)	08:48	10:11	11:35
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:	66-7	66-7	66-7
Y _d	Meter Box Yd - Field Sheet	0.9961	0.9961	0.9961
	Meter Box Yd - Database	0.9961	0.9961	0.9961
	Meter Box ΔH@ - Field Sheet	1.7697	1.7697	1.7697
	Meter Box ΔH@ - Database	1.7697	1.7697	1.7697

QA/QC

	<u>Final Leak Check</u>			
	(a) 4% of Sampling Rate (cfm)	0.0279	0.0279	0.0275
	(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
	<u>Sample Volume</u>			
	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	40.575	40.359	40.185
	<u>Alternative Method 5 Post-Test Calibration (EPA ALT-009)</u>			
√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.2247	1.2247	1.2247
Y _{qa}	Alternative Meter Calibration Factor	0.9862	0.9898	0.9970
	Variation from full-test Y _d (average ≤ ±5%)	-1.0%	-0.6%	0.1%

Average
-0.5%

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Method 5/29 (Particulate/Metals) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 30	Mar 30	Mar 30
Start Time (approx.)	07:31	09:59	12:29
Stop Time (approx.)	09:42	12:10	14:41
Total Duration of Test Run (min.)	131	131	132
Net Sampling Time (min.)	125	125	125

Sampling System Calibration Summary

	Nozzle ID No:	270-2	270-2	270-2
D _n	Nozzle Diameter (in):	0.270	0.270	0.270
	Probe ID No:	67-8-3	67-8-3	67-8-3
C _p	Pitot Coefficient:	0.8300	0.8300	0.8300
	Meter Box ID. No:	61-6	61-6	61-6
Y _d	Meter Box Yd - Field Sheet	0.9960	0.9960	0.9960
	Meter Box Yd - Database	0.9960	0.9960	0.9960
	Meter Box ΔH@ - Field Sheet	1.7601	1.7601	1.7601
	Meter Box ΔH@ - Database	1.7601	1.7601	1.7601

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0202	0.0209	0.0221
(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	0.0040	0.0030

Sample Volume

	Minimum Volume Required (dsf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dsf)	61.655	63.232	66.797

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	0.8921	0.9185	0.9686
Y _{qa}	Alternative Meter Calibration Factor	0.9884	0.9887	0.9858
	Variation from full-test Y _d (average ≤ ±5%)	-0.8%	-0.7%	-1.0%

Average
-0.8%

Mean Isokinetic Sampling Rate Variation

	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	99.56	100.75	102.02

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: 11182
Unit 2 FF Outlet

USEPA Method 13B (Total Fluorides) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 29	Mar 29	Mar 29
Start Time (approx.)	13:21	14:49	16:11
Stop Time (approx.)	14:30	15:57	17:23
Total Duration of Test Run (min.)	69	68	72
Net Sampling Time (min.)	63	63	63

Sampling System Calibration Summary

	Nozzle ID No:	274-1	274-1	274-1
D _n	Nozzle Diameter (in):	0.274	0.274	0.274
	Probe ID No:	67-8-14	67-8-14	67-8-14
C _p	Pitot Coefficient:	0.8120	0.8120	0.8120
	Meter Box ID. No:	61-6	61-6	61-6
Y _d	Meter Box Yd - Field Sheet	0.9960	0.9960	0.9960
	Meter Box Yd - Database	0.9960	0.9960	0.9960
	Meter Box ΔH@ - Field Sheet	1.7601	1.7601	1.7601
	Meter Box ΔH@ - Database	1.7601	1.7601	1.7601

QA/QC

	<u>Final Leak Check</u>			
	(a) 4% of Sampling Rate (cfm)	0.0246	0.0221	0.0237
	(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	0.0040	0.0030
	<u>Sample Volume</u>			
	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	36.431	32.953	35.492
	<u>Alternative Method 5 Post-Test Calibration (EPA ALT-009)</u>			
√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.0623	0.9626	1.0345
Y _{qa}	Alternative Meter Calibration Factor	0.9834	0.9850	0.9873
	Variation from full-test Y _d (average ≤ ±5%)	-1.3%	-1.1%	-0.9%

Average
-1.1%

	<u>Mean Isokinetic Sampling Rate Variation</u>			
	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	103.76	103.92	105.23
	<u>Point-by-Point Isokinetic Variation</u>			
	Number of points <90%	0	1	0
	Number of points >110%	2	1	2
	Number of points <80%	0	1	0
	Number of points >120%	0	1	0

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 SDA Inlet

USEPA Modified Method 26A (HCl) QA/QC Results

Run No.	1	2	3	4
Date (2011)	Mar 29	Mar 29	Mar 29	Mar 29
Start Time (approx.)	07:50	09:23	10:39	11:54
Stop Time (approx.)	08:50	10:23	11:39	12:54
Total Duration of Test Run (min.)	60	60	60	60
Net Sampling Time (min.)	60	60	60	60

Sampling System Calibration Summary

	Nozzle ID No:	NA	NA	NA	NA
D _n	Nozzle Diameter (in):	NA	NA	NA	NA
	Probe ID No:	67-4-5	67-4-5	67-4-5	67-4-5
C _p	Pitot Coefficient:	NA	NA	NA	NA
	Meter Box ID. No:	66-4	66-4	66-4	66-4
Y _d	Meter Box Yd - Field Sheet	0.9983	0.9983	0.9983	0.9983
	Meter Box Yd - Database	0.9983	0.9983	0.9983	0.9983
	Meter Box ΔH@ - Field Sheet	1.6979	1.6979	1.6979	1.6979
	Meter Box ΔH@ - Database	1.6979	1.6979	1.6979	1.6979

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0240	0.0242	0.0246	0.0245
(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)	0.0030	0.0050	0.0050	0.0030

Sample Volume

V _{mstd}	Minimum Volume Required (dscf)	30.00	30.00	30.00	30.00
	Actual Sample Volume (dscf)	35.018	34.973	35.355	35.457

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.0815	1.0916	1.0954	1.0954
Y _{qa}	Alternative Meter Calibration Factor	1.0316	1.0357	1.0271	1.0269
	Variation from full-test Y _d (average ≤ ±5%)	3.3%	3.7%	2.9%	2.9%
					Average
					3.2%

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Modified Method 26A (HCl) QA/QC Results

Run No.	1*	2	3	4
Date (2011)	Mar 29	Mar 29	Mar 29	Mar 29
Start Time (approx.)	07:50	09:23	10:39	11:54
Stop Time (approx.)	08:50	10:23	11:39	12:54
Total Duration of Test Run (min.)	60	60	60	60
Net Sampling Time (min.)	60	60	60	60

Sampling System Calibration Summary

	Nozzle ID No:	NA	NA	NA	NA
D _n	Nozzle Diameter (in):	NA	NA	NA	NA
	Probe ID No:	67-4-1	67-4-1	67-4-1	67-4-1
C _p	Pitot Coefficient:	NA	NA	NA	NA
	Meter Box ID. No:	61-6	61-6	61-6	61-6
Y _d	Meter Box Yd - Field Sheet	0.9960	0.9960	0.9960	0.9960
	Meter Box Yd - Database	0.9960	0.9960	0.9960	0.9960
	Meter Box ΔH@ - Field Sheet	1.7601	1.7601	1.7601	1.7601
	Meter Box ΔH@ - Database	1.7601	1.7601	1.7601	1.7601

QA/QC

	<u>Final Leak Check</u>				
	(a) 4% of Sampling Rate (cfm)	0.0281	0.0283	0.0283	0.0283
	(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	0.0030	0.0020
	<u>Sample Volume</u>				
	Minimum Volume Required (dscf)	30.00	30.00	30.00	30.00
V _{msld}	Actual Sample Volume (dscf)	41.197	40.703	40.369	40.289
	<u>Alternative Method 5 Post-Test Calibration (EPA ALT-009)</u>				
√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.2247	1.2247	1.2247	1.2247
Y _{qs}	Alternative Meter Calibration Factor	0.9785	0.9803	0.9832	0.9838
	Variation from full-test Y _d (average ≤ ±5%)	-1.8%	-1.6%	-1.3%	-1.2%
					Average
					-1.5%

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 5/29 (Particulate/Metals) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 28	Mar 28	Mar 28
Start Time (approx.)	07:31	10:05	12:43
Stop Time (approx.)	09:43	12:19	14:55
Total Duration of Test Run (min.)	132	134	132
Net Sampling Time (min.)	125	125	125

Sampling System Calibration Summary

	Nozzle ID No:	270-1	270-1	270-2
D _n	Nozzle Diameter (in):	0.270	0.270	0.270
	Probe ID No:	67-8-3	67-8-3	67-8-3
C _p	Pitot Coefficient:	0.8300	0.8300	0.8300
	Meter Box ID. No:	66-24	66-24	66-24
Y _d	Meter Box Yd - Field Sheet	0.9847	0.9847	0.9847
	Meter Box Yd - Database	0.9847	0.9847	0.9847
	Meter Box ΔH@ - Field Sheet	1.7639	1.7639	1.7639
	Meter Box ΔH@ - Database	1.7639	1.7639	1.7639

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0211	0.0214	0.0218
(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	0.0040

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	63.365	64.092	64.593

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	0.9311	0.9429	0.9666
Y _{qa}	Alternative Meter Calibration Factor	0.9913	0.9919	1.0030
	Variation from full-test Y _d (average ≤ ±5%)	0.7%	0.7%	1.9%

**Average
1.1%**

Mean Isokinetic Sampling Rate Variation

	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	100.82	100.18	99.04

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: 11182
Unit 3 FF Outlet

USEPA Method 13B (Total Fluorides) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 30	Mar 30	Mar 30
Start Time (approx.)	11:40	13:04	14:26
Stop Time (approx.)	12:47	14:12	15:30
Total Duration of Test Run (min.)	67	68	64
Net Sampling Time (min.)	63	63	63

Sampling System Calibration Summary

	Nozzle ID No:	274-1	274-1	274-1
D _n	Nozzle Diameter (in):	0.274	0.274	0.274
	Probe ID No:	67-8-14	67-8-14	67-8-14
C _p	Pitot Coefficient:	0.8120	0.8120	0.8120
	Meter Box ID. No:	61-5	61-5	61-5
Y _d	Meter Box Yd - Field Sheet	0.9936	0.9936	0.9936
	Meter Box Yd - Database	0.9936	0.9936	0.9936
	Meter Box ΔH@ - Field Sheet	1.7676	1.7676	1.7676
	Meter Box ΔH@ - Database	1.7676	1.7676	1.7676

QA/QC

	<u>Final Leak Check</u>			
	(a) 4% of Sampling Rate (cfm)	0.0220	0.0249	0.0229
	(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	0.0010	0.0010
	<u>Sample Volume</u>			
	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	33.132	37.422	34.411
	<u>Alternative Method 5 Post-Test Calibration (EPA ALT-009)</u>			
√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	0.9639	1.0751	0.9970
Y _{qa}	Alternative Meter Calibration Factor	0.9839	0.9732	0.9791
	Variation from full-test Y _d (average ≤ ±5%)	-1.0%	-2.0%	-1.5%

**Average
-1.5%**

	<u>Mean Isokinetic Sampling Rate Variation</u>			
	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	103.16	104.21	104.36
	<u>Point-by-Point Isokinetic Variation</u>			
	Number of points <90%	0	0	0
	Number of points >110%	2	2	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: 11182
Unit 3 FF Outlet

USEPA Method 23 (PCDD/F) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 28	Mar 29	Mar 29
Start Time (approx.)	10:05	07:41	12:38
Stop Time (approx.)	14:25	11:59	16:59
Total Duration of Test Run (min.)	260	258	261
Net Sampling Time (min.)	250	250	250

Sampling System Calibration Summary

	Nozzle ID No:	271-1	271-1	271-1
D _n	Nozzle Diameter (in):	0.271	0.271	0.271
	Probe ID No:	67-8-10	67-8-10	67-8-10
C _p	Pitot Coefficient:	0.8220	0.8220	0.8220
	Meter Box ID. No:	61-5	61-5	61-5
Y _d	Meter Box Yd - Field Sheet	0.9936	0.9936	0.9936
	Meter Box Yd - Database	0.9936	0.9936	0.9936
	Meter Box ΔH@ - Field Sheet	1.7676	1.7676	1.7676
	Meter Box ΔH@ - Database	1.7676	1.7676	1.7676

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0242	0.0242	0.0247
(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	0.0030	0.0020

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	144.671	145.546	148.179

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.0401	1.0605	1.0745
Y _{qa}	Alternative Meter Calibration Factor	0.9714	0.9879	0.9802
	Variation from full-test Y _d (average ≤ ±5%)	-2.2%	-0.6%	-1.4%

**Average
-1.4%**

Mean Isokinetic Sampling Rate Variation

	Minimum Allowable (%)	90	90	90
	Maximum Allowable (%)	110	110	110
%I	Actual Variation (%)	103.12	100.30	102.94

Point-by-Point Isokinetic Variation

	Number of points <90%	0	0	0
	Number of points >110%	0	0	1
	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: 11182
Unit 3 SDA Inlet

USEPA Modified Method 26A (HCl) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 30	Mar 30	Mar 30
Start Time (approx.)	07:47	09:06	10:22
Stop Time (approx.)	08:47	10:06	11:22
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:	67-4-5	67-4-5	67-4-5
C _p	Pitot Coefficient:	NA	NA	NA
	Meter Box ID. No:	66-4	66-4	66-4
Y _d	Meter Box Yd - Field Sheet	0.9983	0.9983	0.9983
	Meter Box Yd - Database	0.9983	0.9983	0.9983
	Meter Box ΔH@ - Field Sheet	1.6979	1.6979	1.6979
	Meter Box ΔH@ - Database	1.6979	1.6979	1.6979

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0248	0.0248	0.0244
(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)	0.0050	0.0050	0.0050

Sample Volume

	Minimum Volume Required (dscf)	30.00	30.00	30.00
V _{mstd}	Actual Sample Volume (dscf)	35.919	35.819	35.159

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.0954	1.0954	1.0828
Y _{qa}	Alternative Meter Calibration Factor	1.0141	1.0144	1.0189
	Variation from full-test Y _d (average ≤ ±5%)	1.6%	1.6%	2.1%

Average
1.8%

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Modified Method 26A (HCl) QA/QC Results

Run No.	1	2	3
Date (2011)	Mar 30	Mar 30	Mar 30
Start Time (approx.)	07:47	09:06	10:22
Stop Time (approx.)	08:47	10:06	11:22
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:	61-5	61-5	61-5
Y _d	Meter Box Yd - Field Sheet	0.9936	0.9936	0.9936
	Meter Box Yd - Database	0.9936	0.9936	0.9936
	Meter Box ΔH@ - Field Sheet	1.7676	1.7676	1.7676
	Meter Box ΔH@ - Database	1.7676	1.7676	1.7676

QA/QC

Final Leak Check

(a) 4% of Sampling Rate (cfm)	0.0279	0.0279	0.0279
(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)	40.752	40.549	40.370

Alternative Method 5 Post-Test Calibration (EPA ALT-009)

√ΔH _{avg}	Average of Square Root of ΔH (in. W.C.)	1.2247	1.2247	1.2247
Y _{qa}	Alternative Meter Calibration Factor	0.9813	0.9836	0.9839
	Variation from full-test Y _d (average ≤ ±5%)	-1.2%	-1.0%	-1.0%

Average
-1.1%

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Nozzle Calibration Sheet

Client <u>Wheelabrator</u>	Project Number <u>11182</u>
Calibrated by <u>S Brown</u>	Caliper ID <u>0084936</u>
Date <u>3/21/11</u>	Unit / Runs

	Nozzle Identification	D ₁ (inches)	D ₂ (inches)	D ₃ (inches)	ΔD (inches)	D _{ave} (inches)
5/29	0.270-1	0.269	0.270	0.270	0.001	0.270
	0.270-2	0.270	0.270	0.269	0.001	0.270
23	0.271-1	0.271	0.271	0.270	0.001	0.271
13B	0.271-2	0.272	0.271	0.271	0.001	0.271
	0.274-1	0.274	0.273	0.275	0.002	0.274

D ₁ , D ₂ , D ₃ =	three nozzle diameter measurements	
ΔD =	maximum difference between any two diameters ΔD ≤ 0.004 inches*	
D _{ave} =	average of D ₁ , D ₂ , D ₃	

* (40 CFR 60, Appendix A, Method 5, Section 5.1)

Caliper Calibration Sheet

Calibrated by	<i>D. Zeishman</i>
Date	<i>3-16-11</i>

Caliper ID	<i>0084536</i>

Standard Caliper ID	<i>101460021</i>

Standard Caliper Setting (in)	Caliper Reading (in)	Deviation (ΔD)
0.150	0.149	0.001
0.300	0.299	0.001
0.500	0.499	0.001

ΔD = maximum deviation between standard and caliper being calibrated
 $\Delta D \leq 0.004$ inch for every reading



Meter Box Full Test Calibration

Meter Box No: 61-5

Date of Calibration: 5/3/2010

Meter Box Y_d : 0.9936

Calibration Conducted by: OLEG LAVROV

Meter Box $\Delta H@$: 1.7676

Barometric Pressure: 29.00

				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	$\Delta H@$
0.973	3.00	-1.80	1.0000	0.000	10.000	10.000	625.637	635.732	10.095	70.0	70.0	70.00	81.0	76.0	78.50	9.92	0.9943	1.7019
0.962	3.00	-1.80	1.0000	0.000	10.000	10.000	635.732	645.882	10.150	70.0	70.0	70.00	84.0	77.0	80.50	10.03	0.9926	1.7366
0.381	0.50	-1.10	1.0000	0.000	5.000	5.000	649.227	654.315	5.088	70.5	70.5	70.50	82.0	78.0	80.00	12.64	0.9962	1.8387
0.380	0.50	-1.10	1.0000	0.000	5.000	5.000	654.315	659.418	5.103	70.5	70.5	70.50	83.0	79.0	81.00	12.69	0.9952	1.8498
0.678	1.50	-1.40	1.0000	0.000	10.000	10.000	661.640	671.889	10.249	71.0	71.0	71.00	88.0	80.0	84.00	14.21	0.9923	1.7397
0.677	1.50	-1.40	1.0000	0.000	10.000	10.000	671.889	682.172	10.283	71.0	71.0	71.00	89.0	81.0	85.00	14.22	0.9908	1.7389
Averages																	0.99367	1.76758

Nomenclature	Equations
P_b Barometric Pressure (in. Hg) Q Flow Rate (cfm) ΔH Orifice Pressure differential (in. H ₂ O) ΔP Inlet Pressure Differential (in. H ₂ O) 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) $\Delta H@$ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H ₂ O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$ Θ Duration of Run (minutes)	$Y_d = (Y_{ds}) \left[\frac{V_{ds}}{V_d} \right] \left[\frac{T_d + 460}{T_{ds} + 460} \right] \left[\frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6} \right]$ $\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)} \left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})} \right]^2$ $Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$

Vacuum Gauge

Standard (in. Hg)	Gauge (in. Hg)
4.7	5.0
9.9	10.0
14.9	15.0
20.2	20.0
24.5	25.0

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 61-5

Office: _____

Calibrated by: OLEG LAVROV

Client: _____

Date: 5/3/10

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	50				
100	100	99	100				
150	150	150	150				
200	200	200	200				
250	250	250	250				
300	300	300	300				
350	350	350	350				
400	400	400	400				
450	450	450	450				
500	500	499	500				
550	550	550	550				
600	600	600	600				

Tolerance = $\pm 2^{\circ}\text{F}$ difference from reference setting.

Calibration Reference Information

Reference Used: <u>Omega CL23A</u>	Serial No: <u>T-225950</u>
Calibrated By: <u>JH Metrology</u>	Exp. Date: <u>10/7/2010</u>
Calibration Report No: <u>RO44791</u>	

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 11182 Meter No. 61-5 Orifice D-3
 Location warehouse Meter Yd 0.9936 Orifice K' 0.5558
 Test Date 04/08/11 Meter ΔH@ 1.7676 Orifice Cal. Date 06/22/10
 Operator p bihun Full Test Cal. Date 05/03/10

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) 28.50 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature		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
			Inlet (°F)	Outlet (°F)								
	0.0	451.50	71	73								
	5.0	455.17	72	73	74	1.50	20	5.0	3.67	72.3	0.9849	0.2%
	10.0	458.87	72	74	75	1.50	20	5.0	3.70	72.8	0.9769	-0.6%
	15.0	462.53	72	75	76	1.50	20	5.0	3.66	73.3	0.9876	0.5%

Average Y_i

0.9831

Cal. Error

-1.1%

Calculations and Specifications

$$Y_i = \frac{K \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times (P_b + \frac{\Delta H}{13.6}) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \bar{Y}_i}{\bar{Y}_i} \times 100$$

Spec.: ΔY_i ≤ ±2%

$$Cal. Error = \frac{\bar{Y}_i - Y_d}{Y_d} \times 100$$

Spec.: Cal. Error ≤ ±5%

Meter Box Full Test Calibration

Meter Box No: 61-6

Date of Calibration: 7/20/2010

Meter Box Y_d : 0.9960

Calibration Conducted by: Martin Vaquero

Meter Box $\Delta H@$: 1.7601

Signature: Martin Vaquero

Barometric Pressure: 29.23

				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	$\Delta H@$
0.967	3.00	-1.90	1.0000	0.000	10.000	10.000	821.383	831.452	10.069	77.0	77.0	77.00	91.0	81.0	86.00	9.93	0.9974	1.7208
0.965	3.00	-1.90	1.0000	0.000	10.000	10.000	831.452	841.541	10.089	77.0	77.0	77.00	91.0	81.0	86.00	9.95	0.9955	1.7277
0.385	0.50	-1.10	1.0000	0.000	5.000	5.000	851.319	856.360	5.041	77.0	77.0	77.00	82.0	79.0	80.50	12.48	0.9943	1.8188
0.385	0.50	-1.10	1.0000	0.000	5.000	5.000	856.360	861.399	5.039	77.0	77.0	77.00	82.0	79.0	80.50	12.48	0.9947	1.8188
0.681	1.50	-1.40	1.0000	0.000	10.000	10.000	865.118	875.175	10.057	77.0	77.0	77.00	86.0	79.0	82.50	14.09	0.9972	1.7387
0.681	1.50	-1.40	1.0000	0.000	10.000	10.000	875.175	885.256	10.081	77.0	77.0	77.00	87.0	80.0	83.50	14.09	0.9967	1.7355
Averages																	0.99597	1.76006

Nomenclature	Equations
P_b Barometric Pressure (in. Hg) Q Flow Rate (cfm) ΔH Orifice Pressure differential (in. H₂O) ΔP Inlet Pressure Differential (in. H₂O) 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), $Y_1 \leq Y_{avg} \pm 0.02$ Y_{ds} Standard Meter Correction Factor (unitless) $\Delta H@$ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H₂O) $\Delta H@_1 \leq \Delta H@_{avg} \pm 0.2$ Θ Duration of Run (minutes)	$Y_d = (Y_{ds}) \left[\frac{V_{ds}}{V_d} \right] \left[\frac{T_d + 460}{T_{ds} + 460} \right] \left[\frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6} \right]$ $\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b (T_o + 460)} \left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})} \right]^2$ $Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$

Vacuum Gauge	
Standard (in.Hg)	Gauge (in.Hg)
5.5	5.0
10.8	10.0
15.6	15.0
20.5	20.0
24.0	24.0

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 61-6

Office: _____

Calibrated by: Martin Vaquero

Client: _____

Date: 7/20/10

Job No: _____

Temperature Scale Used: Fahrenheit

Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1	2	3	4	5	6	7
	Stack	Probe	Filter	Imp Out	Aux	DGM In	DGM Out
50	48	50	51				
100	98	99	100				
150	149	150	150				
200	199	199	200				
250	249	249	250				
300	299	299	300				
350	348	349	350				
400	398	399	400				
450	448	449	450				
500	499	499	500				
550	548	549	550				
600	598	599	600				

Tolerance = $\pm 2^{\circ}\text{F}$ difference from reference setting.

Calibration Reference Information

Reference Used: <u>Omega CL23A</u>	Serial No: <u>T-279500</u>
Calibrated By: <u>JH Metrology</u>	Exp. Date: <u>8/18/2010</u>
Calibration Report No: <u>R044791</u>	

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 11182 Meter No. 61-6 Orifice A-2
 Location Warehouse Meter Yd 0.9960 Orifice K' 0.4522
 Test Date 4/5/2011 Meter ΔH@ 1.7601 Orifice Cal. Date 2/9/2011
 Operator N. Hitchins Full Test Cal. Date 7/20/2010

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) 28.38 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature		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
			Inlet (°F)	Outlet (°F)								
	0.0	221.92	68	68								
1	5.0	224.88	68	68	68	1.00	19	5.0	2.97	68.0	0.9908	0.1%
2	10.0	227.85	69	68	68	1.00	19	5.0	2.97	68.3	0.9896	0.0%
3	15.0	230.83	72	69	69	1.00	19	5.0	2.97	69.5	0.9893	-0.1%

Average Y_i

0.9899

Cal. Error

-0.6%

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times (P_b + \frac{\Delta H}{13.6}) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \bar{Y}_i}{\bar{Y}_i} \times 100$$

Spec.: ΔY_i ≤ ±2%

$$Cal. Error = \frac{\bar{Y}_i - Y_d}{Y_d} \times 100$$

Spec.: Cal. Error ≤ ±5%

Meter Box Full Test Calibration

Meter Box No: 66-4

Date of Calibration: 11/2/2010

Meter Box Y_d : 0.9983

Calibration conducted by: OLEG LAVROV

Meter Box $\Delta H@$: 1.6979

Barometric Pressure: 29.58

				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	In	Out	T_{ds} Avg.	In	T_o Out	T_d Avg.	Θ	Y_d	$\Delta H@$
0.980	3.00	-1.70	1.0000	0.000	10.000	10.000	555.658	565.700	10.042	72.0	72.0	72.00	83.0	76.0	79.50	10.01	0.9981	1.7118
0.978	3.00	-1.70	1.0000	0.000	10.000	10.000	565.700	575.782	10.082	72.0	72.0	72.00	84.0	77.0	80.50	10.03	0.9980	1.7154
0.403	0.50	-1.20	1.0000	0.000	5.000	5.000	591.300	596.346	5.048	72.5	72.5	72.50	80.0	78.0	79.00	12.17	0.9987	1.6837
0.403	0.50	-1.20	1.0000	0.000	5.000	5.000	596.346	601.392	5.048	72.5	72.5	72.50	80.0	78.0	79.00	12.15	0.9987	1.6782
0.693	1.50	-1.40	1.0000	0.000	10.000	10.000	605.000	615.075	10.075	73.0	73.0	73.00	83.0	78.0	80.50	14.13	0.9993	1.7055
0.695	1.50	-1.40	1.0000	0.000	10.000	10.000	615.075	625.172	10.097	73.0	73.0	73.00	84.0	79.0	81.50	14.09	0.9990	1.6927
Averages																	0.99832	1.69785

Nomenclature	Equations
P_b Barometric Pressure (in. Hg) Q Flow Rate (cfm) ΔH Orifice Pressure differential (in. H₂O) ΔP Inlet Pressure Differential (in. H₂O) 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), $Y_1 \leq Y_{avg} \pm 0.02$ Y_{ds} Standard Meter Correction Factor (unitless) $\Delta H@$ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H₂O) $\Delta H@_1 \leq \Delta H@_{avg} \pm 0.2$ Θ Duration of Run (minutes)	$Y_d = (Y_{ds}) \left[\frac{V_{ds}}{V_d} \right] \left[\frac{T_d + 460}{T_{ds} + 460} \right] \left[\frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6} \right]$ $\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b (T_o + 460)} \left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})} \right]^2$ $Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$

Vacuum Gauge	
Standard (in. Hg)	Gauge (in. Hg)
5.2	5.0
10.2	10.0
15.4	15.0
19.9	20.0
24.9	25.0

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-4

Office: _____

Calibrated by: OLEG LAVROV

Client: _____

Date: 11/2/10

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	52				
100	100	100	102				
150	150	150	152				
200	200	200	202				
250	250	250	252				
300	299	300	302				
350	349	350	352				
400	399	400	402				
450	449	450	452				
500	499	500	502				
550	549	550	552				
600	599	600	602				

Tolerance = $\pm 2^{\circ}\text{F}$ difference from reference setting.

Calibration Reference Information

Reference Used: <u>Omega CL23A</u>	Serial No: <u>T-225950</u>
Calibrated By: <u>JH Metrology</u>	Exp.date : <u>8/17/2011</u>
Calibration Report No: <u>1000150487</u>	

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 11182 Meter No. 66-4 Orifice B-5
 Location warehouse Meter Yd 0.9983 Orifice K' 0.5403
 Test Date 04/06/11 Meter ΔH@ 1.6979 Orifice Cal. Date 02/09/11
 Operator p bihun Full Test Cal. Date 11/02/10

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) 28.35 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature		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
			Inlet (°F)	Outlet (°F)								
	0.0	304.50	70	68								
	5.0	308.06	71	68	71	1.50	19	5.0	3.56	69.3	0.9842	0.3%
	10.0	311.64	72	69	73	1.50	19	5.0	3.58	70.0	0.9782	-0.3%
	15.0	315.21	72	69	74	1.50	19	5.0	3.57	70.5	0.9824	0.1%

Average Y_i

0.9816

Cal. Error

-1.7%

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times (P_b + \frac{\Delta H}{13.6}) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \bar{Y}_i}{\bar{Y}_i} \times 100$$

Spec.: ΔY_i ≤ ±2%

$$Cal. Error = \frac{\bar{Y}_i - Y_d}{Y_d} \times 100$$

Spec.: Cal. Error ≤ ±5%

Meter Box Full Test Calibration

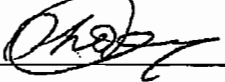
Meter Box No: 66-7

Date of Calibration: 11/8/2010

Meter Box Y_d : 0.9961

Calibration Conducted by: Oleg Lavrov

Meter Box $\Delta H@$: 1.7697

Signature: 

Barometric Pressure: 29.20

				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	$\Delta H@$
0.967	3.00	-1.70	1.0000	0.000	10.000	10.000	925.432	935.579	10.147	67.5	67.5	67.50	86.0	75.0	80.50	10.10	0.9979	1.7389
0.964	3.00	-1.70	1.0000	0.000	10.000	10.000	935.579	945.740	10.181	67.5	67.5	67.50	87.0	76.0	81.50	10.13	0.9984	1.7459
0.383	0.50	-1.10	1.0000	0.000	5.000	5.000	950.227	955.337	5.110	68.0	68.0	68.00	81.0	77.0	79.00	12.72	0.9948	1.8353
0.383	0.50	-1.10	1.0000	0.000	5.000	5.000	955.337	960.447	5.110	68.0	68.0	68.00	81.0	77.0	79.00	12.73	0.9948	1.8382
0.683	1.50	-1.50	1.0000	0.000	10.000	10.000	967.234	977.474	10.240	68.0	68.0	68.00	87.0	78.0	82.50	14.29	0.9958	1.7340
0.684	1.50	-1.50	1.0000	0.000	10.000	10.000	977.474	987.732	10.258	68.0	68.0	68.00	87.0	79.0	83.00	14.27	0.9950	1.7259
Averages																	0.99614	1.76970

Nomenclature	Equations
P_b Barometric Pressure (in. Hg) Q Flow Rate (cfm) ΔH Orifice Pressure differential (in. H₂O) ΔP Inlet Pressure Differential (in. H₂O) 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), $Y_i \leq Y_{avg} \pm 0.02$ Y_{ds} Standard Meter Correction Factor (unitless) $\Delta H@$ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H₂O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$ Θ Duration of Run (minutes)	$Y_d = (Y_{ds}) \left[\frac{V_{ds}}{V_d} \right] \left[\frac{T_d + 460}{T_{ds} + 460} \right] \left[\frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6} \right]$ $\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b (T_o + 460)} \left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})} \right]^2$ $Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$

Vacuum Gauge	
Standard (in.Hg)	Gauge (in.Hg)
5.0	5.0
10.0	10.0
14.8	15.0
19.7	20.0
24.6	25.0

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-7

Office: _____

Calibrated by: Oleg Lavrov

Client: _____

Date: 11/8/10

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	52	52				
100	99	102	102				
150	150	152	152				
200	201	202	202				
250	251	252	252				
300	301	302	302				
350	351	352	352				
400	401	402	402				
450	450	452	452				
500	500	502	502				
550	550	552	552				
600	600	602	602				

Tolerance = $\pm 2^{\circ}\text{F}$ difference from reference setting.

Calibration Reference Information

Reference Used: Omega CL23A

Serial No: T-225950

Calibrated By: JH Metrology

Exp. Date: 8/17/2011

Calibration Report No: 1000150487

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 11182 Meter No. 66-7 Orifice A-5
 Location Warehouse Meter Yd 0.9961 Orifice K' 0.5601
 Test Date 04/06/11 Meter ΔH@ 1.7697 Orifice Cal. Date 02/09/11
 Operator N. Hitchins Full Test Cal. Date 11/08/10

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) 28.32 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature		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
			Inlet (°F)	Outlet (°F)								
	0.0	157.240	70	70								
1	5.0	160.94	71	70	70	1.60	19.0	5.0	3.70	70.3	0.9842	-0.1%
2	10.0	164.62	72	70	71	1.60	19.0	5.0	3.68	70.8	0.9895	0.5%
3	15.0	168.325	73	71	75	1.60	19.0	5.0	3.70	71.5	0.9806	-0.4%

Average Y_i

0.9848

Cal. Error

-1.1%

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times (P_b + \frac{\Delta H}{13.6}) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \bar{Y}_i}{\bar{Y}_i} \times 100 \quad \text{Spec.: } \Delta Y_i \leq \pm 2\%$$

$$\text{Cal. Error} = \frac{\bar{Y}_i - Y_d}{Y_d} \times 100 \quad \text{Spec.: } \text{Cal. Error} \leq \pm 5\%$$

Meter Box Full Test Calibration

Meter Box No: 66-21

Date of Calibration: 8/24/2010

Meter Box Y_d : 0.9837

Calibration Conducted by: Martin Vaquero

Meter Box $\Delta H@$: 1.8252

Signature: *Martin Vaquero*

Barometric Pressure: 29.30

				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	$\Delta H@$
0.940	3.00	-1.80	1.0000	0.000	10.000	10.000	580.251	590.498	10.247	77.5	77.5	77.50	93.0	84.0	88.50	10.23	0.9840	1.8153
0.935	3.00	-1.80	1.0000	0.000	11.000	11.000	590.498	601.805	11.307	77.5	77.5	77.50	93.0	85.0	89.00	11.31	0.9818	1.8304
0.380	0.50	-1.00	1.0000	0.000	5.000	5.000	619.434	624.574	5.140	77.5	77.5	77.50	87.0	85.0	86.00	12.66	0.9844	1.8500
0.379	0.50	-1.00	1.0000	0.000	5.000	5.000	624.574	629.701	5.127	77.5	77.5	77.50	86.0	85.0	85.50	12.67	0.9860	1.8530
0.667	1.50	-1.40	1.0000	0.000	12.000	12.000	640.865	653.194	12.329	77.5	77.5	77.50	90.0	84.0	87.00	17.29	0.9833	1.8005
0.667	1.50	-1.40	1.0000	0.000	11.000	11.000	653.194	664.515	11.321	77.5	77.5	77.50	90.0	85.0	87.50	15.87	0.9825	1.8020
Averages																	0.98368	1.82520

Nomenclature	Equations
P_b Barometric Pressure (in. Hg) Q Flow Rate (cfm) ΔH Orifice Pressure differential (in. H₂O) ΔP Inlet Pressure Differential (in. H₂O) 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), $Y_i \leq Y_{avg} \pm 0.02$ Y_{ds} Standard Meter Correction Factor (unitless) $\Delta H@$ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H₂O) $\Delta H@_i \leq \Delta H@_{avg} \pm 0.2$ Θ Duration of Run (minutes)	$Y_d = (Y_{ds}) \left[\frac{V_{ds}}{V_d} \right] \left[\frac{T_d + 460}{T_{ds} + 460} \right] \left[\frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6} \right]$ $\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)} \left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})} \right]^2$ $Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$

Vacuum Gauge	
Standard (in. Hg)	Gauge (in. Hg)
4.9	5.0
10.1	10.0
15.0	15.0
19.8	20.0
23.5	24.0

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-21

Office: _____

Calibrated by: Martin Vaquero

Client: _____

Date: 8/24/10

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	52				
100	98	100	102				
150	149	150	152				
200	199	200	202				
250	249	250	252				
300	299	300	302				
350	349	350	352				
400	399	400	402				
450	449	450	452				
500	499	500	502				
550	549	550	551				
600	599	600	601				

Tolerance = $\pm 2^{\circ}\text{F}$ difference from reference setting.

Calibration Reference Information

Reference Used: <u>Omega CL23A</u>	Serial No: <u>T-279500</u>
Calibrated By: <u>JH Metrology</u>	Exp. Date: <u>17/8/2011</u>
Calibration Report No: <u>1000150487</u>	

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 11182 Meter No. 66-21 Orifice A-4
 Location Warehouse Meter Yd 0.9837 Orifice K' 0.4934
 Test Date 04/06/11 Meter ΔH@ 1.8252 Orifice Cal. Date 02/09/11
 Operator N. Hitchins Full Test Cal. Date 08/24/10

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) 28.32 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature		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
			Inlet (°F)	Outlet (°F)								
	0.0	734.870	68	68								
1	5.0	738.17	68	68	69	1.30	17.0	5.0	3.30	68.0	0.9696	0.5%
2	10.0	741.51	70	69	69	1.30	17.0	5.0	3.34	68.8	0.9594	-0.6%
3	15.0	744.830	71	70	70	1.30	17.0	5.0	3.32	70.0	0.9665	0.1%

Average Y_i 0.9652
 Cal. Error -1.9%

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times (P_b + \frac{\Delta H}{13.6}) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \bar{Y}_i}{\bar{Y}_i} \times 100 \quad \text{Spec.: } \Delta Y_i \leq \pm 2\%$$

$$\text{Cal. Error} = \frac{\bar{Y}_i - Y_d}{Y_d} \times 100 \quad \text{Spec.: } \text{Cal. Error} \leq \pm 5\%$$

Meter Box Full Test Calibration

Meter Box No: 66-24

Date of Calibration: 8/20/2010

Meter Box Y_d : 0.9847

Calibration Conducted by: Martin Vaquero

Meter Box $\Delta H@$: 1.7639

Signature: Martin Vaquero

Barometric Pressure: 29.17

				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	$\Delta H@$
0.961	3.00	-1.90	1.0000	0.000	10.000	10.000	405.867	416.023	10.156	77.0	77.0	77.00	85.0	79.0	82.00	9.97	0.9816	1.7447
0.954	3.00	-1.90	1.0000	0.000	10.000	10.000	416.023	426.204	10.181	77.0	77.0	77.00	87.0	80.0	83.50	10.04	0.9819	1.7660
0.381	0.50	-1.00	1.0000	0.000	5.000	5.000	429.518	434.605	5.087	77.0	77.0	77.00	83.0	81.0	82.00	12.58	0.9883	1.8450
0.384	0.50	-1.00	1.0000	0.000	5.000	5.000	434.605	439.686	5.081	77.0	77.0	77.00	83.0	81.0	82.00	12.47	0.9895	1.8129
0.684	1.50	-1.30	1.0000	0.000	10.000	10.000	443.028	453.255	10.227	77.0	77.0	77.00	87.0	81.0	84.00	14.00	0.9836	1.7138
0.686	1.50	-1.30	1.0000	0.000	10.000	10.000	453.255	463.493	10.238	77.0	77.0	77.00	87.0	82.0	84.50	13.96	0.9834	1.7008
Averages																	0.98472	1.76387

Nomenclature	Equations
P_b Barometric Pressure (in. Hg) Q Flow Rate (cfm) ΔH Orifice Pressure differential (in. H ₂ O) ΔP Inlet Pressure Differential (in. H ₂ O) 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), $Y_1 \leq Y_{avg} \pm 0.02$ Y_{ds} Standard Meter Correction Factor (unitless) $\Delta H@$ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H ₂ O) $\Delta H@_1 \leq \Delta H@_{avg} \pm 0.2$ Θ Duration of Run (minutes)	$Y_d = (Y_{ds}) \left[\frac{V_{ds}}{V_d} \right] \left[\frac{T_d + 460}{T_{ds} + 460} \right] \left[\frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6} \right]$ $\Delta H@ = \frac{(0.0319)(\Delta H)}{P_b(T_o + 460)} \left[\frac{(T_{ds} + 460)\Theta}{(V_{ds})(Y_{ds})} \right]^2$ $Q = \frac{17.64(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$

Vacuum Gauge	
Standard (in.Hg)	Gauge (in.Hg)
4.4	5.0
9.5	10.0
14.4	15.0
19.2	20.0
23.7	24.0

Meter Box - Pyrometer Calibration Sheet

Meter Box No: 66-24

Office: _____

Calibrated by: Martin Vaquero

Client: _____

Date: 8/20/10

Job No: _____

Temperature Scale Used: Fahrenheit

Type of Calibration: Full-Test

Calibration Reference Settings (°F)	Pyrometer Reading for each Channel (°F)						
	1	2	3	4	5	6	7
	Stack	Probe	Filter	Imp Out	Aux	DGM In	DGM Out
50	49	50	48				
100	99	99	98				
150	149	149	148				
200	199	199	198				
250	249	249	248				
300	299	299	298				
350	349	349	348				
400	399	399	398				
450	449	449	448				
500	499	499	498				
550	550	549	549				
600	599	599	599				

Tolerance = $\pm 2^{\circ}\text{F}$ difference from reference setting.

Calibration Reference Information

Reference Used: <u>Omega CL23A</u>	Serial No: <u>T-279500</u>
Calibrated By: <u>JH Metrology</u>	Exp. Date: <u>17/8/2011</u>
Calibration Report No: <u>1000150487</u>	

Meter Box Critical Orifice Post-Test Calibration Data

Project No. 11182 Meter No. 66-24 Orifice B-5
 Location warehouse Meter Yd 0.9847 Orifice K' 0.5403
 Test Date 04/06/11 Meter ΔH@ 1.7639 Orifice Cal. Date 02/09/11
 Operator p bihun Full Test Cal. Date 08/20/10

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) 28.32 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature		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
			Inlet (°F)	Outlet (°F)								
	0.0	993.00	71	69								
	5.0	996.59	71	69	72	1.50	18	5.0	3.59	70.0	0.9764	0.2%
	10.0	1000.18	72	70	75	1.50	18	5.0	3.59	70.5	0.9746	0.0%
	15.0	1003.78	73	70	76	1.50	18	5.0	3.60	71.3	0.9724	-0.2%

Average Y_i

0.9745

Cal. Error

-1.0%

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times (P_b + \frac{\Delta H}{13.6}) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \bar{Y}_i}{\bar{Y}_i} \times 100$$

Spec.: ΔY_i ≤ ±2%

$$Cal. Error = \frac{\bar{Y}_i - Y_d}{Y_d} \times 100$$

Spec.: Cal. Error ≤ ±5%

Sample Probe Calibration

Probe Type: M5 with S-Type Pitot

I.D. Number: 67-4-1

Project Number: _____

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	72	-2	0.38%	%Difference ≤ 1.5
2	200°F-250°F	243	244	-1	0.14%	

* 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	0.528	0.777	0.816	0.001
2	0.541	0.782	0.824	0.006
3	0.532	0.788	0.813	0.004
Side 'A' Average Probe C _{p(A)} =			0.8179	0.0040

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	0.541	0.787	0.821	0.001
2	0.541	0.790	0.819	0.000
3	0.537	0.786	0.819	0.001
Side 'B' Average Probe C _{p(B)} =			0.8196	0.0008

Specification
Avg. C_p Deviations ≤ 0.01

'A' Average C _p	'B' Average C _p	Difference
0.818	0.820	-0.002

Specification
|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.

$$* C_{P(S)} = C_{P(STD)} \sqrt{\frac{\Delta P_{(STD)}}{\Delta P_{(S)}}}$$

$$** Deviation = |C_{P(S)} - \overline{C_{P(A \text{ or } B)}}|$$

All specifications are from EPA-600/9-76-005, section 3.1

Probe Cp= 0.819

Calibrated by: B Arnold

Date: 04/06/2011

Sample Probe Calibration

Probe Type: M5 with S-Type Pitot

I.D. Number: 67-4-5

Project Number: _____

Thermocouple Calibration

Reference Type: Thermometer

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*	Within spec?
1	Ambient					
2	200°F-250°F					

* Based on Absolute Temperature (Rankine)

%Difference ≤ 1.5

Geometric Pitot Calibration

Is pitot assembly in good repair? ☒ Yes ☐ No If no, explain:

"S" Pitot

Dimensions	Dimensions	Specifications	Within Spec?
$\alpha 1 = 1$	$\alpha 2 = 1$	$\leq 10^\circ$	YES
$\beta 1 = 2$	$\beta 2 = 2$	$\leq 5^\circ$	YES
$\gamma = 1$	$\theta = 1$	None	N/A
$A = 0.735$		None	N/A
$Dt = 0.250$		$0.1875" \leq Dt \leq 0.375"$	YES

Calculations	Specifications	Within Spec?
$A/2 = Pa = Pb = 0.368$ inches	None	N/A
$Pa/Dt = Pb/Dt = 1.470$ inches	$1.05 < P/Dt < 1.5$	YES
$z = A \sin \gamma = 0.013$ inches	$\leq 0.125"$	YES
$w = A \sin \theta = 0.013$ inches	$\leq 0.03125"$	YES

Pitot Cp= 0.84 according to 40 CFR 60 section 10.1

Standard Pitot

	Measurement	Specification	Calculation	Within Spec?
Tube O.D.		None		
Static Hole I.D.		within 10% of (0.1*O.D.)		
Tip to Static		$\geq 6 \times O.D.$		

Sample Probe Calibration

Probe Type: M5 with S-Type Pitot

I.D. Number: 67-8-3

Project Number: 11182

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	63	64	-1	0.19%	%Difference ≤ 1.5
2	200°F-250°F	242	244	-2	0.28%	

* 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	0.544	0.767	0.834	0.001
2	0.543	0.768	0.833	0.000
3	0.540	0.765	0.831	0.001
Side 'A' Average Probe $C_{p(A)}$ =			0.8327	0.0009

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	0.550	0.784	0.829	0.002
2	0.556	0.782	0.835	0.008
3	0.535	0.787	0.816	0.011
Side 'B' Average Probe $C_{p(B)}$ =			0.8265	0.0070

Specification

Avg. C_p Deviations ≤ 0.01

'A' Average C_p

0.833

'B' Average C_p

0.826

Difference

0.007

Specification

|Difference| ≤ 0.01

Does assembly meet specifications?

YES

If "Yes", C_p = Average of Side 'A' and 'B' C_p values. If "No", Pitot must be replaced.

$$* C_{p(S)} = C_{p(STD)} \sqrt{\frac{\Delta p_{(STD)}}{\Delta p_{(S)}}}$$

$$** Deviation = |C_{p(S)} - \overline{C_{p(A \text{ or } B)}}|$$

All specifications are from EPA-600/9-76-005, section 3.1

Probe C_p = 0.830

Calibrated by: B. Arnold

Date: 03/09/2011

Sample Probe Calibration

Probe Type: M5 with S-Type Pitot

I.D. Number: 67-8-10

Project Number: 11182

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	63	63	0	0.00%	%Difference ≤ 1.5
2	200°F-250°F	125	123	2	0.34%	

* 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	0.559	0.815	0.820	0.003
2	0.564	0.815	0.823	0.001
3	0.567	0.816	0.825	0.002
Side 'A' Average Probe $C_{p(A)}$ =			0.8227	0.0020

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	0.564	0.819	0.822	0.001
2	0.562	0.821	0.819	0.002
3	0.566	0.823	0.821	0.001
Side 'B' Average Probe $C_{p(B)}$ =			0.8206	0.0011

Specification

Avg. C_p Deviations ≤ 0.01

'A' Average C_p	'B' Average C_p	Difference
0.823	0.821	0.002

Specification

|Difference| ≤ 0.01

Does assembly meet specifications?

YES

If "Yes", C_p = Average of Side 'A' and 'B' C_p values. If "No", Pitot must be replaced.

$$* C_{p(s)} = C_{p(STD)} \sqrt{\frac{\Delta p_{(STD)}}{\Delta p_{(s)}}}$$

$$** Deviation = |C_{p(s)} - \overline{C_{p(A \text{ or } B)}}|$$

All specifications are from EPA-600/9-76-005, section 3.1

Probe Cp= 0.822

Calibrated by: B. Arnold

Date: 03/14/2011

Sample Probe Calibration

Probe Type: M5 with S-Type Pitot

I.D. Number: 67-8-14

Project Number: 11182

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	63	63	0	0.00%	%Difference ≤ 1.5
2	200°F-250°F	222	225	-3	0.44%	

* 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	0.559	0.825	0.815	0.003
2	0.553	0.829	0.808	0.003
3	0.558	0.830	0.812	0.000
Side 'A' Average Probe $C_{p(A)}$ =			0.8115	0.0023

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	0.561	0.829	0.814	0.002
2	0.563	0.834	0.813	0.001
3	0.557	0.835	0.809	0.003
Side 'B' Average Probe $C_{p(B)}$ =			0.8120	0.0023

Specification
Avg. C_p Deviations ≤ 0.01

'A' Average C_p	'B' Average C_p	Difference
0.812	0.812	0.000

Specification
|Difference| ≤ 0.01

Does assembly meet specifications?

YES

If "Yes", C_p = Average of Side 'A' and 'B' C_p values. If "No", Pitot must be replaced.

$$* C_{p(S)} = C_{p(STD)} \sqrt{\frac{\Delta p_{(STD)}}{\Delta p_{(S)}}}$$

$$** Deviation = |C_{p(S)} - \overline{C_{p(A \text{ or } B)}}|$$

All specifications are from EPA 600/9-76-005, section 3.1

Probe C_p = 0.812

Calibrated by: B. Arnold

Date: 03/14/2010



AIR LIQUIDE Air Liquide America
Specialty Gases LLC



Scott

Shipped 1290 COMBERMERE STREET
From: 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

CLEAN AIR ENGINEERING
DON ALLEN
500 WEST WOOD STREET
PALATINE IL 60067
US

DOCUMENT#: 39951363 -001
PO#: 58610-71-65000
ITEM #: P813-30AL
DATE: 07Dec2010

CYLINDER #: ALM013200
FILL PRESSURE: 02000 PSIG

PURE MATERIAL: NITROGEN

CAS# 7727-37-9

GRADE: ZERO GAS

PURITY: 99.998%

<u>IMPURITY</u>	<u>MAXIMUM CONCENTRATIONS</u>	<u>ACTUAL CONCENTRATIONS</u>
THC	0.5 PPM	< 0.5 PPM

QC BATCH: NITFILL120310

ANALYST: SAJAD HYDER

SAJAD HYDER

**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 48083P.O. No.: 58745-71-65000
Document #: 40716347-002**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: **ALM017071**
Cylinder Pressure***: **2000 PSIG**Certification Date: **28Feb2011** Exp. Date: **27Feb2014**

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
OXYGEN	6.05 %	+/- 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	24Feb2011	PARAMAGNETIC
PIR/2000/B09015	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 = 6.06000
 R2 = 23.20000 Z2 = 0.00000 T2 = 6.06000
 Z3 = 0.00000 T3 = 6.06000 R3 = 23.20000
 Avg. Concentration: **6.047 %**

Concentration = A + Bx + Cx2 + Dx3 + Ex4
 r = 0.999998
 Constants: A = -0.01314124
 B = 1.000039853 C = 0
 D = 0 E = 0

CARBON DIOXIDE

Date: 01Mar2011 Response Unit: MV
 Z1 = 0.00000 R1 = 100.0000 T1 = 75.60000
 R2 = 100.0000 Z2 = 0.00000 T2 = 75.60000
 Z3 = 0.00000 T3 = 75.60000 R3 = 100.0000
 Avg. Concentration: **13.87 %**

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



Air Liquide America
Specialty Gases LLC



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.: 58568-71-65000

Document # : 39624159-002

Customer

CLEAN AIR INSTRUMENT RENTAL
GARY ZAPEL
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: ALM062872

Certification Date: 01Dec2010

Exp. Date: 30Nov2013

Cylinder Pressure***: 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
OXYGEN	14.1 %	+/- 1%	Direct NIST and VSL
CARBON DIOXIDE	5.93 %	+/- 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	1D002807	23.04 %	CARBON DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
CAI/110P/V03018	15Nov2010	PARAMAGNETIC
PIR/2000/609015	01Dec2010	NDIR

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis

OXYGEN

Date: 13Nov2010 Response Unit:%

Z1=0.00000 R1=23.20000 T1=14.09000

R2=23.20000 Z2=0.00000 T2=14.09000

Z3=0.00000 T3=14.09000 R3=23.20000

Avg. Concentration: 14.07 %

Second Triad Analysis

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999998

Constants: A = -0.01919614

B = 1.000175394 C = 0

D = 0 E = 0

CARBON DIOXIDE

Date: 01Dec2010 Response Unit: MV

Z1=0.00000 R1=100.0000 T1=40.83000

R2=100.0000 Z2=0.00000 T2=40.84000

Z3=0.00000 T3=40.84000 R3=100.0000

Avg. Concentration: 5.926 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = -0.999993

Constants: A = -0.00428797

B = 0.132701577 C = -0.0001549

D = 0.000011295 E = 0

APPROVED BY:

JEFF CROTEAU

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WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

FIELD DATA

F

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

QA/QC Initials: ml

Date: 5/9/14



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TEST LOCATION: FF OutletUNIT: 1RUN: 1Part 1/10/11 TESTING
FIELD DATA SHEETMETHOD: STPPAGE 1 OF 2

Client: <u>Whitaker</u>	Project No.: <u>11182</u>
Plant: <u>S. Brown</u>	Date: <u>3/29/11</u>
Meter Operator: <u>P. Buss</u>	
Probe Operator: <u>P. Buss</u>	

Meter Box: <u>116-7</u>	Sample Box No.: <u>M10</u>
Meter Y: <u>0.9961</u>	Meter ΔH: <u>1.7547</u>
K Factor: <u>2.47</u>	Pitot Co: <u>0.93</u>
Leak Rate Before: <u>0.003</u> (cfm) [Lpm] @ <u>12</u> (in. Hg)	
Leak Rate After: <u>0.004</u> (cfm) [Lpm] @ <u>10</u> (in. Hg)	
Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐	

Cross-Section of Test Location

[N] [OP]

Duct Dimensions (in.): 96x96

Static Pres (in. H ₂ O): <u>-11.3</u>	Port Len (in.): <u>10.0</u>	Gas Flow (in. Out): <u>11</u> of page	First point all the way: <u>10</u> [In] [Out]

Amb. Temp (°F): <u>72</u>	Bar Press: <u>30.00</u> (in. Hg) [mbar]
Probe I.D. No.: <u>078-3</u>	
Liner Material: <u>Glass</u>	

Filter No.: <u>E3-23</u>		
Thimble No.: <u>N/A</u>		
Nozzle Diameter: <u>0.270</u>	Nozzle I.D.: <u>270-2</u>	

Start Time: <u>7:41</u>	Stop Time: <u>9:53</u>

Traverse Point Number	Min/pl Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (m ³ /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)	XAD Trap Temp T _t (°F)	Notes	
						Set Points								
				944.875		250	250							
5-1	5	0.33	0.52	947.40	301	249	242	63	75	73	2.5	N/A	9.1	
2	10	0.34	0.54	949.96	301	252	250	56	77	74	2.5		9.1	
3	10	0.45	1.1	952.95	300	251	252	51	79	74	3.0		9.8	
4	20	0.47	1.2	956.00	303	250	252	49	83	75	3.0		8.8	
5	25	0.48	1.2	959.095	303	250	250	49	85	76	3.0		9.6	97.9
4-1	30	0.4	1.0	961.96	301	249	248	51	87	77	3.0		9.7	98.0
2	35	0.33	0.82	964.47	302	250	250	53	88	78	2.5		10.3	
3	40	0.45	1.1	967.38	303	251	252	54	88	79	3.0		8.3	
4	45	0.46	1.1	970.32	301	250	252	55	90	79	3.0		8.1	97.8
5	50	0.44	1.1	973.260	301	250	250	57	86	80	3.0		8.1	98.0
3-1	55	0.32	0.79	975.77	300	250	247	61	85	81	2.5		9.2	
2	60	0.30	0.74	978.17	301	250	250	63	83	80	2.5		8.9	
	Total	0.6250		69.530										
	Average	0.4848		301.200					81.7800					

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC

Date

TEST LOCATION: pt OutletUNIT: 1RUN: 1TESTING
FIELD DATA SHEETMETHOD: 1729 PAGE 2 OF 2

Client: <u>Whitaker</u>	Project No: <u>11182</u>
Plant: <u>Broward</u>	Date: <u>3/29/11</u>
Meter Operator: <u>P. Bihun</u>	
Probe Operator: <u>P. Bihun</u>	

Meter Box	Sample Box No:
Meter Yd	Meter ΔH ₀
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 ₂ O)	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 ₂ O)	Onifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (in ³) [L]	Stack Temp T _s (°F)	Probe T _p (°F) Set Points	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)	XAD Trap Temp T _t (°F)	Notes
7	65	0.38	0.94	980.95	301	251	252	63	83	80	3.0	W/A	9.1
4	70	0.43	1.1	983.8	302	249	250	63	83	80	3.0		8.0
5	75	0.47	1.2	984.8	302	250	250	62	85	80	3.0		9.1
2-1	80	0.36	0.89	989.80	301	250	249	63	83	80	3.0		8.9
2	85	0.30	0.74	992.21	301	251	250	63	84	80	2.5		9.4
3	90	0.30	0.74	994.62	301	251	250	63	86	80	2.5		10.0
4	95	0.38	0.94	997.31	302	249	251	63	84	80	3.0		9.1
5	100	0.51	1.3	1000.550	301	250	250	63	85	81	3.5		9.3
1-1	105	0.39	0.96	1003.36	300	249	251	64	86	81	3.0		10.2
2	110	0.44	1.1	1006.31	301	251	250	64	86	81	3.5		10.1
3	115	0.40	0.99	1009.10	298	250	248	64	87	82	3.0		10.5
4	120	0.37	0.91	1011.83	301	249	248	65	88	82	3.0		10.4
5	125	0.41	1.0	1014.62	300	250	249	65	88	82	3.0		10.3
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC JPB
Date: 3/29/11

TEST LOCATION:

UNIT:

RUN:

TESTING

FIELD DATA SHEET

METHOD: 0729

PAGE

1

OF

2

Client: <u>Wheelabrator</u>	Project No: <u>11182</u>
Plant: <u>S. Broward</u>	Date: <u>3/29/11</u>
Meter Operator: <u>P. Bihner</u>	
Probe Operator: <u>P. Bihner</u>	

Meter Box: <u>66-7</u>	Sample Box No: <u>M4</u>
Meter Y: <u>0.9961</u>	Meter ΔH: <u>1.7697</u>
K Factor: <u>2.47</u>	Pitot Co: <u>0.83</u>
Leak Rate Before: <u>0.0078</u> (Lpm) @ <u>12</u> (in. Hg)	
Leak Rate After: <u>0.0058</u> (Lpm) @ <u>10</u> (in. Hg)	
Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐	

Cross-Section of Test Location			
Duct Dimensions (in.): <u>96x96</u>			
Static Pres (in. H ₂ O): <u>-10.3</u>	Port Len. (in.): <u>10.0</u>	Gas Flow (in) (out) of page: <u>(In) [Out]</u>	First point all the way: <u>(In) [Out]</u>

Amb. Temp (°F): <u>71</u>	Bar. Press: <u>30.00</u> (in. Hg) (mbar)
Probe I.D. No: <u>47513</u>	
Liner Material: <u>(745)</u>	

Filter No: <u>23-24</u>	
Thimble No: <u>N/A</u>	
Nozzle Diameter: <u>0.270</u>	Nozzle I.D.: <u>270-2</u>

Start Time: <u>10:15</u>	Stop Time: <u>15:00</u>

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [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)	XAD Trap Temp. T _t (°F)	Notes	
						Set Points								
	5			15.141		210	210						0.1	
5-1	5	0.24	0.60	17.33	299	214	255	65	83	82	2.5	N/A	9.6	2.17
2	10	0.37	0.93	20.04	301	258	254	65	83	82	2.5		9.2	
3	15	0.43	1.1	23.04	301	281	251	60	86	83	3.0		9.4	
4	20	0.49	1.2	26.13	302	249	251	53	86	83	3.0		9.7	29.50
5	25	0.56	1.4	29.52	303	280	249	52	87	83	3.5		10.3	0.06
4-1	30	0.40	1.0	32.46	299	250	251	56	87	83	2.5		9.8	
2	35	0.24	0.60	34.63	301	252	252	54	88	83	2.0		9.0	
3	40	0.33	0.83	37.17	302	280	250	56	87	83	2.5		9.0	
4	45	0.52	1.3	40.46	302	249	250	55	88	84	3.5		9.4	10.02
5	50	0.46	1.2	43.56	303	280	250	54	90	84	3.0		10.3	11.02
3-1	55	0.31	0.78	46.00	300	250	248	63	83	82	2.5		9.0	11.02
2	60	0.36	0.90	48.70	302	280	250	63	84	82	3.0		9.6	11.02
														43.59
Total		0.6031		67.400										0.035
Average			0.0288		300.760				83.660					

Sum of square roots

Circle correct bracketed units on data sheet.

QA/QC: PA
Date: 3/29/11

2026

TEST LOCATION: PF Outlet
 UNIT: 1 RUN: 2

Part 1 Metals TESTING FIELD DATA SHEET

METHOD: 5129 PAGE 2 OF 2

Client <u>Wheatlab</u>	Project No. <u>11182</u>
Plant <u>8 Broward</u>	Date <u>3/29/11</u>
Meter Operator <u>P. Behm</u>	
Probe Operator <u>P. Behm</u>	

Meter Box	Sample Box No.
Meter Yd.	Meter ΔH _@
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 ₂ O)	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/pl Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [L]	Stack Temp T _s (°F)	Probe T _p (°F) Set Points	Filter T _f (°F)	Cond. Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{min} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _i (°F)	Notes
3	65	0.42	1.1	57.69	302	251	251	63	86	82	3.0	N/A	9.5
4	70	0.43	1.1	54.18	302	251	249	63	86	82	3.0		9.4
5	75	0.35	0.88	57.310	301	251	251	64	87	82	3.0		8.9
2-1	80	0.25	0.63	59.58	300	249	250	64	86	83	2.0		8.7
2	85	0.27	0.68	61.90	300	250	253	64	82	81	2.5		8.0
3	90	0.24	0.60	64.01	299	250	249	64	83	81	2.5		7.8
4	95	0.36	0.90	66.66	300	250	249	58	84	81	3.0		8.1
5	100	0.44	1.1	69.600	301	249	249	54	84	81	3.0		8.2
1-1	105	0.37	0.93	72.38	300	247	250	60	87	82	3.0		9.3
2	110	0.36	0.90	75.01	301	247	252	59	85	81	3.0		9.5
3	115	0.29	0.73	77.40	298	250	250	60	86	81	3.0		8.4
4	120	0.33	0.83	79.25	300	250	250	62	85	82	3.0		8.8
5	125	0.41	1.0	82.761	300	250	250	63	85	82	3.5		9.2
Total													
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC RB
 Date 3/29/11

TEST LOCATION: FF Outlet
 UNIT: 1 RUN: 3

Part 1 Metals TESTING FIELD DATA SHEET

METHOD: 5729 PAGE 1 OF 2

Client: <u>Whelanator</u>	Project No: <u>11/82</u>
Plant: <u>S. Broward</u>	Date: <u>3/29/11</u>
Meter Operator: <u>P. Bihun</u>	
Probe Operator: <u>P. Bihun</u>	

Meter Box: <u>66-7</u>	Sample Box No: <u>143</u>
Meter Yr: <u>0.9961</u>	Meter ΔH: <u>1.7697</u>
K Factor: <u>2.51</u>	Pitot Cp: <u>0.83</u>

Leak Rate Before: <u>0.003</u> [cm] Lpm @ <u>12</u> (in. Hg)
Leak Rate After: <u>0.004</u> [cm] Lpm @ <u>10</u> (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 ₂ O): <u>10.0</u>	Port Len. (in.): <u>10.0</u>	Gas Flow (in) [Out] of page: <u>(In) [Out]</u>	First point all the way: <u>(In) [Out]</u>

Amb. Temp. (°F): <u>83</u>	Bar Press: <u>30.00</u> (in. Hg) (mbar)
Probe I.D. No: <u>67-83</u>	
Liner Material: <u>Glas</u>	

Filter No: <u>e3-4</u>	
Thimble No: <u>N/A</u>	
Nozzle Diameter: <u>0.270</u>	Nozzle I.D.: <u>270-2</u>

Start Time: <u>15:16</u>	Stop Time: <u>17:27</u>

Traverse Point Number	Min/pi Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [L]	Stack Temp. T _s (°F)	Probe T _p (°F) Set Points	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)	XAD Trap Temp T _t (°F)	Notes
1-1	5	0.30	0.75	83.215	303	255	254	65	83	82	3.0	N/A	9.7
2	10	0.33	0.83	88.20	302	255	252	65	83	82	3.0		9.5
3	15	0.35	0.88	90.84	301	254	254	64	84	82	3.0		9.2
4	20	0.45	1.1	93.83	305	249	250	64	87	84	3.5		9.2 96.846
5	25	0.42	1.1	96.90	303	240	250	61	88	82	3.5		8.9 96.05
4-1	30	0.37	0.93	99.58	300	249	243	63	84	81	2.5		9.6
2	35	0.34	0.85	102.15	302	250	252	63	84	81	2.5		9.7
3	40	0.43	1.1	105.13	302	251	254	61	83	81	3.0		9.4
4	45	0.50	1.3	108.40	302	249	251	58	84	81	3.0		9.8 111.74
5	50	0.51	1.3	111.64	302	250	249	57	85	81	3.0		9.7 (-90.7)
3-1	55	0.35	0.88	114.33	303	250	250	61	83	80	2.5		10.0
2	60	0.38	0.91	117.08	303	251	251	62	83	80	3.0		9.6
Total		0.6474		72.460									
Average		1.0652		302.240					82.160				

Sum of square roots

Circle correct bracketed units on data sheet.

TEST LOCATION: FF Outlet
 UNIT: 1 RUN: 3

Part / Metals TESTING FIELD DATA SHEET

METHOD: 5729 PAGE 2 OF 2

Client: <u>Wheelabrator</u>	Project No. <u>11112</u>
Plant: <u>S. Broward</u>	Date: <u>3/29/11</u>
Meter Operator: <u>P. Bihun</u>	
Probe Operator: <u>P. Bihun</u>	

Meter Box	Sample Box No.
Meter Y _d	Meter ΔH _@
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 ₂ O)	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 ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³)	Stack Temp T _s (°F)	Probe T _p (°F) Set Points	Filter T _f (°F)	Cond. Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{max} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _t (°F)	Notes
3	65	0.41	1.0	119.87	302	251	254	62	83	80	3.0	N/A	9.6
4	70	0.48	1.2	123.05	303	249	249	63	83	80	3.5		9.6
5	75	0.58	1.4	126.390	304	280	249	62	83	79	3.5		9.8
2-1	80	0.47	1.2	129.56	304	250	249	64	84	81	3.5		9.4
2	85	0.37	0.93	132.30	304	251	243	62	84	80	3.0		9.5
3	90	0.42	1.1	135.21	302	251	252	59	83	80	3.0		9.5
4	95	0.41	1.0	138.66	302	249	247	57	83	80	3.0		9.7
5	100	0.62	1.6	141.5912	303	280	248	57	85	80	4.0		10.0
1-1	105	0.38	0.95	144.38	301	245	245	61	83	80	3.0		9.3
2	110	0.35	0.88	146.97	301	252	250	61	83	80	3.0		9.5
3	115	0.47	1.2	150.68	300	251	251	61	83	79	3.5		10.4
4	120	0.42	1.1	153.01	301	251	252	60	83	80	3.5		10.0
5	125	0.45	1.1	155.920	301	251	251	60	84	80	3.5		9.2
Total													
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC 13
 Date 3/29/11

Impinger Weight Sheet

Client Wheelabrator	Unit Name/Location Unit 1 FF Outlet
Plant South Broward	Job No. 11182 Method 5/29

Run No. 1	Filter Type Quartz	Sample Box No. M10
Date 3/29/11	Lot No.	pH
Analyst R. Viere	Filter No. e3-23	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	717.3	434.7	282.6	
Impinger 2	100 ml 5% HNO3/10% H2O2	684.3	571.5	112.8	QA/QC RV
Impinger 3	100 ml 5% HNO3/10% H2O2	555.3	530.7	24.6	Date 3/29/11
Impinger 4	Empty	432.9	429.3	3.6	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	547.3	544.9	2.4	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	554.2	553.1	1.1	427.1
Impinger 7	Silica Gel	798.9	787.3	11.6	438.1

Run No. 2	Filter Type Quartz	Sample Box No. M4
Date 3/29/11	Lot No.	pH
Analyst R. Viere	Filter No. e3-24	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	722.1	439.0	283.1	
Impinger 2	100 ml 5% HNO3/10% H2O2	637.8	538.1	99.7	QA/QC RV
Impinger 3	100 ml 5% HNO3/10% H2O2	556.6	535.3	21.3	Date 3/29/11
Impinger 4	Empty	439.0	437.8	1.2	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	548.0	546.4 ^{0L}	546.5 / 1.5	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	605.9	605.6 ^{0L}	604.9 / 1.0	407.8
Impinger 7	Silica Gel	845.0	831.2	13.8	421.8

Run No. 3	Filter Type Quartz	Sample Box No. M3
Date 3/29/11	Lot No.	pH
Analyst D. L. Clark	Filter No. e3-25	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	788.6	451.2	337.4	
Impinger 2	100 ml 5% HNO3/10% H2O2	655.2	564.1	91.1	QA/QC DL
Impinger 3	100 ml 5% HNO3/10% H2O2	576.9	568.4	8.5	Date 3/29/11
Impinger 4	Empty	452.7	450.6	2.1	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	538.1	537.8	0.3	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	530.4	530.7	-0.3	439.1
Impinger 7	Silica Gel	733.2	716.5	16.7	455.8

TEST LOCATION: FF OUTLET
UNIT: 1 RUN: 1

FLUORIDE

TESTING

METHOD: 13B PAGE 1 OF 2

FIELD DATA SHEET

Client: WHEELABRATOR Project No. 1102
Plant: S. BROWARD Date: 3.28.11
Meter Operator: NH
Probe Operator: BA

Meter Box: 66-21 Sample Box No. B1
Meter Yd: 0.9837 Meter ΔH: 1.8252
K Factor: 2.65 Pitot Co: NH 2.880.81
Leak Rate Before: 0.003 [Lpm] @ 15 (in. Hg)
Leak Rate After: 0.002 [Lpm] @ 6 (in. Hg)
Pitot Leak Check Before: ☒ After Good: ☒ Bad: ☐

Cross-Section of Test Location

[IN] [UP]

96 x 96

Static Pres. (in. H₂O): -11.3 Port Len. (in.): 10 Gas Flow: 10 [Out] First point all the way: 10 [Out]

Amb. Temp. (°F): 80 Bar. Press: 29.95 [in. Hg] [mbar]
Probe ID No.: 56-96-11 67-8+14
Liner Material: GLASS

Filter No.: -
Thimble No.: -
Nozzle Diameter: 0.274 Nozzle ID: 274-1

Start Time: 12:03 Stop Time: 13:12

Traverse Point Number	Min/pt 25 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. [ft] [L] 612.410	Stack Temp Ts (°F)	Probe T _p (°F) Set Points 250 250	Filter T _f (°F) 250 250	Cond. Temp. T _c (°F) 63 61 60 59 59 61 62 64 63 64 64 86 87 88	DGM Inlet T _{m in} (°F) 75 75 76 77 78 81 82 83 86 87 88	DGM Outlet T _{m out} (°F) 74 74 74 74 74 75 75 76 77 76 77 77 78	Pump Vacuum (in. Hg) 3 3 3 3 3 4 4 4 4 4 4 4 4	XAD Trap Temp (°F) 9.8 9.8 9.7 10.1 10.0 10.7 9.9 10.1 8.8 10.0 9.4 9.3	Notes
1-1	2.5	0.47	1.2	613.99	296	260	252	63	75	74	3	9.8	
2	5	0.49	1.3	615.59	294	256	253	61	75	74	3	9.8	
3	7.5	0.34	0.90	616.93	296	249	252	60	76	74	3	9.7	
4	10	0.36	0.95	618.34	291	250	252	59	77	74	3	10.1	
5	12.5	0.55	1.5	620.155	296	252	252	59	78	74	3	10.0	0.290
2-1	15	0.51	1.4	621.87	294	255	250	61	81	75	4	10.7	
2	17.5	0.40	1.1	623.34	297	252	249	62	82	75	4	9.9	
3	20	0.41	1.1	624.81	294	249	251	64	83	76	4	10.1	
4	22.5	0.51	1.4	626.47	298	250	252	64	84	76	4	9.5	
5	25	0.60	1.6	627.905	299	252	250	63	86	77	4	8.8	1.030
3-1	27.5	0.47	1.2	629.95	297	255	251	63	86	77	4	10.0	
2	30	0.38	1.0	631.40	297	249	250	64	87	77	4	9.4	
3	32.5	0.40	1.1	632.90	298	249	249	64	88	78	4	9.3	
Total		17.0558	21.1500	39.4400	7426				1058	981			
Average		0.6822	1.2460		297.0400				82.2200				

Sum of square roots.

Circle correct bracketed units on data sheet.

TEST LOCATION: FF OUTLET
 UNIT: 1 RUN: 1

FLUORIDE TESTING
FIELD DATA SHEET

METHOD: 13B PAGE 2 OF 2

Client: <u>W. H. BARNARD</u>	Project No.: <u>1182</u>
Plant: <u>S. BROWN</u>	Date: <u>3.28.11</u>
Meter Operator: <u>NH</u>	
Probe Operator: <u>BA</u>	

Meter Box: <u>66-24</u>	Sample Box No.: <u>B1</u>
Meter Yr: <u>0.9837</u>	Meter ΔH: <u>1.8252</u>
K Factor: <u>2.65</u>	Pilot Cp: <u>0.812</u>

Leak Rate Before: [cfm] [Lpm] @ (in. Hg)	
Leak Rate After: [cfm] [Lpm] @ (in. Hg)	
Pilot Leak Check Before: ☐ After Good ☐ Bad ☐	

Cross-Section of Test Location

Duct Dimensions (in.): 96 x 96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (in) [Out]	First point all the way (in) [Out]
	<u>10</u>		

Amb. Temp (°F)	Bar Press: <u>29.95</u> [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/pl Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (in) [L]	Stack Temp. T _s (°F)	Probe T _p (°F) Set Points	Filter T _f (°F)	Cond. Temp. T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{max} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F)	Notes
3-4	35	0.47	1.2	<u>634.45</u>	298	250	249	64	89	79	4	10.0	
-5	37.5	0.58	1.5	<u>636.185</u>	298	251	257	64	90	79	4	9.7	23
4-1	40	0.47	1.2	<u>638.01</u>	297	254	250	64	88	80	4	9.7	
2	42.5	0.41	1.1	<u>639.57</u>	299	257	249	63	90	80	4	9.9	
3	45	0.49	1.3	<u>641.12</u>	299	248	250	62	90	81	4	9.9	
4	47.5	0.49	1.3	<u>642.74</u>	297	248	250	61	91	81	4	9.2	
5	50	0.50	1.3	<u>644.330</u>	295	251	250	59	92	81	4	9.0	135
5-1	52.5	0.40	1.1	<u>645.99</u>	295	255	250	58	91	82	4	10.2	
2	55	0.40	1.1	<u>647.48</u>	299	251	257	57	93	83	4	9.7	
3	57.5	0.50	1.3	<u>649.08</u>	298	249	257	58	93	83	4	9.8	
4	60	0.55	1.5	<u>650.80</u>	300	250	250	60	94	84	4	9.6	
5	62.5	0.55	1.5	<u>652.525</u>	300	250	250	60	94	84	4	9.6	
Total									1095	977			
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC 58
 Date 3/28

TEST LOCATION: FF OUT
 UNIT: 1 RUN: 2

FLUORINE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 1 OF 2

Client: WHEELABRATOR Project No: 11182
 Plant: 7 S. BROWARD Date: 3.28.11
 Meter Operator: NH
 Probe Operator: BA

Meter Box: 46-21 Sample Box No: B22
 Meter Yd: 0.9837 Meter ΔH: 1.8252
 K Factor: 2.65 Pitot Co: 0.812
 Leak Rate Before: 0.004 [Lpm] @ 15 (in. Hg)
 Leak Rate After: 0.004 [Lpm] @ 8 (in. Hg)
 Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐

Cross-Section of Test Location

Duct Dimensions (in.): 96 x 94

Static Pres (in. H₂O): -11.3 Port Len (in.): 10 Gas Flow: (In) [Out] First point all the way (In) [Out]
 of page (In) [Out]

Amb Temp (°F): 82 Bar Press: 29.95 [in. Hg] [mbar]
 Probe ID No: 56-96-11 67-8-19
 Liner Material: GLASS

Filter No: -
 Thimble No: -
 Nozzle Diameter: 0.274 Nozzle ID: 274-1

Start Time: 13:33 Stop Time: 14:44

Traverse Point Number	Min/pt 2.5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init Vol (ft ³) [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)	XAD Trap Temp (°F)	Notes
5-1	2.5	0.41	1.1	654.62	300	258	260	64	89	86	4	9.6	
2	5	0.41	1.1	656.11	299	254	257	59	90	87	4	10.1	
3	7.5	0.48	1.3	657.71	300	252	253	52	90	86	4	9.7	
4	10	0.55	1.5	659.42	299	251	252	45	92	86	4	10.1	
5	12.5	0.57	1.4	661.135	301	251	252	43	93	87	4	9.7	.275
4-1	15	0.49	1.3	662.92	300	252	250	43	93	87	4	10.2	
2	17.5	0.40	1.1	664.46	300	253	250	43	94	87	4	9.8	
3	20	0.42	1.1	665.96	300	250	250	45	94	87	4	9.8	
4	22.5	0.55	1.5	667.47	300	249	251	46	94	87	4	10.0	
5	25	0.60	1.6	669.485	300	249	250	47	95	87	4	9.8	.625
3-1	27.5	0.52	1.4	671.29	299	254	250	52	94	88	4	10.1	
2	30	0.38	1.0	672.78	302	252	250	53	95	87	4	8.6	
3	32.5	0.43	1.1	674.27	303	249	250	57	94	87	4	9.4	
Total		7.0160	31.2200	39.9750	7491				1207	1129			
Average		0.6806	1.2488		299.6400				90.9200				

Sum of square roots.

16.5

Circle correct bracketed units on data sheet.

3903

QA/QC

Date: 3.28.11



TEST LOCATION: FF OUT
 UNIT: 1 RUN: 2

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 2 OF 2

Client: <u>WHEELABRATOR</u>	Project No: <u>11182</u>
Plant: <u>S. BROWARDS</u>	Date: <u>3.28.11</u>
Meter Operator: <u>NH</u>	
Probe Operator: <u>BA</u>	

Meter Box: <u>66-21</u>	Sample Box No: <u>B22</u>
Meter Yr: <u>0.9837</u>	Meter ΔH: <u>1.8252</u>
K Factor: <u>2.65</u>	Pitot Cp: <u>0.812</u>
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:

Duct Dimensions (in.): 96 x 94

Static Pres. (in. H ₂ O):	Port Len. (in.): <u>10</u>	Gas Flow (in) [Out] of page: <u>(In) [Out]</u>	First point all the way: <u>(In) [Out]</u>

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 2.5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [L]	Stack Temp. T _s (°F)	Probe T _p (°F) Set Points 250 250	Filter T _f (°F) 250 250	Cond. Temp. T _c (°F)	DGM Inlet T _{m in} (°F)	DGM Outlet T _{m out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp. (°F)	Notes
3-4	35	0.48	1.3	675.87	300	250	250	63	95	87	4	9.4	
5	37.5	0.55	1.5	677.590	300	250	250	63	95	87	4	9.5	.72
2-1	40	0.48	1.3	679.50	299	255	250	64	93	87	4	10.7	
2	42.5	0.40	1.1	681.00	300	257	250	66	94	87	4	10.6	
3	45	0.38	1.0	682.46	297	249	250	63	94	88	4	9.7	
4	47.5	0.48	1.3	684.11	301	249	250	62	94	88	4	9.6	
5	50	0.66	1.7	685.945	303	257	249	60	95	88	4	10.6	71.095
1-1	52.5	0.31	0.82	687.90	299	253	250	61	94	88	4	10.6	
2	55	0.42	1.1	688.91	299	257	250	59	94	88	4	10.8	
3	57.5	0.40	1.1	690.42	294	250	250	57	95	88	4	9.7	
4	60	0.38	1.0	691.89	297	249	257	56	95	88	4	9.2	
5	62.5	0.58	1.5	693.575	299	257	250	57	95	88	4	9.8	
Total													
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

TEST LOCATION: FF OUTLET
 UNIT: 1 RUN: 3

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 1 OF 2

Client WHEELABRATOR Project No. 11187
 Plant S. BEOWARD Date 3.28.11
 Meter Operator NH
 Probe Operator BA

Meter Box 66-21 Sample Box No. B1
 Meter Yr. 0.9837 Meter ΔH @ 1.8252
 K Factor 2.65 Pitot Cp 0.812
 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

Duct Dimensions (in.) 96 x 96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (in. Hg) [In] [Out]	First point all the way (In) [Out]
<u>-11.3</u>	<u>10</u>	<u>(In) [Out]</u>	<u>(In) [Out]</u>

Amb Temp (°F) 85 Bar Press 29.95 [in. Hg] [mbar]
 Probe I.D. No. 56-96-4 67-8-14
 Liner Material 64155

Filter No. -
 Thimble No. -
 Nozzle Diameter 0.274 Nozzle I.D. 274-1

Start Time: 15:02 Stop Time: 16:11

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [L]	Stack Temp. T _s (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond. Temp. T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{min} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp. T _{tr} (°F)	Notes
	<u>2.5</u>			<u>694.130</u>		<u>250</u>	<u>250</u>						
1-1	<u>2.5</u>	<u>0.40</u>	<u>1.1</u>	<u>695.77</u>	<u>294</u>	<u>240</u>	<u>257</u>	<u>65</u>	<u>89</u>	<u>87</u>	<u>4</u>	<u>10.3</u>	
2	<u>5</u>	<u>0.50</u>	<u>1.3</u>	<u>697.25</u>	<u>299</u>	<u>254</u>	<u>254</u>	<u>64</u>	<u>90</u>	<u>87</u>	<u>4</u>	<u>10.2</u>	
3	<u>7.5</u>	<u>0.40</u>	<u>1.1</u>	<u>698.88</u>	<u>296</u>	<u>251</u>	<u>252</u>	<u>52</u>	<u>90</u>	<u>87</u>	<u>4</u>	<u>10.6</u>	
4	<u>10</u>	<u>0.38</u>	<u>1.0</u>	<u>700.34</u>	<u>299</u>	<u>252</u>	<u>254</u>	<u>49</u>	<u>91</u>	<u>87</u>	<u>4</u>	<u>11.0</u>	
5	<u>12.5</u>	<u>0.61</u>	<u>1.4</u>	<u>702.116</u>	<u>301</u>	<u>257</u>	<u>253</u>	<u>48</u>	<u>92</u>	<u>87</u>	<u>4</u>	<u>10.8</u>	<u>.255</u>
2-1	<u>15</u>	<u>0.52</u>	<u>1.4</u>	<u>703.95</u>	<u>29301</u>	<u>256</u>	<u>246</u>	<u>49</u>	<u>92</u>	<u>87</u>	<u>4</u>	<u>10.6</u>	
2	<u>17.5</u>	<u>0.38</u>	<u>1.0</u>	<u>705.42</u>	<u>302</u>	<u>257</u>	<u>248</u>	<u>50</u>	<u>93</u>	<u>87</u>	<u>4</u>	<u>9.0</u>	
3	<u>20</u>	<u>0.32</u>	<u>0.85</u>	<u>706.76</u>	<u>299</u>	<u>249</u>	<u>251</u>	<u>52</u>	<u>93</u>	<u>87</u>	<u>4</u>	<u>8.6</u>	
4	<u>22.5</u>	<u>0.42</u>	<u>1.1</u>	<u>708.27</u>	<u>298</u>	<u>250</u>	<u>252</u>	<u>53</u>	<u>93</u>	<u>87</u>	<u>4</u>	<u>8.8</u>	
5	<u>25</u>	<u>0.55</u>	<u>1.5</u>	<u>709.995</u>	<u>300</u>	<u>251</u>	<u>251</u>	<u>53</u>	<u>94</u>	<u>87</u>	<u>4</u>	<u>9.2</u>	<u>1.145</u>
3-1	<u>27.5</u>	<u>0.36</u>	<u>0.95</u>	<u>711.55</u>	<u>300</u>	<u>255</u>	<u>246</u>	<u>58</u>	<u>92</u>	<u>87</u>	<u>4</u>	<u>10.1</u>	
2	<u>30</u>	<u>0.40</u>	<u>1.1</u>	<u>713.04</u>	<u>301</u>	<u>251</u>	<u>248</u>	<u>58</u>	<u>93</u>	<u>87</u>	<u>4</u>	<u>10.3</u>	
3	<u>32.5</u>	<u>0.43</u>	<u>1.1</u>	<u>714.54</u>	<u>302</u>	<u>248</u>	<u>253</u>	<u>59</u>	<u>95</u>	<u>88</u>	<u>4</u>	<u>9.5</u>	
Total		<u>76.6593</u>	<u>29.6800</u>	<u>39.0800</u>	<u>7509</u>				<u>1197</u>	<u>1132</u>			
Average		<u>0.6664</u>	<u>1.1872</u>	<u>39.040</u>	<u>300.3600</u>				<u>90.5800</u>				

Sum of square roots

15.1

Circle correct bracketed units on data sheet.

3697 QA/QC NH
 Date 3.28.11

TEST LOCATION: FF OUTLETUNIT: 1 RUN: 3FLUORIDE TESTING
FIELD DATA SHEETMETHOD: 13B PAGE 2 OF 2

Client <u>WHEELABRATOR</u>	Project No. <u>11182</u>
Plant <u>S BROWN</u>	Date <u>3.28.11</u>
Meter Operator <u>NH</u>	
Probe Operator <u>B/A</u>	

Meter Box <u>66-21</u>	Sample Box No. <u>B1</u>
Meter Yr <u>0.9837</u>	Meter AH <u>1.8252</u>
K Factor <u>2.65</u>	Pitot C <u>0.812</u>

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			
Duct Dimensions (in.)			
Static Pres (in. H ₂ O)	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 2.5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. <u>0</u> [L]	Stack Temp T _s (°F)	Probe T _p (°F) Set Points 250 250	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{max} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F)	Notes
3-4	35	0.50	1.3	716.15	301	250	253	61	95	88	4	9.8	
5	37.5	0.52	1.4	717.825	301	251	257	62	96	88	4	8.9	7.975
4-1	40	0.48	1.3	719.61	301	256	245	63	95	88	4	9.9	
2	42.5	0.37	0.98	721.04	302	250	249	63	96	89	4	8.6	
3	45	0.42	1.1	722.55	301	248	252	64	96	89	4	8.8	
4	47.5	0.46	1.2	724.11	301	250	253	63	96	89	4	9.0	
5	50	0.52	1.4	725.790	300	250	250	64	95	88	4	8.9	7.920
5-1	52.5	0.38	1.0	727.40	300	256	246	63	94	88	4	9.8	
2	55	0.38	1.0	728.86	302	252	247	64	94	89	4	9.3	
3	57.5	0.45	1.2	730.41	301	250	250	64	94	89	4	9.8	
4	60	0.52	1.4	732.09	301	250	252	64	94	88	4	9.4	
5	62.5	0.50	1.3	733.745	301	251	252	64	94	88	4	9.3	
Total	*								1139	1061			
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

14.58

3612

QA/QC 89Date 3/18

Impinger Weight Sheet

Client Wheelabrator		Unit Name/Location Unit 1 FF Outlet	
Plant South Broward	Job No. 11182	Method	13B

CAE TL-07-2 cat #514763A 499.5

Run No. 1	Filter Type Teflon glass mat	Sample Box No. B1
Date 3/28/11	Lot No.	pH
Analyst R. V. Vee	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	748.5	634.4	114.1	
Impinger 2	100 mL DI H2O	624.2	544.8	79.4	
Impinger 3	Empty	478.3	456.7	21.6	
Impinger 4	Silica Gel	757.9	734.6	23.3	
					Total Weight (gm)
					215.1
					238.4

QA/QC RV
Date 3/28/11

Run No. 2	Filter Type Teflon glass mat	Sample Box No. B22
Date 3/28/11	Lot No.	pH
Analyst R. V. Vee	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	674.7	546.5	128.2	
Impinger 2	100 mL DI H2O	635.1	563.7	71.4	
Impinger 3	Empty	466.5	443.2	23.3	
Impinger 4	Silica Gel	806.5	789.8	16.7	
					Total Weight (gm)
					222.9
					239.6

QA/QC RV
Date 3/28/11

Run No. 3	Filter Type Teflon glass mat	Sample Box No. B1
Date 3/28/11	Lot No.	pH
Analyst R. V. Vee	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	758.6	635.2	123.4	
Impinger 2	100 mL DI H2O	622.5	544.4	78.1	
Impinger 3	Empty	473.9	456.9	17.0	
Impinger 4	Silica Gel	772.4	757.8	14.6	
					Total Weight (gm)
					218.5
					233.1

QA/QC RV
Date 3/28/11

TEST LOCATION: SDA INLETUNIT: 1 RUN: 1HCl

TESTING

METHOD: 26A PAGE 1 OF 1

FIELD DATA SHEET

Client: <u>Whe Laboratories</u>	Project No. <u>11182</u>
Plant: <u>S. Brown RD</u>	Date: <u>3-28-11</u>
Meter Operator: <u>R. Arnold</u>	
Probe Operator: <u></u>	

Meter Box: <u>66-4</u>	Sample Box No. <u>B11</u>
Meter Yr: <u>0.9783</u>	Meter ΔH : <u>1.6979</u>
K Factor: <u>—</u>	Pilot C _p : <u>—</u>

Leak Rate Before: <u>0.004</u> [cfm] [Lpm]	@ <u>15</u> (in. Hg)
Leak Rate After: <u>0.005</u> [cfm] [Lpm]	@ <u>19</u> (in. Hg)
Pilot Leak Check Before: ☐	After: Good ☐ Bad ☐

Cross-Section of Test Location

↑
(M) [UP]

Duct Dimensions (in.): 105

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow: (In) [Out]	First point all the way (In) [Out]
<u>-2.1</u>	<u>14</u>	<u>(In)</u> [Out]	<u>(In)</u> [Out]

Amb. Temp. (°F): <u>89</u>	Bar. Press: <u>29.95</u> (in. Hg) [mbar]
Probe ID No: <u>67-4-5</u>	
Liner Material: <u>GLASS</u>	

Filter No: <u>—</u>	
Thimble No: <u>—</u>	
Nozzle Diameter: <u>—</u>	Nozzle ID: <u>—</u>

Start Time: <u>7:48</u>	Stop Time: <u>8:48</u>

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. [ft ³] [L] 931.270	Stack Temp T _s (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{min} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F)	Notes
						Set Points						2	
1-1	5	N/A	1.2	934.11	485	353	357	65	85	85	3.5	8.7	
↓	10	↓	1.2	937.13	485	353	356	59	87	86	4.5	8.7	
	15		1.2	940.17	485	350	351	53	89	88	6.0	8.3	
	20		1.2	943.24	486	356	352	51	91	88	7.0	8.5	
	25		1.2	946.29	486	353	354	49	92	88	8.5	8.1	
	30		1.2	949.39	487	356	352	49	93	90	9.5	8.5	
	35		1.2	952.47	487	351	356	51	93	90	11.5	8.0	
	40		1.2	955.55	486	353	354	52	93	90	12.5	9.2	
	45		1.2	958.65	487	353	352	53	95	90	14.5	8.2	
	50		1.2	961.76	485	355	357	55	95	90	16.0	7.8	
	55		1.2	964.84	482	354	352	57	95	90	17.5	8.5	
60	1.2	967.920	483	352	352	60	95	90	18.5	8.9			
	Total	*	14400	36.70									
	Average		1.2000	485.3333					90.3333				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: SB
Date: 3/28

TEST LOCATION: SDA INLET
 UNIT: 1 RUN: 2

HCI TESTING FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client: Wetlabrator Project No: 11182
 Plant: S. BROWARD Date: 3-28-11
 Meter Operator: B. ARNOLD
 Probe Operator: —

Meter Box: 66-4 Sample Box No: B21
 Meter Y: 0.9983 Meter ΔH: 1.6979
 K-Factor: — Pitot Co: —
 Leak Rate Before: 0.0026 [Lpm] @ 15 (in. Hg)
 Leak Rate After: 0.0036 [Lpm] @ 20 (in. Hg)
 Pitot Leak Check Before: ☐ After Good: ☐ Bad: ☐

Cross-Section of Test Location:

Duct Dimensions: (in.) 105

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (In) [Out]	First point all the way (In) [Out]
<u>-1.9</u>	<u>14</u>	<u>(In)</u> [Out]	<u>(In)</u> [Out]

Amb Temp (°F): 96 Bar Press: 29.95 [in. Hg] [mbar]
 Probe ID No: 67-4-5
 Liner Material: GLASS

Filter No: —
 Thimble No: —
 Nozzle Diameter: — Nozzle ID: —

Start Time: 9:11 Stop Time: 10:11

Traverse Point Number	Min/pl 5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. [ft ³] [L] 968.093	Stack Temp T _s (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{max} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F)	Notes
						Set Points 350 350						0.2	
1-1	5	N/A	1.2	971.18	484	352	355	66	95	94	3.5	7.7	
	10		1.2	974.39	484	355	356	54	96	95	4.0	8.3	
	15		1.2	977.37	483	356	356	50	96	95	5.0	7.6	
	20		1.2	980.44	480	350	356	52	99	95	6.5	7.9	
	25		1.2	983.54	483	356	353	55	100	96	7.5	7.7	
	30		1.2	986.67	487	356	356	57	100	96	9.5	7.9	
	35		1.2	989.77	485	353	354	62	100	96	10.5	8.6	
	40		1.2	992.85	484	353	353	56	101	97	11.5	8.4	
	45		1.2	995.98	486	354	353	53	101	97	12.5	8.7	
	50		1.2	999.08	485	357	350	51	101	97	15.0	9.2	
	55		1.2	002.19	486	355	353	52	100	97	16.0	10.8	
	60		1.2	005.290	486	358	354	52	100	97	18.0	9.5	
	Total	*	18.400	37.197									
	Average		1.2000		484.4166				97.5416				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: BA
 Date: 3-28-11

TEST LOCATION: SDA INLET
 UNIT: 1 RUN: 3

HCl TESTING FIELD DATA SHEET

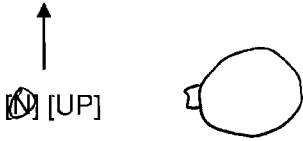
METHOD: 26A PAGE 1 OF 1

Client: <u>Walslaborator</u>	Project No.: <u>11182</u>
Plant: <u>S. BLANKS</u>	Date: <u>3-28-11</u>
Meter Operator: <u>B. ARNOLD</u>	
Probe Operator: <u> </u>	

Meter Box: <u>66-4</u>	Sample Box No: <u> </u>
Meter Yr: <u>0.9983</u>	Meter ΔH: <u>1.4979</u>
K Factor: <u> </u>	Pitot Cp: <u> </u>

Leak Rate Before: <u>0.0020</u> [Lpm] @ <u>15</u> (in. Hg)
Leak Rate After: <u>0.0031</u> [Lpm] @ <u>20</u> (in. Hg)
Pitot Leak Check Before: ☐ After Good ☐ Bad ☐

Cross-Section of Test Location



Duct Dimensions (in.): 105

Static Pres. (in. H ₂ O): <u>-2.0</u>	Port Len. (in.): <u>14</u>	Gas Flow (In) [Out] of page: <u>(In) [Out]</u>	First point all the way: <u>(In) [Out]</u>

Amb. Temp (°F): <u>96</u>	Bar. Press: <u>29.85</u> [in. Hg] [mbar]
Probe I.D. No: <u>67-4-5</u>	
Liner Material: <u>GLASS</u>	

Filter No: <u> </u>		
Thimble No: <u> </u>		
Nozzle Diameter: <u> </u>	Nozzle I.D.: <u> </u>	

Start Time: <u>10:35</u>	Stop Time: <u>11:35</u>

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. [ft ³] [L]	Stack Temp. Ts (°F)	Probe T _p (°F) Set Points	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)	XAD Trap Temp T _t (°F)	Notes
1-1	5	N/A	1.2	005.556	484	350	350	65	95	95	3.5	8.0	
	10		1.2	011.70	483	353	353	50	97	95	4.5	7.4	
	15		1.2	014.68	483	353	350	48	97	95	5.0	8.0	
	20		1.2	017.73	486	357	357	45	91	91	6.5	8.1	
	25		1.2	020.79	486	352	353	47	89	88	8.0	8.5	
	30		1.2	023.87	484	350	353	49	88	87	9.0	9.0	
	35		1.2	026.91	489	351	351	54	86	86	11.0	8.5	
	40		1.2	029.97	487	353	351	56	86	85	12.0	7.4	
	45		1.2	033.04	484	351	351	58	80	80	13.5	8.2	
	50		1.2	036.05	485	350	350	59	80	80	15.0	7.2	
	55		1.2	039.10	483	354	351	60	76	76	16.0	7.4	
	60		1.2	042.160	484	352	355	62	77	76	18.5	8.6	
Total				14.4000									
Average				1.2000									

* Sum of square roots.

Circle correct bracketed units on data sheet:

QA/QC BA
 Date 3-28-11

Impinger Weight Sheet

Client Wheelabrator		Unit Name/Location Unit 1 SDA Inlet	
Plant South Broward	Job No. 11182	Method Mod. 26A	

TL07-3

cert # 514763A

499.5

Run No. 1	Filter Type Quartz	Sample Box No. B 11
Date 3/28/11	Lot No.	pH
Analyst D. Luckard	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	476.8	459.2	17.6	
Impinger 2	100 mL 0.1N H2SO4	625.9	537.7	88.2	
Impinger 3	100 mL 0.1N H2SO4	589.6	551.7	37.9	
Impinger 4	Empty	535.6	523.9	11.7	
Impinger 5	Silica Gel	776.6	756.7	19.9	
					Total Weight (gm)
					155.4
					175.3

QA/QC DC
Date 3/28/11

Run No. 2	Filter Type Quartz	Sample Box No. B 21
Date 3/28/11	Lot No.	pH
Analyst R. Viese	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4 498.0	461.1 ^{DC}	457.9	40.1	
Impinger 2	100 mL 0.1N H2SO4 645.1	544 ^{DC}	555.4	89.7	
Impinger 3	100 mL 0.1N H2SO4	575.2	550.7	24.5	
Impinger 4	Empty	448.9	442.9	6.0	
Impinger 5	Silica Gel	764.9	751.7	13.2	
					Total Weight (gm)
					160.3
					173.5

QA/QC DC
Date 3/28/11

Run No. 3	Filter Type Quartz	Sample Box No. B 11
Date 3/28/11	Lot No.	pH
Analyst D. Luckard	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	517.3	461.1	56.2	
Impinger 2	100 mL 0.1N H2SO4	634.3	541.2	93.1	
Impinger 3	100 mL 0.1N H2SO4	569.8	553.4	16.4	
Impinger 4	Empty	530.0	525.4	4.6	
Impinger 5	Silica Gel	789.4	776.6	12.8	
					Total Weight (gm)
					170.3
					183.1

QA/QC DC
Date 3/28/11

TEST LOCATION: FF OUTLET
 UNIT: 1 RUN: 1

HCl TESTING FIELD DATA SHEET

METHOD: 264 PAGE 1 OF 1

Client Wheelabrator Project No. 11182
 Plant S. BROWARDS Date 3.28.11
 Meter Operator NH
 Probe Operator -

Meter Box 66.7 Sample Box No. 816
 Meter Yr. 0.9961 Meter ΔH 1.7697
 K Factor - Pitot C_p -

Leak Rate Before 0.003 [Lpm] @ 15 (in. Hg)
 Leak Rate After 0.002 [Lpm] @ 5 (in. Hg)
 Pitot Leak Check Before ☐ After Good ☐ Bad ☐

Cross-Section of Test Location

Duct Dimensions (in.) 96 x 96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (in. Hg)	First point all the way
<u>-11.0</u>	<u>10</u>	<u>40</u> [Out]	<u>(N)</u> [Out]

of page 1

Amb. Temp (°F) 74 Bar Press. 29.96 [in. Hg] [mbar]
 Probe ID No. 67-4-1
 Liner Material GLASS

Filter No. -
 Thimble No. -
 Nozzle Diameter - Nozzle ID -

Start Time 7:48 Stop Time 8:48

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. [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)	XAD Trap Temp T _x (°F)	Notes
3-1	5	N/A	1.5	818.355	302	302	303	63	81	77	3	9.2	
	10		1.5	825.35	301	304	302	51	83	77	3	9.5	
	15		1.5	828.76	300	302	302	46	86	77	3	9.2	
	20		1.5	832.23	301	301	303	47	88	78	3	9.9	
	25		1.5	835.69	300	301	302	50	89	79	3	9.5	
	30		1.5	839.16	300	302	303	54	90	80	3	10.1	
	35		1.5	842.68	301	301	302	59	91	81	3	9.4	
	40		1.5	846.14	300	302	302	62	92	81	3	9.7	
	45		1.5	849.74	301	301	302	62	93	82	3	9.2	
	50		1.5	853.22	301	301	303	63	94	83	3	8.7	
	55		1.5	856.72	301	301	302	63	94	83	3	9.2	
	60		1.5	860.215	301	302	302	63	95	84	3	9.4	
									1076				
	Total			41.8600	3609				998	902			
	Average			1.5000	300.7500				84.9167				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC NH
 Date 3.28.11

METHOD: 26A PAGE 1 OF 1

Start Time:	9:11	Stop Time:	10:11

Circle correct bracketed units on data sheet.

Impinger Weight Sheet

Client Wheelabrator		Unit Name/Location Unit 1 FF Outlet	
Plant South Broward	Job No. 11182	Method	Mod. 26A

CAE TL07-2 cert #514763A 499.5

Run No. 1	Filter Type Quartz	Sample Box No. B16
Date 3/28/11	Lot No.	pH
Analyst P. Vicere	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	530.4	463.6	66.8	
Impinger 2	100 mL 0.1N H2SO4	688.2	566.1	122.1	
Impinger 3	100 mL 0.1N H2SO4	585.2	544.1	41.1	
Impinger 4	Empty	444.9	438.6	6.3	
Impinger 5	Silica Gel	748.3	731.1	17.2	Total Weight (gm)
					236.3
					253.5

QA/QC RV
Date 3/28/11

Run No. 2	Filter Type Quartz	Sample Box No. B14
Date 3/28/11	Lot No.	pH
Analyst D. L. N. Clark	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	525.9	455.0	70.9	
Impinger 2	100 mL 0.1N H2SO4	640.0	525.0	115.0	
Impinger 3	100 mL 0.1N H2SO4	574.1	535.8	38.3	
Impinger 4	Empty	456.3	448.2	8.1	
Impinger 5	Silica Gel	749.0	736.1	12.9	Total Weight (gm)
					232.3
					245.2

QA/QC PC
Date 3/28/11

Run No. 3	Filter Type Quartz	Sample Box No. B12
Date 3/28/11	Lot No.	pH
Analyst P. Vicere	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	549.0	454.2	94.8	
Impinger 2	100 mL 0.1N H2SO4	662.9	542.1	120.8	
Impinger 3	100 mL 0.1N H2SO4	576.2	550.3	25.9	
Impinger 4	Empty	435.7	429.0	6.7	
Impinger 5	Silica Gel	782.3	770.0	12.3	Total Weight (gm)
					248.2
					260.5

QA/QC RV
Date 3/28/11

TEST LOCATION: FF AntHdUNIT: 2RUN: 1Part 1 Metals TESTING
FIELD DATA SHEETMETHOD: 5729 PAGE 1 OF 2

Client	<u>Wheatland</u>	Project No.	<u>11682</u>
Plant	<u>S. Brown</u>	Date	<u>3/30/11</u>
Meter Operator	<u>P. Bihun</u>		
Probe Operator	<u>P. Bihun</u>		

Meter Box	<u>6d-6</u>	Sample Box No.	<u>M10</u>
Meter Yr.	<u>0.9960</u>	Meter ΔH	<u>17601</u>
K Factor	<u>2.32</u>	Pilot Cp	<u>0.83</u>
Leak Rate Before	<u>0.002</u> (cfm) [Lpm]	@	<u>13</u> (in. Hg)
Leak Rate After	<u>0.003</u> (cfm) [Lpm]	@	<u>10</u> (in. Hg)
Pilot Leak Check Before	☒	After	Good ☒ Bad ☐

Cross-Section of Test Location

(IN) (OUT)

Duct Dimensions (in.) 96 x 96

Static Pres (in. H ₂ O)	Port Len. (in.)	Gas Flow (in) (out) of page	First point all the way (in) (out)
<u>-10.0</u>	<u>40.0</u>	<u>67</u>	<u>0</u>

Amb Temp (°F)	<u>77</u>	Bar Press	<u>30.05</u> (in. Hg) [mbar]
Probe I.D. No.	<u>107-f-3</u>		
Liner Material	<u>Glass</u>		

Filter No.	<u>23-26</u>		
Thimble No.	<u>N/A</u>		
Nozzle Diameter	<u>0.770</u>	Nozzle I.D.	<u>270-2</u>

Start Time	<u>7:31</u>	Stop Time	<u>9:42</u>

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol (ft ³) [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)	XAD Trap Temp T _t (°F)	Notes
				<u>12.765</u>		<u>200</u>	<u>250</u>						
5-1	5	0.32	0.74	15.19	302	255	253	65	76	75	2.0	N/A	9.3
2	10	0.34	0.79	17.70	300	254	251	64	77	75	2.0		9.4
3	15	0.42	0.97	20.49	301	250	250	59	80	76	2.5		9.1
4	20	0.37	0.86	23.13	300	249	250	57	81	76	2.5		8.6
5	25	0.31	0.72	25.530	301	250	252	58	82	77	2.0		8.0
4-1	30	0.32	0.74	28.01	300	249	255	58	82	77	2.0		8.0
2	35	0.32	0.74	30.43	301	252	249	58	83	78	2.0		8.5
3	40	0.34	0.79	32.94	301	251	250	58	85	78	2.5		7.6
4	45	0.35	0.81	35.50	301	248	250	58	84	79	2.5		7.6
5	50	0.34	0.79	37.990	301	250	250	57	85	79	2.5		7.1
3-1	55	0.21	0.49	40.60	301	249	252	60	84	79	2.0		8.2
2	60	0.32	0.70	42.37	301	252	250	62	84	80	2.0		7.3
Total		<u>0.574</u>		<u>63.190</u>									
Average			<u>0.7992</u>		<u>300.320</u>				<u>82.116062</u>				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC 15
Date 3/30/11
Clean Air
ENGINEERING

TEST LOCATION: RF OutletUNIT: 2RUN: 1TESTING
FIELD DATA SHEETMETHOD: 5729 PAGE 2 OF 2

Client: <u>Whitcomb</u>	Project No: <u>11182</u>
Plant: <u>S. Brown</u>	Date: <u>3/30/11</u>
Meter Operator: <u>P. Behner</u>	
Probe Operator: <u>P. Behner</u>	

Meter Box	Sample Box No.
Meter Y ₁	Meter ΔH ₀
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 ₂ O)	Port Lens (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 ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (m) [L]	Stack Temp Ts (°F)	Probe T _p (°F) Set Points	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)	XAD Trap Temp T _i (°F)	Notes
3	65	0.32	0.70	44.71	301	280	210	63	85	80	2.0	N/A	7.3
4	70	0.38	0.95	47.49	301	288	280	61	85	80	2.5		7.3
5	25	0.37	0.93	50.230	298	280	280	56	86	80	2.5		7.6
2-1	80	0.31	0.78	52.77	299	280	249	58	85	81	2.5		8.0
2	85	0.32	0.80	55.33	299	282	280	57	86	81	2.5		7.1
3	90	0.31	0.88	57.90	300	280	280	57	86	82	2.5		7.4
4	95	0.34	0.88	60.60	300	289	280	58	87	82	2.5		7.8
5	100	0.35	0.88	63.288	301	289	280	59	88	82	2.5		7.9
1-1	105	0.29	0.73	65.75	300	289	280	61	87	83	2.5		7.9
2	110	0.30	0.71	68.21	299	281	280	62	88	83	2.5		7.8
3	115	0.31	0.78	70.75	300	281	210	63	88	84	2.5		7.6
4	120	0.31	0.88	73.41	300	289	281	63	89	84	3.0		8.3
8	125	0.37	0.93	76.170	300	280	280	63	89	84	3.0		8.4
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: PBSDate: 3/30/11

TEST LOCATION: FF Outlet
 UNIT: 2 RUN: 2

Part 1 Methyls TESTING
 FIELD DATA SHEET

METHOD: 5729 PAGE 1 OF 2

Client: Wholesale Project No.: 11182
 Plant: B. Broward Date: 3/30/11
 Meter Operator: P. Biquin
 Probe Operator: P. Biquin

Meter Box: 61-6 Sample Box No.: MY
 Meter Yr.: 0.9960 Meter ΔH : 1.7601
 K Factor: 250 Pitot C.: 0.83
 Leak Rate Before: 0.001 (Lpm) @ 13 (in. Hg)
 Leak Rate After: 0.004 (Lpm) @ 10 (in. Hg)
 Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐

Cross-Section of Test Location



Duct Dimensions (in.): 96x96

Static Pres (in. H₂O): -9.8 Port Len (in.): 10.0 Gas Flow (In) (Out) of page: (In) (Out) First point all the way (In) (Out): (In) (Out)

Amb. Temp. (°F): 80 Bar. Press. 30.01 (in. Hg) (mbar)
 Probe I.D. No.: 6743
 Liner Material: 9455

Filter No.: 03-27
 Thimble No.: N/A
 Nozzle Diameter: 0.270 Nozzle I.D.: 270-2

Start Time: 9:19 Stop Time: 9:10

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) (L)	Stack Temp T _s (°F)	Probe T _p (°F) Set Points	Filter T _f (°F)	Cond. Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{min} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _r (°F)	Notes
5-1	5	0.28	0.70	76.645	300	257	252	65	86	85	2.0	N/A	7.3
2	10	0.30	0.75	81.47	300	256	254	65	87	85	2.0		7.6
3	15	0.36	0.90	84.17	300	253	251	64	88	85	2.5		8.0
4	20	0.38	0.95	86.97	300	249	248	62	90	86	2.5		7.9
5	25	0.40	1.0	89.870	302	250	252	62	90	86	2.5		8.2
4-1	30	0.31	0.78	92.43	299	250	248	63	89	86	2.5		8.9
2	35	0.30	0.75	94.89	299	252	248	63	89	86	2.0		8.8
3	40	0.30	0.75	97.33	299	251	249	63	90	86	2.0		8.6
4	45	0.33	0.83	99.92	300	249	247	63	90	86	2.5		8.5
5	50	0.33	0.83	102.520	301	250	249	64	90	86	2.5		8.0
3-1	55	0.28	0.70	104.93	302	250	251	65	88	86	2.0		9.0
2	60	0.30	0.75	107.39	299	251	250	64	89	86	2.5		8.8
Total		0.5800		65.415									
Average		0.8468		300.2000					87.3200				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: PPB
 Date: 3/30/11

TEST LOCATION: PF Outlet-
UNIT: 2 RUN: 2

Part 1 Metals TESTING FIELD DATA SHEET

METHOD: 5129 PAGE 2 OF 2

Client: <u>Wheelabrator</u>	Project No. <u>11182</u>
Plant: <u>8 Burner</u>	Date <u>3/30/11</u>
Meter Operator: <u>P. Bihun</u>	
Probe Operator: <u>P. Bihun</u>	

Meter Box	Sample Box No.
Meter Yd	Meter ΔH _@
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 ₂ O)	Port Len. (in.)	Gas Flow [In] [Out]	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 ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [b]	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)	XAD Trap Temp T _t (°F)	Notes
						210	210						
3	60	0.33	0.83	109.99	300	217	249	61	89	86	2.5	N/A	9.0
4	70	0.36	0.90	112.70	300	249	251	59	89	86	2.5		7.9
5	25	0.38	0.95	115.570	301	280	252	60	90	86	2.5		8.9
2-1	80	0.38	0.95	118.33	300	249	251	62	89	86	2.5		8.8
2	85	0.36	0.90	124.03	300	251	250	63	90	86	2.5		8.7
3	90	0.38	0.95	123.80	300	251	259	64	90	86	2.5		8.3
4	95	0.42	1.1	126.74	301	249	250	62	89	85	3.0		7.8
5	100	0.38	0.95	127.34	301	250	250	60	90	85	2.5		9.0
1-1	105	0.30	0.75	132.05	301	249	250	62	89	86	2.5		8.4
2	110	0.28	0.70	134.42	301	251	249	63	89	86	2.5		8.4
3	115	0.32	0.80	136.96	299	257	250	64	88	85	3.0		8.9
4	120	0.34	0.85	139.62	300	249	249	64	88	85	3.0		8.3
5	125	0.34	0.85	142.250	300	250	249	64	88	85	3.0	✓	8.0
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: 10
Date: 3/30/11

TEST LOCATION: FF Outlet
 UNIT: 2 RUN: 3

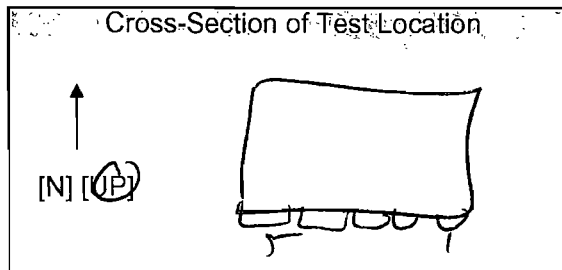
Part 1 Metals TESTING FIELD DATA SHEET

METHOD: 5/29 PAGE 1 OF 2

Client: Wheelabrator Project No: 111F2
 Plant: S. Broward Date: 3/30/11
 Meter Operator: P. Bihun
 Probe Operator: P. Bihun

Meter Box: 61-4 Sample Box No: M3
 Meter Y: 0.9960 Meter ΔH: 17601
 K Factor: 2.50 Pitot C: 0.83

Leak Rate Before: 0.003 (cfm) [Lpm] @ 13 (in. Hg)
 Leak Rate After: 0.003 (cfm) [Lpm] @ 10 (in. Hg)
 Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐



Duct Dimensions (in.): 96x96
 Static Pres (in. H₂O): -10.0 Port Len. (in.): 10.0
 Gas Flow (in) Out: (in) Out First point all the way: (in) Out

Amb Temp (°F): 83 Bar Press: 30.01 (in. Hg) [mbar]
 Probe I.D. No: 607-8-3
 Liner Material: Glass

Filter No: C3-29
 Thimble No: N/A
 Nozzle Diameter: 0.270 Nozzle I.D.: 270-2

Start Time: 12:29 Stop Time: 14:41

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Onifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init Vol (ft ³) [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)	XAD Trap Temp T _t (°F)	Notes
				<u>142.505</u>		<u>270</u>	<u>270</u>						<u>O₂</u>
5-1	5	<u>0.28</u>	<u>0.70</u>	<u>144.88</u>	<u>299</u>	<u>257</u>	<u>251</u>	<u>65</u>	<u>85</u>	<u>84</u>	<u>2.0</u>	<u>N/A</u>	<u>9.8</u>
2	10	<u>0.31</u>	<u>0.79</u>	<u>147.42</u>	<u>302</u>	<u>253</u>	<u>245</u>	<u>65</u>	<u>86</u>	<u>84</u>	<u>2.0</u>		<u>9.2</u>
3	15	<u>0.29</u>	<u>0.74</u>	<u>149.81</u>	<u>299</u>	<u>251</u>	<u>248</u>	<u>64</u>	<u>87</u>	<u>84</u>	<u>2.0</u>		<u>8.2</u> <u>k=2.05</u>
4	20	<u>0.30</u>	<u>0.77</u>	<u>152.34</u>	<u>300</u>	<u>249</u>	<u>249</u>	<u>64</u>	<u>88</u>	<u>84</u>	<u>2.0</u>		<u>8.4</u>
5	25	<u>0.30</u>	<u>0.77</u>	<u>154.830</u>	<u>300</u>	<u>249</u>	<u>248</u>	<u>64</u>	<u>88</u>	<u>84</u>	<u>2.0</u>		<u>8.7</u> <u>154.884</u>
4-1	30	<u>0.33</u>	<u>0.84</u>	<u>157.47</u>	<u>300</u>	<u>250</u>	<u>255</u>	<u>64</u>	<u>87</u>	<u>84</u>	<u>2.0</u>		<u>9.6</u> <u>10.05</u>
2	35	<u>0.36</u>	<u>0.92</u>	<u>160.22</u>	<u>301</u>	<u>252</u>	<u>250</u>	<u>64</u>	<u>88</u>	<u>84</u>	<u>2.5</u>		<u>9.2</u>
3	40	<u>0.33</u>	<u>0.84</u>	<u>162.85</u>	<u>300</u>	<u>252</u>	<u>250</u>	<u>60</u>	<u>89</u>	<u>84</u>	<u>2.0</u>		<u>8.0</u>
4	45	<u>0.38</u>	<u>0.97</u>	<u>165.67</u>	<u>300</u>	<u>250</u>	<u>247</u>	<u>59</u>	<u>90</u>	<u>85</u>	<u>2.5</u>		<u>7.8</u> <u>165.481</u>
5	50	<u>0.37</u>	<u>0.94</u>	<u>168.431</u>	<u>300</u>	<u>249</u>	<u>253</u>	<u>61</u>	<u>91</u>	<u>86</u>	<u>2.5</u>		<u>8.0</u> <u>-0.05</u>
3-1	55	<u>0.31</u>	<u>0.79</u>	<u>171.00</u>	<u>300</u>	<u>249</u>	<u>251</u>	<u>62</u>	<u>90</u>	<u>86</u>	<u>2.0</u>		<u>9.2</u>
2	60	<u>0.36</u>	<u>0.92</u>	<u>173.75</u>	<u>301</u>	<u>252</u>	<u>250</u>	<u>63</u>	<u>91</u>	<u>87</u>	<u>2.5</u>		<u>8.8</u>
Total		<u>0.6051</u>		<u>169.180</u>									
Average		<u>0.992</u>		<u>300.280</u>					<u>88.0600</u>				

Sum of square roots.

Circle correct bracketed units on data sheet

QA/QC: 113
 Date: 3/30/11

2074



9.99

TEST LOCATION:

UNIT: 2RUN: 3

TESTING

METHOD: SLUG

PAGE

2 OF 2

FIELD DATA SHEET

Client: <u>Whitcomb</u>	Project No: <u>11182</u>
Plant: <u>S. Broward</u>	Date: <u>3/30/11</u>
Meter Operator: <u>P. Bihun</u>	
Probe Operator: <u>P. Bihun</u>	

Meter Box	Sample Box No
Meter Yr	Meter ΔH ₀
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 ₂ O)	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 ID

Start Time	Stop Time

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init Vol (L)	Stack Temp T _s (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{max} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _r (°F)	Notes
						210	210						
3	65	0.39	1.0	176.66	301	251	250	64	91	87	2.5	N/A	9.1
4	70	0.41	1.2	179.79	302	249	250	64	91	87	3.0		8.7
5	75	0.43	1.1	182.80	302	249	249	64	92	87	2.5		8.0
2-1	80	0.36	0.92	185.63	300	249	250	63	90	87	2.5		8.5
2	85	0.37	0.94	188.42	300	251	280	63	91	87	2.5		8.7
3	90	0.39	1.0	191.30	299	251	250	64	91	87	2.5		8.2
4	95	0.43	1.1	194.29	300	249	251	64	92	87	2.5		8.3
5	100	0.48	1.2	197.42	301	249	249	64	92	87	3.0		8.7
1-1	105	0.42	1.1	200.41	300	250	250	65	93	88	2.5		8.5
2	110	0.36	0.92	203.16	300	251	251	64	92	88	2.5		8.4
3	115	0.39	1.0	206.04	299	251	280	63	92	88	2.5		9.1
4	120	0.39	1.0	208.92	300	249	250	63	92	88	2.5		8.4
5	125	0.42	1.1	211.91	301	249	250	63	92	88	3.0		8.2
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC

Date



Impinger Weight Sheet

Client Wheelabrator		Unit Name/Location Unit 2 FF Outlet	
Plant South Broward	Job No. 11182	Method	5/29

Run No. 1	Filter Type Quartz	Sample Box No. M10
Date 3/30/11	Lot No.	pH
Analyst R. Vigne	Filter No. e3-26	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	708.3	433.8	274.5	
Impinger 2	100 ml 5% HNO3/10% H2O2	652.4	570.0	82.4	QA/QC Rv Date 3/30/11
Impinger 3	100 ml 5% HNO3/10% H2O2	543.9	529.5	14.4	
Impinger 4	Empty	432.4	428.9	3.5	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	544.5	542.4	2.1	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	553.7	552.6	1.1	378.0
Impinger 7	Silica Gel	791.0	776.8	14.2	392.2

Run No. 2	Filter Type Quartz	Sample Box No. M4
Date 3/30/11	Lot No.	pH
Analyst R. Vigne	Filter No. e3-27	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	713.4	438.0	275.4	
Impinger 2	100 ml 5% HNO3/10% H2O2	627.7	537.6	90.1	QA/QC Rv Date 3/30/11
Impinger 3	100 ml 5% HNO3/10% H2O2	550.6	535.2	15.4	
Impinger 4	Empty	441.1	439.0	2.1	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	550.8	549.4	1.4	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	607.2	606.7	0.5	384.9
Impinger 7	Silica Gel	858.1	844.7	13.4	398.3

Run No. 3	Filter Type Quartz	Sample Box No. M3
Date 3/30/11	Lot No.	pH
Analyst R. Vigne	Filter No. e3-29	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	755.4	450.1	305.3	
Impinger 2	100 ml 5% HNO3/10% H2O2	650.0	564.6	85.4	QA/QC Rv Date 3/30/11
Impinger 3	100 ml 5% HNO3/10% H2O2	576.9	565.2	11.7	
Impinger 4	Empty	452.2	450.2	2.0	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	539.8	538.2	1.6	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	529.8	529.6	0.2	406.2
Impinger 7	Silica Gel	745.0	732.1	12.9	419.1

TEST LOCATION: FF OUTLET
UNIT: 2 RUN: 1

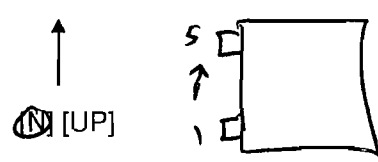
FIELD DATA SHEET

METHOD: 13B PAGE 1 OF 2

Client: Wheelabrator Project No. 11182
Plant: S. Broward Date: 3.29.11
Meter Operator: NH
Probe Operator: BA

Meter Box: 41-6 Sample Box No. B22
Meter Yr: 0-9960 Meter ΔH: 1.7601
K-Factor: 2.7 Pitot Co: 0.812
Leak Rate Before: 0.003 [cfm] [Lpm] @ 15 (in. Hg)
Leak Rate After: 0.003 [cfm] [Lpm] @ 5 (in. Hg)
Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐

Cross-Section of Test Location:



Duct Dimensions (in.): 96 x 96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (in. Hg) [Out]	First point all the way
<u>-10.3</u>	<u>10</u>	<u>10</u> [Out]	<u>10</u> [Out]

of page.

Amb. Temp (°F) 83 Bar. Press. 30.00 [6. Hg] [mbar]
Probe ID No. 56-96-11 67-8-19
Liner Material: GLASS

Filter No. -
Thimble No. -
Nozzle Diameter 0.274 Nozzle ID 274-1

Start Time: 13:21 Stop Time: 14:30

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. [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)	XAD Trap Temp T _t (°F)	Notes
	2.5			899.175		250	250						
1-1	2.5	0.49	1.3	900.92	300	258	251	62	94	93	3	10.8	
2	5	0.42	1.1	902.46	300	251	252	58	95	93	3	10.6	
3	7.5	0.44	1.2	904.04	300	248	253	54	96	94	3	10.4	
4	6	0.49	1.3	905.63	299	250	253	52	97	93	3	10.3	
5	12.5	0.52	1.5	907.415	301	252	250	51	99	94	3	10.4	.515
2-1	15	0.53	1.4	909.20	298	253	248	52	99	93	3	10.5	
2	17.5	0.44	1.2	910.79	302	251	251	51	100	93	3	10.0	
3	20	0.50	1.4	912.48	301	249	251	52	101	93	3	10.1	
4	22.5	0.60	1.6	914.29	302	249	251	53	101	94	3	9.9	
5	25	0.59	1.6	916.080	303	249	248	53	102	94	3	8.7	.165
3-1	27.5	0.41	1.1	917.65	302	253	248	51	101	94	3	9.6	
2	30	0.47	1.3	919.29	303	250	250	54	101	94	3	9.0	
3	32.5	0.42	1.1	920.85	301	248	251	56	102	94	3	9.2	
Total		76.2038	28.5500	38.3800	7575				1258	1216			
Average		0.6482	7.1896	300.6000	3912				100.8750				

Sum of square roots.

Circle correct bracketed units on data sheet.

3912

QA/QC

Date

96.8402

TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 1

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13 B PAGE 2 OF 2

Client: Wheelabrator Project No: 11182
 Plant: S BROWARD Date: 3.29.11
 Meter Operator: NH
 Probe Operator: BA

Meter Box: 41-6 Sample Box No: B2
 Meter Yr: 0.9962 Meter ΔH: 1.7601
 K Factor: 2.7 Pitot Co: 0.812

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 ₂ O)	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: 14:30

Traverse Point Number	Min/pt 25 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [L]	Stack Temp T _s (°F)	Probe T _p (°F) Set Points	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)	XAD Trap Temp T _t (°F)	Notes
3-4	35	0.45	1.2	922.42	301	248	252	57	102	94	3	9.2	
5	37.5	0.53	1.4	924.125	302	250	250	57	102	94	3	10.2	.200
4-1	40	0.30	0.81	925.50	298	252	248	62	100	94	3	11.9	
2	42.5	0.30	0.81	926.79	298	252	249	61	100	94	3	11.9	
3	45	0.29	0.78	928.04	299	250	257	60	101	94	3	11.5	
4	47.5	0.30	0.81	929.37	299	247	250	60	100	94	3	11.5	
5	50	0.36	0.97	930.925	300	250	250	60	100	94	3	10.3	.125
5-1	52.5	0.34	0.92	932.33	301	253	249	63	100	94	3	9.8	
2	55	0.33	0.89	933.77	301	250	250	64	100	94	3	8.6	
3	57.5	0.33	0.89	935.04	301	250	250	64	101	95	3	9.6	
4	60	0.38	1.0	936.61	301	248	250	65	100	95	3	9.5	
5	62.5	0.36	0.97	937.940	302	250	250	65	101	95	3	8.2	
	Total	*							1207	1131			
	Average												

* Sum of square roots.

Circle correct bracketed units on data sheet.

11.45

3403 QA/QC SB
 Date 3/21

TEST LOCATION: FF OUTLET FLUORIDES TESTING
UNIT: 2 RUN: 2 FIELD DATA SHEET

METHOD: 13 B PAGE 1 OF 2

Client: Whelan Project No. 1182
Plant: Browards Date: 3.29.11
Meter Operator: NH
Probe Operator: BA

Meter Box: 61-6 Sample Box No: B1
Meter Y: 0.9960 Meter ΔH : 1.7601
K Factor: 2.7 Pitot C: 0.812
Leak Rate Before: 0.006 [Lpm] @ 13 (in. Hg)
Leak Rate After: 0.004 [Lpm] @ 8 (in. Hg)
Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐

Cross-Section of Test Location

Duct Dimensions (in.): 96 x 96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (in. Out)	First point all the way
<u>-10.3</u>	<u>10</u>	<u>in</u>	<u>in</u> [Out]

Amb. Temp (°F): 82 Bar Press: 30.00 [in. Hg] [mbar]
Probe I.D. No: 56-96-11 67-8-14
Liner Material: GLASS

Filter No: -
Thimble No: -
Nozzle Diameter: .274 Nozzle I.D.: 274-1

Start Time: 14:49 Stop Time: 15:57

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. [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)	XAD Trap Temp (°F)	Notes
	<u>2.5</u>			<u>938.505</u>		<u>250</u>	<u>250</u>					<u>0.2</u>	
5-1	2.5	0.35	0.95	939.93	299	260	260	63	94	94	3	8.9	
2	5	0.34	0.92	941.32	300	253	246	57	95	93	3	8.9	
3	7.5	0.35	0.95	942.72	299	250	246	53	95	93	3	8.9	
4	10	0.39	1.1	944.21	300	247	247	51	96	93	3	8.2	
5	12.5	0.34	0.92	945.625	300	249	248	50	96	93	3	8.2	7.715 .09
4-1	15	0.34	0.92	947.07	299	253	252	50	96	92	3	8.2	
2	17.5	0.33	0.89	948.425	299	252	250	49	97	93	3	8.4	
3	20	0.34	0.92	949.80	299	249	257	48	97	92	3	8.1	
4	22.5	0.31	0.84	951.13	299	248	249	50	97	92	3	8.8	
5	25	0.30	0.81	952.405	298	248	250	49	97	92	3	8.6	.525 .12
3-1	27.5	0.30	0.81	953.82	298	253	249	51	97	92	3	8.3	
2	30	0.31	0.84	955.14	299	252	250	51	98	92	3	8.5	
3	32.5	0.31	0.84	956.45	299	249	250	52	98	92	3	7.8	
Total		14.6216	23.2200	34.5900	7474				1253	1004			
Average		0.5849	0.9288		298.9600				94.5200				

Sum of square roots.

Circle correct bracketed units on data sheet.

1171

3888 QA/QC NH
Date: 3.29.11



TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 2

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 2 OF 2

Client: Wheelabrator Project No: 11182
 Plant: S. Broward Date: 3.29.11
 Meter Operator: NH
 Probe Operator: BA

Meter Box: 61-6 Sample Box No: B1
 Meter Y: 0.9960 Meter ΔH: 1.7601
 K Factor: 2.7 Pitot C: 0.812

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 ₂ O)	Port Len. (in.)	Gas Flow [In] [Out] [In] [Out]	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: 15:57

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. [ft] [L]	Stack Temp. T _s (°F)	Probe T _p (°F) Set Points	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)	XAD Trap Temp T _x (°F)	Notes
3-4	35	0.31	0.84	957.77	300	248	250	54	98	92	3	8.0	
5	37.5	0.32	0.86	959.095	299	250	249	52	98	92	3	8.1	.08
2-1	40	0.32	0.86	960.55	297	253	250	57	97	92	3	9.5	
2	42.5	0.32	0.86	961.85	299	251	250	61	97	92	3	8.4	
3	45	0.34	0.92	963.24	299	249	250	62	97	92	3	8.4	
4	47.5	0.37	1.0	964.68	299	249	249	62	98	92	3	8.9	
5	50	0.41	1.1	966.190	299	249	250	62	97	92	3	9.1	.135
1-1	52.5	0.37	1.0	967.77	299	253	250	63	96	92	3	9.2	
2	55	0.34	0.92	969.20	299	250	250	63	97	92	3	9.8	
3	57.5	0.35	0.95	970.55	297	249	252	64	97	92	3	9.3	
4	60	0.40	1.1	971.48	299	250	248	64	97	92	3	9.5	
5	62.5	0.41	1.1	973.520	300	248	249	63	97	91	3	8.8	
Total	*								1164	1103			
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

3586 QA/QC SB
 Date 3/29

TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 3

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 1 OF 2

Client: Wheelabrator Project No: 11182
 Plant: S BROWARD Date: 3.29.11
 Meter Operator: NH
 Probe Operator: BA

Meter Box: 61-6 Sample Box No: B22
 Meter Yr: 0.9960 Meter ΔH: 1.7601
 K-Factor: 2.7 Pilot Cp: 0.812
 Leak Rate Before: 0.004 [cm] [Lpm] @ 13 (in. Hg)
 Leak Rate After: 0.003 [cm] [Lpm] @ 7 (in. Hg)
 Pilot Leak Check Before: ☒ After: Good ☒ Bad ☐

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.): 96 x 96

Static Pres (in. H ₂ O): <u>-10.3</u>	Port Len (in.): <u>10</u>	Gas Flow (in. Hg) [Out]: <u>10</u> of page	First point all the way (in) [Out]: <u>10</u>

Amb. Temp (°F): 80 Bar Press: 30.00 [in. Hg] [mbar]
 Probe ID No: 56-96-11 67-8-14
 Liner Material: GLASS

Filter No: -
 Thimble No: -
 Nozzle Diameter: .274 Nozzle ID: 274-1

Start Time: 16:11 Stop Time: 17:23

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init Vol (ft ³) [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)	XAD Trap Temp T _x (°F)	Notes
	<u>2.5</u>			<u>973.920</u>		<u>250</u>	<u>250</u>						
1-1	2.5	0.40	1.1	975.59	298	255	250	64	90	89	3	9.4	
2	5	0.37	1.0	977.77 976.91	300	256	250	57	90	90	3	9.4	
3	7.5	0.41	1.1	978.43	298	253	252	47	92	89	3	9.9	
4	10	0.46	1.2	980.07	299	252	249	44	93	89	3	9.8	
5	12.5	0.51	1.4	981.660	300	251	250	44	94	89	3	9.8	1.045
2-1	15	0.44	1.2	983.65	299	253	250	47	93	89	3	10.2	
2	17.5	0.37	1.0	985.10	300	250	250	46	94	89	3	9.3	
3	20	0.41	1.1	986.62	300	248	250	46	94	89	3	10.2	
4	22.5	0.47	1.3	988.25	300	249	251	46	95	89	3	9.8	
5	25	0.51	1.4	989.930	300	250	250	47	95	89	3	9.4	1.0375
3-1	27.5	0.40	1.1	991.85	299	252	251	51	94	89	3	9.6	
2	30	0.40	1.1	993.33	300	250	250	57	94	89	3	9.2	
3	32.5	0.41	1.1	994.81	300	248	250	57	95	89	3	9.1	
Total		15.6967	26.9100	37.0200	7485				1213	1158			
Average		0.6279	1.0764	299.4000					91.2200				

Sum of square roots:
15.1000

Circle correct bracketed units on data sheet.

3893 QA/QC SB
 Date: 3/29

TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 3

FLUORIDE TESTING FIELD DATA SHEET

METHOD: TSB PAGE 2 OF 2

Client: <u>Wheelabrator</u>	Project No: <u>11182</u>
Plant: <u>S. Broward</u>	Date: <u>3.29.11</u>
Meter Operator: <u>NH</u>	
Probe Operator: <u>NH</u>	

Meter Box: <u>61-6</u>	Sample Box No: <u>B 22</u>
Meter Y: <u>0.9960</u>	Meter ΔH: <u>1.7601</u>
K Factor: <u>27</u>	Pilot C: <u>0.812</u>

Leak Rate Before	[cfm] [Lpm]	@	(in. Hg)
Leak Rate After	[cfm] [Lpm]	@	(in. Hg)
Pilot Leak Check Before	☐	After: Good ☐ Bad ☐	

Cross-Section of Test Location

↑
[N] [UP]

Duct Dimensions (in.)

Static Pres (in. H ₂ O)	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: <u>17:23</u>

Traverse Point Number	Min/pt 2.5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. <u>ff</u> [L]	Stack Temp. T _s (°F)	Probe T _p (°F) Set Points 250 250	Filter T _f (°F) 250 250	Cond Temp T _c (°F) 52 53 57 54 54 54 58 60 60 60 60	DGM Inlet T _{m in} (°F) 95 95 93 94 95 95 93 94 93 93	DGM Outlet T _{m out} (°F) 89 89 88 89 88 88 88 88 89 88	Pump Vacuum (in. Hg) 3 3 3 3 3 3 3 3 3 3	XAD Trap Temp T _X (°F) 9.0 9.2 10.5 9.7 9.6 9.4 9.7 9.2 9.2 8.9 9.6	Notes
3-4	35	0.43	1.2	996.36	300	249	250	52	95	89	3	9.0	
5	37.5	0.45	1.2	997.895	300	250	249	53	95	89	3	9.2	8.185
4-1	40	0.39	1.1	999.74	299	252	250	57	93	88	3	10.5	
2	42.5	0.36	0.97	1001.16	301	251	250	54	94	89	3	9.7	
3	45	0.41	1.1	1002.67	300	249	250	54	95	88	3	9.6	
4	47.5	0.36	0.97	1004.09	300	248	250	54	95	88	3	9.4	
5	50	0.36	0.97	1005.510	299	250	250	54	95	89	3	9.7	5.795
5-1	52.5	0.25	0.68	1007.01	297	252	249	58	93	88	3	9.7	
2	55	0.33	0.89	1008.20	298	249	250	60	93	88	3	9.2	
3	57.5	0.34	0.92	1009.62	300	248	250	60	94	88	3	9.2	
4	60	0.33	0.89	1010.96	299	250	250	60	94	89	3	8.9	
5	62.5	0.34	0.92	1012.345	299	250	251	60	93	88	3	9.6	
Total				26.9100					1129	1061			
Average				1.0764									

Sum of square roots.

Circle correct bracketed units on data sheet.

Impinger Weight Sheet

Client: Wheelabrator		Unit Name/Location: Unit 2 FF Outlet	
Plant: South Broward	Job No: 11182	Method:	13B

Run No. 1	Filter Type: Teflon glass mat	Sample Box No. B22
Date: 3/29/11	Lot No:	pH:
Analyst: D. Lucke	Filter No: NA	Rinse:

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	705.8	546.9	158.9	
Impinger 2	100 mL DI H2O	618.7	564.5	54.2	
Impinger 3	Empty	452.8	444.1	8.7	
Impinger 4	Silica Gel	750.0	736.8	13.2	
					Total Weight (gm)
					221.8
					235.0

QA/QC DC
Date 3/29/11

Run No. 2	Filter Type: Teflon glass mat	Sample Box No. B1
Date: 3/29/11	Lot No:	pH:
Analyst: D. Lucke	Filter No: NA	Rinse:

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	753.6	635.6	118.0	
Impinger 2	100 mL DI H2O	607.9	544.2	63.7	
Impinger 3	Empty	468.5	453.7	14.8	
Impinger 4	Silica Gel	725.4	711.0	14.4	
					Total Weight (gm)
					196.5
					210.9

QA/QC DC
Date 3/29/11

Run No. 3	Filter Type: Teflon glass mat	Sample Box No. B22
Date: 3/29/11	Lot No:	pH:
Analyst: R. Viera	Filter No: NA	Rinse:

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	705.3	546.5	158.8	
Impinger 2	100 mL DI H2O	620.5	562.3	58.2	
Impinger 3	Empty	454.2	443.2	11.0	
Impinger 4	Silica Gel	761.0	749.9	11.1	
					Total Weight (gm)
					228.0
					239.1

QA/QC RV
Date 3/29/11

TEST LOCATION: SDA INLET
 UNIT: 2 RUN: 1

HCl TESTING FIELD DATA SHEET

METHOD: 264 PAGE 1 OF 1

Client <u>Wheabrator</u>	Project No. <u>11182</u>
Plant <u>S. BLOWN</u>	Date <u>3-30-11</u>
Meter Operator <u>B. Arnold</u>	
Probe Operator	

Meter Box <u>66-4</u>	Sample Box No. <u>B21</u>
Meter Ya. <u>0.9985</u>	Meter ΔH <u>1.6779</u>
K Factor <u>—</u>	Pitot Co. <u>—</u>
Leak Rate Before <u>0.003</u> [m] [Lpm]	@ <u>15</u> (in. Hg)
Leak Rate After <u>0.003</u> [m] [Lpm]	@ <u>21</u> (in. Hg)
Pitot Leak Check Before ☐	After: Good ☐ Bad ☐

Cross-Section of Test Location

[UP]

Duct Dimensions (in.) 105

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (m) [Out]	First point all the way (m) [Out]
<u>-1.7</u>	<u>14</u>		

Amb. Temp (°F) <u>74</u>	Bar Press. <u>30.00</u> [in. Hg] [mbar]
Probe I.D. No. <u>67-4-5</u>	
Liner Material <u>GLASS</u>	

Filter No. <u>—</u>	
Thimble No. <u>—</u>	
Nozzle Diameter	Nozzle I.D.

Start Time <u>7:58</u>	Stop Time <u>8:50</u>

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init Vol. [ft ³] [L]	Stack Temp T _s (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{max} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _i (°F)	Notes
1-1	5	N/A	1.2	042.327	477	350	350	66	82	80	3.0	10.3	
	10		1.2	048.40	471	354	350	44	83	81	4.0	9.5	
	15		1.2	051.46	473	355	352	42	85	81	6.0	9.8	
	20		1.2	054.55	477	357	350	42	86	82	7.5	7.1	
	25		1.2	057.60	481	355	352	43	88	82	10.0	8.2	
	30		1.2	060.67	485	350	354	46	88	82	11.5	7.8	
	35		1.2	063.72	490	351	355	47	88	82	14.0	7.0	
	40		1.2	066.77	485	352	352	53	88	82	15.5	9.8	
	45		1.2	069.81	473	354	355	57	89	83	17.0	9.3	
	50		1.2	072.76	469	355	352	60	89	83	20.0	7.4	
	55		1.1	075.56	446	351	353	62	88	84	20.5	7.0	
	60		0.95	078.315	483	354	352	64	88	84	20.5	7.4	
Total				140500	35.988								
Average				1.1708	478.3333				84.5000				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC BA
 Date 3-29-11

TEST LOCATION: SDA INLET
 UNIT: 2 RUN: 2

HCl TESTING FIELD DATA SHEET

METHOD: ZGA PAGE 1 OF 1

Client: <u>Whelanator</u>	Project No: <u>11182</u>
Plan: <u>2-2S. Blower</u>	Date: <u>3-29-11</u>
Meter Operator: <u>B. Arnold</u>	
Probe Operator: <u> </u>	

Meter Box: <u>166-4</u>	Sample Box No: <u> </u>
Meter Yd: <u>0.9983</u>	Meter ΔH: <u>1.6979</u>
K Factor: <u> </u>	Pitot Co: <u> </u>
Leak Rate Before: <u>0.003</u> [cfm] [Lpm] @ <u>15</u> (in. Hg)	
Leak Rate After: <u>0.005</u> [cfm] [Lpm] @ <u>21</u> (in. Hg)	
Pitot Leak Check Before: ☐ After: Good ☐ Bad ☐	

Cross-Section of Test Location			
Duct Dimensions (in.): <u>105</u>			
Static Pres (in. H ₂ O): <u>-1.7</u>	Port Len (in.): <u>14</u>	Gas Flow (in) Out: <u> </u>	First point all the way: <u>(N) [Out]</u>

Amb Temp (°F): <u>89</u>	Bar Press: <u>30.00</u> [in. Hg] [mbar]
Probe ID No: <u>67-45</u>	
Liner Material: <u>GLASS</u>	

Filter No: <u> </u>		
Thimble No: <u> </u>		
Nozzle Diameter: <u> </u>	Nozzle ID: <u> </u>	

Start Time: <u>9:23</u>	Stop Time: <u>10:23</u>

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. [ft ³] [L]	Stack Temp T _s (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{max} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _t (°F)	Notes
				<u>078.514</u>		<u>350</u>	<u>350</u>					<u>0.2</u>	
1-1	5	<u>N/A</u>	<u>1.2</u>	<u>081.56</u>	<u>476</u>	<u>350</u>	<u>355</u>	<u>65</u>	<u>88</u>	<u>86</u>	<u>3.5</u>	<u>9.0</u>	
	10		<u>1.2</u>	<u>084.56</u>	<u>480</u>	<u>355</u>	<u>353</u>	<u>49</u>	<u>89</u>	<u>86</u>	<u>5.0</u>	<u>8.0</u>	
	15		<u>1.2</u>	<u>087.55</u>	<u>484</u>	<u>356</u>	<u>354</u>	<u>50</u>	<u>89</u>	<u>86</u>	<u>7.0</u>	<u>7.5</u>	
	20		<u>1.2</u>	<u>090.57</u>	<u>489</u>	<u>351</u>	<u>355</u>	<u>47</u>	<u>93</u>	<u>89</u>	<u>9.0</u>	<u>7.6</u>	
	25		<u>1.2</u>	<u>093.63</u>	<u>489</u>	<u>350</u>	<u>354</u>	<u>48</u>	<u>94</u>	<u>89</u>	<u>10.5</u>	<u>6.9</u>	
	30		<u>1.2</u>	<u>096.64</u>	<u>483</u>	<u>355</u>	<u>354</u>	<u>52</u>	<u>94</u>	<u>90</u>	<u>12.0</u>	<u>8.9</u>	
	35		<u>1.2</u>	<u>099.68</u>	<u>491</u>	<u>352</u>	<u>355</u>	<u>54</u>	<u>94</u>	<u>90</u>	<u>13.5</u>	<u>8.6</u>	
	40		<u>1.2</u>	<u>102.89</u>	<u>476</u>	<u>350</u>	<u>354</u>	<u>58</u>	<u>94</u>	<u>90</u>	<u>14.5</u>	<u>10.2</u>	
	45		<u>1.2</u>	<u>105.84</u>	<u>473</u>	<u>351</u>	<u>355</u>	<u>62</u>	<u>94</u>	<u>91</u>	<u>16.0</u>	<u>9.6</u>	
	50		<u>1.2</u>	<u>108.90</u>	<u>465</u>	<u>350</u>	<u>352</u>	<u>60</u>	<u>94</u>	<u>91</u>	<u>18.5</u>	<u>6.6</u>	
	55		<u>1.2</u>	<u>111.91</u>	<u>480</u>	<u>352</u>	<u>356</u>	<u>61</u>	<u>94</u>	<u>91</u>	<u>20.0</u>	<u>7.2</u>	
	60		<u>1.1</u>	<u>114.875</u>	<u>480</u>	<u>351</u>	<u>355</u>	<u>63</u>	<u>94</u>	<u>91</u>	<u>20.5</u>	<u>7.2</u>	
	Total		<u>14.3000</u>	<u>36.361</u>									
	Average		<u>1.1916</u>	<u>480.500</u>					<u>90.8750</u>				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC 30
 Date 3/29

METHOD: 26A PAGE 1 OF 1

Start Time	10:39	Stop Time	11:39

Circle correct bracketed units on data sheet.

F-41

TEST LOCATION: SDA INLET
 UNIT: 2 RUN: 4

HCl TESTING
FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client: <u>Wheelabrator</u>	Project No: <u>11182</u>
Plant: <u>S. BROWARD</u>	Date:
Meter Operator: <u>B. ARNOLD</u>	
Probe Operator:	

Meter Box: <u>46-4</u>	Sample Box No: <u>B11</u>
Meter Yr: <u>0.9983</u>	Meter ΔH ₀ : <u>0.976979</u>
K Factor:	Pitot C _p :
Leak Rate Before: <u>0.002</u> [cfm] [Lpm] @ <u>15</u> (in. Hg)	
Leak Rate After: <u>0.003</u> [cfm] [Lpm] @ <u>20</u> (in. Hg)	
Pitot Leak Check Before: ☐ After: Good ☐ Bad ☐	

Cross-Section of Test Location:

Duct Dimensions (in.): 105

Static Pres. (in. H ₂ O): <u>-1.8</u>	Port Len. (in.): <u>14</u>	Gas Flow (In) [Out] of page: <u>(In) [Out]</u>	First point all the way: <u>(In) [Out]</u>

Amb Temp (°F): <u>88</u>	Bar Press: <u>80.00</u> [in. Hg] [mbar]
Probe ID No: <u>67-4-5</u>	
Liner Material: <u>GLASS</u>	

Filter No: <u>-</u>		
Thimble No: <u>-</u>		
Nozzle Diameter:	Nozzle ID:	

Start Time: <u>11:54</u>	Stop Time: <u>12:54</u>

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init Vol (ft ³) [L]	Stack Temp T _s (°F)	Probe T _p (°F) Set Points	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)	XAD Trap Temp T _t (°F)	Notes
1-1	5	N/A	1.2	152.065	483	350	350	66	86	85	3.5	7.7	
	10		1.2	158.19	483	351	351	54	88	87	4.5	7.4	
	15		1.2	161.25	480	351	352	50	89	88	5.5	7.1	
	20		1.2	164.30	480	350	351	48	89	88	7.6	7.9	
	25		1.2	167.37	476	350	351	49	90	87	8.5	8.2	
	30		1.2	170.42	474	355	356	53	90	87	10.0	7.1	
	35		1.2	173.48	471	351	355	56	90	87	11.0	7.5	
	40		1.2	176.54	474	350	354	59	90	88	12.0	7.6	
	45		1.2	179.60	477	351	351	60	90	88	13.5	7.5	
	50		1.2	182.67	479	353	355	62	91	88	15.5	7.6	
	55		1.2	185.71	480	352	350	63	91	88	17.0	8.2	
	60		1.2	188.770	480	352	351	64	91	88	18.5	8.3	
Total *				14.400									
Average				36.705									
					478.0833				88.5000				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: BA
 Date: 8-29-11

Impinger Weight Sheet

Client Wheelabrator	Unit Name/Location Unit 2 SDA Inlet
Plant South Broward	Job No. 11182 Method Mod. 26A

Run No. 1	Filter Type Quartz	Sample Box No. B21
Date 3/29/11	Lot No.	pH
Analyst D. Luckhard	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	484.8	454.2	30.6	
Impinger 2	100 mL 0.1N H2SO4	646.7	558.3	88.4	
Impinger 3	100 mL 0.1N H2SO4	586.9	560.0	26.9	
Impinger 4	Empty	452.6	445.2	7.4	
Impinger 5	Silica Gel	777.7	764.2	13.5	Total Weight (gm)
					153.3
					166.8

QA/QC DC
Date 3/29/11

Run No. 2	Filter Type Quartz	Sample Box No. B11
Date 3/29/11	Lot No.	pH
Analyst D. Luckhard	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	495.3	461.9	33.4	
Impinger 2	100 mL 0.1N H2SO4	639.7	540.3	99.4	
Impinger 3	100 mL 0.1N H2SO4	580.1	554.5	25.6	
Impinger 4	Empty	531.4	525.5	5.9	
Impinger 5	Silica Gel	779.3	761.6	17.7	Total Weight (gm)
					164.3
					182.0

QA/QC DC
Date 3/29/11

Run No. 3	Filter Type Quartz	Sample Box No. B21
Date 3/29/11	Lot No.	pH
Analyst D. Luckhard	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	499.6	459.5	40.1	
Impinger 2	100 mL 0.1N H2SO4	645.8	552.3	88.5	
Impinger 3	100 mL 0.1N H2SO4	584.7	557.2	27.5	
Impinger 4	Empty	448.9	444.5	4.4	
Impinger 5	Silica Gel	788.5	777.8	10.7	Total Weight (gm)
					160.5
					171.2

QA/QC DC
Date 3/29/11

Impinger Weight Sheet

Client: Wheelabrator	Unit Name/Location: Unit 2 SDA Inlet
Plant: South Broward	Job No: 11182
Method: Mod. 26A	

Run No: 4	Filter Type: Quartz	Sample Box No: B 11
Date: 3/29/11	Lot No:	pH:
Analyst: D. Luckhard	Filter No: NA	Rinse:

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	499.5	461.2	38.3	
Impinger 2	100 mL 0.1N H2SO4	646.0	541.4	104.6	
Impinger 3	100 mL 0.1N H2SO4	577.8	554.6	23.2	
Impinger 4	Empty	529.3	525.4	3.9	
Impinger 5	Silica Gel	791.3	779.3	12.0	Total Weight (gm)
					170.0
					182.0

QA/QC DC
Date 3/29/11

Run No: 5	Filter Type: Quartz	Sample Box No:
Date:	Lot No:	pH:
Analyst:	Filter No: NA	Rinse:

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4				
Impinger 2	100 mL 0.1N H2SO4				
Impinger 3	100 mL 0.1N H2SO4				
Impinger 4	Empty				
Impinger 5	Silica Gel				Total Weight (gm)

QA/QC
Date

Run No: 6	Filter Type: Quartz	Sample Box No:
Date:	Lot No:	pH:
Analyst:	Filter No: NA	Rinse:

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4				
Impinger 2	100 mL 0.1N H2SO4				
Impinger 3	100 mL 0.1N H2SO4				
Impinger 4	Empty				
Impinger 5	Silica Gel				Total Weight (gm)

QA/QC
Date

TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 1

ACI TESTING FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client: UNITEC LABS Project No: 11182
 Plant: S. BROWARD Date: 3-29-11
 Meter Operator: NH
 Probe Operator: -

Meter Box: 61-6 Sample Box No: B16
 Meter Y: 0.9960 Meter ΔH: 1-7601
 K Factor: - Pitot C: -
 Leak Rate Before: 0.004 [cm] [Lpm] @ 15 (in. Hg)
 Leak Rate After: 0.002 [cm] [Lpm] @ 5 (in. Hg)
 Pitot Leak Check Before: ☐ After: Good ☐ Bad ☐

Cross-Section of Test Location

Duct Dimensions (in.): 96 x 96

Static Pres. (in. H ₂ O)	Pitot Len. (in.)	Gas Flow (in.) [Out]	First point all the way (in.) [Out]
<u>-10.4</u>	<u>10</u>	<u>(IN)</u> [Out]	<u>(IN)</u> [Out]

Amb. Temp (°F): 75 Bar. Press: 30.0 [in. Hg] [mbar]
 Probe I.D. No: 67-4-1
 Liner Material: 6455

Filter No: -
 Thimble No: -
 Nozzle Diameter: - Nozzle I.D: -

Start Time: 7:50 Stop Time: 8:50

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (in.) [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)	XAD Trap Temp T _x (°F)	Notes
3-1	5	N/A	1.5	727.335	294	300	300	63	74	NH 73	3	10.6	
	10		1.5	734.28	301	301	304	57	74	73	3	11.0	
	15		1.5	737.68	301	307	302	54	79	74	3	10.5	
	20		1.5	741.11	300	303	302	57	82	74	3	9.6	
	25		1.5	744.68	301	301	303	62	84	75	3	9.8	
	30		1.5	748.29	300	301	303	63	86	76	3	9.4	
	35		1.5	751.85	301	302	302	65	89	77	3	9.6	
	40		1.5	755.43	299	302	302	65	89	78	3	11.0	
	45		1.5	758.99	298	302	302	64	90	79	3	11.4	
	50		1.5	762.50	299	302	302	58	91	80	3	10.6	
	55		1.5	765.94	300	302	302	55	92	81	3	8.2	
	60		1.5	769.465	301	302	302	53	92	82	3	8.2	
Total	*	-		42.1300	3600				1022	922			
Average	-	-	1.5000		300.0000				81.0000				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: NH
 Date: 3-29-11

METHOD: 26A PAGE 1 OF 1

Start Time: 9:23	Stop Time: 10:23

Circle correct bracketed units on data sheet.



CleanAir
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TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 3

HCl TESTING FIELD DATA SHEET

METHOD: 264 PAGE 1 OF 1

Client NHELABRATOR Project No. 11182
 Plant S. BROWARD Date 3.29.11
 Meter Operator NH
 Probe Operator

Meter Box 61-6 Sample Box No. B12
 Meter Yr. 0.9960 Meter ΔH 1.7601
 K Factor - Pitot C -
 Leak Rate Before 0.003 [cfm] [Lpm] @ 14 (in. Hg)
 Leak Rate After 0.003 [cfm] [Lpm] @ 5 (in. Hg)
 Pitot Leak Check Before ☐ After: Good ☐ Bad ☐

Cross-Section of Test Location

Duct Dimensions (in.) 96 x 96

Static Pres (in. H ₂ O)	Port Len. (in.)	Gas Flow (ft ³ /min) [Out]	First point all the way
<u>-10.1</u>	<u>10</u>	<u>10</u> [Out]	<u>10</u> [Out]

Amb Temp (°F) Bar Press 30.00 [in. Hg] [mbar]
 Probe I.D. No. 67-4-1
 Liner Material GLASS

Filter No. -
 Thimble No. -
 Nozzle Diameter - Nozzle I.D.

Start Time: 10:39 Stop Time: 11:39

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V_m Init Vol (ft ³) [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)	XAD Trap Temp (°F)	Notes
3-1	5	NA	1.5	816.78	299	300	300	65	96	92	3	9.6	
	10		1.5	820.30	299	305	302	58	97	93	3	9.0	
	15		1.5	823.79	299	303	303	57	100	93	3	10.2	
	20		1.5	827.37	300	302	302	52	100	93	3	10.1	
	25		1.5	830.91	301	301	301	53	101	93	3	10.3	
	30		1.5	834.41	300	301	303	54	101	94	3	10.1	
	35		1.5	837.97	302	302	302	54	102	94	3	9.8	
	40		1.5	841.52	301	302	302	55	101	94	3	10.1	
	45		1.5	NH ~~844.84~~ 845.05	301	302	302	57	101	94	3	10.0	
	50		1.5	848.59	301	301	303	57	101	94	3	10.3	
	55		1.5	852.10	300	302	301	61	101	94	3	9.9	
	60		1.5	855.645	302	302	302	61	102	94	3	8.9	
Total				42.4950		3605			1203	122			
Average		1.5000		300.4167					96.8750				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC NH
 Date 3.29.11

TEST LOCATION: FF OUTLET
 UNIT: 2 RUN: 4

HCl TESTING
FIELD DATA SHEET

METHOD: 26 A PAGE 1 OF 1

Client: Wheelabrator Project No: 11182
 Plant: S. Browns Date: 3.25.11
 Meter Operator: NH
 Probe Operator:

Meter Box: 61-6 Sample Box No:
 Meter Y: 0.9960 Meter ΔH: 1.7601
 K Factor: - Pitot C: -

Leak Rate Before: 0.004 [cm] [Lpm] @ 15 (in. Hg)
 Leak Rate After: 0.002 [cm] [Lpm] @ 6 (in. Hg)
 Pitot Leak Check Before: ☐ After: Good ☐ Bad ☐

Cross-Section of Test Location:

Duct Dimensions (in.): 96 x 96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (N) [Out]	First point all the way
<u>-10.1</u>	<u>10</u>	of page	(N) [Out]

Amb. Temp (°F): Bar Press: 30.00 [in. Hg] [mbar]
 Probe I.D. No: 67-4-1
 Liner Material: Glass

Filter No: -
 Thimble No: -
 Nozzle Diameter: - Nozzle I.D:

Start Time: 11:54 Stop Time: 12:54

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (L) <u>856.080</u> <u>855.940 NH</u>	Stack Temp T _s (°F)	Probe Temp (°F)	Filter Temp (°F)	Cond. Temp T _c (°F)	DGM Inlet T _{m in} (°F)	DGM Outlet T _{m out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F)	Notes
3-1	5	N/A	1.5	859.81	302	300	301	63	96	93	3	9.3	
	10		1.5	863.31	301	304	304	63	98	94	3	8.5	
	15		1.5	866.79	301	305	302	60	99	94	3	9.0	
	20		1.5	870.30	301	305	302	61	100	93	3	9.4	
	25		1.5	873.55	300	301	302	64	101	93	3	9.8	
	30		1.5	877.40	300	302	302	64	102	94	3	9.1	
	35		1.5	880.92	300	302	302	65	102	94	3	8.7	
	40		1.5	884.44	307	302	302	64	102	94	3	8.8	
	45		1.5	888.00	301	313	302	65	102	94	3	9.5	
	50		1.5	891.57	302	301	302	65	102	94	3	9.2	
	55		1.5	895.01	301	302	302	65	103	94	3	9.5	
	60		1.5	898.525	301	302	302	64	103	95	3	9.1	
Total				<u>42.4450</u>	3611								
Average			<u>1.5000</u>		300.9167				<u>97.3333</u>				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: NH
 Date: 3.29.11

Impinger Weight Sheet

Client Wheelabrator		Unit Name/Location Unit 2 FF Outlet	
Plant South Broward	Job No. 11182	Method	Mod. 26A

Run No. 1	Filter Type Quartz	Sample Box No. B16
Date 3/29/11	Lot No.	pH
Analyst R. Vicere	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	513.1	459.2	53.9	
Impinger 2	100 mL 0.1N H2SO4	670.3	569.2	101.1	
Impinger 3	100 mL 0.1N H2SO4	594.8	543.0	51.8	
Impinger 4	Empty	456.4	440.9	15.5	
Impinger 5	Silica Gel	765.6	748.1	17.5	
					Total Weight (gm)
					222.3
					239.8

QA/QC RV
Date 3/29/11

Run No. 2	Filter Type Quartz	Sample Box No. B14
Date 3/29/11	Lot No.	pH
Analyst R. Vicere	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	525.9	453.6	72.3	
Impinger 2	100 mL 0.1N H2SO4	650.5	526.8	123.7	
Impinger 3	100 mL 0.1N H2SO4	573.0	536.3	36.7	
Impinger 4	Empty	455.0	446.3	8.7	
Impinger 5	Silica Gel	758.2	748.8	9.4	
					Total Weight (gm)
					241.4
					250.8

QA/QC RV
Date 3/29/11

Run No. 3	Filter Type Quartz	Sample Box No. B12
Date 3/29/11	Lot No.	pH
Analyst R. Vicere	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	520.7	455.5	65.2	
Impinger 2	100 mL 0.1N H2SO4	664.0	539.9	124.1	
Impinger 3	100 mL 0.1N H2SO4	587.0	553.0	34.0	
Impinger 4	Empty	434.8	429.7	5.1	
Impinger 5	Silica Gel	757.1	742.7	14.4	
					Total Weight (gm)
					228.4
					242.8

QA/QC RV
Date 3/29/11

Impinger Weight Sheet

Client: Wheelabrator	Unit Name/Location: Unit 2 FF Outlet
Plant: South Broward	Job No: 11182
Method: Mod. 26A	

Run No: 4	Filter Type: Quartz	Sample Box No: B16
Date: 3/29/11	Lot No.	pH
Analyst: R. Viere	Filter No: NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	508.3	461.2	47.1	
Impinger 2	100 mL 0.1N H2SO4	681.3	564.6	116.7	
Impinger 3	100 mL 0.1N H2SO4	600.4	543.5	56.9	
Impinger 4	Empty	455.9	440.6	15.3	
Impinger 5	Silica Gel	779.2	760.2	19.0	
					Total Weight (gm)
					236.0
					255.0

QA/QC: *AV*
Date: 3/29/11

Run No: 5	Filter Type: Quartz	Sample Box No.
Date	Lot No.	pH
Analyst	Filter No: NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4				
Impinger 2	100 mL 0.1N H2SO4				
Impinger 3	100 mL 0.1N H2SO4				
Impinger 4	Empty				
Impinger 5	Silica Gel				
					Total Weight (gm)

QA/QC
Date

Run No: 6	Filter Type: Quartz	Sample Box No.
Date	Lot No.	pH
Analyst	Filter No: NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4				
Impinger 2	100 mL 0.1N H2SO4				
Impinger 3	100 mL 0.1N H2SO4				
Impinger 4	Empty				
Impinger 5	Silica Gel				
					Total Weight (gm)

QA/QC
Date

TEST LOCATION: FF-outletUNIT: 3RUN: 1TESTING
FIELD DATA SHEETMETHOD: 5729 PAGE 1 OF 2

Client: <u>Whelan</u>	Project No: <u>111P2</u>
Plant: <u>Brown</u>	Date: <u>3/25/11</u>
Meter Operator: <u>P. B. Jones</u>	
Probe Operator: <u>P. B. Jones</u>	

Meter Box: <u>66-24</u>	Sample Box No: <u>MLO</u>
Meter Yr: <u>0.8447</u>	Meter ΔH: <u>1.7639</u>
K-Factor: <u>2.600</u>	Pitot C: <u>0.83</u>
Leak Rate Before: <u>0.002</u> [cm ³ /min] @ <u>12</u> (in. Hg)	
Leak Rate After: <u>0.003</u> [cm ³ /min] @ <u>10</u> (in. Hg)	
Pitot Leak Check Before: <u>X</u> After: Good <u>X</u> Bad <u></u>	

Cross-Section of Test Location

(IN) (UP)

Duct Dimensions (in.): 96 x 96

Static Pres. (in. H ₂ O): <u>-6.0</u>	Port Len. (in.): <u>10.0</u>	Gas Flow (in) (Out) of page: <u>(In) (Out)</u>	First point all the way: <u>(In) (Out)</u>

Amb. Temp (°F): <u>75</u>	Bar. Press: <u>29.45</u> (in. Hg) (mbar)
Probe ID No: <u>678-3</u>	
Liner Material: <u>Glass</u>	

Filter No: <u>CS-20</u>	
Thimble No: <u>N/A</u>	
Nozzle Diameter: <u>0.776</u>	Nozzle ID: <u>270-1</u>

Start Time: <u>7:31</u>	Stop Time: <u>9:43</u>

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init Vol. (ft ³)	Stack Temp T _s (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond. Temp T _c (°F)	DGM Inlet T _{in} (°F)	DGM Outlet T _{out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _t (°F)	Notes
5-1	5	0.28	0.73	786.71	296	254	258	65	77	76	3.1	N/A	8.4
2	10	0.29	0.75	781.63	293	257	257	59	77	76	3.1		8.6
3	15	0.29	0.71	794.04	296	251	257	57	79	76	3.1		8.6
4	20	0.30	0.78	796.53	291	249	252	57	80	76	3.1		8.0
5	25	0.31	0.81	799.05	299	250	250	58	81	77	3.1		8.2
4-1	30	0.29	0.75	801.54	299	250	249	62	81	77	3.1		8.2
2	35	0.28	0.73	803.94	297	252	250	62	82	78	3.1		8.0
3	40	0.30	0.78	806.43	299	251	250	63	83	78	3.1		8.3
4	45	0.32	0.83	809.02	298	248	249	59	84	78	3.1		8.1
5	50	0.32	0.83	811.57	299	250	250	58	84	77	3.1		8.2
3-1	55	0.30	0.78	814.12	295	249	250	60	84	79	3.1		8.4
2	60	0.30	0.78	816.62	298	252	250	59	85	80	3.1		8.6
Total				6598.5									
Average		0.579	0.812	297.000					82.9000				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: PB
Date: 3/25/11

Clean Air
ENGINEERING

TEST LOCATION: FF OutletUNIT: 3RUN: 1

Part 1 Metals **TESTING FIELD DATA SHEET**

METHOD: 5729PAGE 2 OF 2

Client: <u>Whelan</u>	Project No.: <u>11182</u>
Plant: <u>S. Braum</u>	Date: <u>7/28/11</u>
Meter Operator: <u>P. Bihun</u>	
Probe Operator: <u>P. Bihun</u>	

Meter Box	Sample Box No.
Meter Y ₄	Meter ΔH ₀
K Factor	Pitot C ₀
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 ₂ O)	Port Len. (in.)	Gas Flow [In] [Out]	First point all the way [In] [Out]
		of page	

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 ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³)	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)	XAD Trap Temp T _t (°F)	Notes
						Set Points:							
						210	210						
3	65	0.31	0.81	819.16	298	257	249	58	86	80	3.1	N/A	8.0
4	70	0.31	0.81	821.72	298	249	280	57	87	81	4.0		7.9
5	75	0.33	0.86	824.360	299	280	249	59	88	81	4.0		8.2
2-1	80	0.36	0.94	827.16	298	248	281	62	87	82	4.0		8.8
2	85	0.34	0.88	829.81	299	252	249	62	89	82	4.0		8.5
3	90	0.35	0.91	832.53	297	251	280	62	89	83	4.0		8.2
4	95	0.38	0.95	835.38	300	249	249	63	90	83	4.0		8.6
5	100	0.39	1.0	838.241	296	280	280	63	90	84	4.5		8.7
1-1	105	0.34	0.88	840.92	295	248	250	64	89	84	4.0		8.7
2	110	0.43	1.1	843.91	297	251	248	63	90	85	4.5		9.1
3	115	0.42	1.1	846.91	291	251	249	62	91	85	4.5		9.4
4	120	0.40	1.0	849.77	294	249	249	61	91	85	4.5		9.5
5	125	0.45	1.2	852.940	297	280	249	61	91	85	5.0		9.6
	Total												
	Average												

Sum of square roots.

Circle correct bracketed units on data sheet.

 QA/QC AB
 Date 7/28/11


TEST LOCATION: PF Outlet
 UNIT: 3 RUN: 2

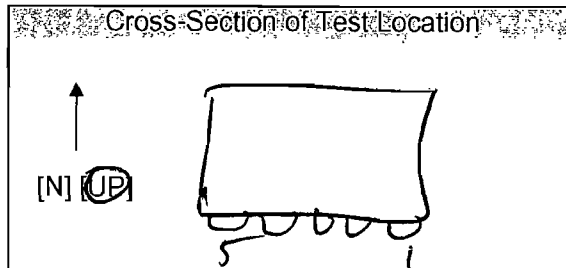
Part 1 Metals TESTING
 FIELD DATA SHEET

METHOD: 5129 PAGE 1 OF 2

Client: Wheelabrator Project No: 11182
 Plant: S. Brown Date: 3/28/11
 Meter Operator: P. Bihun
 Probe Operator: P. Bihun

Meter Box: 06-24 Sample Box No: 11182
 Meter Y: 0.9547 Meter ΔH: 1.7639
 K Factor: 2.67 Pitot C: 0.83

Leak Rate Before: 0.003 (cfm) (Lpm) @ 12 (in. Hg)
 Leak Rate After: 0.003 (cfm) (Lpm) @ 10 (in. Hg)
 Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐



Duct Dimensions (in.): 96 x 96
 Static Pres (in. H₂O): -7.5 Port Len (in.): 10.0
 Gas Flow: (In) [Out] First point all the way: (In) [Out]
 of page

Amb Temp (°F): 81 Bar Press: 29.95 (in. Hg) (mbar)
 Probe ID No: 07-8-3
 Liner Material: CRS

Filter No: 23-22
 Thimble No: N/A
 Nozzle Diameter: 0.270 Nozzle ID: 270-1

Start Time: 10:05 Stop Time: 12:19

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m (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)	XAD Trap Temp T _i (°F)	Notes
				853.200		280	200						
4-1	5	0.34	0.91	855.95	297	260	258	65	89	87	3.5	N/A	10.9
2	10	0.34	0.91	858.45	296	253	251	65	89	87	3.5		10.9
3	15	0.35	0.93	861.41	296	251	252	64	91	87	3.5		8.5 R=2.52
4	20	0.39	1.0	864.28	299	249	251	59	92	87	3.5		9.7
5	25	0.37	0.95	867.050	298	249	249	57	93	87	3.5		9.3 867.13i
3-1	30	0.37	0.95	869.91	298	249	251	60	92	88	3.5		9.6 (90P)
2	35	0.37	0.95	872.72	297	251	250	60	93	88	3.5		8.9
3	40	0.35	0.90	875.38	297	251	257	61	92	88	3.5		9.1
4	45	0.39	1.0	878.26	298	248	249	61	89	87	3.5		9.2 880.925
5	50	0.33	0.85	880.870	296	250	249	60	89	85	3.5		8.8 (90P)
2-1	55	0.42	1.1	883.87	297	249	250	63	86	83	4.0		9.4
2	60	0.38	0.97	886.66	296	249	250	57	87	83	3.5		8.2
Total				44679.0									
Average		0.5873	0.8928	715.960					83.3200				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: PH
 Date: 3/28/11



TEST LOCATION: FF Outlet Part Metals TESTING
 UNIT: 3 RUN: 2 FIELD DATA SHEET

METHOD: 5129 PAGE 2 OF 2

Client: <u>Wheelabrator</u>	Project No: <u>11182</u>
Plant: <u>S. Broward</u>	Date: <u>3/28/11</u>
Meter Operator: <u>P. Bihun</u>	
Probe Operator: <u>P. Bihun</u>	

Meter Box	Sample Box No
Meter Y ₀	Meter ΔH ₀
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 ₂ O)	Port Len. (in.)	Gas Flow [In] [Out]	First point all the way [In] [Out]
		of page	

Amb Temp (°F)	Bar Press [in. Hg] [mbar]
Probe ID No	
Liner Material	

Filter No	
Thimble No	
Nozzle Diameter	Nozzle ID

Start Time	Stop Time

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (in. ³)	Stack Temp T _s (°F)	Probe T _p (°F) Set Points	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)	XAD Trap Temp T _t (°F)	Notes
3	65	0.35	0.97	889.46	291	240 242	251	56	85	82	4.0	N/A	8.5
4	70	0.40	1.0	892.29	297	249 250	251	56	83	81	4.0		8.5 892.29
1	25	0.35	0.97	895.160	295	240 251	251	56	81	79	4.0		8.5 895.160
1-1	50	0.35	0.90	897.91	293	249 251	251	59	78	76	3.5		8.7 897.91
2	45	0.30	0.77	900.38	290	251 249	251	59	78	76	3.5		8.8
3	90	0.32	0.82	902.93	294	251 249	251	61	79	75	3.5		8.6
4	85	0.35	0.90	905.59	296	249 250	251	61	79	75	3.5		8.5 905.59
5	100	0.37	0.95	908.348	296	249 250	251	61	80	75	3.5		8.5 908.348
8-1	105	0.23	0.59	910.56	292	250 250	251	62	79	75	3.0		8.4 910.56
2	110	0.27	0.63	912.86	296	251 250	251	62	80	76	3.5		8.4
3	115	0.28	0.72	915.23	295	251 250	251	62	81	76	3.5		8.4
4	120	0.30	0.77	917.69	296	249 250	251	62	83	76	3.5		8.6
5	125	0.33	0.85	920.285	296	250 251	251	63	83	76	3.5		8.8
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

TEST LOCATION: PF Outlet
 UNIT: 3 RUN: 3

Part 1 Metals TESTING FIELD DATA SHEET

METHOD: 5129 PAGE 1 OF 2

Client: Wheatlax Project No: 11182
 Plant: S. Broward Date: 3/28/11
 Meter Operator: P. Babin
 Probe Operator: P. Babin

Meter Box: 106-24 Sample Box No: M3
 Meter Yd: 0.9847 Meter ΔH_g: 176.39
 K-Factor: 2.12 Pitot C_p: 0.83
 Leak Rate Before: 0.004 (cfm) [Lpm] @ 12 (in. Hg)
 Leak Rate After: 0.004 (cfm) [Lpm] @ 10 (in. Hg)
 Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐

Cross-Section of Test Location



Duct Dimensions (in.): 96 x 96

Static Pres (in. H ₂ O): <u>-8.0</u>	Port Len (in.): <u>10.0</u>	Gas Flow (in. [Out] of page): <u>(In) [Out]</u>	First point all the way: <u>(In) [Out]</u>

Amb Temp (°F): 77 Bar Press: 29.95 (in. Hg) (mbar)
 Probe I.D. No: 67 f-3
 Liner Material: Glass

Filter No: 23-21
 Thimble No: N/A
 Nozzle Diameter: 0.270 Nozzle I.D.: 2702

Start Time: 12:43 Stop Time: 14:55

Traverse Point Number	Min/pt	Velocity Head	Orifice Setting	Gas Sample Volume	Stack Temp	Probe T _p	Filter T _f	Cond Temp	DGM Inlet	DGM Outlet	Pump Vacuum	XAD Trap Temp	Notes
	5 Elapsed Time	ΔP (in. H ₂ O)	ΔH (in. H ₂ O)	Init. Vol. (ft ³) [L]		(°F)	(°F)						
				920.680		280	280						
1-1	5	0.35	0.90	923.38	295	263	261	65	82	80	3.5	N/A	8.6
2	10	0.35	0.90	926.03	297	257	255	62	84	81	3.1		8.6
3	15	0.42	1.1	928.94	291	256	257	59	86	81	4.0		8.2
4	20	0.42	1.1	931.83	299	251	251	58	89	87	4.0		9.2
5	25	0.45	1.2	934.910	297	250	252	59	90	83	4.5		8.9
5-1	30	0.79	0.74	937.48	295	249	252	63	89	84	3.1		8.2
2	35	0.30	0.77	939.94	297	250	247	63	90	84	3.5		8.5
3	40	0.33	0.85	942.53	297	251	250	63	91	85	3.5		8.2
4	45	0.31	0.79	945.01	299	248	249	64	92	86	3.5		8.0
5	50	0.31	0.79	947.565	298	250	250	62	92	86	3.5		8.0
4-1	55	0.32	0.82	950.20	301	249	251	62	91	86	4.0		8.3
2	60	0.32	0.82	952.77	300	251	249	61	92	86	4.0		8.3
	Total	0.6008		67.985									
	Average		0.9388		297.2400				88.8200				

Sum of square roots

Circle correct bracketed units on data sheet.

QA/QC P9
 Date: 3/28/11

TEST LOCATION: PT Outlet
 UNIT: 3 RUN: 3

Part / Metals TESTING FIELD DATA SHEET

METHOD: 5129 PAGE 2 OF 2

Client: <u>Wheelabrator</u>	Project No. <u>11182</u>
Plant: <u>S. Broward</u>	Date: <u>3/28/11</u>
Meter Operator: <u>P. Bihun</u>	
Probe Operator: <u>P. Bihun</u>	

Meter Box	Sample Box No.
Meter Yr.	Meter ΔH ₀
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 ₂ O)	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 D No.		
Liner Material		

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle D	

Start Time:	Stop Time:

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP _v (in. H ₂ O)	Orifice Setting ΔH ₀ (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [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)	XAD Trap Temp T _t (°F)	Notes
						Set Points							
	5					200	200						O ₂
3	65	0.33	0.85	95.39	293	251	249	100	92	87	4.0	N/A	8.6
4	70	0.33	0.85	95.799	289	249	250	59	93	87	4.0		8.4
5	75	0.32	0.82	96.560	297	250	251	61	93	88	3.5		8.7
3-1	80	0.38	0.97	96.340	297	250	251	63	92	88	4.0		9.0
2	85	0.35	0.90	96.611	297	251	249	57	93	88	4.0		8.6
3	90	0.37	0.95	96.859	298	251	249	54	93	88	4.0		8.8
4	95	0.37	0.95	97.166	297	249	248	52	93	89	4.0		8.9
5	100	0.35	0.90	97.350	298	249	251	51	94	89	4.0		8.6
2-1	105	0.44	1.1	97.31	295	250	257	56	93	89	4.5		8.8
2	110	0.42	1.1	98.023	300	251	249	53	95	90	4.5		9.0
3	115	0.42	1.1	98.14	297	257	250	53	95	90	4.5		8.8
4	120	0.42	1.1	98.605	299	249	249	54	95	90	4.5		8.9
5	125	0.42	1.1	98.945	298	250	251	54	95	90	4.5		8.8
	Total												
	Average												

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC PB
 Date 3/28/11

Impinger Weight Sheet

Client Wheelabrator	Unit Name/Location Unit 3 FF Outlet
Plant South Broward	Job No. 11182 Method 5/29

Run No. 1	Filter Type Quartz	Sample Box No. M10
Date 3/28/11	Lot No.	pH
Analyst R. Vicer	Filter No. e3-20	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	664.0	433.0	231.0	
Impinger 2	100 ml 5% HNO3/10% H2O2	686.4	568.9	117.5	
Impinger 3	100 ml 5% HNO3/10% H2O2	551.8	525.9	25.9	
Impinger 4	Empty	433.3	428.6	4.7	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	545.5	540.3	5.2	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	550.6	550.0	0.6	384.9
Impinger 7	Silica Gel	787.6	771.1	16.5	401.4

QA/QC RV
Date 3/28/11

Run No. 2	Filter Type Quartz	Sample Box No. M4
Date 3/28/11	Lot No. e3-22 RV	pH
Analyst D. Luckhard	Filter No. e3-22	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	687.7	437.0	250.7	
Impinger 2	100 ml 5% HNO3/10% H2O2	642.0	536.5	105.5	
Impinger 3	100 ml 5% HNO3/10% H2O2	551.9	532.4	19.5	
Impinger 4	Empty	440.7	437.0	3.7	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	548.7	545.1	3.6	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	605.0	603.5	1.5	384.5
Impinger 7	Silica Gel	831.6	816.4	15.2	399.7

QA/QC DL
Date 3/28/11

Run No. 3	Filter Type Quartz	Sample Box No. M3
Date 3/28/11	Lot No. e3-21 RV	pH
Analyst R. Vicer	Filter No. e3-22	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	724.2	449.3	274.9	
Impinger 2	100 ml 5% HNO3/10% H2O2	657.9	563.4	94.5	
Impinger 3	100 ml 5% HNO3/10% H2O2	582.5	563.2	19.3	
Impinger 4	Empty	451.2	448.8	2.4	
Impinger 5	100 ml 4% KMnO4/10% H2SO4	537.0	535.9	1.1	Total Weight (gm)
Impinger 6	100 ml 4% KMnO4/10% H2SO4	530.3	529.8	0.5	392.7
Impinger 7	Silica Gel	741.3	728.6	12.7	405.4

QA/QC RV
Date 3/28/11

TEST LOCATION: FF OUT FLUORIDE TESTING METHOD: 13B PAGE 1 OF 2
 UNIT: 3 RUN: 1

FIELD DATA SHEET

Client: <u>Wheelabrator</u>	Project No.: <u>11182</u>
Plant: <u>S. Ground</u>	Date: <u>3.30.11</u>
Meter Operator: <u>NH</u>	
Probe Operator:	

Meter Box: <u>61-5</u>	Sample Box No:
Meter Yr: <u>0.9936</u>	Meter ΔH: <u>1.7676</u>
K-Factor: <u>2.47</u>	Pilot C: <u>0.812</u>
Leak Rate Before <u>0.004</u> [cm] [Lpm] @ <u>3</u> (in. Hg)	
Leak Rate After <u>0.001</u> [cm] [Lpm] @ <u>5</u> (in. Hg)	
Pilot Leak Check Before ☒ After: Good ☐ Bad ☐	

Cross-Section of Test Location

Duct Dimensions (in.): 96 x 96

Static Pres (in. H ₂ O): <u>-5.8</u>	Port Len (in.): <u>10</u>	Gas Flow (in. Hg) [Out]: <u>0</u>	First point all the way of page: <u>0</u> [Out]

Amb Temp (°F): <u>85</u>	Bar Press: <u>30.05</u> [in. Hg] [mbar]
Probe ID No: <u>56-96-11</u>	<u>67-8-18</u>
Liner Material: <u>6LASS</u>	

Filter No: <u>-</u>		
Thimble No: <u>-</u>		
Nozzle Diameter: <u>0.274</u>	Nozzle ID: <u>274-1</u>	

Start Time: <u>11:40</u>	Stop Time: <u>12:47</u>

Traverse Point Number	Min/pt 2.5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init Vol (ft ³) [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)	XAD Trap Temp T _x (°F)	Notes
				334.160		250	250						
5-1	2.5	0.33	0.88	335.42	298	259	259	63	87	85	3	7.6	
2	5	0.26	0.69	336.69	298	254	255	41	87	86	3	6.8	
3	7.5	0.26	0.69	337.87	297	251	256	54	88	86	3	7.3	
4	10	0.30	0.80	339.13	297	250	256	52	88	86	3	7.2	
5	12.5	0.28	0.75	340.355	297	250	254	51	89	86	3	6.9	.435
4-1	15	0.36	0.96	341.83	297	253	254	51	88	86	3	6.9	
2	17.5	0.36	0.96	343.12	298	253	253	50	89	87	3	6.9	
3	20	0.35	0.93	344.60	298	249	250	49	90	86	3	7.6	
4	22.5	0.34	0.91	345.96	298	249	253	50	90	86	3	7.3	
5	25	0.31	0.83	347.255	296	250	253	51	90	86	3	7.3	.315
3-1	27.5	0.37	0.99	348.74	296	255	251	54	89	86	3	7.0	
2	30	0.37	0.99	350.15	298	251	253	54	90	86	3	6.7	
3	32.5	0.34	0.91	351.52	298	249	252	56	91	86	3	7.3	
Total		4.7743	23.3200	34.3800	297.41	2423			1156	1118			
Average		0.5910	0.9332		296.9200				87.7800				

Sum of square roots.

Circle correct bracketed units on data sheet.

TEST LOCATION: FF out
 UNIT: 3 RUN: 1

FLUORIDE TESTING FIELD DATA SHEET

METHOD: BB PAGE 2 OF 2

Client Wheelabrator Project No. 11182
 Plant S Broward Date 3.30.11
 Meter Operator NH
 Probe Operator

Meter Box 61-5 Sample Box No. B1
 Meter Yr. 0.9936 Meter ΔH @ 1.7676
 K Factor 2.67 Pitot Co. 0.817

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 ₂ O)	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 2.5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. <u>0.1</u> [L]	Stack Temp T _s (°F)	Probe T _p (°F) Set Points 250 252	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)	XAD Trap Temp T _x (°F) <u>0.2</u>	Notes
3-4	35	0.31	0.83	352.80	297	250	252	59	90	86	3	7.2	
5	37.5	0.31	0.83	354.10	297	250	252	62	90	87	3	6.5	.240
2-1	40	0.39	1.0	355.67	297	253	252	65	89	86	3	8.2	
2	42.5	0.39	1.0	357.10	298	252	253	65	90	86	3	7.2	
3	45	0.37	0.99	358.54	299	249	250	65	90	87	3	7.1	
4	47.5	0.38	1.0	359.95	296	250	251	65	90	86	3	7.2	
5	50	0.37	0.99	361.385	296	250	250	66	90	86	3	7.3	.495
NH 5-1-1	52.5	0.38	1.0	362.77	293	252	253	67	90	87	3	7.5	
2	55	0.40	1.1	364.42	294	252	254	66	90	87	3	8.2	
3	57.5	0.41	1.1	365.93	297	250	250	65	90	86	3	7.7	
4	60	0.38	1.0	367.41	297	250	253	65	90	86	3	7.7	
5	62.5	0.45	1.2	368.920	296	250	252	64	90	86	3	7.1	
Total									1079	1036			
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

12.04

3557 QA/QC 50
 Date 3/30

TEST LOCATION: FF OUT
UNIT: 3 RUN: 2

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 1 OF 2

Client: Wheelabrator Project No: 11182
Plant: S Broward Date: 3.30.11
Meter Operator: NH
Probe Operator:

Meter Box: 615 Sample Box No: 922
Meter Y: 0.9936 Meter ΔH: 1.7676
K Factor: 2.67 Pitot Co: 0.812
Leak Rate Before: 0.003 [cm] [Lpm] @ 12 (in. Hg)
Leak Rate After: 0.001 [cm] [Lpm] @ 6 (in. Hg)
Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐

Cross-Section of Test Location

Duct Dimensions: (in.) 96 x 96

Static Pres (in. H ₂ O)	Port Len (in.)	Gas Flow (in. Out)	First point all the way
<u>-8.8</u>	<u>10</u>	<u>(N)</u> [Out]	

Amb. Temp (°F): Bar. Press: 30.05 [in. Hg] [mbar]
Probe ID No: 556-96-11 67-8-14
Liner Material: GLASS

Filter No: -
Thimble No: -
Nozzle Diameter: 0.274 Nozzle ID: 274-1

Start Time: 13:04 Stop Time: 14:12

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init Vol. (ft ³) [L]	Stack Temp T _s (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{in} (°F)	DGM Outlet T _{out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F)	Notes
	<u>2.5</u>			<u>369.370</u>		<u>250</u>	<u>250</u>						
1 -1	2.5	0.50	1.3	371.14	297	250	252	65	86	85	4	8.4	
2	5	0.54	1.4	372.84	298	255	256	65	88	86	4	8.3	
3	7.5	0.48	1.3	374.50	297	255	258	61	89	86	4	7.7	
4	10	0.43	1.1	376.13	295	255	255	59	90	86	4	7.7	
5	12.5	0.48	1.3	377.640	295	253	257	58	90	86	4	7.7	.715 .075
2 -1	15	0.55	1.5	379.43	298	255	255	61	90	86	4	8.8	
2	17.5	0.53	1.4	381.15	299	252	254	62	91	86	4	8.5	
3	20	0.48	1.3	382.79	298	249	252	63	92	86	4	8.1	
4	22.5	0.50	1.3	384.44	298	250	250	65	92	87	4	8.3	
5	25	0.48	1.3	386.080	298	251	249	65	93	87	4	8.7	.150 .07
3 -1	27.5	0.42	1.1	387.66	297	255	259	61	90	87	4	9.1	
2	30	0.48	1.3	389.24	298	250	254	57	91	87	4	9.0	
3	32.5	0.48	1.3	390.92	299	248	252	53	91	86	4	9.7	
Total		<u>16.4972</u>	<u>29.0500</u>	<u>388.8600</u>	<u>7434</u>				<u>1173</u>	<u>1121</u>			
Average		<u>0.6599</u>	<u>1.1620</u>		<u>297.3600</u>				<u>88.4800</u>				

Sum of square roots.

16.9

Circle correct bracketed units on data sheet.

3867 QA/QC NH
Date 3.30.11

TEST LOCATION: FF OUT
 UNIT: 3 RUN: 2

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 2 OF 2

Client: <u>Whe Laboratories</u>	Project No: <u>1182</u>
Plant: <u>S. Broward</u>	Date: <u>3.30.11</u>
Meter Operator: <u>NH</u>	
Probe Operator:	

Meter Box: <u>61-5</u>	Sample Box No: <u>B22</u>
Meter Y: <u>0.9936</u>	Meter ΔH: <u>1.7676</u>
K Factor: <u>2.67</u>	Pitot C: <u>0.812</u>

Leak Rate Before: ☒ [Lpm] @ (in. Hg)
Leak Rate After: ☒ [Lpm] @ (in. Hg)
Pitot Leak Check Before: ☐ After: Good ☐ Bad ☐

Cross-Section of Test Location:

↑
[N] [UP]

Duct Dimensions (in.):

Static Pres (in. H ₂ O)	Port Len. (in.)	Gas Flow [In] [Out]	First point all the way [In] [Out]

Amb. Temp (°F)	Bar. Press. (in. Hg) [mbar]
Probe ID No.	
Liner Material:	

Filter No.	
Trimble No.	
Nozzle Diameter	Nozzle ID

Start Time	Stop Time

Traverse Point Number	Min/pt 2.5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (L)	Stack Temp T _s (°F)	Probe Temp (°F) Set Points 250 250	Filter Temp (°F) 250 250	Cond Temp T _c (°F) 53	DGM Inlet T _{m in} (°F) 91	DGM Outlet T _{m out} (°F) 87	Pump Vacuum (in. Hg) 4	XAD Trap Temp (°F) 9.7	Notes
3-4	35	0.35	1.0	392.39	296	250	250	53	91	87	4	9.7	
5	37.5	0.37	0.99	393.805	298	250	251	53	91	87	4	8.8	.895 .09
4-1	40	0.37	0.99	395.32	296	253	253	55	90	87	4	9.4	
2	42.5	0.37	0.99	396.76	298	252	252	53	91	87	4	8.4	
3	45	0.45	1.2	398.33	299	249	252	53	91	87	4	7.4	
4	47.5	0.41	1.1	399.89	298	250	253	51	91	87	4	7.5	
5	50	0.39	1.0	401.520	297	251	252	52	91	87	4	7.5	.600 .08
5-1	52.5	0.36	0.96	402.83	296	254	252	55	90	86	4	8.9	
2	55	0.35	0.93	404.21	296	251	252	53	90	86	4	7.9	
3	57.5	0.37	0.99	405.44	296	250	253	51	90	87	4	8.4	
4	60	0.38	1.0	407.09	299	250	252	51	91	87	4	7.7	
5	62.5	0.38	1.0	408.545	298	250	252	51	91	87	4	8.4	
	Total								1088	1042			
	Average												

Sum of square roots.

Circle correct bracketed units on data sheet.

12.15

3567 QA/QC 38
 Date 3/30

TEST LOCATION: FF out
UNIT: 3 RUN: 3

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 17B PAGE 1 OF 2

Client: Wheelabrator Project No: 1482
Plant: S Broward Date: 3.30.11
Meter Operator: NH
Probe Operator:

Meter Box: 415 Sample Box No: B21
Meter Yd: 0.9936 Meter ΔH: 1.7676
K Factor: 2.67 Pitot C: 0.812
Leak Rate Before: 0.003 [cm] [Lpm] @ 13 (in. Hg)
Leak Rate After: 0.001 [cm] [Lpm] @ 6 (in. Hg)
Pitot Leak Check Before: ☒ After: Good ☒ Bad ☐

Cross-Section of Test Location

Duct Dimensions (in.): 96 x 96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow (in. H ₂ O)	First point all the way
<u>-6.5</u>	<u>10</u>	<u>15</u> [Out]	<u>10</u> [Out]

of page

Amb. Temp (°F): 85 Bar. Press: 30.05 [in. Hg] [mbar]
Probe ID No: 67-8-14
Liner Material: GLASS

Filter No: -
Thimble No: -
Nozzle Diameter: 0.274 Nozzle ID: 274-1

Start Time: 14:26 Stop Time: 15:36

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [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)	XAD Trap Temp (°F)	Notes
	<u>2.5</u>			<u>408.940</u>		<u>250</u>	<u>250</u>						
5-1	2.5	0.35	0.93	410.33	297	260	260	64	87	86	3	7.5	
2	5	0.35	0.93	411.72	299	260	260	65	87	86	3	7.5	
3	7.5	0.30	0.80	413.00	297	255	260	63	88	86	3	7.2	
4	10	0.37	0.99	414.40	297	257	256	63	89	86	3	7.2	
5	12.5	0.33	0.88	415.750	298	257	254	63	90	86	3	6.7	.875 .065
4-1	15	0.38	1.0	417.26	297	254	253	63	89	84	3	7.5	
2	17.5	0.38	1.0	418.68	298	257	253	62	90	86	3	7.4	
3	20	0.38	1.0	420.12	298	249	252	62	90	87	3	7.7	
4	22.5	0.35	0.93	421.50	298	250	252	62	91	87	3	7.9	
5	25	0.38	1.0	422.920	299	257	253	57	91	87	3	7.9	1.0990 .179
3-1	27.5	0.44	1.2	424.70	298	253	252	56	90	87	3	8.3	
2	30	0.46	1.2	426.28	300	257	253	52	92	88	3	7.3	
3	32.5	0.40	1.1	427.60	299	258	253	57	92	88	4	7.7	
Total		5.2781	24.9200	35.7760	7445								
Average		0.6111	0.4968		297.8000				88.9200				

Sum of square roots.

Circle correct bracketed units on data sheet.

TEST LOCATION: FF OUTLET
 UNIT: 3 RUN: 3

FLUORIDE TESTING FIELD DATA SHEET

METHOD: 13B PAGE 2 OF 2

Client: <u>Wheelabrator</u>	Project No: <u>11182</u>
Plant: <u>G. Broward</u>	Date: <u>3-30-11</u>
Meter Operator: <u>NH</u>	
Probe Operator:	

Meter Box: <u>61-5</u>	Sample Box No: <u>B21</u>
Meter Y: <u>0.9936</u>	Meter ΔH: <u>1.7676</u>
K Factor: <u>2.47</u>	Pitot Co: <u>0.812</u>

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 ₂ O)	Port Len. (in.)	Gas Flow [In] [Out]	First point all the way [In] [Out]

Amb. Temp. (°F) <u>85</u>	Bar. Press: <u>30.05</u> [in. Hg] [mbar]
Probe ID No:	
Liner Material:	

Filter No:	
Thimble No:	
Nozzle Diameter:	Nozzle ID:

Start Time:	Stop Time:

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol: [ft ³] [L] <u>408.940</u>	Stack Temp T _s (°F)	Probe T _p (°F) Set Points	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)	XAD Trap Temp (°F)	Notes
3-4	35	0.38	1.0	429.25	298	250	247	50	92	87	4	7.5	
5	37.5	0.32	0.85	430.575	297	250	250	50	92	87	4	7.5	.655 .08
2-1	40	0.38	1.0	432.07	297	252	252	52	96	87	4	8.0	
2	42.5	0.44	1.2	433.70	299	251	251	51	91	87	4	7.2	
3	45	0.40	1.1	435.15	299	250	251	52	92	87	4	7.0	
4	47.5	0.39	1.0	436.60	298	250	252	52	92	87	4	7.0	
5	50	0.38	1.0	438.015	300	251	251	54	93	88	4	7.5	.090 .075
1-2	52.5	0.35	0.93	439.47	297	252	252	56	91	88	4	6.9	
2	55	0.35	0.93	440.86	297	251	249	52	93	88	4	6.7	
3	57.5	0.32	0.85	442.16	295	250	250	56	92	88	4	7.6	
4	60	0.38	1.0	443.65	298	250	250	56	93	88	4	7.2	
5	62.5	0.40	1.1	445.115	295	250	250	57	93	88	4	7.2	
Total		*							1104	1650			
Average													

* Sum of square roots.

Circle correct bracketed units on data sheet.

11.96

3570 QA/QC 58
 Date 3/30

Impinger Weight Sheet

Client Wheelabrator	Unit Name/Location Unit 3 FF Outlet
Plant South Broward	Job No. 11182 Method 13B

Run No. 1	Filter Type Teflon glass mat	Sample Box No. B1
Date 3/30/11	Lot No.	pH
Analyst R. Viore	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	759.4	634.7	124.7	
Impinger 2	100 mL DI H2O	611.7	546.0	65.7	
Impinger 3	Empty	454.0	437.0	17.0	
Impinger 4	Silica Gel	738.9	725.2	13.7	
					Total Weight (gm)
					207.4
					221.1

QA/QC PV
Date 3/30/11

Run No. 2	Filter Type Teflon glass mat	Sample Box No. B22
Date 3/30/11	Lot No.	pH
Analyst R. Viore	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	710.0	548.0	162.0	
Impinger 2	100 mL DI H2O	623.5	564.5	59.0	
Impinger 3	Empty	457.2	445.7	11.5	
Impinger 4	Silica Gel	771.3	760.6	10.7	
					Total Weight (gm)
					232.5
					243.2

QA/QC PV
Date 3/30/11

Run No. 3	Filter Type Teflon glass mat	Sample Box No. B21
Date 3/30/11	Lot No.	pH
Analyst R. Viore	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	100 mL DI H2O	814.6	633.9	180.7	
Impinger 2	100 mL DI H2O	586.3	546.4	39.9	
Impinger 3	Empty	444.6	440.1	4.5	
Impinger 4	Silica Gel	747.5	738.8	8.7	
					Total Weight (gm)
					225.1
					233.8

QA/QC PV
Date 3/30/11

TEST LOCATION: FF Outlet
 UNIT: 3 RUN: 1

Dioxin TESTING FIELD DATA SHEET

METHOD: 23 PAGE 1 OF 2

Client: Wheabrator Project No: 11182
 Plant: S. Brownards Date: 3/28/11
 Meter Operator: C. Slimg
 Probe Operator: C. Slimg

Meter Box: 61-5 Sample Box No: 06
 Meter Yr: 0.9936 Meter ΔH: 1.7676
 K Factor: 552.66 2.7 Pilot C: 0.822
 Leak Rate Before: 0.004 [cfm] Lpm @ 12 (in. Hg)
 Leak Rate After: 0.004 [cfm] Lpm @ 13 (in. Hg)
 Pitot Leak Check Before: ☒ After: Good ☒ Bad: ☐

Cross-Section of Test Location

Duct Dimensions (in.): 96x96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow [In] [Out]	First point all the way [In] [Out]
<u>-7.5</u>	<u>10</u>	<u>[In] [Out]</u>	<u>[In] [Out]</u>

Amb. Temp (°F): 90 Bar. Press: 29.95 [in. Hg] [mbar]
 Probe ID No: 67-8-10
 Liner Material: Gla 32

Filter No: —
 Thimble No: —
 Nozzle Diameter: 0.271 Nozzle ID: 0.271-1

Start Time: 10:09 Stop Time: 14:25

Traverse Point Number	Min/pt	Velocity Head	Orifice Setting	Gas Sample Volume	Stack Temp	Probe T _p	Filter T _f	Cond Temp	DGM Inlet	DGM Outlet	Pump Vacuum	XAD Trap Temp	Notes
	10 Elapsed Time	ΔP (in. H ₂ O)	ΔH (in. H ₂ O)	V _m Init Vol (ft ³) [L]		(°F)	(°F)		Set Points	T _{m in} (°F)			
				745.425		250	250						0.258
5-1	10	0.39	1.1	751.55	298	247	244	63	90	88	6	61	0.2
2	20	0.39	1.0	757.65	296	252	250	60	94	88	6	49	0.2 K=2
3	30	0.42	1.1	763.61	297	251	249	53	97	89	6	51	0.2
4	40	0.40	1.0	769.67	297	250	250	56	96	90	6	49	0.2
5	50	0.42	1.1	775.705	299	250	249	59	95	89	6	56	0.2 775.7
4-1	60	0.37	0.95	781.35	298	247	248	64	90	87	6	63	0.2 0.065
2	70	0.36	0.93	786.86	297	250	250	62	91	86	6	49	0.2
3	80	0.36	0.93	792.34	297	250	290	60	87	83	6	49	0.2
4	90	0.36	0.93	797.76	299	250	250	61	86	81	6	55	0.2 803.0
5	100	0.33	0.85	803.110	298	250	250	64	85	80	6	63	0.2 803.1
3-1	110	0.38	0.98	808.72	298	249	251	64	84	80	6	50	0.2 808.7
2	120	0.34	0.88	814.27	296	251	250	62	87	80	6	50	0.2
		7.35987	11.75		3572			1042	99505	1027			
	Total	16.1202	15.4271	150.990	7432				2317	2159			
	Average	0.6448	1.0872		297.2800				89.5200				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC
 Date: 3/28

TEST LOCATION: FF Outlet
 UNIT: 3 RUN: 1

Approx TESTING FIELD DATA SHEET

METHOD: 23 PAGE 2 OF 2

Client: Wheelabrator Project No: 11182
 Plant: S. Broward Date: 3/28/11
 Meter Operator: C. Glimp
 Probe Operator: "

Meter Box: 61-5 Sample Box No:
 Meter Y₂: 0.9936 Meter ΔH₂: 1.7676
 K-Factor: 0.2258 Pitot Co:
 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 ₂ O)	Port Len. (in.)	Gas Flow [In] [Out]	First point all the way [In] [Out]

Amb Temp (°F): Bar Press: [in. Hg] [mbar]
 Probe ID No: 67-8-10
 Liner Material:

Filter No:
 Thimble No:
 Nozzle Diameter: 0.271 Nozzle ID:

Start Time: Stop Time:

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. [ft ³] [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)	XAD Trap Temp T _t (°F)	Notes
						Set Points							
	10					250	250						
3-3	130	0.37	0.99	819.84	298	251	249	63	89	81	6	56	8.0 0.2
4	140	0.39	1.0	829.57	298	250	249	61	91	82	6	54	7.7 0.2
5	150	0.38	0.98	831.225	296	250	249	63	92	83	6	52	7.4 0.2 831.280
2-1	160	0.44	1.1	837.33	298	248	250	64	89	85	6	62	6.6 0.2 0.075
2	170	0.47	1.2	843.62	294	250	251	57	94	85	6	54	7.9 0.2
3	180	0.53	1.4	850.28	298	251	250	61	96	87	7	52	8.2 0.2
4	190	0.46	1.2	857.01	299	250	251	64	97	88	7	56	7.4 0.2
5	200	0.47	1.2	863.600	296	250	251	53	98	89	7	90	8.1 0.2 863.640
1-1	210	0.46	1.2	870.12	295	249	250	59	95	89	7	57	8.2 0.2 0.040
2	220	0.47	1.2	876.57	296	250	250	62	98	90	7	52	7.8 0.2
3	230	0.50	1.4	883.35	295	250	250	64	99	91	7	58	8.2 0.2
4	240	0.49	1.3	890.01	298	251	251	62	99	91	7	50	7.8 0.2
5	250	0.49	1.3	896.655	299	250	251	63	98	91		49	8.1 0.2
	Total												
	Average												

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC CS
 Date: 3/28

TEST LOCATION: FF Outlet
 UNIT: 3 RUN: 2

Proxin TESTING FIELD DATA SHEET

METHOD: 23 PAGE 1 OF 2

Client Wheelerator Project No. 11182
 Plant S. Broward's Date 3/29/11
 Meter Operator C. Glimp
 Probe Operator C. Glimp

Meter Box 61-5 Sample Box No. 04
 Meter No. 0.9936 Meter ΔH 1.7676
 K Factor 67.19676 Pitot Co. 0.822
 Leak Rate Before 0.003 [Lpm] @ 14 (in. Hg)
 Leak Rate After 0.003 [Lpm] @ 13 (in. Hg)
 Pitot Leak Check Before ☒ After: Good ☒ Bad ☐

Cross Section of Test Location

Duct Dimensions (in.) 96 x 96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
<u>-7.3</u>	<u>10</u>		<u>[In] [Out]</u>

Amb. Temp (°F) 80 Bar. Press. 30.00 [in. Hg] [mbar]
 Probe ID No. 67-8-10
 Liner Material Glass

Filter No. —
 Thimble No. —
 Nozzle Diameter 0.271 Nozzle I.D. 271-1

Start Time 7:41 Stop Time 11:59

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [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)	XAD Trap Temp T _t (°F)	Notes
	<u>10</u>			<u>0.43</u> <u>897.065</u>		<u>290</u>	<u>290</u>						
5-1	10	0.43	1.1	902.39	297	294	291	64	74	74	5	43	920.2
2	20	0.40	1.0	908.04	298	291	290	53	80	76	5	42	920.2
3	30	0.44	1.1	914.02	296	290	290	50	84	77	7	54	900.2
4	40	0.39	0.99	919.92	298	290	290	54	85	78	<u>38+7</u>	62	890.2
5	50	0.44	1.1	925.815	297	246	290	55	87	79	7	43	960.2 925.885
4-1	60	0.42	1.1	931.76	296	249	290	57	85	80	7	50	900.2 0.070
2	70	0.42	1.1	937.57	296	294	290	57	88	81	7	48	890.2
3	80	0.40	1.0	943.38	294	291	290	62	89	82	7	62	900.2
4	90	0.38	0.96	949.07	297	290	290	57	91	83	6	45	780.2
5	100	0.37	0.94	954.535	296	290	290	60	91	83	6	48	870.2 954.605
3-1	110	0.50	1.3	961.02	295	249	290	58	89	84	7	40	960.2 0.070
2	120	0.44	1.1	967.27	298	291	290	55	92	85	7	45	830.2
		2.7631	12.79		3558				1035	<u>882.962</u>			
	Total	16.7396	28.2	151.065	7383				2261	2102			
	Average	0.6696	1.1280		295.3200				87.260				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC CS
 Date 3/29/11

TEST LOCATION: FF Outlet
 UNIT: 3 RUN: 2

Proxin TESTING
FIELD DATA SHEET

METHOD: 23 PAGE 2 OF 2

Client: Wheelabrator Project No: 11182
 Plant: S. Brown's Date: 7/29/11
 Meter Operator: C. Simpson
 Probe Operator: 1

Meter Box: 61-5 Sample Box No: 04
 Meter Yd: 0.9936 Meter ΔH : 0.7676
 K Factor: 2.57 Pitot Co: 0.822

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

54321
00000

IN [UP]

Duct Dimensions (in.) 96 X 96

Static Pres. (in. H₂O) -7.3 Port Len. (in.) 10 Gas Flow [In] [Out] Out First point all the way of page 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 ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m (in. H ₂ O)	Stack Temp T _s (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{in} (°F)	DGM Outlet T _{out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _t (°F)	Notes
	<u>10</u>			<u>0</u>		<u>250</u>	<u>250</u>						
3-3	130	0.48	1.1	973.38	298	250	251	61	94	89	7	54	8.9 0.2
3-4	140	0.42	1.1	979.19	297	250	250	61	93	86	7	43	9.1 0.2 9.0
5	150	0.45	1.1	985.505	297	250	251	56	94	86	7	40	9.8 0.2 9.85 59.5
2-1	160	0.52	1.3	991.93	296	248	250	61	90	87	7	49	9.1 0.2 0.090
2	170	0.53	1.3	998.39	296	251	251	61	94	88	7	59	7.9 0.2
3	180	0.49	1.2	1004.89	296	251	249	64	96	88	8	62	7.9 0.2
4	190	0.49	1.2	1011.27	296	249	249	64	96	89	7.5	43	7.6 0.2
5	200	0.43	1.1	1017.460	292	250	250	57	96	89	7	41	8.3 0.2 17.575
1-1	210	0.49	1.2	1023.65	290	249	251	62	93	89	7	47	9.0 0.2 0.115
2	220	0.47	1.2	1029.89	289	250	250	50	93	88	7	42	9.4 0.2
3	230	0.51	1.3	1036.35	289	250	250	51	95	88	8	50	9.7 0.2
4	240	0.36	0.91	1041.85	293	251	250	58	96	88	6	61	8.8 0.2
5	250	0.50	1.4	1048.475	296	250	249	60	96	89	8	62	8.8 0.2
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC CS
 Date 7/29/11

TEST LOCATION:

FF Outlet Pioxin

TESTING

METHOD: 23

PAGE 1

OF 2

UNIT: 3

RUN: 3

FIELD DATA SHEET

Client: Wheelabrator	Project No: 11162
Plant: S. Brown's	Date: 3/29/11
Meter Operator: C. Slings	
Probe Operator: 11	

Meter Box: 61-5	Sample Box No: D6
Meter Y: 0.9936	Meter ΔH: 1.7676
K Factor: 2.93	Pilot C: 0.822

Leak Rate Before: 0.0038 [Lpm]	@ 14 (in. Hg)
Leak Rate After: 0.0038 [Lpm]	@ 13 (in. Hg)
Pilot Leak Check Before: ☒	After: Good ☒ Bad ☐

Cross-Section of Test Location			
Duct Dimensions (in.): 96 x 96			
Static Pres. (in. H ₂ O): -9.2	Port Len. (in.): 10	Gas Flow [In] [Out]: 0	First point all the way: ☒ [In] [Out]

Amb. Temp (°F): 86	Bar Press: 30.00 [in. Hg] [mbar]
Probe ID No: 67-8-10	
Liner Material: Glass	

Filter No: —	—	—
Thimble No: —	—	—
Nozzle Diameter: 0.271	Nozzle ID: 271-1	

Start Time: 12:38	Stop Time: 16:59

Traverse Point Number	Min/pt 10 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. [L] 50.510	Stack Temp T _s (°F)	Probe T _p (°F) Set Points 250 290	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)	XAD Trap Temp T _{tr} (°F)	Notes
5-1	10	0.36	0.91	56.12	297	256	256	64	87	86	4.5	61	7.9 0.2
2	20	0.39	0.99	61.78	297	253	252	57	91	87	5.5	43	7.9 0.2 K=236
3	30	0.44	1.1	67.72	298	250	250	55	94	87	6	49	8.1 0.2
4	40	0.39	1.0	73.53	297	249	250	59	96	89	6	58	8.4 0.2
5	50	0.34	0.87	78.88	298	250	250	62	94	89	6.0	53	7.6 0.2 78.975
4-1	60	0.44	1.1	84.78	295	247	249	64	92	88	6	58	8.4 0.2 0.090
2	70	0.54	1.4	91.67	296	251	250	58	95	89	8	51	8.6 0.2
3	80	0.42	1.1	98.11	298	251	250	62	97	89	7	57	7.9 0.2
4	90	0.51	1.3	104.560	299	250	250	54	97	89	7.5	50	8.3 0.2 100.110 2
5	100	0.57	1.4	111.445050	295	247	250	59	93	89	8	55	8.9 0.2 0.070 2
3-1	10	0.90	1.3	118.83	299	250	250	62	94	89	8	57	8.6 0.2
2	120	0.62	1.6	125.41	299	251	249	64	95	89	4	61	7.9 0.2
		8.1052	14.08	58	3568				1125	1060			
	Total	16.7839	29.05	154.500	739.5				2311	2181			
	Average	0.6713	1.1620	154.510	295.800				89.8400				

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: 65
Date: 3/29/11

TEST LOCATION: FF Outlet
 UNIT: 3

Pioxin TESTING
 FIELD DATA SHEET

METHOD: 23 PAGE 2 OF 2

Client: Wheeler Project No: 11182
 Plant: S. Broward Date: 3/29/11
 Meter Operator: C. Slump
 Probe Operator: C. Slump

Meter Box: 61-5 Sample Box No: D6
 Meter Y: 6.9936 Meter ΔH : 1.7676
 K Factor: 296 Pitot Co: 0.822

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

Duct Dimensions (in.): 96 x 96

Static Pres (in. H₂O): 10 Port Len (in.): 10 Gas Flow [in] [out] of page (N) [Out]

Amb Temp (°F): Bar Press: [in. Hg] [mbar]
 Probe ID No:
 Liner Material:

Filter No:
 Thimble No:
 Nozzle Diameter: Nozzle ID:

Start Time: Stop Time:

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init Vol (ft ³) [L]	Stack Temp T _s (°F)	Probe T _p (°F) Set Points	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{max} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _i (°F)	Notes
3-3	130	0.90	1.3	132.15	296	250	250	63	92	88	8	49	80 0.2
4	140	0.43	1.1	138.37	298	250	250	61	93	88	7	51	76 0.2
5	150	0.42	1.1	144.585	295	250	250	62	93	87	7	54	84 0.2 144.660
2-1	160	0.42	1.1	150.48	293	248	250	64	91	87	7	53	86 0.2 00085
2	170	0.41	1.0	156.28	293	251	251	61	92	88	6	51	80 0.2
3	180	0.44	1.1	162.27	296	251	250	64	92	87	7	54	74 0.2
4	190	0.45	1.2	168.59	297	250	250	64	92	86	7	53	73 0.2
5	200	0.51	1.3	175.110	298	250	250	64	92	86	7	57	75 0.2 175.285
1-1	210	0.42	1.1	180.181.13	285	249	250	64	89	85	6.5	53	9.8 0.2 0.145
2	220	0.50	1.3	187.59	285	251	250	64	90	85	7	52	83 0.2
3	230	0.30	0.77	192.56	296	250	250	64	90	85	6	54	96 0.2
4	240	0.51	1.3	198.91	295	250	250	59	90	85	7.5	48	96 0.2
5	250	0.51	1.3	205.400	296	249	249	61	90	84	7.5	54	82 0.2
Total													
Average													

Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: CS
 Date: 3/29/11



Impinger Weight Sheet

Client Wheelabrator		Unit Name/Location Unit 3 FF Outlet	
Plant South Broward	Job No. 11182	Method 23	

CAE TL-07-2 Cat #514763A 499.5

Run No. 4	Filter Type	Sample Box No. D6
Date 3/28/11	Lot No.	pH
Analyst D. Luckhard	Filter No.	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	1416.4	604.5	811.9	
Impinger 2	100 ml HPLC H2O	537.0	521.5	5.5	QA/QC DC
Impinger 3	100 ml HPLC H2O	544.1	543.6	0.5	Date 3/28/11
Impinger 4	Empty	455.4	452.0	3.4	
Impinger 5	Trap # T0927-008	339.6	318.4	21.2	Total Weight (gm)
Impinger 6	Silica Gel	821.8	773.5	48.3	842.5
					890.8

Run No. 5	Filter Type	Sample Box No. D4
Date 3/29/11	Lot No.	pH
Analyst D. Luckhard	Filter No.	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	1500.4	643.3	857.1	
Impinger 2	100 ml HPLC H2O	564.0	562.0	2.0	QA/QC DC
Impinger 3	100 ml HPLC H2O	541.7	541.3	0.4	Date 3/29/11
Impinger 4	Empty	444.8	438.4	6.4	
Impinger 5	Trap # T0927-012	419.1	403.2	15.9	Total Weight (gm)
Impinger 6	Silica Gel	808.0	760.7	47.3	881.8
					929.1

Run No. 6	Filter Type	Sample Box No. D6
Date 3/29/11	Lot No.	pH
Analyst D. Luckhard	Filter No. T0927-011	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	Empty	1506.2	604.7	901.5	
Impinger 2	100 ml HPLC H2O	533.3	531.7	1.6	QA/QC DC
Impinger 3	100 ml HPLC H2O	549.0	544.6	4.4	Date 3/29/11
Impinger 4	Empty	457.1	452.8	4.3	
Impinger 5	Trap # T0927-011	367.8	347.2	20.6	Total Weight (gm)
Impinger 6	Silica Gel	783.9	733.5	50.4	932.4
					982.8



METHOD: 26A PAGE 1 OF 1

Start Time: 7:47	Stop Time: 8:47

Circle correct bracketed units on data sheet.

F-72

TEST LOCATION: SDA INLET
UNIT: 3 RUN: 2

14C1 TESTING
FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

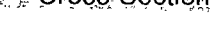
Client <u>Water Laboratory</u>	Project No. <u>11182</u>
Plant <u>S. Broward</u>	Date <u>3-30-11</u>
Meter Operator <u>B. ARNOLD</u>	
Probe Operator <u> </u>	

Meter Box	166-4	Sample Box No.	1311
Meter V_a	0.9983	Meter $\Delta H_{\odot}$	1.6979
K Factor	—	Pilot C_p	

Leak Rate Before 0.003 [cfm] [Lpm] @ 15 (in. Hg)Leak Rate After: 0.005 (cfm) [Lpm] @ 19 (in. Hg)

Pitot Leak Check Before ☐ After: Good ☐ Bad ☐

Cross-Section of Test Location

Duct Dimensions (in.) 105

Static Pres	Port Len	Gas Flow	First point

(in: H ₂ O)	(in.)	~~(in)~~ [Out]	all the way

-1.4	14	of page	 [Out]

Amb Temp: (°F)	87	Bar. Press.	30.05	in (Hg)	mmbar
Probe ID No.	SBA 674-5				
Liner Material	GLASS				

Filter No. _____		
Thimble No. _____		
Nozzle Diameter _____	Nozzle D _____	

Start Time:	9:06	Stop Time:	

Traverse Point Number	Min/pl 5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [L] 226.447	Stack Temp T _s (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{max} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F) 0.2	Notes
						Set Points							
1-1	5	N/A	1.2	229.69	470	354	353	65	89	89	3.5	8.9	
	10		1.2	232.67	471	356	354	48	89	89	5.0	7.3	
	15		1.2	235.77	470	357	354	44	92	90	6.5	7.5	
	20		1.2	238.88	468	357	350	42	93	90	8.0	7.0	
	25		1.2	241.96	466	354	353	42	93	90	9.0	7.1	
	30		1.2	245.86	468	354	356	42	93	91	10.5	7.5	
	35		1.2	248.17	466	355	353	43	93	91	12.0	7.8	
	40		1.2	251.29	469	356	355	43	93	91	13.5	7.6	
	45		1.2	254.40	468	357	352	44	93	91	14.5	7.9	
	50		1.2	257.48	468	355	356	47	93	91	15.5	8.2	
	55		1.2	260.56	471	352	350	52	93	91	17.0	8.3	
	60		1.2	263.656	472	351	352	55	93	91	18.0	8.2	
	Total		14.4600	37.209									
	Average		1.2000	468.9166					91.3333				

* Sum of square roots.

Circle correct bracketed units on data sheet

QA/QC BA
Date 8-30-11



Clean Air
ENGINEERING

TEST LOCATION: SDA inlet
UNIT: 3 RUN: 3

HCL TESTING
FIELD DATA SHEET

METHOD: Z67 PAGE 1 OF 1

Client	Wavelength	Project No.	11182
Plant	S. Broward	Date	3-30-11
Meter Operator	B. Arnold		
Probe Operator	—		

Meter Box	66-4	Sample Box No.	B21
Meter Y _d	0.9983	Meter ΔH ₀	1.679
K Factor	—	Pitot C _p	
Leak Rate Before	0.003 [cfm]	[Lpm]	@ 15 (in Hg)
Leak Rate After	0.005 [cfm]	[Lpm]	@ 21 (in Hg)
Pitot Leak Check Before	☐	After: Good	☐ Bad: ☐

Cross-Section of Test Location



[N] [UP]



Duct Dimensions (in.)			
Static Pres. (in. H ₂ O) -1.3	Port Len. (in.) 14	Gas Flow (in) [Out] of page	First point all the way (in) [Out]

Amb. Temp. (°F)	90	Bar. Press.	30.05	[in. Hg] [mbar]
Probe I.D. No.	67-4-5			
Liner Material	PLAST			

Filter No.	—		
Thimble No.	—	—	
Nozzle Diameter		Nozzle I.D.	

Start Time:	10:22	Stop Time:	11:22

Traverse Point Number	Min/pt S Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m		Stack Temp T _s (°F)	Probe T _p (°F)	Filter T _f (°F)	Cond Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{max} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp (°F)	Notes
				Init Vol	(ft ³) [L]		Set Points							
				263.919			350	350						
1-f	5	N/A	1.2	276.03	471	350	353	67	91	91	3.5	6.7		
	10		1.2	276.11	467	350	350	60	93	91	5.5	6.6		
	15		1.2	273.17	468	353	357	50	93	91	7.5	6.4		
	20		1.2	276.21	466	350	353	45	93	91	9.0	6.7		
	25		1.2	279.30	469	351	357	47	93	91	10.5	6.7		
	30		1.2	282.42	475	351	357	50	94	92	13.0	6.3		
	35		1.2	285.53	471	350	354	51	94	92	15.0	6.8		
	40		1.2	288.64	471	356	352	54	94	92	16.5	6.9		
	45		1.2	291.74	471	353	354	57	94	92	17.5	6.5		
	50		1.2	294.76	467	350	351	60	94	92	20.0	7.5		
	55		1.1	297.67	463	353	355	63	92	92	20.5	7.5		
	60		0.98	300.511	465	354	354	66	92	92	21.0	7.6		
	Total	*	14.0900	36.592										
	Average		1.1433		468.6666				92.3333					

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC BA
Date 30-11

Impinger Weight Sheet

Client Wheelabrator		Unit Name/Location Unit 3 SDA Inlet	
Plant South Broward	Job No. 11182	Method Mod. 26A	

Run No. 1	Filter Type Quartz	Sample Box No. B21
Date 3/29/11	Lot No.	pH
Analyst P. Luckhart	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	491.1	459.0	32.1	
Impinger 2	100 mL 0.1N H2SO4	659.5	558.4	101.1	
Impinger 3	100 mL 0.1N H2SO4	592.1	554.4	37.7	
Impinger 4	Empty	452.2	445.0	7.2	
Impinger 5	Silica Gel	741.8	723.8	18.0	Total Weight (gm)
					178.1
					196.1

RV
QA/QC
Date 3/29/11

Run No. 2	Filter Type Quartz	Sample Box No. B11
Date 3/30/11	Lot No.	pH
Analyst P. Luckhart	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	513.8	459.4	54.4	
Impinger 2	100 mL 0.1N H2SO4	637.1	539.0	98.1	
Impinger 3	100 mL 0.1N H2SO4	574.5	552.5	22.0	
Impinger 4	Empty	528.3	524.1	4.2	
Impinger 5	Silica Gel	779.8	767.1	12.7	Total Weight (gm)
					178.7
					191.4

QA/QC DC
Date 3/30/11

Run No. 3	Filter Type Quartz	Sample Box No. B21
Date 3/30/11	Lot No.	pH
Analyst R. Viana	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	524.0	460.2	63.8	
Impinger 2	100 mL 0.1N H2SO4	650.3	562.1	88.2	
Impinger 3	100 mL 0.1N H2SO4	581.0	554.8	26.2	
Impinger 4	Empty	451.2	445.0	6.2	
Impinger 5	Silica Gel	754.4	741.8	12.6	Total Weight (gm)
					184.4
					197.0

QA/QC RV
Date 3/30/11

TEST LOCATION: FF OUTLET
 UNIT: 3 RUN: 21
 NH

ACI TESTING FIELD DATA SHEET

METHOD: 2CA PAGE 1 OF 1

Client: <u>Wheelabrator</u>	Project No: <u>111P2</u>
Plant: <u>S BARNARD</u>	Date: <u>3.30.11</u>
Meter Operator: <u>NH</u>	
Probe Operator: <u>—</u>	

Meter Box: <u>61-5</u>	Sample Box No: <u>B14</u>
Meter Y _g : <u>0.9936</u>	Meter ΔH _g : <u>1.7676</u>
K Factor: <u>—</u>	Pitot C _p : <u>—</u>
Leak Rate Before: <u>0.003</u> [cm] [Lpm] @ <u>14</u> (in. Hg)	
Leak Rate After: <u>0.002</u> [cm] [Lpm] @ <u>6</u> (in. Hg)	
Pitot Leak Check Before: ☒ After Good ☒ Bad ☐	

Cross-Section of Test Location:

Duct Dimensions (in.): 96 x 96

Static Pres. (in. H ₂ O): <u>-9.1</u>	Port Len. (in.): <u>10</u>	Gas Flow: <u>(N) [Out]</u> of page.	First point all the way: <u>(N) [Out]</u>

Amb. Temp. (°F): <u>75</u>	Bar. Press: <u>30.05</u> [in. Hg] [mbar]
Probe I.D. No.: <u>67-4-1</u>	
Liner Material: <u>GLASS</u>	

Filter No.: <u>—</u>	
Thimble No.: <u>—</u>	
Nozzle Diameter: <u>—</u>	Nozzle I.D.: <u>—</u>

Start Time: <u>7:47</u>	Stop Time: <u>8:47</u>

Traverse Point Number	Min/pt Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [L]	Stack Temp T _s (°F)	Probe Temp (°F) Set Points	Filter Temp (°F)	Cond. Temp T _c (°F)	DGM Inlet T _{m in} (°F)	DGM Outlet T _{m out} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _x (°F)	Notes
3-1	5	N/A	1.5	210.73	244	300	303	65	79	77	4	8.0	
10			1.5	214.16	248	300	303	59	81	77	4	8.0	
15			1.5	217.64	300	305	302	58	84	78	4	6.7	
20			1.5	221.13	299	309	302	60	86	78	4	6.8	
25			1.5	224.59	298	304	304	62	87	79	4	7.2	
30			1.5	228.05	298	301	303	65	88	80	4	7.4	
35			1.5	231.54	299	300	302	57	89	80	4	7.5	
40			1.5	235.02	298	301	302	56	89	82	4	7.5	
45			1.5	238.49	299	303	302	56	89	81	4	7.2	
50			1.5	241.95	299	302	302	57	89	81	4	7.0	
55			1.5	245.51	298	301	301	54	89	81	4	7.9	
60			1.5	248.980	299	302	303	55	89	82	4	7.5	
Total *				41.8760	3584				1039	956			
Average			1.5000	298.6667					83.1250				

Sum of square roots.

Circle correct bracketed units on data sheet.

TEST LOCATION: FF OUTLET
 UNIT: 3 RUN: 2

HCl TESTING
FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client: Wheelabrator Project No: 11182
 Plant: S. Browns Date: 3.30.11
 Meter Operator: NH
 Probe Operator:

Meter Box: 61-5 Sample Box No: B12
 Meter V: 0.9936 Meter ΔH : 1.7676
 K Factor: - Pitot C: -
 Leak Rate Before: 0.004 [cc/h] [Lpm] @ 12 (in. Hg)
 Leak Rate After: 0.002 [cc/h] [Lpm] @ 6 (in. Hg)
 Pitot Leak Check Before: ☐ After: Good ☐ Bad ☐

Cross-Section of Test Location

Duct Dimensions (in.): 96 x 96

Static Pres. (in. H ₂ O)	Port Len. (in.)	Gas Flow	First point
<u>-5.8</u>	<u>10</u>	<u>10</u> [Out]	all the way <u>10</u> [Out]

Amb. Temp. (°F): Bar. Press: 30.05 [in. Hg] [mbar]
 Probe I.D. No: 67-4-1
 Liner Material: GLASS

Filter No: -
 Thimble No: -
 Nozzle Diameter: - Nozzle I.D:

Start Time: 9:06 Stop Time: 10:06

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V_m Init. Vol: <u>10</u> [L] <u>249.480</u>	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points <u>300</u> <u>300</u>	Filter T_f (°F) <u>300</u> <u>300</u>	Cond. Temp. T_c (°F) <u>63</u>	DGM Inlet $T_{m in}$ (°F) <u>83</u>	DGM Outlet $T_{m out}$ (°F) <u>81</u>	Pump Vacuum (in. Hg) <u>4</u>	XAD Trap Temp (°F) <u>7.0</u>	Notes
3-1	5	N/A	1.5	253.08	300	305	304	63	83	81	4	7.0	
	10		1.5	256.62	300	306	303	63	86	81	4	6.8	
	15		1.5	260.07	300	304	303	61	89	82	4	6.6	
	20		1.5	263.52	297	303	302	63	90	83	4	6.8	
	25		1.5	267.11	299	301	302	65	90	83	4	6.2	
	30		1.5	270.63	300	301	302	58	90	83	4	7.0	
	35		1.5	274.12	299	302	301	58	90	84	4	6.9	
	40		1.5	277.59	305	302	302	60	91	84	4	6.8	
	45		1.5	281.05	299	302	301	61	91	84	4	6.7	
	50		1.5	284.51	300	302	303	62	91	84	4	6.8	
	55		1.5	287.99	301	301	302	64	90	84	4	6.5	
	60		1.5	291.375	299	303	302	65	90	84	4	6.4	
Total *				41.8950	3599				1071	997			
Average				1.5000	299.9167				86.1667				

* Sum of square roots.

Circle correct bracketed units on data sheet.

QA/QC: NH
 Date: 3.30.11

TEST LOCATION: FF OUTLET
 UNIT: 3 RUN: 3

HCl TESTING
FIELD DATA SHEET

METHOD: 26A PAGE 1 OF 1

Client <u>Wheelabrator</u>	Project No. <u>11182</u>
Plant <u>S. Broward</u>	Date <u>3.30.11</u>
Meter Operator <u>NH</u>	
Probe Operator	

Meter Box <u>61-5</u>	Sample Box No. <u>B16</u>
Meter Yd. <u>0.9936</u>	Meter ΔH ₀ <u>1.7676</u>
K Factor <u>-</u>	Pitot C _p <u>-</u>

Leak Rate Before <u>0.004 [dm]</u> [Lpm] @ <u>12</u> (in. Hg)
Leak Rate After <u>0.002 [dm]</u> [Lpm] @ <u>6</u> (in. Hg)
Pitot Leak Check Before ☐ After: Good ☐ Bad ☐

Cross-Section of Test Location

Duct Dimensions (in.) 96 x 96

Static Pres. (in. H ₂ O) <u>-5.8</u>	Port Len. (in.) <u>10</u>	Gas Flow <u>10</u> [Out] of page	First point all the way <u>10</u> [Out]

Amb Temp. (°F) <u>75</u>	Bar Press. <u>30.45</u> [in. Hg] [mbar]
Probe ID No. <u>67-4-1</u>	
Liner Material <u>GLASS</u>	

Filter No. <u>-</u>	
Thimble No. <u>-</u>	
Nozzle Diameter <u>-</u>	Nozzle ID <u>-</u>

Start Time: <u>10:22</u>	Stop Time: <u>11:22</u>

Traverse Point Number	Min/pt. Elapsed Time	Velocity Head ΔP (in. H ₂ O)	Orifice Setting ΔH (in. H ₂ O)	Gas Sample Volume V _m Init. Vol. (ft ³) [L]	Stack Temp T _s (°F)	Probe Temp (°F)		Cond Temp T _c (°F)	DGM Inlet T _{min} (°F)	DGM Outlet T _{max} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T _t (°F)	Notes
						Set	Points						
3-1	5	N/A	1.5	295.56	298	298	306	63	85	85	4	6.4	
	10	↓	1.5	299.15	297	306	304	61	89	85	4	6.4	
	15	↓	1.5	302.62	298	303	302	60	91	87	4	6.8	
	20		1.5	305.13	298	302	302	63	92	87	4	7.2	
	25		1.5	309.61	298	301	302	55	92	86	4	6.9	
	30		1.5	313.07	300	302	301	59	92	86	4	6.7	
	35		1.5	316.55	298	302	302	61	92	86	4	7.2	
	40		1.5	320.02	299	302	301	62	93	87	4	7.1	
	45		1.5	323.54	299	302	302	63	92	87	4	6.4	
	50		1.5	326.89	298	302	302	64	93	87	4	6.8	
	55		1.5	330.43	297	302	302	65	93	87	4	7.2	
	60		1.5	333.895	298	302	301	65	93	87	4	7.4	
	Total	*		41.9200	3578				1097	1137			
	Average		1.5000		298.1667				88.9167				

* Sum of square roots.

Circle correct bracketed units on data sheet.

Impinger Weight Sheet

Client Wheelabrator		Unit Name/Location Unit 3 FF Outlet	
Plant South Broward	Job No. 11182	Method	Mod. 26A

Run No. 1	Filter Type Quartz	Sample Box No. <i>B16</i>
Date <i>3/30/11</i>	Lot No.	pH
Analyst <i>R. Vigne</i>	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	549.0	455.0	94.0	
Impinger 2	100 mL 0.1N H2SO4	650.9	526.8	124.1	
Impinger 3	100 mL 0.1N H2SO4	573.2	537.4	35.8	
Impinger 4	Empty	455.0	~~440.6~~	447.3 / 7.7	
Impinger 5	Silica Gel	754.6	~~760.2~~	740.2 / 14.4	Total Weight (gm)
					261.6
					276.0

QA/QC *RV*
Date *3/30/11*

Run No. 2	Filter Type Quartz	Sample Box No. <i>B12</i>
Date <i>3/30/11</i>	Lot No.	pH
Analyst <i>R. Vigne</i>	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	532.9	455.7	77.2	
Impinger 2	100 mL 0.1N H2SO4	675.4	546.0	134.4	
Impinger 3	100 mL 0.1N H2SO4	595.2	554.1	41.1	
Impinger 4	Empty	439.5	429.7	9.8	
Impinger 5	Silica Gel	770.0	756.9	13.1	Total Weight (gm)
					262.5
					275.6

QA/QC *RV*
Date *3/30/11*

Run No. 3	Filter Type Quartz	Sample Box No. <i>B16</i>
Date <i>3/30/11</i>	Lot No.	pH
Analyst <i>R. Vigne</i>	Filter No. NA	Rinse

	Contents	Gross Weight (gm)	Tare Weight (gm)	Net Weight Gain (gm)	
Impinger 1	50 mL 0.1N H2SO4	541.7	461.2	80.5	
Impinger 2	100 mL 0.1N H2SO4	689.8	565.8	124.0	
Impinger 3	100 mL 0.1N H2SO4	589.1	543.5	45.6	
Impinger 4	Empty	449.8	440.5	9.3	
Impinger 5	Silica Gel	793.6	779.1	14.5	Total Weight (gm)
					259.9
					273.9

QA/QC *RV*
Date *3/30/11*

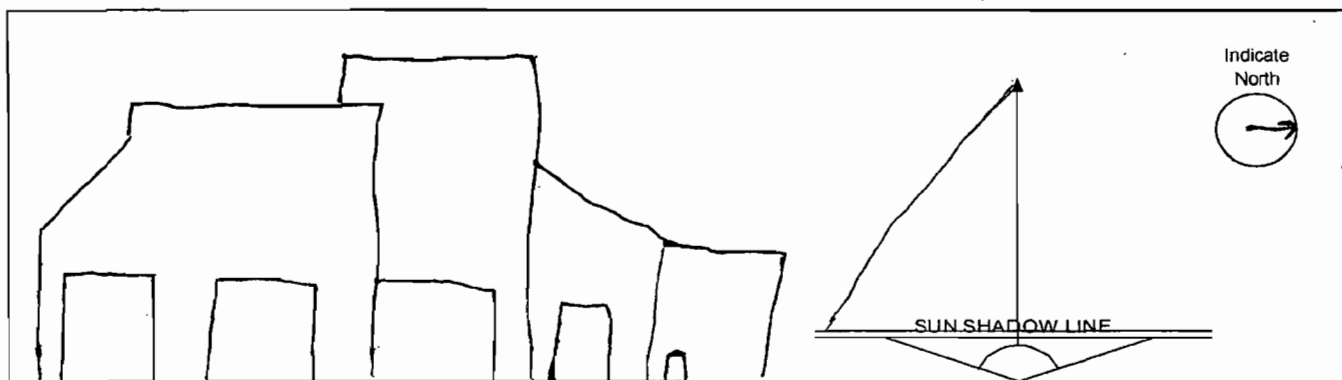
EPA METHOD 22

Fugitive or Smoke Emission Inspection

Outdoor Location

Job No.	11182	Date	3/30/11
Client	wheelabrator	Observer	D. Luckard
Plant	S. Broward's	Affiliation	Clean Air Engineering
Industry	air testing, MSW	Process Unit	Ash & Metals Unloading
Precipitation	none	Wind Direction	South ^{PL} North
Sky Conditions	Clear	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)
Ash Unloading / Conveyor	Start: 733		
	Stop: 750 ^{PL} 753	20:00	00:00
	Start: 758		
	Stop: 818	20:00	00:00
	Start: 823		
	Stop: 843	20:00	00:00
	Start:		
	Stop:		
	Start:		
	Stop:		
	Start:		
	Stop:		

Note: Rest breaks must be taken every 15 to 20 minutes for 5 to 10 minutes.

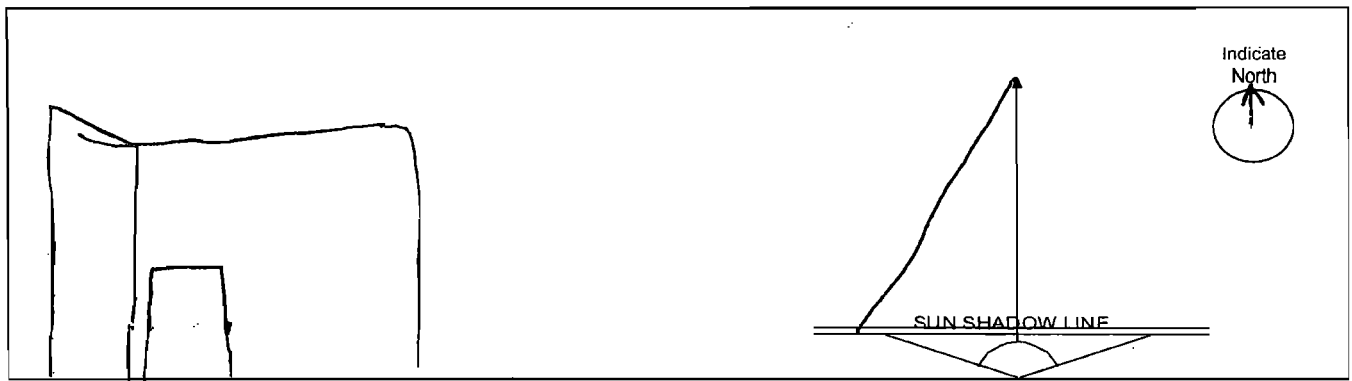
EPA METHOD 22

Fugitive or Smoke Emission Inspection

Outdoor Location

Job No.	11182	Date	3/30/11
Client	wheelabrator	Observer	D. Luck 4412
Plant	S. Broward	Affiliation	Clean Air Engineering
Industry	air testing MSW	Process Unit	Ash Roll-up Door
Precipitation	0	Wind Direction	North
Sky Conditions	clear	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)
SB Ash Conveyer Roll up Door to Baghouse	Start 848	20:00	00:00
	Stop 908		
	Start 913	20:00	00:00
	Stop 933		
	Start 938	20:00	00:00
	Stop 958		
	Start		
	Stop		
	Start		
	Stop		
	Start		
	Stop		

Note: Rest breaks must be taken every 15 to 20 minutes for 5 to 10 minutes.

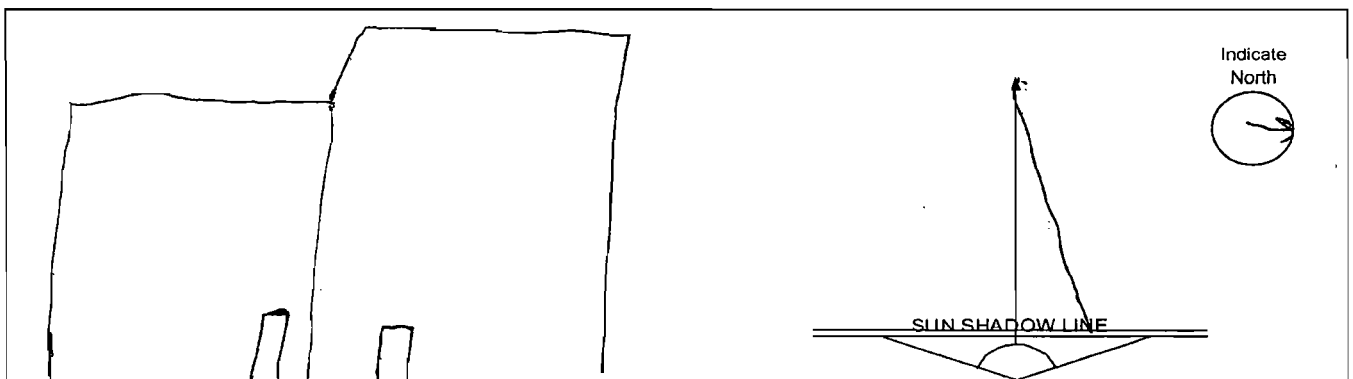
EPA METHOD 22

Fugitive or Smoke Emission Inspection

Outdoor Location

Job No.	11182	Date	3/30/11
Client	Wheelabrator	Observer	D. Luckard
Plant	S. Browns	Affiliation	Clean Air Engineering
Industry	emissions testing MSW	Process Unit	Ash Handling System
Precipitation	0	Wind Direction	South
Sky Conditions	Clear	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)
Doors to Baghouse	Start 1442	20:00	00:00
	Stop 1502		
	Start 1507	20:00	00:00
	Stop 1527		
	Start ~~1532~~ 1532	20:00	00:00
	Stop 1552		
	Start		
	Stop		
	Start		
	Stop		
	Start		
	Stop		

Note: Rest breaks must be taken every 15 to 20 minutes for 5 to 10 minutes.

Visible Emissions Observation Form

CLIENT/OWNER Wheelabrator		PROJECT NUMBER 11182		OBSERVATION DATE 3/30/11					START TIME 1150		END TIME 1405		
PLANT S. Broward	UNIT	RUN 1											
PROCESS EQUIPMENT Limestone Silo		OPERATING MODE Continuous											
CONTROL EQUIPMENT Fabric filter		OPERATING MODE Continuous											
DESCRIBE EMISSION POINT an awning vent at the exit of the fabric filter.				15					30				
				45					60				
				15					30				
				45					60				
				15					30				
				45					60				
				15					30				
				45					60				
HEIGHT ABOVE GROUND LEVEL 0		DISTANCE FROM OBSERVER 150											
HEIGHT RELATIVE TO OBSERVER 50		DIRECTION FROM OBSERVER East											
DESCRIBE EMISSIONS white plume				15					30				
				45					60				
				15					30				
				45					60				
				15					30				
				45					60				
				15					30				
				45					60				
EMISSION COLOR White		PLUME TYPE: CONTINUOUS ☒											
		FUGITIVE ☐ INTERMITTENT ☐											
WATER DROPLETS PRESENT YES ☐ NO ☒		IF WATER DROPLET PLUME ATTACHED ☐ DETACHED ☐											
POINT IN PLUME AT WHICH EMISSIONS WERE DETERMINED fabric filter exit													
DESCRIBE BACKGROUND Blue sky													
WIND SPEED 0-5 MPH		WIND DIRECTION South											
AMBIENT TEMPERATURE 76°-85°		RELATIVE HUMIDITY 80%											
LAYOUT SKETCH OF SOURCE				RANGE OF OPACITY READINGS									
				MINIMUM				MAXIMUM					
				0				0					
				OBSERVER'S NAME (PRINT) Daniel Luckhard									
OBSERVER'S SIGNATURE Daniel Luckhard				DATE 3/30/11									
CERTIFIED BY Aeromet				DATE 3/9/11									
COMMENTS													

Visible Emissions Observation Form

2/3

CLIENT/OWNER <i>wheelabrator</i>		PROJECT NUMBER <i>11182</i>		OBSERVATION DATE <i>3/30/11</i>				START TIME		END TIME				
PLANT <i>S. Drouard</i>	UNIT <i>1</i>	RUN	SEC MIN	15	30	45	60	SEC MIN	15	30	45	60		
PROCESS EQUIPMENT <i>Linestear Silo</i>			OPERATING MODE <i>continuous</i>			1		30		0		0		
CONTROL EQUIPMENT <i>fabric filter</i>			OPERATING MODE <i>continuous</i>			2		32		0		0		
DESCRIBE EMISSION POINT			5			0		35		0		0		
			6			0		36		0		0		
			7			0		37		0		0		
			8			0		38		0		0		
HEIGHT ABOVE GROUND LEVEL		DISTANCE FROM OBSERVER		9		0		39		0		0		
				10		0		40		0		0		
HEIGHT RELATIVE TO OBSERVER		DIRECTION FROM OBSERVER		11		0		41		0		0		
				12		0		42		0		0		
DESCRIBE EMISSIONS			13			0		43		0		0		
			14			0		44		0		0		
			15			0		45		0		0		
			16			0		46		0		0		
EMISSION COLOR		PLUME TYPE: CONTINUOUS ☐		17		0		47		0		0		
		FUGITIVE ☐ INTERMITTENT ☐		18		0		48		0		0		
WATER DROPLETS PRESENT		IF WATER DROPLET PLUME		19		0		49		0		0		
YES ☐ NO ☐		ATTACHED ☐ DETACHED ☐		20		0		50		0		0		
POINT IN PLUME AT WHICH EMISSIONS WERE DETERMINED			21			0		51		0		0		
			22			0		52		0		0		
DESCRIBE BACKGROUND			23			0		53		0		0		
			24			0		54		0		0		
			25			0		55		0		0		
WIND SPEED		WIND DIRECTION		26		0		56		0		0		
				27		0		57		0		0		
AMBIENT TEMPERATURE		RELATIVE HUMIDITY		28		0		58		0		0		
				29		0		59		0		0		
LAYOUT SKETCH OF SOURCE			INDICATE NORTH			RANGE OF OPACITY READINGS			MINIMUM			MAXIMUM		
						OBSERVER'S NAME (PRINT) <i>Daniel Luckhard</i>			OBSERVER'S SIGNATURE <i>Daniel Luckhard</i>			DATE <i>3/30/11</i>		
						CERTIFIED BY <i>Acromet</i>			DATE <i>3/9/11</i>					
COMMENTS														

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Visible Emissions Observation Form

CLIENT/OWNER		PROJECT NUMBER		OBSERVATION DATE					START TIME					END TIME				
Wheelabrator		11182																
PLANT	UNIT	RUN	MIN	15	30	45	60	MIN	15	30	45	60	MIN	15	30	45	60	
S. Broward		1	0	0	0	0	0	30	0	0	0	0	30	0	0	0	0	
PROCESS EQUIPMENT		OPERATING MODE		1	0	0	0	0	31	0	0	0	0	31	0	0	0	0
Limestone Silo		continuous		2	0	0	0	0	32	0	0	0	0	32	0	0	0	0
CONTROL EQUIPMENT		OPERATING MODE		3	0	0	0	0	33	0	0	0	0	33	0	0	0	0
fabric filter		continuous		4	0	0	0	0	34	0	0	0	0	34	0	0	0	0
DESCRIBE EMISSION POINT			5	0	0	0	0	35	0	0	0	0	35	0	0	0	0	
			6	0	0	0	0	36	0	0	0	0	36	0	0	0	0	
			7	0	0	0	0	37	0	0	0	0	37	0	0	0	0	
			8	0	0	0	0	38	0	0	0	0	38	0	0	0	0	
HEIGHT ABOVE GROUND LEVEL		DISTANCE FROM OBSERVER		9	0	0	0	0	39	0	0	0	0	39	0	0	0	0
				10	0	0	0	0	40	0	0	0	0	40	0	0	0	0
HEIGHT RELATIVE TO OBSERVER		DIRECTION FROM OBSERVER		11	0	0	0	0	41	0	0	0	0	41	0	0	0	0
				12	0	0	0	0	42	0	0	0	0	42	0	0	0	0
DESCRIBE EMISSIONS			13	0	0	0	0	43					43					
			14	0	0	0	0	44					44					
			15	0	0	0	0	45					45					
			16	0	0	0	0	46					46					
EMISSION COLOR		PLUME TYPE: CONTINUOUS ☐		17	0	0	0	0	47					47				
		FUGITIVE ☐ INTERMITTENT ☐		18	0	0	0	0	48					48				
WATER DROPLETS PRESENT		IF WATER DROPLET PLUME		19	0	0	0	0	49					49				
YES ☐ NO ☐		ATTACHED ☐ DETACHED ☐		20	0	0	0	0	50					50				
POINT IN PLUME AT WHICH EMISSIONS WERE DETERMINED			21	0	0	0	0	51					51					
			22	0	0	0	0	52					52					
DESCRIBE BACKGROUND			23	0	0	0	0	53					53					
			24	0	0	0	0	54					54					
			25	0	0	0	0	55					55					
WIND SPEED		WIND DIRECTION		26	0	0	0	0	56					56				
				27	0	0	0	0	57					57				
AMBIENT TEMPERATURE		RELATIVE HUMIDITY		28	0	0	0	0	58					58				
				29	0	0	0	0	59					59				
LAYOUT SKETCH OF SOURCE			RANGE OF OPACITY/READINGS															
			INDICATE NORTH															
			MINIMUM: _____ MAXIMUM: _____ OBSERVER'S NAME (PRINT): Daniel Luckhard OBSERVER'S SIGNATURE: [Signature] DATE: 3/30/11 CERTIFIED BY: AeroMet DATE: 3/9/11															
COMMENTS																		
Was not notified that the truck had left at 1405																		

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WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

FIELD DATA PRINTOUTS

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

QA/QC Initials: ML

Date: 5/9/14



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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: 11182
Source Area (ft²): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505

Bar. Press. (in. Hg): 30.00
Static P: -11.3
O₂ (dry volume %): 8.97
CO₂ (dry volume %): 10.07
N₂+CO (dry volume %): 80.96

Nozzle ID No: 270-2
Nozzle Diameter (D_n): 0.270
Probe ID No: 67-8-3
Pitot C_p: 0.830
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/29/11
Start Time: 07:41
Stop Time: 09:53
Leak Rate Before: 0.003 cfm @ 17 "Hg
Leak Rate After: 0.004 cfm @ 10 "Hg

H₂O (condensate, ml or gm): 427.1
H₂O (silica, g): 11.6
Actual Moisture (%): 23.34

Meter Box ID. No: 66-7
Meter ΔH@: 1.76970
Meter Y_d: 0.99610

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
5-01	5.0	0.33	0.82	944.875	301	75	73	0.57	2.52	101.2
5-02	10.0	0.34	0.84	949.960	301	77	74	0.58	2.56	100.8
5-03	15.0	0.45	1.10	952.950	300	79	74	0.67	2.99	102.1
5-04	20.0	0.47	1.20	956.000	303	83	75	0.69	3.05	101.7
5-05	25.0	0.48	1.20	959.095	303	85	76	0.69	3.10	101.8
LEAK CHECK	25.0			959.130						
4-01	30.0	0.41	1.00	961.960	301	87	77	0.64	2.83	100.3
4-02	35.0	0.33	0.82	964.470	302	88	78	0.57	2.51	99.0
4-03	40.0	0.45	1.10	967.380	303	88	79	0.67	2.91	98.3
4-04	45.0	0.46	1.10	970.320	301	90	79	0.68	2.94	97.9
4-05	50.0	0.44	1.10	973.260	301	86	80	0.66	2.94	100.4
LEAK CHECK	50.0			973.310						
3-01	55.0	0.32	0.79	975.770	300	85	81	0.57	2.46	98.4
3-02	60.0	0.30	0.74	978.170	301	83	80	0.55	2.40	99.4
3-03	65.0	0.38	0.94	980.950	301	83	80	0.62	2.78	102.4
3-04	70.0	0.43	1.10	983.870	302	83	80	0.66	2.92	101.2
3-05	75.0	0.47	1.20	986.990	302	85	80	0.69	3.12	103.3
LEAK CHECK	75.0			987.120						
2-01	80.0	0.36	0.89	989.800	301	83	80	0.60	2.68	101.4
2-02	85.0	0.30	0.74	992.210	301	84	80	0.55	2.41	99.8
2-03	90.0	0.30	0.74	994.620	301	86	80	0.55	2.41	99.6
2-04	95.0	0.38	0.94	997.350	302	84	80	0.62	2.73	100.5
2-05	100.0	0.51	1.30	1000.550	301	85	81	0.71	3.20	101.5
LEAK CHECK	100.0			1000.605						
1-01	105.0	0.39	0.96	1003.360	300	86	81	0.62	2.76	99.7
1-02	110.0	0.44	1.10	1006.310	301	86	81	0.66	2.95	100.6
1-03	115.0	0.40	0.99	1009.100	298	87	82	0.63	2.79	99.4
1-04	120.0	0.37	0.91	1011.830	301	88	82	0.61	2.73	101.2
1-05	125.0	0.41	1.00	1014.675	300	88	82	0.64	2.84	100.2
Final	125.0									
25 points sampled		Sq.Rt. ΔP:								
QC-Check: Field Averages		0.6280	0.9848	69.5300	301.1200	81.7800				

☒ 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: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000

Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505

Test Date: 3/29/11

Start Time: 10:15

Stop Time: 15:00

Leak Rate Before: 0.007 cfm @ 12 "Hg

Leak Rate After: 0.005 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -10.3

O₂ (dry volume %): 8.96

CO₂ (dry volume %): 10.49

N₂+CO (dry volume %): 80.55

Nozzle ID No: 270-2

Nozzle Diameter (D_n): 0.270

Probe ID No: 67-8-3

Pitot C_p: 0.830

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 407.8

H₂O (silica, g): 13.8

Actual Moisture (%): 23.26

Meter Box ID. No: 66-7

Meter ΔH@: 1.76970

Meter Y_d: 0.99610

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
						T _{m-in} (°F)	T _{m-out} (°F)			
	0.0			15.145						
5-01	5.0	0.24	0.60	17.330	299	83	82	0.49	2.19	100.7
5-02	10.0	0.37	0.93	20.040	301	83	82	0.61	2.71	100.8
5-03	15.0	0.43	1.10	23.040	301	86	83	0.66	3.00	103.2
5-04	20.0	0.49	1.20	26.130	302	86	83	0.70	3.09	99.7
5-05	25.0	0.56	1.40	29.525	303	87	83	0.75	3.40	102.5
LEAK CHECK	25.0			29.585						
4-01	30.0	0.40	1.00	32.460	299	87	83	0.63	2.88	102.3
4-02	35.0	0.24	0.60	34.630	301	88	83	0.49	2.17	99.6
4-03	40.0	0.33	0.83	37.170	302	87	83	0.57	2.54	99.7
4-04	45.0	0.52	1.30	40.460	302	88	84	0.72	3.29	102.8
4-05	50.0	0.46	1.20	43.560	303	90	84	0.68	3.10	102.8
LEAK CHECK	50.0			43.595						
3-01	55.0	0.31	0.78	46.000	300	83	82	0.56	2.41	97.7
3-02	60.0	0.36	0.90	48.700	302	84	82	0.60	2.70	101.8
3-03	65.0	0.42	1.10	51.690	302	86	82	0.65	2.99	104.2
3-04	70.0	0.43	1.10	54.680	302	86	82	0.66	2.99	103.0
3-05	75.0	0.35	0.88	57.310	301	87	82	0.59	2.63	100.2
LEAK CHECK	75.0			57.380						
2-01	80.0	0.25	0.63	59.580	300	86	83	0.50	2.20	99.1
2-02	85.0	0.27	0.68	61.900	300	82	81	0.52	2.32	101.1
2-03	90.0	0.24	0.60	64.010	299	83	81	0.49	2.11	97.4
2-04	95.0	0.36	0.90	66.660	300	84	81	0.60	2.65	99.9
2-05	100.0	0.44	1.10	69.600	301	84	81	0.66	2.94	100.4
LEAK CHECK	100.0			69.655						
1-01	105.0	0.37	0.93	72.380	300	87	82	0.61	2.72	101.0
1-02	110.0	0.36	0.90	75.050	301	85	81	0.60	2.67	100.6
1-03	115.0	0.29	0.73	77.400	298	86	81	0.54	2.35	98.3
1-04	120.0	0.33	0.83	79.950	300	85	82	0.57	2.55	100.2
1-05	125.0	0.41	1.00	82.765	300	85	82	0.64	2.82	99.3
Final	125.0		0.92880	67.40000	300.76000	83.86000		0.60340	67.40000	

25 points sampled

Sq. Rt. ΔP:

QC-Check: Field Averages

0.6034 0.9288 67.4000 300.7600 83.8600

☒ 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 1 FF Outlet
Test Run: 3
Client: Wheelabrator South Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505

Bar. Press. (in. Hg): 30.00
Static P: -10.0
O₂ (dry volume %): 9.43
CO₂ (dry volume %): 10.29
N₂+CO (dry volume %): 80.28

Nozzle ID No: 270-2
Nozzle Diameter (D_n): 0.270
Probe ID No: 67-8-3
Pitot C_p: 0.830
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/29/11
Start Time: 15:16
Stop Time: 17:27
Leak Rate Before: 0.003 cfm @ 12" Hg
Leak Rate After: 0.004 cfm @ 10" Hg

H₂O (condensate, ml or gm): 439.1
H₂O (silica, g): 16.7
Actual Moisture (%): 23.29

Meter Box ID. No: 66-7
Meter ΔH@: 1.76970
Meter Y_d: 0.99610

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
5-01	5.0	0.30	0.75	83.215	303	83	82	0.55	2.46	101.5
5-02	10.0	0.33	0.83	88.200	302	83	82	0.57	2.53	99.7
5-03	15.0	0.35	0.88	90.840	301	84	82	0.59	2.64	100.9
5-04	20.0	0.45	1.10	93.830	305	87	84	0.67	2.99	100.6
5-05	25.0	0.42	1.10	96.790	303	85	82	0.65	2.96	103.3
LEAK CHECK	25.0			96.840						
4-01	30.0	0.37	0.93	99.580	300	84	81	0.61	2.74	101.9
4-02	35.0	0.34	0.85	102.150	302	84	81	0.58	2.57	99.8
4-03	40.0	0.43	1.10	105.130	302	83	81	0.66	2.98	103.0
4-04	45.0	0.50	1.30	108.400	302	84	81	0.71	3.27	104.8
4-05	50.0	0.51	1.30	111.640	302	85	81	0.71	3.24	102.7
LEAK CHECK	50.0			111.710						
3-01	55.0	0.35	0.88	114.330	303	83	80	0.59	2.62	100.5
3-02	60.0	0.38	0.95	117.080	303	83	80	0.62	2.75	101.3
3-03	65.0	0.41	1.00	119.870	302	83	80	0.64	2.79	98.9
3-04	70.0	0.48	1.20	123.050	303	83	80	0.69	3.18	104.3
3-05	75.0	0.58	1.40	126.390	304	83	79	0.76	3.34	99.8
LEAK CHECK	75.0			126.455						
2-01	80.0	0.47	1.20	129.560	304	84	81	0.69	3.11	102.8
2-02	85.0	0.37	0.93	132.300	304	84	80	0.61	2.74	102.2
2-03	90.0	0.42	1.10	135.210	302	83	80	0.65	2.91	101.9
2-04	95.0	0.41	1.00	138.060	302	83	80	0.64	2.85	101.0
2-05	100.0	0.62	1.60	141.590	303	85	80	0.79	3.53	101.8
LEAK CHECK	100.0			141.652						
1-01	105.0	0.38	0.95	144.380	301	83	80	0.62	2.73	100.3
1-02	110.0	0.35	0.88	146.970	301	83	80	0.59	2.59	99.2
1-03	115.0	0.47	1.20	150.080	300	83	79	0.69	3.11	102.9
1-04	120.0	0.42	1.10	153.010	301	83	80	0.65	2.93	102.5
1-05	125.0	0.45	1.10	155.920	301	84	80	0.67	2.91	98.3
Final	125.0									
25 points sampled		Sq.Rt. ΔP								
QC-Check: Field Averages		0.6474	1.0652	72.4600	302.2400	82.1600				

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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USEPA Method 3 Laboratory Data

Location: Unit 1 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Method: EPA Method 3A

Fuel Type: Municipal Waste

F_o for Fuel: 1.03 to 1.3

Test Method: USEPA Method 5/29
Analyte: Particulate/Metals

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:		10.07000		8.97000	80.96000	29.97000	1.18471	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.49000		8.96000	80.55000	30.03680	1.13823	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.29000		9.43000	80.28000	30.02360	1.11467	☒ Fo value within expected range.
	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
Client: Wheelabrator South Broward, Inc.
Project No: 11182

Test Method: USEPA Method 5/29
Analyte: Particulate/Metals
Analyst: R. Vicere
Analyst Emp No: 563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	717.3	434.7	282.6		
Impinger 2	5%HNO3/10%H2O2	684.3	571.5	112.8		
Impinger 3	5%HNO3/10%H2O2	555.3	530.7	24.6		
Impinger 4	Empty	432.9	429.3	3.6		
Impinger 5	4%KMnO4/10%H2SO4	547.3	544.9	2.4		
Impinger 6	4%KMnO4/10%H2SO4	554.2	553.1	1.1	427.1 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	798.9	787.3	11.6	0.0 less rinse (gm)	
Impinger 8					427.1 Net Liquid (gm)	427.1 ☒ QA/QC OK
					+ 11.6 Silica Gel (gm)	11.6 ☒ QA/QC OK
					438.7 Total Vlc (gm)	438.7 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	722.1	439.0	283.1		
Impinger 2	5%HNO3/10%H2O2	637.8	538.1	99.7		
Impinger 3	5%HNO3/10%H2O2	556.6	535.3	21.3		
Impinger 4	Empty	439.0	437.8	1.2		
Impinger 5	4%KMnO4/10%H2SO4	548.0	546.5	1.5		
Impinger 6	4%KMnO4/10%H2SO4	605.9	604.9	1.0	407.8 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	845.0	831.2	13.8	0.0 less rinse (gm)	
Impinger 8					407.8 Net Liquid (gm)	407.8 ☒ QA/QC OK
					+ 13.8 Silica Gel (gm)	13.8 ☒ QA/QC OK
					421.6 Total Vlc (gm)	421.6 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	788.6	451.2	337.4		
Impinger 2	5%HNO3/10%H2O2	655.2	564.1	91.1		
Impinger 3	5%HNO3/10%H2O2	576.9	568.4	8.5		
Impinger 4	Empty	452.7	450.6	2.1		
Impinger 5	4%KMnO4/10%H2SO4	538.1	537.8	0.3		
Impinger 6	4%KMnO4/10%H2SO4	530.4	530.7	-0.3	439.1 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	733.2	716.5	16.7	0.0 less rinse (gm)	
Impinger 8					439.1 Net Liquid (gm)	439.1 ☒ QA/QC OK
					+ 16.7 Silica Gel (gm)	16.7 ☒ QA/QC OK
					455.8 Total Vlc (gm)	455.8 ☒ QA/QC OK
	Rinse:		(ml or gm)			

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						
					Liquid (gm)	Field Data Check
					less rinse (gm)	
					Net Liquid (gm)	☐ QA/QC OK
					Silica Gel (gm)	☐ QA/QC OK
					Total Vlc (gm)	☐ QA/QC OK
	Rinse:		(ml or gm)			

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Field Data Printout

Test Method: USEPA Method 13B
Analyte: Total Fluorides

Location: Unit 1 FF Outlet

Test Run: 1

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator:	N. Hitchins	569

Probe Operator:	B. Arnold	770

Test Date: 3/28/11

Start Time:	12:03

Stop Time:	13:12

Leak Rate Before:	0.003	cfm	@ 15 "Hg

Leak Rate After:	0.002	cfm	@ 6 "Hg

Bar. Press. (in. Hg): 29.95

Static P:	-11.3

O₂ (dry volume %): 9.61

CO₂ (dry volume %): 10.04

N₂+CO (dry volume %): 80.35

Nozzle ID No: 274-1

Nozzle Diameter (D_n): 0.274

Probe ID No: 67-8-14

Pitot C_p : 0.812

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 215.1

H₂O (silica, g): 23.3

Actual Moisture (%): 22.81

Meter Box ID. No: 66-21

Meter $\Delta H@$: 1.82520Meter Y_d: 0.98370

Traverse Point	Run Time 2.5 min/read	Pitot ΔP_s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T_s (°F)	Dry Gas Meter T_{m-in} T_{m-out} (°F) (°F)		ΔP_s (calculated) (in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			612.410						
1-01	2.5	0.47	1.20	613.990	296	75	74	0.69	1.58	103.0
1-02	5.0	0.49	1.30	615.590	296	75	74	0.70	1.60	102.2
1-03	7.5	0.34	0.90	616.930	296	76	74	0.58	1.34	102.5
1-04	10.0	0.36	0.95	618.340	291	77	74	0.60	1.41	104.4
1-05	12.5	0.55	1.50	620.155	296	78	74	0.74	1.81	109.1
LEAK CHECK	12.5			620.290						
2-01	15.0	0.51	1.40	621.870	294	81	75	0.71	1.58	98.2
2-02	17.5	0.40	1.10	623.340	297	82	75	0.63	1.47	103.1
2-03	20.0	0.41	1.10	624.810	296	83	76	0.64	1.47	101.6
2-04	22.5	0.51	1.40	626.470	298	84	76	0.71	1.66	103.0
2-05	25.0	0.60	1.60	627.905	299	86	77	0.77	1.43	82.0*
LEAK CHECK	25.0			628.030						
3-01	27.5	0.47	1.20	629.950	297	86	77	0.69	1.92	123.6*
3-02	30.0	0.38	1.00	631.400	297	87	77	0.62	1.45	103.7
3-03	32.5	0.40	1.10	632.900	298	88	78	0.63	1.50	104.4
3-04	35.0	0.47	1.20	634.450	298	89	79	0.69	1.55	99.4
3-05	37.5	0.58	1.50	636.185	298	90	79	0.76	1.73	100.1
LEAK CHECK	37.5			636.415						
4-01	40.0	0.47	1.20	638.010	297	88	80	0.69	1.60	102.2
4-02	42.5	0.41	1.10	639.510	299	90	80	0.64	1.50	102.9
4-03	45.0	0.49	1.30	641.120	299	90	81	0.70	1.61	100.9
4-04	47.5	0.49	1.30	642.740	297	91	81	0.70	1.62	101.3
4-05	50.0	0.50	1.30	644.330	295	92	81	0.71	1.59	98.2
LEAK CHECK	50.0			644.465						
5-01	52.5	0.40	1.10	645.990	295	91	82	0.63	1.52	105.3
5-02	55.0	0.40	1.10	647.480	299	93	83	0.63	1.49	102.9
5-03	57.5	0.50	1.30	649.080	298	93	83	0.71	1.60	98.8
5-04	60.0	0.55	1.50	650.800	300	94	84	0.74	1.72	101.3
5-05	62.5	0.55	1.50	652.525	300	94	84	0.74	1.73	101.5
Final	62.5		1.24600	39.49000	297.04000	82.22000		0.68223	39.49000	

25 points sampled
QC-Check: Field Averages

$$Sq.\check{R}t.\Delta P$$

0.6822

1.2460

39.49

0	29

0400	

82.220

☒ Avg. 0☒ Avg: 0☒ Avg. OI☒

q: OK

☒ Avg.

042811 102720
R

Field Data Printout

Test Method: USEPA Method 13B
Analyte: Total Fluorides

Location: Unit 1 FF Outlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchens 569
Probe Operator: B. Arnold 770
Test Date: 3/28/11
Start Time: 13:33
Stop Time: 14:44
Leak Rate Before: 0.006 cfm @ 15 "Hg
Leak Rate After: 0.004 cfm @ 8 "Hg

Bar. Press. (in. Hg): 29.95
Static P: -11.3
O₂ (dry volume %): 9.54
CO₂ (dry volume %): 10.08
N₂+CO (dry volume %): 80.38

Nozzle ID No: 274-1
Nozzle Diameter (D_n): 0.274
Probe ID No: 67-8-14
Pitot C_p: 0.812
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 222.9
H₂O (silica, g): 16.7
Actual Moisture (%): 22.95

Meter Box ID: No: 66-21
Meter ΔH@: 1.82520
Meter Y_d: 0.98370

Traverse Point	Run Time 2.5 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
5-01	2.5	0.41	1.10	653.040	300	89	86	0.64	1.58	108.1
5-02	5.0	0.41	1.10	656.110	299	90	87	0.64	1.49	101.7
5-03	7.5	0.48	1.30	657.710	300	90	86	0.69	1.60	101.1
5-04	10.0	0.55	1.50	659.420	299	92	86	0.74	1.71	100.8
5-05	12.5	0.51	1.40	661.135	301	93	87	0.71	1.72	104.9
LEAK CHECK	12.5			661.275						
4-01	15.0	0.49	1.30	662.920	300	93	87	0.70	1.64	102.5
4-02	17.5	0.40	1.10	664.460	300	94	87	0.63	1.54	106.1
4-03	20.0	0.42	1.10	665.960	300	94	87	0.65	1.50	100.8
4-04	22.5	0.55	1.50	667.670	300	94	87	0.74	1.71	100.5
4-05	25.0	0.60	1.60	669.485	300	95	87	0.77	1.82	102.1
LEAK CHECK	25.0			669.625						
3-01	27.5	0.52	1.40	671.290	299	94	88	0.72	1.66	100.5
3-02	30.0	0.38	1.00	672.780	302	95	87	0.62	1.49	105.3
3-03	32.5	0.43	1.10	674.270	303	94	87	0.66	1.49	99.2
3-04	35.0	0.48	1.30	675.870	300	95	87	0.69	1.60	100.6
3-05	37.5	0.55	1.50	677.590	300	95	87	0.74	1.72	101.0
LEAK CHECK	37.5			677.720						
2-01	40.0	0.48	1.30	679.500	299	93	87	0.69	1.78	112.0*
2-02	42.5	0.40	1.10	681.000	300	94	87	0.63	1.50	103.3
2-03	45.0	0.38	1.00	682.460	297	94	88	0.62	1.46	102.9
2-04	47.5	0.48	1.30	684.110	301	94	88	0.69	1.65	103.8
2-05	50.0	0.66	1.70	685.945	303	95	88	0.81	1.84	98.6
LEAK CHECK	50.0			686.095						
1-01	52.5	0.31	0.82	687.400	299	94	88	0.56	1.30	101.9
1-02	55.0	0.42	1.10	688.910	299	94	88	0.65	1.51	101.3
1-03	57.5	0.40	1.10	690.420	294	95	88	0.63	1.51	103.4
1-04	60.0	0.38	1.00	691.890	297	95	88	0.62	1.47	103.5
1-05	62.5	0.58	1.50	693.575	299	95	88	0.76	1.69	96.2
Final	62.5		1.24880	39.97500	299.64000	90.42000		0.68064	39.97500	

25 points sampled
QC-Check: Field Averages

Sq.Rt.LAP	0.6806	1.2488	39.9750	299.6400	90.4200
✓ Avg. OK	✓ Avg. OK	✓ Avg. OK	✓ Avg. OK	✓ Avg. OK	✓ Avg. OK

042611 102720
N

Field Data Printout

Test Method: USEPA Method 13B
Analyte: Total Fluorides

Location: Unit 1 FF Outlet
Test Run: 3
Client: Wheelabrator South Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: B. Arnold 770
Test Date: 3/28/11
Start Time: 15:02
Stop Time: 16:11
Leak Rate Before: 0.005 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 7 "Hg

Bar. Press. (in. Hg): 29.95
Static P: -11.3
O₂ (dry volume %): 9.29
CO₂ (dry volume %): 10.33
N₂+CO (dry volume %): 80.38

Nozzle ID No: 274-1
Nozzle Diameter (D_n): 0.274
Probe ID No: 67-8-14
Pitot C_p: 0.812
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 218.5
H₂O (silica, g): 14.6
Actual Moisture (%): 22.89

Meter Box ID. No: 66-21
Meter ΔH@: 1.82520
Meter Y_d: 0.98370

Traverse Point	Run Time 2.5 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			694.130						
1-01	2.5	0.40	1.10	695.770	299	89	87	0.63	1.64	113.4*
1-02	5.0	0.50	1.30	697.250	299	90	87	0.71	1.48	91.5
1-03	7.5	0.40	1.10	698.880	296	90	87	0.63	1.63	112.4*
1-04	10.0	0.38	1.00	700.340	299	91	87	0.62	1.46	103.3
1-05	12.5	0.61	1.60	702.110	301	92	87	0.78	1.77	99.1
LEAK CHECK	12.5			702.255						
2-01	15.0	0.52	1.40	703.950	301	92	87	0.72	1.70	102.7
2-02	17.5	0.38	1.00	705.420	302	93	87	0.62	1.47	104.1
2-03	20.0	0.32	0.85	706.760	299	93	87	0.57	1.34	103.1
2-04	22.5	0.42	1.10	708.270	298	93	87	0.65	1.51	101.4
2-05	25.0	0.55	1.50	709.995	300	94	87	0.74	1.73	101.4
LEAK CHECK	25.0			710.145						
3-01	27.5	0.36	0.95	711.550	300	92	87	0.60	1.40	102.1
3-02	30.0	0.40	1.10	713.040	301	93	87	0.63	1.49	102.8
3-03	32.5	0.43	1.10	714.540	302	95	88	0.66	1.50	99.6
3-04	35.0	0.50	1.30	716.150	301	95	88	0.71	1.61	99.1
3-05	37.5	0.52	1.40	717.825	301	96	88	0.72	1.68	101.0
LEAK CHECK	37.5			717.975						
4-01	40.0	0.48	1.30	719.610	301	95	88	0.69	1.63	102.7
4-02	42.5	0.37	0.98	721.040	302	96	89	0.61	1.43	102.1
4-03	45.0	0.42	1.10	722.550	301	96	89	0.65	1.51	101.2
4-04	47.5	0.46	1.20	724.110	301	96	89	0.68	1.56	99.9
4-05	50.0	0.52	1.40	725.790	300	95	88	0.72	1.68	101.4
LEAK CHECK	50.0			725.920						
5-01	52.5	0.38	1.00	727.400	300	94	88	0.62	1.48	104.4
5-02	55.0	0.38	1.00	728.860	302	94	89	0.62	1.46	103.1
5-03	57.5	0.45	1.20	730.410	301	94	89	0.67	1.55	100.5
5-04	60.0	0.52	1.40	732.090	301	94	88	0.72	1.68	101.5
5-05	62.5	0.50	1.30	733.745	301	94	88	0.71	1.65	102.0
Final	62.5		1.18720	39.04000	300.36000	90.58000		0.66637	39.04000	

25 points sampled

QC-Check: Field Averages

Sq. RL ΔP

0.6664 1.1872 39.0400 300.3600 90.5800

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

042611 102720
P

USEPA Method 3 Laboratory Data

Location: Unit 1 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Method: EPA Method 3A

Fuel Type: Municipal Waste

F_o for Fuel: 1.03 to 1.3

Test Method:

USEPA Method 13B

Analyte:

Total Fluorides

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:		10.04000		9.61000	80.35000	29.99080	1.12450	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.08000		9.54000	80.38000	29.99440	1.12698	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.33000		9.29000	80.38000	30.02440	1.12391	☒ Fo value within expected range.
	1							
	2							
	3							
Avg.								
CEM or Other Avg:								☐ Fo value within expected range.

042611 102720
RNP®

USEPA Method 4 Laboratory Data

Location: Unit 1 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Test Method: USEPA Method 13B

Analyte: Total Fluorides

Analyst: R. Vicere

Analyst Emp No: 563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	748.5	634.4	114.1
Impinger 2	DI Water	624.2	544.8	79.4
Impinger 3	Empty	478.3	456.7	21.6
Impinger 4	Silica Gel	757.9	734.6	23.3
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

215.1 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

215.1 Net Liquid (gm)

215.1

☒ QA/QC OK

+ 23.3 Silica Gel (gm)

23.3

☒ QA/QC OK

238.4 Total Vlc (gm)

238.4

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	674.7	546.5	128.2
Impinger 2	DI Water	635.1	563.7	71.4
Impinger 3	Empty	466.5	443.2	23.3
Impinger 4	Silica Gel	806.5	789.8	16.7
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

222.9 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

222.9 Net Liquid (gm)

222.9

☒ QA/QC OK

+ 16.7 Silica Gel (gm)

16.7

☒ QA/QC OK

239.6 Total Vlc (gm)

239.6

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	758.6	635.2	123.4
Impinger 2	DI Water	622.5	544.4	78.1
Impinger 3	Empty	473.9	456.9	17.0
Impinger 4	Silica Gel	772.4	757.8	14.6
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

218.5 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

218.5 Net Liquid (gm)

218.5

☒ QA/QC OK

+ 14.6 Silica Gel (gm)

14.6

☒ QA/QC OK

233.1 Total Vlc (gm)

233.1

☒ QA/QC OK

Rinse: (ml or gm)

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water			
Impinger 2	DI Water			
Impinger 3	Empty			
Impinger 4	Silica Gel			
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

Liquid (gm)

Field Data Check

less rinse (gm)

Net Liquid (gm)

☐ QA/QC OK

Silica Gel (gm)

☐ QA/QC OK

Total Vlc (gm)

☐ QA/QC OK

Rinse: (ml or gm)

042611 102720
RNP

Field Data Printout

Test Method: 3EPA Modified Method 26A

Analyte: HCl

Location: Unit 1 SDA Inlet

Test Run: 1

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 60.13205

Meter Operator: B. Arnold 770

Probe Operator:

Test Date: 3/28/11

Start Time: 07:48

Stop Time: 08:48

Leak Rate Before: 0.004 cfm @ 15 "Hg

Leak Rate After: 0.005 cfm @ 19 "Hg

Bar. Press. (in. Hg): 29.95

Static P: -2.1

O₂ (dry volume %): 8.39

CO₂ (dry volume %): 10.90

N₂+CO (dry volume %): 80.71

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-5

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 155.4

H₂O (silica, g): 19.9

Actual Moisture (%): 18.95

Meter Box ID. No: 66-4

Meter ΔH@: 1.69790

Meter Y_d: 0.99830

Traverse Point	Run Time	Pitot	Sample	Metered	Stack	Dry Gas Meter		$\sqrt{\Delta P_s}$	Volume	Isokinetics
	5.0 min/read	ΔP_s	ΔH	(dcf)	T_s	T_{m-in}	T_{m-out}	(calculated)	(calculated)	(calculated)
	0.0	(in. H ₂ O)	(in. H ₂ O)		(°F)	(°F)	(°F)	($\sqrt{\text{in. H}_2\text{O}}$)	(ft ³)	(%)
1-01	5.0		1.20	934.110	485	85	85		2.89	
1-01	10.0		1.20	937.130	485	87	86		3.02	
1-01	15.0		1.20	940.170	485	89	88		3.04	
1-01	20.0		1.20	943.240	486	91	88		3.07	
1-01	25.0		1.20	946.290	486	92	88		3.05	
1-01	30.0		1.20	949.390	487	93	90		3.10	
1-01	35.0		1.20	952.470	487	93	90		3.08	
1-01	40.0		1.20	955.550	486	93	90		3.08	
1-01	45.0		1.20	958.650	487	95	90		3.10	
1-01	50.0		1.20	961.760	485	95	90		3.11	
1-01	55.0		1.20	964.840	482	95	90		3.08	
1-01	60.0		1.20	967.920	483	95	90		3.08	
Final	60.0		1.20000	36.70000	485.33333	90.33333		0.00000	36.70000	
1 points sampled										
QC-Check: Field Averages										
Sq:RLΔP			1.2000	36.7000	485.3333	90.3333				

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

042611 102735
N

Field Data Printout

Test Method: 3EPA Modified Method 26A

Analyte: HCl

Location: Unit 1 SDA Inlet

Test Run: 2

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 60.13205

Meter Operator: B. Arnold 770

Probe Operator:

Test Date: 3/28/11

Start Time: 09:11

Stop Time: 10:11

Leak Rate Before: 0.002 cfm @ 15 "Hg

Leak Rate After: 0.003 cfm @ 20 "Hg

Bar. Press. (in. Hg): 29.95

Static P: -1.9

O₂ (dry volume %): 8.50

CO₂ (dry volume %): 10.88

N₂+CO (dry volume %): 80.62

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-5

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 160.3

H₂O (silica, g): 13.2

Actual Moisture (%): 18.79

Meter Box ID. No: 66-4

Meter ΔH@: 1.69790

Meter Y_a: 0.99830

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} T _{m-out} (°F) (°F)		√ΔP _s (calculated) (in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			968.093						
1-01	5.0		1.20	971.180	484	95	94		3.09	
1-01	10.0		1.20	974.390	484	96	95		3.21	
1-01	15.0		1.20	977.370	483	96	95		2.98	
1-01	20.0		1.20	980.440	480	99	95		3.07	
1-01	25.0		1.20	983.540	483	100	96		3.10	
1-01	30.0		1.20	986.670	487	100	96		3.13	
1-01	35.0		1.20	989.770	485	100	96		3.10	
1-01	40.0		1.20	992.850	484	101	97		3.08	
1-01	45.0		1.20	995.980	486	101	97		3.13	
1-01	50.0		1.20	999.080	485	101	97		3.10	
1-01	55.0		1.20	1002.190	486	100	97		3.11	
1-01	60.0		1.20	1005.290	486	100	97		3.10	
Final	60.0		1.20000	37.19700	484.41667	97.54167		0.00000	37.19700	

1 points sampled

Sq. Rt. ΔP

QC-Check: Field Averages

1.2000	37.1970	484.4166	97.5416

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

042611 102738
M

Field Data Printout

Test Method: 3EPA Modified Method 26A

Analyte: HCl

Location: Unit 1 SDA Inlet
 Test Run: 3
 Client: Wheelabrator South Broward, Inc.
 Project No: 11182
 Source Area (ft²): 60.13205
 Meter Operator: B. Arnold 770
 Probe Operator:
 Test Date: 3/28/11
 Start Time: 10:35
 Stop Time: 11:35
 Leak Rate Before: 0.002 cfm @ 15 "Hg
 Leak Rate After: 0.003 cfm @ 20 "Hg

Bar. Press. (in. Hg): 29.95
 Static P: -2.0
 O₂ (dry volume %): 7.91
 CO₂ (dry volume %): 11.41
 N₂+CO (dry volume %): 80.68

Nozzle ID No: NA
 Nozzle Diameter (D_n): NA
 Probe ID No: 67-4-5
 Pitot C_p: NA
 Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 170.3
 H₂O (silica, g): 12.8
 Actual Moisture (%): 19.56

Meter Box ID. No: 66-4
 Meter ΔH@: 1.69790
 Meter Y_d: 0.99830

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
1-01	0.0		1.20	5.556	484	95	95		3.17	
1-01	5.0		1.20	8.730	483	97	95		2.97	
1-01	10.0		1.20	11.700	483	97	95		2.98	
1-01	15.0		1.20	14.680	486	91	91		3.05	
1-01	20.0		1.20	17.730	486	89	88		3.06	
1-01	25.0		1.20	20.790	484	88	87		3.08	
1-01	30.0		1.20	23.870	489	86	86		3.04	
1-01	35.0		1.20	26.910	487	86	85		3.06	
1-01	40.0		1.20	29.970	484	80	80		3.07	
1-01	45.0		1.20	33.040	485	80	80		3.01	
1-01	50.0		1.20	36.050	483	76	76		3.05	
1-01	55.0		1.20	39.100	484	77	76		3.06	
1-01	60.0		1.20	42.160						
Final	60.0		1.20000	36.60400	484.83333	86.50000		0.00000	36.60400	

1 points sampled
 QC Check: Field Averages
 Sq.Rt. ΔP

1.2000	36.6040	484.8333	86.5000

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

642611 102739
 N

USEPA Method 3 Laboratory Data

Location: Unit 1 SDA Inlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Method: EPA Method 3A

Fuel Type: Municipal Waste

F_o for Fuel: 1.03 to 1.3

Test Method: EPA Modified Method 26A

Analyte:

HCl

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:		10.90000		8.39000	80.71000	30.07960	1.14771	☒ Fo value within expected range.
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.88000		8.50000	80.62000	30.08080	1.13971	☒ Fo value within expected range.
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		11.41000		7.91000	80.68000	30.14200	1.13848	☒ Fo value within expected range.
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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NMN @

USEPA Method 4 Laboratory Data

Test Method: SEPA Modified Method 26A

Location: Unit 1 SDA Inlet

Analyte: HCl

Client: Wheelabrator South Broward, Inc.

Analyst: D. Luckhard

Project No: 11182

Analyst Emp No: 568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H ₂ SO ₄	476.8	459.2	17.6
Impinger 2	100 ml 0.1N H ₂ SO ₄	625.9	537.7	88.2
Impinger 3	100 ml 0.1N H ₂ SO ₄	589.6	551.7	37.9
Impinger 4	Empty	535.6	523.9	11.7
Impinger 5	Silica Gel	776.6	756.7	19.9
Impinger 6				
Impinger 7				
Impinger 8				

155.4 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

155.4 Net Liquid (gm)

155.4

+ 19.9 Silica Gel (gm)

19.9

175.3 Total Vlc (gm)

175.3

☒ QA/QC OK☒ QA/QC OK☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H ₂ SO ₄	498.0	457.9	40.1
Impinger 2	100 ml 0.1N H ₂ SO ₄	645.1	555.4	89.7
Impinger 3	100 ml 0.1N H ₂ SO ₄	575.2	550.7	24.5
Impinger 4	Empty	448.9	442.9	6.0
Impinger 5	Silica Gel	764.9	751.7	13.2
Impinger 6				
Impinger 7				
Impinger 8				

160.3 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

160.3 Net Liquid (gm)

160.3

+ 13.2 Silica Gel (gm)

13.2

173.5 Total Vlc (gm)

173.5

☒ QA/QC OK☒ QA/QC OK☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H ₂ SO ₄	517.3	461.1	56.2
Impinger 2	100 ml 0.1N H ₂ SO ₄	634.3	541.2	93.1
Impinger 3	100 ml 0.1N H ₂ SO ₄	569.8	553.4	16.4
Impinger 4	Empty	530.0	525.4	4.6
Impinger 5	Silica Gel	789.4	776.6	12.8
Impinger 6				
Impinger 7				
Impinger 8				

170.3 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

170.3 Net Liquid (gm)

170.3

+ 12.8 Silica Gel (gm)

12.8

183.1 Total Vlc (gm)

183.1

☒ QA/QC OK☒ QA/QC OK☒ QA/QC OK

Rinse: (ml or gm)

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				

Liquid (gm)

Field Data Check

less rinse (gm)

Net Liquid (gm)

Silica Gel (gm)

Total Vlc (gm)

☐ QA/QC OK☐ QA/QC OK☐ QA/QC OK

Rinse: (ml or gm)

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NMN@

Field Data Printout

Test Method: SEPA Modified Method 26A

Analyte: HCl

Location: Unit 1 FF Outlet

Test Run: 1

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569

Probe Operator:

Test Date: 3/28/11

Start Time: 07:48

Stop Time: 08:48

Leak Rate Before: 0.003 cfm @ 15 "Hg

Leak Rate After: 0.002 cfm @ 5 "Hg

Bar. Press. (in. Hg): 29.95

Static P: -11.0

O₂ (dry volume %): 9.47

CO₂ (dry volume %): 10.05

N₂+CO (dry volume %): 80.48

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-1

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 236.3

H₂O (silica, g): 17.2

Actual Moisture (%): 22.72

Meter Box ID. No: 66-7

Meter ΔH@: 1.76970

Meter Y_d: 0.99610

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} T _{m-out} (°F) (°F)		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			818.355						
3-01	5.0		1.50	821.900	302	81	77		3.54	
3-01	10.0		1.50	825.350	301	83	77		3.45	
3-01	15.0		1.50	828.760	300	86	77		3.41	
3-01	20.0		1.50	832.230	301	88	78		3.47	
3-01	25.0		1.50	835.690	300	89	79		3.46	
3-01	30.0		1.50	839.160	300	90	80		3.47	
3-01	35.0		1.50	842.680	301	91	81		3.52	
3-01	40.0		1.50	846.140	300	92	81		3.46	
3-01	45.0		1.50	849.740	301	93	82		3.60	
3-01	50.0		1.50	853.220	301	94	83		3.48	
3-01	55.0		1.50	856.720	301	94	83		3.50	
3-01	60.0		1.50	860.215	301	95	84		3.50	
Final	60.0		1.50000	41.86000	300.75000	84.91667		0.00000	41.86000	

3 points sampled

Sq. Rt. ΔP

QC-Check: Field Averages

	1.5000	41.8600	300.7500	84.9167

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

042611 102755

L

Field Data Printout

Test Method: 3EPA Modified Method 26A

Analyte: HCl

Location: Unit 1 FF Outlet

Test Run: 2

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569

Probe Operator:

Test Date: 3/28/11

Start Time: 09:11

Stop Time: 10:11

Leak Rate Before: 0.003 cfm @ 15 "Hg

Leak Rate After: 0.002 cfm @ 6 "Hg

Bar. Press. (in. Hg): 29.95

Static P: -12.3

O₂ (dry volume %): 9.77

CO₂ (dry volume %): 9.76

N₂+CO (dry volume %): 80.47

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-1

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 232.3

H₂O (silica, g): 12.9

Actual Moisture (%): 22.23

Meter Box ID. No: 66-7

Meter ΔH@: 1.76970

Meter Y_d: 0.99610

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			860.635						
3-01	5.0		1.50	864.110	303	85	85		3.48	
3-01	10.0		1.50	867.660	304	87	85		3.55	
3-01	15.0		1.50	871.980	304	89	85		4.32	
3-01	20.0		1.50	874.500	304	89	85		2.52	
3-01	25.0		1.50	878.000	304	89	85		3.50	
3-01	30.0		1.50	881.500	305	90	85		3.50	
3-01	35.0		1.50	885.090	305	90	85		3.59	
3-01	40.0		1.50	888.510	304	91	85		3.42	
3-01	45.0		1.50	891.970	303	91	86		3.46	
3-01	50.0		1.50	895.480	303	91	86		3.51	
3-01	55.0		1.50	898.960	304	91	86		3.48	
3-01	60.0		1.50	902.460	303	90	86		3.50	
Final	60.0		1.50000	41.82500	303.83333	87.37500		0.00000	41.82500	

3 points sampled
QC-Check: Field Averages

Sq.Rt. ΔP	1.5000	41.8250	303.8333	87.3750

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

942811 102755
K

Field Data Printout

Test Method: **3EPA Modified Method 26A**
 Analyte: **HCl**

Location: Unit 1 FF Outlet

Test Run: 3

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569

Probe Operator:

Test Date: 3/28/11

Start Time: 10:35

Stop Time: 11:35

Leak Rate Before: 0.003 cfm @ 15 "Hg

Leak Rate After: 0.002 cfm @ 6 "Hg

Bar. Press. (in. Hg): 29.95

Static P: -11.2

O₂ (dry volume %): 8.82

CO₂ (dry volume %): 10.57

N₂+CO (dry volume %): 80.61

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-1

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 248.2

H₂O (silica, g): 12.3

Actual Moisture (%): 23.38

Meter Box ID. No: 66-7

Meter ΔH@: 1.76970

Meter Y_d: 0.99610

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} T _{m-out} (°F) (°F)		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			903.195						
3-01	5.0		1.50	906.680	303	85	84		3.48	
3-01	10.0		1.50	909.970	302	85	83		3.29	
3-01	15.0		1.50	913.340	301	86	82		3.37	
3-01	20.0		1.50	916.750	302	87	81		3.41	
3-01	25.0		1.50	920.150	301	86	81		3.40	
3-01	30.0		1.50	923.590	301	86	81		3.44	
3-01	35.0		1.50	927.110	301	86	80		3.52	
3-01	40.0		1.50	930.620	302	85	80		3.51	
3-01	45.0		1.50	934.090	302	83	78		3.47	
3-01	50.0		1.50	937.590	301	83	78		3.50	
3-01	55.0		1.50	941.050	301	83	77		3.46	
3-01	60.0		1.50	944.465	301	83	76		3.42	
Final	60.0		1.50000	41.27000	301.50000	82.45833		0.00000	41.27000	

3 points sampled
 QC-Check: Field Averages

Sq.Rt.ΔP	1.5000	41.2700	301.5000	82.4583
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

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 L

USEPA Method 3 Laboratory Data

Location: Unit 1 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Method: EPA Method 3A

Fuel Type: Municipal Waste

F_o for Fuel: 1.03 to 1.3

Test Method: EPA Modified Method 26A

Analyte:

HCl

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:		10.05000		9.47000	80.48000	29.98680	1.13731	☒ Fo value within expected range.
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		9.76000		9.77000	80.47000	29.95240	1.14037	☒ Fo value within expected range.
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.57000		8.82000	80.61000	30.04400	1.14286	☒ Fo value within expected range.
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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LKL

USEPA Method 4 Laboratory Data

Location: Unit 1 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Test Method: SEPA Modified 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	530.4	463.6	66.8		
Impinger 2	100 ml 0.1N H2SO4	688.2	566.1	122.1		
Impinger 3	100 ml 0.1N H2SO4	585.2	544.1	41.1		
Impinger 4	Empty	444.9	438.6	6.3		
Impinger 5	Silica Gel	748.3	731.1	17.2		
Impinger 6					236.3 Liquid (gm)	Field Data Check
Impinger 7					0.0 less rinse (gm)	
Impinger 8					236.3 Net Liquid (gm)	236.3 ☒ QA/QC OK
					+ 17.2 Silica Gel (gm)	17.2 ☒ QA/QC OK
					253.5 Total Vlc (gm)	253.5 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	50 ml 0.1N H2SO4	525.9	455.0	70.9		
Impinger 2	100 ml 0.1N H2SO4	640.0	525.0	115.0		
Impinger 3	100 ml 0.1N H2SO4	574.1	535.8	38.3		
Impinger 4	Empty	456.3	448.2	8.1		
Impinger 5	Silica Gel	749.0	736.1	12.9		
Impinger 6					232.3 Liquid (gm)	Field Data Check
Impinger 7					0.0 less rinse (gm)	
Impinger 8					232.3 Net Liquid (gm)	232.3 ☒ QA/QC OK
					+ 12.9 Silica Gel (gm)	12.9 ☒ QA/QC OK
					245.2 Total Vlc (gm)	245.2 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	50 ml 0.1N H2SO4	549.0	454.2	94.8		
Impinger 2	100 ml 0.1N H2SO4	662.9	542.1	120.8		
Impinger 3	100 ml 0.1N H2SO4	576.2	550.3	25.9		
Impinger 4	Empty	435.7	429.0	6.7		
Impinger 5	Silica Gel	782.3	770.0	12.3		
Impinger 6					248.2 Liquid (gm)	Field Data Check
Impinger 7					0.0 less rinse (gm)	
Impinger 8					248.2 Net Liquid (gm)	248.2 ☒ QA/QC OK
					+ 12.3 Silica Gel (gm)	12.3 ☒ QA/QC OK
					260.5 Total Vlc (gm)	260.5 ☒ QA/QC OK
	Rinse:		(ml or gm)			

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						
					Liquid (gm)	Field Data Check
					less rinse (gm)	
					Net Liquid (gm)	☐ QA/QC OK
					Silica Gel (gm)	☐ QA/QC OK
					Total Vlc (gm)	☐ QA/QC OK
	Rinse:		(ml or gm)			

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LKL

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: 11182
Source Area (ft²): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505

Bar. Press. (in. Hg): 30.05
Static P: -10.0
O₂ (dry volume %): 8.04
CO₂ (dry volume %): 11.28
N₂+CO (dry volume %): 80.68

Nozzle ID No: 270-2
Nozzle Diameter (D_n): 0.270
Probe ID No: 67-8-3
Pitot C_p: 0.830
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/30/11
Start Time: 07:31
Stop Time: 09:42
Leak Rate Before: 0.002 cfm @ 13 "Hg
Leak Rate After: 0.003 cfm @ 10 "Hg

H₂O (condensate, ml or gm): 378.0
H₂O (silica, g): 14.2
Actual Moisture (%): 23.04

Meter Box ID. No: 61-6
Meter ΔH@: 1.76010
Meter Y_d: 0.99600

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			12.765						
5-01	5.0	0.32	0.74	15.190	302	76	75	0.57	2.43	98.2
5-02	10.0	0.34	0.79	17.700	300	77	75	0.58	2.51	98.4
5-03	15.0	0.42	0.97	20.440	301	80	76	0.65	2.74	96.4
5-04	20.0	0.37	0.86	23.130	300	81	76	0.61	2.69	100.7
5-05	25.0	0.31	0.72	25.530	301	82	77	0.56	2.40	98.0
LEAK CHECK	25.0			25.585						
4-01	30.0	0.32	0.74	28.010	300	82	77	0.57	2.43	97.4
4-02	35.0	0.32	0.74	30.430	301	83	78	0.57	2.42	97.1
4-03	40.0	0.34	0.79	32.940	301	85	79	0.58	2.51	97.4
4-04	45.0	0.35	0.81	35.500	301	84	79	0.59	2.56	98.0
4-05	50.0	0.34	0.79	37.990	301	85	79	0.58	2.49	96.6
LEAK CHECK	50.0			38.045						
3-01	55.0	0.21	0.49	40.000	301	84	79	0.46	1.96	96.6
3-02	60.0	0.30	0.70	42.370	301	84	80	0.55	2.37	97.9
3-03	65.0	0.30	0.70	44.710	301	85	80	0.55	2.34	96.6
3-04	70.0	0.38	0.95	47.490	301	85	80	0.62	2.78	102.0
3-05	75.0	0.37	0.93	50.230	298	86	80	0.61	2.74	101.6
LEAK CHECK	75.0			50.285						
2-01	80.0	0.31	0.78	52.770	299	85	81	0.56	2.49	100.7
2-02	85.0	0.32	0.80	55.330	299	86	81	0.57	2.56	102.0
2-03	90.0	0.35	0.88	57.900	300	86	82	0.59	2.57	97.9
2-04	95.0	0.34	0.85	60.600	300	87	82	0.58	2.70	104.3
2-05	100.0	0.35	0.88	63.285	301	88	82	0.59	2.69	102.2
LEAK CHECK	100.0			63.335						
1-01	105.0	0.29	0.73	65.750	300	87	83	0.54	2.42	100.8
1-02	110.0	0.30	0.75	68.210	299	88	83	0.55	2.46	100.8
1-03	115.0	0.31	0.78	70.750	300	88	84	0.56	2.54	102.4
1-04	120.0	0.34	0.88	73.410	300	89	84	0.58	2.66	102.3
1-05	125.0	0.37	0.93	76.170	300	89	84	0.61	2.76	101.8
Final	125.0									
				0.79920	63.19000	300.32000	82.16000	0.57411	63.19000	

25 points sampled	Sq.Rt.ΔP				
QC-Check: Field Averages	0.5741	0.7992	63.1900	300.3200	82.1600
	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

2RSD = 7.1%

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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: 11182
Source Area (ft²): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505
Test Date: 3/30/11
Start Time: 09:59
Stop Time: 12:10
Leak Rate Before: 0.005 cfm @ 13 "Hg
Leak Rate After: 0.004 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -9.8
O₂ (dry volume %): 8.52
CO₂ (dry volume %): 10.79
N₂+CO (dry volume %): 80.69

Nozzle ID No: 270-2
Nozzle Diameter (D_n): 0.270
Probe ID No: 67-8-3
Pitot C_p: 0.830
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 384.9
H₂O (silica, g): 13.4
Actual Moisture (%): 22.87

Meter Box ID. No: 61-6
Meter ΔH@: 1.76010
Meter Y_d: 0.99600

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			76.645						
5-01	5.0	0.28	0.70	79.030	300	86	85	0.53	2.39	101.0
5-02	10.0	0.30	0.75	81.470	300	87	85	0.55	2.44	99.7
5-03	15.0	0.36	0.90	84.170	300	88	85	0.60	2.70	100.7
5-04	20.0	0.38	0.95	86.970	300	90	86	0.62	2.80	101.3
5-05	25.0	0.40	1.00	89.870	302	90	86	0.63	2.90	102.4
LEAK CHECK	25.0			89.915						
4-01	30.0	0.31	0.78	92.430	299	89	86	0.56	2.52	100.8
4-02	35.0	0.30	0.75	94.890	299	89	86	0.55	2.46	100.2
4-03	40.0	0.30	0.75	97.330	299	90	86	0.55	2.44	99.3
4-04	45.0	0.33	0.83	99.920	300	90	86	0.57	2.59	100.6
4-05	50.0	0.33	0.83	102.520	301	90	86	0.57	2.60	101.0
LEAK CHECK	50.0			102.555						
3-01	55.0	0.28	0.70	104.930	302	88	86	0.53	2.38	100.4
3-02	60.0	0.30	0.75	107.390	299	89	86	0.55	2.46	100.2
3-03	65.0	0.33	0.83	109.990	300	89	86	0.57	2.60	101.0
3-04	70.0	0.36	0.90	112.700	300	89	86	0.60	2.71	100.8
3-05	75.0	0.38	0.95	115.510	301	90	86	0.62	2.81	101.8
LEAK CHECK	75.0			115.545						
2-01	80.0	0.38	0.95	118.330	300	89	86	0.62	2.79	100.9
2-02	85.0	0.36	0.90	121.030	300	90	86	0.60	2.70	100.4
2-03	90.0	0.38	0.95	123.800	300	90	86	0.62	2.77	100.2
2-04	95.0	0.42	1.10	126.760	301	89	85	0.65	2.96	102.2
2-05	100.0	0.38	0.95	129.545	301	90	85	0.62	2.78	101.0
LEAK CHECK	100.0			129.620						
1-01	105.0	0.30	0.75	132.050	301	89	86	0.55	2.43	99.1
1-02	110.0	0.28	0.70	134.420	301	89	86	0.53	2.37	100.0
1-03	115.0	0.32	0.80	136.960	299	88	85	0.57	2.54	100.3
1-04	120.0	0.34	0.85	139.620	300	88	85	0.58	2.66	102.0
1-05	125.0	0.34	0.85	142.250	300	88	85	0.58	2.63	100.9
Final	125.0									
25 points sampled		Sq. Rt. ΔP								
QC-Check: Field Averages		0.5800	0.8468	65.4150	300.2000	87.3200		0.58003	65.41500	
		☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK				

2RSD = 7.0%

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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: 11182
Source Area (ft²): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505
Test Date: 3/30/11
Start Time: 12:29
Stop Time: 14:41
Leak Rate Before: 0.003 cfm @ 13 "Hg
Leak Rate After: 0.003 cfm @ 10 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -10.0
O₂ (dry volume %): 8.46
CO₂ (dry volume %): 10.99
N₂+CO (dry volume %): 80.55

Nozzle ID No: 270-2
Nozzle Diameter (D_n): 0.270
Probe ID No: 67-8-3
Pitot C_p: 0.830
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 406.2
H₂O (silica, g): 12.9
Actual Moisture (%): 22.80

Meter Box ID. No: 61-6
Meter ΔH@: 1.76010
Meter Y_d: 0.99600

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
5-01	5.0	0.28	0.70	142.505	299	85	84	0.53	2.38	100.6
5-02	10.0	0.31	0.79	144.880	302	86	84	0.56	2.54	102.4
5-03	15.0	0.29	0.74	149.850	299	87	84	0.54	2.43	101.0
5-04	20.0	0.30	0.77	152.340	300	88	84	0.55	2.49	101.7
5-05	25.0	0.30	0.77	154.830	300	88	84	0.55	2.49	101.7
LEAK CHECK	25.0			154.885						
4-01	30.0	0.33	0.84	157.470	300	87	84	0.57	2.59	100.8
4-02	35.0	0.36	0.92	160.220	301	88	84	0.60	2.75	102.7
4-03	40.0	0.33	0.84	162.850	300	89	84	0.57	2.63	102.4
4-04	45.0	0.38	0.97	165.670	300	90	85	0.62	2.82	102.1
4-05	50.0	0.37	0.94	168.435	300	91	86	0.61	2.77	101.3
LEAK CHECK	50.0			168.485						
3-01	55.0	0.31	0.79	171.000	300	90	86	0.56	2.51	100.7
3-02	60.0	0.36	0.92	173.750	301	91	87	0.60	2.75	102.1
3-03	65.0	0.39	1.00	176.660	301	91	87	0.62	2.91	103.8
3-04	70.0	0.45	1.20	179.790	302	91	87	0.67	3.13	104.1
3-05	75.0	0.43	1.10	182.800	302	92	87	0.66	3.01	102.3
LEAK CHECK	75.0			182.865						
2-01	80.0	0.36	0.92	185.630	300	90	87	0.60	2.76	102.7
2-02	85.0	0.37	0.94	188.420	300	91	87	0.61	2.79	102.1
2-03	90.0	0.39	1.00	191.300	299	91	87	0.62	2.88	102.6
2-04	95.0	0.43	1.10	194.290	300	92	87	0.66	2.99	101.5
2-05	100.0	0.48	1.21	197.420	301	92	87	0.69	3.13	100.6
LEAK CHECK	100.0			197.475						
1-01	105.0	0.42	1.10	200.410	300	93	88	0.65	2.94	100.6
1-02	110.0	0.36	0.92	203.160	300	92	88	0.60	2.75	101.9
1-03	115.0	0.39	1.00	206.040	299	92	88	0.62	2.88	102.4
1-04	120.0	0.39	1.00	208.920	300	92	88	0.62	2.88	102.5
1-05	125.0	0.42	1.10	211.910	301	92	88	0.65	2.99	102.7
Final	125.0			0.94320	69.18000	300.28000	88.06000	0.60511	69.18000	

25 points sampled
QC-Check: Field Averages
Sq.Rt.ΔP
0.6051 0.9428 69.1800 300.2800 88.0600
☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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P

USEPA Method 3 Laboratory Data

Location: Unit 2 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Method: EPA Method 3A

Fuel Type: Municipal Waste

F_o for Fuel: 1.03 to 1.3

Test Method:

USEPA Method 5/29

Analyte:

Particulate/Metals

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:		11.28000		8.04000	80.68000	30.12640	1.14007	☒ Fo value within expected range.
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.79000		8.52000	80.69000	30.06720	1.14736	☒ Fo value within expected range.
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.99000		8.46000	80.55000	30.09680	1.13194	☒ Fo value within expected range.
	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: 11182

Test Method: USEPA Method 5/29
Analyte: Particulate/Metals
Analyst: R. Vicere
Analyst Emp No: 563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	708.3	433.8	274.5		
Impinger 2	5%HNO3/10%H2O2	652.4	570.0	82.4		
Impinger 3	5%HNO3/10%H2O2	543.9	529.5	14.4		
Impinger 4	Empty	432.4	428.9	3.5		
Impinger 5	4%KMnO4/10%H2SO4	544.5	542.4	2.1		
Impinger 6	4%KMnO4/10%H2SO4	553.7	552.6	1.1	378.0 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	791.0	776.8	14.2	0.0 less rinse (gm)	
Impinger 8					378.0 Net Liquid (gm)	378.0 ☒ QA/QC OK
					+ 14.2 Silica Gel (gm)	14.2 ☒ QA/QC OK
					392.2 Total Vlc (gm)	392.2 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	713.4	438.0	275.4		
Impinger 2	5%HNO3/10%H2O2	627.7	537.6	90.1		
Impinger 3	5%HNO3/10%H2O2	550.6	535.2	15.4		
Impinger 4	Empty	441.1	439.0	2.1		
Impinger 5	4%KMnO4/10%H2SO4	550.8	549.4	1.4		
Impinger 6	4%KMnO4/10%H2SO4	607.2	606.7	0.5	384.9 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	858.1	844.7	13.4	0.0 less rinse (gm)	
Impinger 8					384.9 Net Liquid (gm)	384.9 ☒ QA/QC OK
					+ 13.4 Silica Gel (gm)	13.4 ☒ QA/QC OK
					398.3 Total Vlc (gm)	398.3 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	755.4	450.1	305.3		
Impinger 2	5%HNO3/10%H2O2	650.0	564.6	85.4		
Impinger 3	5%HNO3/10%H2O2	576.9	565.2	11.7		
Impinger 4	Empty	452.2	450.2	2.0		
Impinger 5	4%KMnO4/10%H2SO4	539.8	538.2	1.6		
Impinger 6	4%KMnO4/10%H2SO4	529.8	529.6	0.2	406.2 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	745.0	732.1	12.9	0.0 less rinse (gm)	
Impinger 8					406.2 Net Liquid (gm)	406.2 ☒ QA/QC OK
					+ 12.9 Silica Gel (gm)	12.9 ☒ QA/QC OK
					419.1 Total Vlc (gm)	419.1 ☒ QA/QC OK
	Rinse:		(ml or gm)			

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)	
					Silica Gel (gm)	☐ QA/QC OK
					Total Vlc (gm)	☐ QA/QC OK
	Rinse:		(ml or gm)			

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Field Data Printout

Test Method: USEPA Method 13B
Analyte: Total Fluorides

Location: Unit 2 FF Outlet

Test Run: 1

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569
Probe Operator: B. Arnold 770

Test Date: 3/29/11

Start Time: 13:21

Stop Time: 14:30

Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.003 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -10.3

O₂ (dry volume %): 8.84

CO₂ (dry volume %): 10.66

N₂+CO (dry volume %): 80.50

Nozzle ID No: 274-1

Nozzle Diameter (D_n): 0.274

Probe ID No: 67-8-14

Pitot C_p: 0.812

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 221.8

H₂O (silica, g): 13.2

Actual Moisture (%): 23.29

Meter Box ID. No: 61-6

Meter ΔH@: 1.76010

Meter Y_d: 0.99600

Traverse Point	Run Time 2.5 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			899.175						
1-01	2.5	0.49	1.30	900.920	300	94	93	0.70	1.75	109.9
1-02	5.0	0.42	1.10	902.460	300	95	93	0.65	1.54	104.6
1-03	7.5	0.44	1.20	904.040	300	96	94	0.66	1.58	104.7
1-04	10.0	0.49	1.30	905.630	299	97	93	0.70	1.59	99.8
1-05	12.5	0.56	1.50	907.415	301	99	94	0.75	1.78	104.7
LEAK CHECK	12.5			907.515						
2-01	15.0	0.53	1.40	909.200	298	99	93	0.73	1.69	101.4
2-02	17.5	0.44	1.20	910.790	302	100	93	0.66	1.59	105.2
2-03	20.0	0.50	1.40	912.480	301	101	93	0.71	1.69	104.8
2-04	22.5	0.60	1.60	914.290	302	101	94	0.77	1.81	102.5
2-05	25.0	0.59	1.60	916.080	303	102	94	0.77	1.79	102.2
LEAK CHECK	25.0			916.165						
3-01	27.5	0.41	1.10	917.650	302	101	94	0.64	1.49	101.6
3-02	30.0	0.47	1.30	919.290	303	101	94	0.69	1.64	104.9
3-03	32.5	0.42	1.10	920.850	301	102	94	0.65	1.56	105.2
3-04	35.0	0.45	1.20	922.420	301	102	94	0.67	1.57	102.4
3-05	37.5	0.53	1.40	924.125	302	102	94	0.73	1.71	102.5
LEAK CHECK	37.5			924.200						
4-01	40.0	0.30	0.81	925.500	298	100	94	0.55	1.30	103.7
4-02	42.5	0.30	0.81	926.790	298	100	94	0.55	1.29	102.9
4-03	45.0	0.29	0.78	928.060	299	101	94	0.54	1.27	103.0
4-04	47.5	0.30	0.81	929.370	299	100	94	0.55	1.31	104.5
4-05	50.0	0.36	0.97	930.925	300	100	94	0.60	1.55	113.4*
LEAK CHECK	50.0			931.050						
5-01	52.5	0.34	0.92	932.330	301	100	94	0.58	1.28	96.1
5-02	55.0	0.33	0.89	933.770	301	100	94	0.57	1.44	109.7
5-03	57.5	0.33	0.89	935.040	301	101	95	0.57	1.27	96.6
5-04	60.0	0.38	1.00	936.610	301	100	95	0.62	1.57	111.4*
5-05	62.5	0.36	0.97	937.940	302	101	95	0.60	1.33	97.0
Final	62.5		1.14200	38.38000	300.60000	96.84000		0.64815	38.38000	

25 points sampled

Sq.Rt.ΔP

QC-Check: Field Averages

0.6482 1.1420 38.3800 300.6000 96.8400

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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Field Data Printout

Test Method: USEPA Method 13B
Analyte: Total Fluorides

Location: Unit 2 FF Outlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator: B. Arnold 770

Bar. Press. (in. Hg): 30.00
Static P: -10.3
O₂ (dry volume %): 7.91
CO₂ (dry volume %): 11.65
N₂+CO (dry volume %): 80.44

Nozzle ID No: 274-1
Nozzle Diameter (D_n): 0.274
Probe ID No: 67-8-14
Pitot C_p: 0.812
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/29/11
Start Time: 14:49
Stop Time: 15:57
Leak Rate Before: 0.006 cfm @ 13 "Hg
Leak Rate After: 0.004 cfm @ 8 "Hg

H₂O (condensate, ml or gm): 196.5
H₂O (silica, g): 14.4
Actual Moisture (%): 23.15

Meter Box ID. No: 61-6
Meter ΔH@: 1.76010
Meter Y_d: 0.99600

Traverse Point	Run Time 2.5 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
5-01	2.5	0.35	0.95	938.505	299	94	94	0.59	1.42	105.9
5-02	5.0	0.34	0.92	939.930	300	95	93	0.58	1.39	104.9
5-03	7.5	0.35	0.95	942.720	299	95	93	0.59	1.40	104.1
5-04	10.0	0.39	1.10	944.210	300	96	93	0.62	1.49	104.9
5-05	12.5	0.34	0.92	945.625	300	96	93	0.58	1.41	106.7
LEAK CHECK	12.5			945.715						
4-01	15.0	0.34	0.92	947.070	299	96	93	0.58	1.36	102.1
4-02	17.5	0.33	0.89	948.425	299	97	93	0.57	1.35	103.5
4-03	20.0	0.34	0.92	949.800	299	97	92	0.58	1.38	103.6
4-04	22.5	0.31	0.84	951.130	299	97	92	0.56	1.33	104.9
4-05	25.0	0.30	0.81	952.405	298	97	92	0.55	1.27	102.2
LEAK CHECK	25.0			952.525						
3-01	27.5	0.30	0.81	953.820	298	97	92	0.55	1.30	103.8
3-02	30.0	0.31	0.84	955.140	299	98	92	0.56	1.32	104.0
3-03	32.5	0.31	0.84	956.450	299	98	92	0.56	1.31	103.2
3-04	35.0	0.31	0.84	957.770	300	98	92	0.56	1.32	104.1
3-05	37.5	0.32	0.86	959.095	299	98	92	0.57	1.33	102.8
LEAK CHECK	37.5			959.175						
2-01	40.0	0.32	0.86	960.550	297	97	92	0.57	1.38	106.6
2-02	42.5	0.32	0.86	961.850	299	97	92	0.57	1.30	100.9
2-03	45.0	0.34	0.92	963.247	299	97	92	0.58	1.40	105.2
2-04	47.5	0.37	1.00	964.680	299	98	92	0.61	1.43	103.4
2-05	50.0	0.41	1.10	966.190	299	97	92	0.64	1.51	103.6
LEAK CHECK	50.0			966.325						
1-01	52.5	0.37	1.00	967.790	299	96	92	0.61	1.46	105.9
1-02	55.0	0.34	0.92	969.200	299	97	92	0.58	1.41	106.2
1-03	57.5	0.35	0.95	970.550	297	97	92	0.59	1.35	100.1
1-04	60.0	0.40	1.10	971.480	299	97	92	0.63	0.93	64.6*
1-05	62.5	0.41	1.10	973.520	300	97	91	0.64	2.04	140.2*
Final	62.5		0.92880	34.59000	298.96000	94.52000		0.58486	34.59000	
25 points sampled										
QC-Check: Field Averages		Sq. RLΔP								
		0.5849	0.9288	34.5900	298.9600	94.5200				
		☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK				

042611 102812

Field Data Printout

Test Method: USEPA Method 13B
Analyte: Total Fluorides

Location: Unit 2 FF Outlet

Test Run: 3

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569

Probe Operator: B. Arnold 770

Test Date: 3/29/11

Start Time: 16:11

Stop Time: 17:23

Leak Rate Before: 0.004 cfm @ 13 "Hg

Leak Rate After: 0.003 cfm @ 7 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -10.3

O₂ (dry volume %): 8.77

CO₂ (dry volume %): 10.94

N₂+CO (dry volume %): 80.29

Nozzle ID No: 274-1

Nozzle Diameter (D_n): 0.274

Probe ID No: 67-8-14

Pitot C_p: 0.812

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 228.0

H₂O (silica, g): 11.1

Actual Moisture (%): 24.07

Meter Box ID, No: 61-6

Meter ΔH@: 1.76010

Meter Y_d: 0.99600

Traverse Point	Run Time 2.5 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			973.920						
1-01	2.5	0.40	1.10	975.590	298	90	89	0.63	1.67	118.1*
1-02	5.0	0.37	1.00	976.970	300	90	90	0.61	1.38	101.5
1-03	7.5	0.41	1.10	978.430	298	92	89	0.64	1.46	101.8
1-04	10.0	0.46	1.20	980.070	299	93	89	0.68	1.64	107.9
1-05	12.5	0.51	1.40	981.660	300	94	89	0.71	1.59	99.4
LEAK CHECK	12.5			982.045						
2-01	15.0	0.44	1.20	983.650	299	93	89	0.66	1.61	108.0
2-02	17.5	0.37	1.00	985.100	300	94	89	0.61	1.45	106.3
2-03	20.0	0.41	1.10	986.620	300	94	89	0.64	1.52	105.9
2-04	22.5	0.47	1.30	988.250	300	95	89	0.69	1.63	106.0
2-05	25.0	0.51	1.40	989.930	300	95	89	0.71	1.68	104.9
LEAK CHECK	25.0			990.375						
3-01	27.5	0.40	1.10	991.850	299	94	89	0.63	1.48	104.0
3-02	30.0	0.40	1.10	993.330	300	94	89	0.63	1.48	104.4
3-03	32.5	0.41	1.10	994.810	300	95	89	0.64	1.48	103.0
3-04	35.0	0.43	1.20	996.360	300	95	89	0.66	1.55	105.4
3-05	37.5	0.45	1.20	997.895	300	95	89	0.67	1.53	102.0
LEAK CHECK	37.5			998.185						
4-01	40.0	0.39	1.10	999.740	299	93	88	0.62	1.56	111.2*
4-02	42.5	0.36	0.97	1001.160	301	94	89	0.60	1.42	105.6
4-03	45.0	0.41	1.10	1002.670	300	95	88	0.64	1.51	105.2
4-04	47.5	0.36	0.97	1004.090	300	95	88	0.60	1.42	105.6
4-05	50.0	0.36	0.97	1005.510	299	95	89	0.60	1.42	105.4
LEAK CHECK	50.0			1005.795						
5-01	52.5	0.25	0.68	1007.010	297	93	88	0.50	1.22	108.3
5-02	55.0	0.33	0.89	1008.200	298	93	88	0.57	1.19	92.4
5-03	57.5	0.34	0.92	1009.620	300	94	88	0.58	1.42	108.7
5-04	60.0	0.33	0.89	1010.960	299	94	89	0.57	1.34	103.9
5-05	62.5	0.34	0.92	1012.345	299	93	88	0.58	1.38	106.0
Final	62.5		1.07640	37.02000	299.40000	91.22000		0.62787	37.02000	

25 points sampled

Sq.Rt.ΔP

QC-Check: Field Averages

0.6279 1.0764 37.0200 299.4000 91.2200

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

042811 102812
P

USEPA Method 3 Laboratory Data

Location: Unit 2 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Method: EPA Method 3A

Fuel Type: Municipal Waste

F_o for Fuel: 1.03 to 1.3

Test Method:

USEPA Method 13B

Analyte:

Total Fluorides

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:		10.66000		8.84000	80.50000	30.05920	1.13133	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		11.65000		7.91000	80.44000	30.18040	1.11502	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.94000		8.77000	80.29000	30.10120	1.10878	☒ Fo value within expected range.
	1							
	2							
	3							
Avg.								
CEM or Other Avg:								☐ Fo value within expected range.

042611 102612
QLP@

USEPA Method 4 Laboratory Data

Location: Unit 2 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Test Method: USEPA Method 13B

Analyte: Total Fluorides

Analyst: D. Luckhard

Analyst Emp No: 568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	705.8	546.9	158.9
Impinger 2	DI Water	618.7	564.5	54.2
Impinger 3	Empty	452.8	444.1	8.7
Impinger 4	Silica Gel	750.0	736.8	13.2
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

221.8 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

221.8 Net Liquid (gm)

+ 13.2 Silica Gel (gm)

235.0 Total Vlc (gm)

221.8

13.2

235.0

☒ QA/QC OK

☒ QA/QC OK

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	753.6	635.6	118.0
Impinger 2	DI Water	607.9	544.2	63.7
Impinger 3	Empty	468.5	453.7	14.8
Impinger 4	Silica Gel	725.4	711.0	14.4
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

196.5 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

196.5 Net Liquid (gm)

+ 14.4 Silica Gel (gm)

210.9 Total Vlc (gm)

196.5

14.4

210.9

☒ QA/QC OK

☒ QA/QC OK

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	705.3	546.5	158.8
Impinger 2	DI Water	620.5	562.3	58.2
Impinger 3	Empty	454.2	443.2	11.0
Impinger 4	Silica Gel	761.0	749.9	11.1
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

228.0 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

228.0 Net Liquid (gm)

+ 11.1 Silica Gel (gm)

239.1 Total Vlc (gm)

228.0

11.1

239.1

☒ QA/QC OK

☒ QA/QC OK

☒ QA/QC OK

Rinse: (ml or gm)

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water			
Impinger 2	DI Water			
Impinger 3	Empty			
Impinger 4	Silica Gel			
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

Liquid (gm)

Field Data Check

less rinse (gm)

Net Liquid (gm)

Silica Gel (gm)

Total Vlc (gm)

☐ QA/QC OK

☐ QA/QC OK

☐ QA/QC OK

Rinse: (ml or gm)

042611 102012

QLP

Field Data Printout

Test Method: EPA Modified Method 26A

Analyte: HCl

Location: Unit 2 SDA Inlet

Test Run: 1

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 60.13205

Meter Operator: B. Arnold 770

Probe Operator:

Test Date: 3/29/11

Start Time: 07:50

Stop Time: 08:50

Leak Rate Before: 0.003 cfm @ 15 "Hg

Leak Rate After: 0.003 cfm @ 21 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -1.7

O₂ (dry volume %): 8.45

CO₂ (dry volume %): 10.91

N₂+CO (dry volume %): 80.64

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-5

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 153.3

H₂O (silica, g): 13.5

Actual Moisture (%): 18.31

Meter Box ID. No: 66-4

Meter ΔH@: 1.69790

Meter Y_d: 0.99830

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			42.327						
1-01	5.0	1.20	1.20	45.400	477	82	80		3.07	
1-01	10.0	1.20	1.20	48.400	471	83	81		3.00	
1-01	15.0	1.20	1.20	51.460	473	85	81		3.06	
1-01	20.0	1.20	1.20	54.550	477	86	82		3.09	
1-01	25.0	1.20	1.20	57.600	481	88	82		3.05	
1-01	30.0	1.20	1.20	60.670	485	88	82		3.07	
1-01	35.0	1.20	1.20	63.720	490	88	82		3.05	
1-01	40.0	1.20	1.20	66.770	485	88	82		3.05	
1-01	45.0	1.20	1.20	69.810	473	89	83		3.04	
1-01	50.0	1.20	1.20	72.760	469	89	83		2.95	
1-01	55.0	1.10	1.10	75.560	476	88	84		2.80	
1-01	60.0	0.95	0.95	78.315	483	88	84		2.76	
Final	60.0		1.17083	35.98800	478.33333	84.50000		0.00000	35.98800	

1 points sampled
QC-Check: Field Averages

Sq.Rt.ΔP

1.1708	35.9880	478.3333	84.5000

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

042611 102928
M

Field Data Printout

Test Method: **SEPA Modified Method 26A**

Analyte: **HCl**

Location: Unit 2 SDA Inlet

Test Run: 2

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 60.13205

Meter Operator: B. Arnold 770

Probe Operator:

Test Date: 3/29/11

Start Time: 09:23

Stop Time: 10:23

Leak Rate Before: 0.003 cfm @ 15 "Hg

Leak Rate After: 0.005 cfm @ 21 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -1.7

O₂ (dry volume %): 8.11

CO₂ (dry volume %): 11.28

N₂+CO (dry volume %): 80.61

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-5

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 164.3

H₂O (silica, g): 17.7

Actual Moisture (%): 19.67

Meter Box ID No: 66-4

Meter ΔH@: 1.69790

Meter Y_d: 0.99830

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			78.514		T _{m-in}	T _{m-out}			
					(°F)	(°F)	(°F)			
1-01	5.0		1.20	81.560	476	88	86		3.05	
1-01	10.0		1.20	84.560	480	89	86		3.00	
1-01	15.0		1.20	87.550	484	89	86		2.99	
1-01	20.0		1.20	90.570	489	93	89		3.02	
1-01	25.0		1.20	93.630	489	94	89		3.06	
1-01	30.0		1.20	96.640	483	94	90		3.01	
1-01	35.0		1.20	99.680	491	94	90		3.04	
1-01	40.0		1.20	102.890	476	94	90		3.21	
1-01	45.0		1.20	105.840	473	94	91		2.95	
1-01	50.0		1.20	108.900	465	94	91		3.06	
1-01	55.0		1.20	111.910	480	94	91		3.01	
1-01	60.0		1.10	114.875	480	94	91		2.97	
Final	60.0		1.19167	36.36100	480.50000	90.87500		0.00000	36.36100	

QC-Check: Field Averages

Sq. Rt. ΔP

1.1916 36.3610 480.5000 90.8750

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

042811 102826

Field Data Printout

Test Method: 3EPA Modified Method 26A

Analyte: HCl

Location: Unit 2 SDA Inlet
 Test Run: 3
 Client: Wheelabrator South Broward, Inc.
 Project No: 11182
 Source Area (ft²): 60.13205
 Meter Operator: B. Arnold 770
 Probe Operator:
 Test Date: 3/29/11
 Start Time: 10:39
 Stop Time: 11:39
 Leak Rate Before: 0.003 cfm @ 15 "Hg
 Leak Rate After: 0.005 cfm @ 22 "Hg

Bar. Press. (in. Hg): 30.00
 Static P: -1.6
 O₂ (dry volume %): 8.31
 CO₂ (dry volume %): 11.09
 N₂+CO (dry volume %): 80.60

Nozzle ID No: NA
 Nozzle Diameter (D_n): NA
 Probe ID No: 67-4-5
 Pitot C_p: NA
 Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 160.5
 H₂O (silica, g): 10.7
 Actual Moisture (%): 18.56

Meter Box ID. No: 66-4
 Meter ΔH@: 1.69790
 Meter Y_d: 0.99830

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
1-01	0.0		1.20	115.040	471	94	93		3.13	
1-01	5.0		1.20	118.170	471	94	93		3.03	
1-01	10.0		1.20	121.200	468	95	92		3.08	
1-01	15.0		1.20	124.280	471	95	92		3.10	
1-01	20.0		1.20	127.380	474	95	92		3.07	
1-01	25.0		1.20	130.450	475	95	92		3.06	
1-01	30.0		1.20	133.510	478	93	91		3.05	
1-01	35.0		1.20	136.560	479	93	91		3.08	
1-01	40.0		1.20	139.640	479	92	90		3.08	
1-01	45.0		1.20	142.720	481	92	90		3.06	
1-01	50.0		1.20	145.780	482	92	90		3.04	
1-01	55.0		1.20	148.820	482	92	90		3.08	
1-01	60.0		1.20	151.901						
Final	60.0		1.20000	36.86100	475.91667	92.41667		0.00000	36.86100	

1 points sampled
 QC-Check: Field Averages

Sq.Rt.ΔP	1.2000	36.8610	475.9166	92.4166

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

042811 102828
 P

Field Data Printout

Test Method: SEPA Modified Method 26A

Analyte: HCl

Location: Unit 2 SDA Inlet

Test Run: 4

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 60.13205

Meter Operator: B. Arnold 770

Probe Operator:

Test Date: 3/29/11

Start Time: 11:54

Stop Time: 12:54

Leak Rate Before: 0.002 cfm @ 15 "Hg

Leak Rate After: 0.003 cfm @ 20 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -1.8

O₂ (dry volume %): 7.85

CO₂ (dry volume %): 11.55

N₂+CO (dry volume %): 80.60

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-5

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 170.0

H₂O (silica, g): 12.0

Actual Moisture (%): 19.46

Meter Box ID. No: 66-4

Meter ΔH@: 1.69790

Meter Y_d: 0.99830

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
						T _{m-in} (°F)	T _{m-out} (°F)			
	0.0			152.065						
1-01	5.0		1.20	155.160	483	86	85		3.10	
1-01	10.0		1.20	158.190	483	88	87		3.03	
1-01	15.0		1.20	161.250	480	89	88		3.06	
1-01	20.0		1.20	164.300	480	89	88		3.05	
1-01	25.0		1.20	167.370	476	90	87		3.07	
1-01	30.0		1.20	170.342	474	90	87		2.97	
1-01	35.0		1.20	173.480	471	90	87		3.14	
1-01	40.0		1.20	176.540	474	90	88		3.06	
1-01	45.0		1.20	179.600	477	90	88		3.06	
1-01	50.0		1.20	182.670	479	91	88		3.07	
1-01	55.0		1.20	185.710	480	91	88		3.04	
1-01	60.0		1.20	188.770	480	91	88		3.06	
Final	60.0		1.20000	36.70500	478.08333	88.50000		0.00000	36.70500	

1 points sampled

QC-Check: Field Averages

Sq. Rt. ΔP

1.2000	36.7050	478.0833	88.5000

☐ Avg. OK

☒ Avg. OK

☒ Avg. OK

☒ Avg. OK

☒ Avg. OK

042611 102928

P

USEPA Method 3 Laboratory Data

Location: Unit 2 SDA Inlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Method: EPA Method 3A

Fuel Type: Municipal Waste

F_o for Fuel: 1.03 to 1.3

Test Method: EPA Modified Method 26A

Analyte:

HCl

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:		10.91000		8.45000	80.64000	30.08360	1.14115	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		11.28000		8.11000	80.61000	30.12920	1.13387	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		11.09000		8.31000	80.60000	30.10680	1.13526	☒ Fo value within expected range.
4	1							
	2							
	3							
Avg.								
CEM or Other Avg:		11.55000		7.85000	80.60000	30.16200	1.12987	☒ Fo value within expected range.

042611 102828
MIPP

USEPA Method 4 Laboratory Data

Test Method: SEPA Modified Method 26A

Location: Unit 2 SDA Inlet

Analyte: HCl

Client: Wheelabrator South Broward, Inc.

Analyst: D. Luckhard

Project No: 11182

Analyst Emp No: 568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	484.8	454.2	30.6
Impinger 2	100 ml 0.1N H2SO4	646.7	558.3	88.4
Impinger 3	100 ml 0.1N H2SO4	586.9	560.0	26.9
Impinger 4	Empty	452.6	445.2	7.4
Impinger 5	Silica Gel	777.7	764.2	13.5
Impinger 6				
Impinger 7				
Impinger 8				

153.3 Liquid (gm) Field Data Check

0.0 less rinse (gm)

153.3 Net Liquid (gm)

+ 13.5 Silica Gel (gm)

166.8 Total Vlc (gm)

153.3

13.5

166.8

☒ QA/QC OK

☒ QA/QC OK

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	495.3	461.9	33.4
Impinger 2	100 ml 0.1N H2SO4	639.7	540.3	99.4
Impinger 3	100 ml 0.1N H2SO4	580.1	554.5	25.6
Impinger 4	Empty	531.4	525.5	5.9
Impinger 5	Silica Gel	779.3	761.6	17.7
Impinger 6				
Impinger 7				
Impinger 8				

164.3 Liquid (gm) Field Data Check

0.0 less rinse (gm)

164.3 Net Liquid (gm)

+ 17.7 Silica Gel (gm)

182.0 Total Vlc (gm)

164.3

17.7

182.0

☒ QA/QC OK

☒ QA/QC OK

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	499.6	459.5	40.1
Impinger 2	100 ml 0.1N H2SO4	645.8	557.3	88.5
Impinger 3	100 ml 0.1N H2SO4	584.7	557.2	27.5
Impinger 4	Empty	448.9	444.5	4.4
Impinger 5	Silica Gel	788.5	777.8	10.7
Impinger 6				
Impinger 7				
Impinger 8				

160.5 Liquid (gm) Field Data Check

0.0 less rinse (gm)

160.5 Net Liquid (gm)

+ 10.7 Silica Gel (gm)

171.2 Total Vlc (gm)

160.5

10.7

171.2

☒ QA/QC OK

☒ QA/QC OK

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 4

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	499.5	461.2	38.3
Impinger 2	100 ml 0.1N H2SO4	646.0	541.4	104.6
Impinger 3	100 ml 0.1N H2SO4	577.8	554.6	23.2
Impinger 4	Empty	529.3	525.4	3.9
Impinger 5	Silica Gel	791.3	779.3	12.0
Impinger 6				
Impinger 7				
Impinger 8				

170.0 Liquid (gm) Field Data Check

0.0 less rinse (gm)

170.0 Net Liquid (gm)

+ 12.0 Silica Gel (gm)

182.0 Total Vlc (gm)

170.0

12.0

182.0

☒ QA/QC OK

☒ QA/QC OK

☒ QA/QC OK

Rinse: (ml or gm)

Field Data Printout

Test Method: 3EPA Modified Method 26A

Analyte: HCl

Location: Unit 2 FF Outlet

Test Run: 1

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569

Probe Operator:

Test Date: 3/29/11

Start Time: 07:50

Stop Time: 08:50

Leak Rate Before: 0.004 cfm @ 15 "Hg

Leak Rate After: 0.002 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -10.4

O₂ (dry volume %): 9.56

CO₂ (dry volume %): 9.88

N₂+CO (dry volume %): 80.56

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-1

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 222.3

H₂O (silica, g): 17.5

Actual Moisture (%): 21.50

Meter Box ID. No: 61-6

Meter ΔH@: 1.76010

Meter Y_d: 0.99600

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
						T _{m-in} (°F)	T _{m-out} (°F)			
	0.0			727.335						
3-01	5.0		1.50	730.850	299	74	73		3.51	
3-01	10.0		1.50	734.280	301	74	73		3.43	
3-01	15.0		1.50	737.680	301	79	74		3.40	
3-01	20.0		1.50	741.110	300	82	74		3.43	
3-01	25.0		1.50	744.680	301	84	75		3.57	
3-01	30.0		1.50	748.290	300	86	76		3.61	
3-01	35.0		1.50	751.850	301	89	77		3.56	
3-01	40.0		1.50	755.430	299	89	78		3.58	
3-01	45.0		1.50	758.990	298	90	79		3.56	
3-01	50.0		1.50	762.500	299	91	80		3.51	
3-01	55.0		1.50	765.940	300	92	81		3.44	
3-01	60.0		1.50	769.465	301	92	82		3.52	
Final	60.0		1.50000	42.13000	300.00000	81.00000		0.00000	42.13000	
3 points sampled										
QC-Check: Field Averages										
Sq.Rt.ΔP				1.5000	42.1300	300.0000	81.0000			

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

042611 102652
P

Field Data Printout

Test Method: SEPA Modified Method 26A

Analyte:

HCl

Location: Unit 2 FF Outlet

Test Run: 2

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569

Probe Operator:

Test Date: 3/29/11

Start Time: 09:23

Stop Time: 10:23

Leak Rate Before: 0.003 cfm @ 15 "Hg

Leak Rate After: 0.001 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -10.4

O₂ (dry volume %): 9.36

CO₂ (dry volume %): 10.06

N₂+CO (dry volume %): 80.58

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-1

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 241.4

H₂O (silica, g): 9.4

Actual Moisture (%): 22.48

Meter Box ID. No: 61-6

Meter ΔH@: 1.76010

Meter Y_d: 0.99600

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} T _{m-out} (°F) (°F)		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			770.115						
3-01	5.0		1.50	773.780	301	86	84		3.66	
3-01	10.0		1.50	777.140	300	89	85		3.36	
3-01	15.0		1.50	780.670	301	92	85		3.53	
3-01	20.0		1.50	784.170	300	94	86		3.50	
3-01	25.0		1.50	787.710	302	97	86		3.54	
3-01	30.0		1.50	791.240	299	98	87		3.53	
3-01	35.0		1.50	794.850	300	98	88		3.61	
3-01	40.0		1.50	798.380	297	99	89		3.53	
3-01	45.0		1.50	801.960	299	99	90		3.58	
3-01	50.0		1.50	805.550	298	99	90		3.59	
3-01	55.0		1.50	809.020	301	100	91		3.47	
3-01	60.0		1.50	812.570	301	100	91		3.55	
Final	60.0		1.50000	42.45500	299.91667	91.79167		0.00000	42.45500	

3 points sampled

Sq. RL ΔP

QC-Check: Field Averages

	1.5000	42.4550	299.9167	91.7917

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

042611 102952
J

Field Data Printout

Test Method: SEPA Modified Method 26A
Analyte: HCl

Location: Unit 2 FF Outlet
Test Run: 3
Client: Wheelabrator South Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator:
Test Date: 3/29/11
Start Time: 10:39
Stop Time: 11:39
Leak Rate Before: 0.003 cfm @ 14 "Hg
Leak Rate After: 0.003 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.00
Static P: -10.1
O₂ (dry volume %): 9.08
CO₂ (dry volume %): 10.39
N₂+CO (dry volume %): 80.53

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 228.4
H₂O (silica, g): 14.4
Actual Moisture (%): 22.06

Meter Box ID. No: 61-6
Meter ΔH@: 1.76010
Meter Y_d: 0.99600

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			813.150						
3-01	5.0		1.50	816.780	299	96	92		3.63	
3-01	10.0		1.50	820.300	299	97	93		3.52	
3-01	15.0		1.50	823.790	299	100	93		3.49	
3-01	20.0		1.50	827.370	300	100	93		3.58	
3-01	25.0		1.50	830.910	301	101	93		3.54	
3-01	30.0		1.50	834.410	300	101	94		3.50	
3-01	35.0		1.50	837.970	302	102	94		3.56	
3-01	40.0		1.50	841.520	301	101	94		3.55	
3-01	45.0		1.50	845.050	301	101	94		3.53	
3-01	50.0		1.50	848.590	301	101	94		3.54	
3-01	55.0		1.50	852.100	300	101	94		3.51	
3-01	60.0		1.50	855.645	302	102	94		3.54	
Final	60.0		1.50000	42.49500	300.41667	96.87500		0.00000	42.49500	

3 points sampled
QC-Check: Field Averages

Sq. Rt. ΔP	1.5000	42.4950	300.4167	96.8750
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

042611 102652
P

Field Data Printout

Test Method: SEPA Modified Method 26A

Analyte: HCl

Location: Unit 2 FF Outlet

Test Run: 4

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569

Probe Operator:

Test Date: 3/29/11

Start Time: 11:54

Stop Time: 12:54

Leak Rate Before: 0.004 cfm @ 15 "Hg

Leak Rate After: 0.002 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -10.1

O₂ (dry volume %): 8.69

CO₂ (dry volume %): 10.87

N₂+CO (dry volume %): 80.44

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-1

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 236.0

H₂O (silica, g): 19.0

Actual Moisture (%): 22.95

Meter Box ID. No: 61-6

Meter ΔH@: 1.76010

Meter Y_d: 0.99600

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			856.080		T _{m-in} (°F)	T _{m-out} (°F)			
3-01	5.0		1.50	859.810	302	96	93		3.73	
3-01	10.0		1.50	863.310	301	98	94		3.50	
3-01	15.0		1.50	866.790	301	99	94		3.48	
3-01	20.0		1.50	870.300	301	100	93		3.51	
3-01	25.0		1.50	873.550	300	101	93		3.25	
3-01	30.0		1.50	877.400	300	102	94		3.85	
3-01	35.0		1.50	880.920	300	102	94		3.52	
3-01	40.0		1.50	884.440	301	102	94		3.52	
3-01	45.0		1.50	888.000	301	102	94		3.56	
3-01	50.0		1.50	891.510	302	102	94		3.51	
3-01	55.0		1.50	895.010	301	103	94		3.50	
3-01	60.0		1.50	898.525	301	103	95		3.51	
Final	60.0		1.50000	42.44500	300.91667	97.33333		0.00000	42.44500	

3 points sampled
QC-Check: Field Averages

Sq. Rt. ΔP	1.5000	42.4450	300.9167	97.3333
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

042811 102952

USEPA Method 3 Laboratory Data

Test Method: EPA Modified Method 26A
Analyte: HCl

Location: Unit 2 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11182
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:		9.88000		9.56000	80.56000	29.96320	1.14777	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.06000		9.36000	80.58000	29.98400	1.14712	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.39000		9.08000	80.53000	30.02560	1.13763	☒ Fo value within expected range.
4	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.87000		8.69000	80.44000	30.08680	1.12328	☒ Fo value within expected range.

042811 102862
P J P J

USEPA Method 4 Laboratory Data

Test Method: SEPA Modified Method 26A

Location: Unit 2 FF Outlet

Analyte: HCl

Client: Wheelabrator South Broward, Inc.

Analyst: R. Vicere

Project No: 11182

Analyst Emp No: 563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	513.1	459.2	53.9
Impinger 2	100 ml 0.1N H2SO4	670.3	569.2	101.1
Impinger 3	100 ml 0.1N H2SO4	594.8	543.0	51.8
Impinger 4	Empty	456.4	440.9	15.5
Impinger 5	Silica Gel	765.6	748.1	17.5
Impinger 6				
Impinger 7				
Impinger 8				

222.3 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

222.3 Net Liquid (gm)

222.3

☒ QA/QC OK

+ 17.5 Silica Gel (gm)

17.5

☒ QA/QC OK

239.8 Total Vlc (gm)

239.8

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	525.9	453.6	72.3
Impinger 2	100 ml 0.1N H2SO4	650.5	526.8	123.7
Impinger 3	100 ml 0.1N H2SO4	573.0	536.3	36.7
Impinger 4	Empty	455.0	446.3	8.7
Impinger 5	Silica Gel	758.2	748.8	9.4
Impinger 6				
Impinger 7				
Impinger 8				

241.4 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

241.4 Net Liquid (gm)

241.4

☒ QA/QC OK

+ 9.4 Silica Gel (gm)

9.4

☒ QA/QC OK

250.8 Total Vlc (gm)

250.8

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	520.7	455.5	65.2
Impinger 2	100 ml 0.1N H2SO4	664.0	539.9	124.1
Impinger 3	100 ml 0.1N H2SO4	587.0	553.0	34.0
Impinger 4	Empty	434.8	429.7	5.1
Impinger 5	Silica Gel	757.1	742.7	14.4
Impinger 6				
Impinger 7				
Impinger 8				

228.4 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

228.4 Net Liquid (gm)

228.4

☒ QA/QC OK

+ 14.4 Silica Gel (gm)

14.4

☒ QA/QC OK

242.8 Total Vlc (gm)

242.8

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 4

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	508.3	461.2	47.1
Impinger 2	100 ml 0.1N H2SO4	681.3	564.6	116.7
Impinger 3	100 ml 0.1N H2SO4	600.4	543.5	56.9
Impinger 4	Empty	455.9	440.6	15.3
Impinger 5	Silica Gel	779.2	760.2	19.0
Impinger 6				
Impinger 7				
Impinger 8				

236.0 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

236.0 Net Liquid (gm)

236.0

☒ QA/QC OK

+ 19.0 Silica Gel (gm)

19.0

☒ QA/QC OK

255.0 Total Vlc (gm)

255.0

☒ QA/QC OK

Rinse: (ml or gm)

042611 102052
PJPJ

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: 11182
Source Area (ft²): 64.00000
Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505

Bar. Press. (in. Hg): 29.95
Static P: -6.0
O₂ (dry volume %): 9.26
CO₂ (dry volume %): 10.13
N₂+CO (dry volume %): 80.61

Nozzle ID No: 270-1
Nozzle Diameter (D_n): 0.270
Probe ID No: 67-8-3
Pitot C_p: 0.830
Pitot Leak Check: ☒ Pass ☐ Fail

Test Date: 3/28/11
Start Time: 07:31
Stop Time: 09:43
Leak Rate Before: 0.002 cfm @ 12 "Hg
Leak Rate After: 0.003 cfm @ 10 "Hg

H₂O (condensate, ml or gm): 384.9
H₂O (silica, g): 16.5
Actual Moisture (%): 22.96

Meter Box ID. No: 66-24
Meter ΔH@: 1.76390
Meter Y_d: 0.98470

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
5-01	5.0	0.28	0.73	786.755	296	77	76	0.53	2.40	101.4
5-02	10.0	0.29	0.75	791.630	293	77	76	0.54	2.47	102.2
5-03	15.0	0.29	0.75	794.040	296	79	76	0.54	2.41	99.7
5-04	20.0	0.30	0.78	796.530	295	80	76	0.55	2.49	101.1
5-05	25.0	0.31	0.81	799.065	299	81	77	0.56	2.54	101.3
LEAK CHECK	25.0			799.120						
4-01	30.0	0.29	0.75	801.540	299	81	77	0.54	2.42	100.0
4-02	35.0	0.28	0.73	803.940	297	82	78	0.53	2.40	100.6
4-03	40.0	0.30	0.78	806.430	299	83	78	0.55	2.49	100.9
4-04	45.0	0.32	0.83	809.020	298	84	78	0.57	2.59	101.5
4-05	50.0	0.32	0.83	811.575	299	84	79	0.57	2.56	100.1
LEAK CHECK	50.0			811.640						
3-01	55.0	0.30	0.78	814.120	295	84	79	0.55	2.48	100.1
3-02	60.0	0.30	0.78	816.620	298	85	80	0.55	2.50	100.9
3-03	65.0	0.31	0.81	819.160	298	86	80	0.56	2.54	100.7
3-04	70.0	0.31	0.81	821.720	298	87	81	0.56	2.56	101.3
3-05	75.0	0.33	0.86	824.360	299	88	81	0.57	2.64	101.3
LEAK CHECK	75.0			824.400						
2-01	80.0	0.36	0.94	827.160	298	87	82	0.60	2.76	101.3
2-02	85.0	0.34	0.88	829.810	299	89	82	0.58	2.65	100.0
2-03	90.0	0.35	0.91	832.530	297	89	83	0.59	2.72	100.9
2-04	95.0	0.38	0.99	835.380	300	90	83	0.62	2.85	101.6
2-05	100.0	0.39	1.00	838.245	296	90	84	0.62	2.87	100.5
LEAK CHECK	100.0			838.285						
1-01	105.0	0.34	0.88	840.920	295	89	84	0.58	2.63	99.0
1-02	110.0	0.43	1.10	843.910	297	90	85	0.66	2.99	99.9
1-03	115.0	0.42	1.10	846.910	291	91	85	0.65	3.00	100.9
1-04	120.0	0.40	1.00	849.770	296	91	85	0.63	2.86	98.9
1-05	125.0	0.45	1.20	852.940	297	91	85	0.67	3.17	103.4
Final	125.0		0.87120	65.98500	297.00000	82.90000		0.57787	65.98500	

25 points sampled
QC-Check: Field Averages

Sq. RLΔP	0.5779	0.8712	65.9850	297.0000	82.9000
☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

042611 103023
K

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: 11182

Source Area (ft²): 64.00000

Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505

Test Date: 3/28/11

Start Time: 10:05

Stop Time: 12:19

Leak Rate Before: 0.003 cfm @ 12 "Hg
Leak Rate After: 0.003 cfm @ 10 "Hg

Bar. Press. (in. Hg): 29.95

Static P: -7.5

O₂ (dry volume %): 9.23

CO₂ (dry volume %): 10.23

N₂+CO (dry volume %): 80.54

Nozzle ID No: 270-1

Nozzle Diameter (D_n): 0.270

Probe ID No: 67-8-3

Pitot C_p: 0.830

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 384.5

H₂O (silica, g): 15.2

Actual Moisture (%): 22.69

Meter Box ID. No: 66-24

Meter ΔH@: 1.76390

Meter Y_d: 0.98470

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			853.200						
4-01	5.0	0.34	0.91	855.950	297	89	87	0.58	2.75	103.1
4-02	10.0	0.34	0.91	858.670	296	89	87	0.58	2.72	101.9
4-03	15.0	0.35	0.93	861.410	296	91	87	0.59	2.74	101.0
4-04	20.0	0.39	1.00	864.280	299	92	87	0.62	2.87	100.3
4-05	25.0	0.37	0.95	867.050	298	93	87	0.61	2.77	99.2
LEAK CHECK	25.0			867.130						
3-01	30.0	0.37	0.95	869.910	298	92	88	0.61	2.78	99.6
3-02	35.0	0.37	0.95	872.720	297	93	88	0.61	2.81	100.5
3-03	40.0	0.35	0.90	875.380	297	92	88	0.59	2.66	97.9
3-04	45.0	0.39	1.00	878.260	298	89	87	0.62	2.88	100.9
3-05	50.0	0.33	0.85	880.870	296	89	85	0.57	2.61	99.4
LEAK CHECK	50.0			880.925						
2-01	55.0	0.42	1.10	883.870	297	86	83	0.65	2.95	100.0
2-02	60.0	0.38	0.97	886.660	296	87	83	0.62	2.79	99.4
2-03	65.0	0.38	0.97	889.460	298	85	82	0.62	2.80	100.2
2-04	70.0	0.40	1.00	892.290	297	83	81	0.63	2.83	98.9
2-05	75.0	0.38	0.97	895.160	295	81	79	0.62	2.87	103.1
LEAK CHECK	75.0			895.235						
1-01	80.0	0.35	0.90	897.910	293	78	76	0.59	2.67	100.6
1-02	85.0	0.30	0.77	900.380	290	78	76	0.55	2.47	100.1
1-03	90.0	0.32	0.82	902.930	294	79	75	0.57	2.55	100.3
1-04	95.0	0.35	0.90	905.590	296	79	75	0.59	2.66	100.2
1-05	100.0	0.37	0.95	908.345	296	80	75	0.61	2.76	100.8
LEAK CHECK	100.0			908.430						
5-01	105.0	0.23	0.59	910.560	292	79	75	0.48	2.13	98.6
5-02	110.0	0.27	0.69	912.860	296	80	76	0.52	2.30	98.4
5-03	115.0	0.28	0.72	915.230	295	81	76	0.53	2.37	99.4
5-04	120.0	0.30	0.77	917.690	296	83	76	0.55	2.46	99.6
5-05	125.0	0.33	0.85	920.285	296	83	76	0.57	2.59	100.2
Final	125.0									
			0.89280	66.79000	295.96000	83.32000		0.58732	66.79000	

25 points sampled

Sq. RLΔP

QC-Check: Field Averages

0.5873 0.8928 66.7900 295.9600 83.3200

☒ 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: 11182
Source Area (ft²): 64.00000

Meter Operator: P. Bihun 505
Probe Operator: P. Bihun 505

Test Date: 3/28/11
Start Time: 12:43
Stop Time: 14:55
Leak Rate Before: 0.004 cfm @ 12 "Hg
Leak Rate After: 0.004 cfm @ 10 "Hg

Bar. Press. (in. Hg): 29.95
Static P: -8.0
O₂ (dry volume %): 8.86
CO₂ (dry volume %): 10.66
N₂+CO (dry volume %): 80.48

Nozzle ID No: 270-2
Nozzle Diameter (D_n): 0.270
Probe ID No: 67-8-3
Pitot C_p: 0.830
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 392.7
H₂O (silica, g): 12.7
Actual Moisture (%): 22.80

Meter Box ID. No: 66-24
Meter ΔH@: 1.76390
Meter Y_d: 0.98470

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
1-01	5.0	0.35	0.90	920.680	295	82	80	0.59	2.70	101.1
1-02	10.0	0.35	0.90	926.030	297	84	81	0.59	2.65	99.1
1-03	15.0	0.42	1.10	928.940	291	86	81	0.65	2.91	98.8
1-04	20.0	0.42	1.10	931.830	299	89	82	0.65	2.89	98.3
1-05	25.0	0.45	1.20	934.950	297	90	83	0.67	3.12	102.2
LEAK CHECK	25.0			935.045						
5-01	30.0	0.29	0.74	937.480	295	89	84	0.54	2.44	99.2
5-02	35.0	0.30	0.77	939.940	297	90	84	0.55	2.46	98.5
5-03	40.0	0.33	0.85	942.530	297	91	85	0.57	2.59	98.8
5-04	45.0	0.31	0.79	945.050	299	92	86	0.56	2.52	99.1
5-05	50.0	0.31	0.79	947.565	298	92	86	0.56	2.52	98.8
LEAK CHECK	50.0			947.655						
4-01	55.0	0.32	0.82	950.200	301	91	86	0.57	2.55	98.7
4-02	60.0	0.32	0.82	952.770	300	92	86	0.57	2.57	99.5
4-03	65.0	0.33	0.85	955.390	293	92	87	0.57	2.62	99.4
4-04	70.0	0.33	0.85	957.990	299	93	87	0.57	2.60	98.9
4-05	75.0	0.32	0.82	960.560	297	93	88	0.57	2.57	99.1
LEAK CHECK	75.0			960.620						
3-01	80.0	0.38	0.97	963.400	297	92	88	0.62	2.78	98.5
3-02	85.0	0.35	0.90	966.110	297	93	88	0.59	2.71	99.9
3-03	90.0	0.37	0.95	968.890	298	93	88	0.61	2.78	99.7
3-04	95.0	0.37	0.95	971.660	297	93	89	0.61	2.77	99.2
3-05	100.0	0.35	0.90	974.350	298	94	89	0.59	2.69	99.0
LEAK CHECK	100.0			974.385						
2-01	105.0	0.41	1.10	977.310	295	93	89	0.64	2.92	99.4
2-02	110.0	0.42	1.10	980.230	300	95	90	0.65	2.92	98.1
2-03	115.0	0.42	1.10	983.140	297	95	90	0.65	2.91	97.6
2-04	120.0	0.42	1.10	986.050	299	95	90	0.65	2.91	97.7
2-05	125.0	0.42	1.10	988.945	298	95	90	0.65	2.90	97.2
Final	125.0									
25 points sampled		Sq. Rt. ΔP:								
QC-Check: Field Averages		0.6008	0.9388	67.9850	297.2400	88.8200		0.60077	67.98500	

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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USEPA Method 3 Laboratory Data

Location: Unit 3 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Method: EPA Method 3A

Fuel Type: Municipal Waste

F_o for Fuel: 1.03 to 1.3

Test Method:

USEPA Method 5/29

Analyte:

Particulate/Metals

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:		10.13000		9.26000	80.61000	29.99120	1.14906	☒ Fo value within expected range.
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.23000		9.23000	80.54000	30.00600	1.14076	☒ Fo value within expected range.
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.66000		8.86000	80.48000	30.06000	1.12946	☒ Fo value within expected range.
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Location: Unit 3 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Test Method: USEPA Method 5/29

Analyte: Particulate/Metals

Analyst: R. Vicere

Analyst Emp No: 563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	664.0	433.0	231.0		
Impinger 2	5%HNO3/10%H2O2	686.4	568.9	117.5		
Impinger 3	5%HNO3/10%H2O2	551.8	525.9	25.9		
Impinger 4	Empty	433.3	428.6	4.7		
Impinger 5	4%KMnO4/10%H2SO4	545.5	540.3	5.2		
Impinger 6	4%KMnO4/10%H2SO4	550.6	550.0	0.6	384.9 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	787.6	771.1	16.5	0.0 less rinse (gm)	
Impinger 8					384.9 Net Liquid (gm)	384.9 ☒ QA/QC OK
					+ 16.5 Silica Gel (gm)	16.5 ☒ QA/QC OK
					401.4 Total Vlc (gm)	401.4 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	687.7	437.0	250.7		
Impinger 2	5%HNO3/10%H2O2	642.0	536.5	105.5		
Impinger 3	5%HNO3/10%H2O2	551.9	532.4	19.5		
Impinger 4	Empty	440.7	437.0	3.7		
Impinger 5	4%KMnO4/10%H2SO4	548.7	545.1	3.6		
Impinger 6	4%KMnO4/10%H2SO4	605.0	603.5	1.5	384.5 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	831.6	816.4	15.2	0.0 less rinse (gm)	
Impinger 8					384.5 Net Liquid (gm)	384.5 ☒ QA/QC OK
					+ 15.2 Silica Gel (gm)	15.2 ☒ QA/QC OK
					399.7 Total Vlc (gm)	399.7 ☒ QA/QC OK
	Rinse:		(ml or gm)			

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)		
Impinger 1	Empty	724.2	449.3	274.9		
Impinger 2	5%HNO3/10%H2O2	657.9	563.4	94.5		
Impinger 3	5%HNO3/10%H2O2	582.5	563.2	19.3		
Impinger 4	Empty	451.2	448.8	2.4		
Impinger 5	4%KMnO4/10%H2SO4	537.0	535.9	1.1		
Impinger 6	4%KMnO4/10%H2SO4	530.3	529.8	0.5	392.7 Liquid (gm)	Field Data Check
Impinger 7	Silica Gel	741.3	728.6	12.7	0.0 less rinse (gm)	
Impinger 8					392.7 Net Liquid (gm)	392.7 ☒ QA/QC OK
					+ 12.7 Silica Gel (gm)	12.7 ☒ QA/QC OK
					405.4 Total Vlc (gm)	405.4 ☒ QA/QC OK
	Rinse:		(ml or gm)			

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
					Total Vlc (gm)	☐ QA/QC OK
	Rinse:		(ml or gm)			

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Field Data Printout

Test Method: USEPA Method 13B
Analyte: Total Fluorides

Location: Unit 3 FF Outlet

Test Run: 1

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569
Probe Operator:

Test Date: 3/30/11

Start Time: 11:40

Stop Time: 12:47

Leak Rate Before: 0.004 cfm @ 13 "Hg
Leak Rate After: 0.001 cfm @ 5 "Hg

Bar. Press. (in. Hg): 30.05

Static P: -5.8

O₂ (dry volume %): 8.00

CO₂ (dry volume %): 11.44

N₂+CO (dry volume %): 80.56

Nozzle ID No: 274-1

Nozzle Diameter (D_n): 0.274

Probe ID No: 67-8-14

Pitot C_p: 0.812

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 207.4

H₂O (silica, g): 13.7

Actual Moisture (%): 23.90

Meter Box ID. No: 61-5

Meter ΔH@: 1.76760

Meter Y_d: 0.99360

Traverse Point	Run Time 2.5 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			334.160						
5-01	2.5	0.37	0.88	335.420	298	87	85	0.61	1.26	92.4
5-02	5.0	0.26	0.69	336.690	298	87	86	0.51	1.27	110.9*
5-03	7.5	0.26	0.69	337.870	297	88	86	0.51	1.18	102.9
5-04	10.0	0.30	0.80	339.130	297	88	86	0.55	1.26	102.3
5-05	12.5	0.28	0.75	340.355	297	89	86	0.53	1.23	102.9
LEAK CHECK	12.5			340.435						
4-01	15.0	0.36	0.96	341.830	297	88	86	0.60	1.39	103.5
4-02	17.5	0.36	0.96	343.120	298	89	87	0.60	1.29	95.6
4-03	20.0	0.35	0.93	344.600	298	90	86	0.59	1.48	111.2*
4-04	22.5	0.34	0.91	345.960	298	90	86	0.58	1.36	103.7
4-05	25.0	0.31	0.83	347.255	296	90	86	0.56	1.30	103.2
LEAK CHECK	25.0			347.315						
3-01	27.5	0.37	0.99	348.740	296	89	86	0.61	1.43	104.1
3-02	30.0	0.37	0.99	350.150	298	90	86	0.61	1.41	103.0
3-03	32.5	0.34	0.91	351.520	298	91	86	0.58	1.37	104.3
3-04	35.0	0.31	0.83	352.800	297	90	86	0.56	1.28	102.1
3-05	37.5	0.31	0.83	354.110	297	90	87	0.56	1.31	104.4
LEAK CHECK	37.5			354.240						
2-01	40.0	0.39	1.00	355.670	297	89	86	0.62	1.43	101.8
2-02	42.5	0.39	1.00	357.100	298	90	86	0.62	1.43	101.8
2-03	45.0	0.37	0.99	358.540	299	90	87	0.61	1.44	105.2
2-04	47.5	0.38	1.00	359.950	296	90	86	0.62	1.41	101.5
2-05	50.0	0.37	0.99	361.385	296	90	86	0.61	1.44	104.7
LEAK CHECK	50.0			361.495						
1-01	52.5	0.38	1.00	362.970	293	90	87	0.62	1.48	105.9
1-02	55.0	0.40	1.10	364.420	294	90	87	0.63	1.45	101.6
1-03	57.5	0.41	1.10	365.930	297	90	86	0.64	1.51	104.8
1-04	60.0	0.38	1.00	367.410	297	90	86	0.62	1.48	106.7
1-05	62.5	0.45	1.20	368.920	296	90	86	0.67	1.51	100.0
Final	62.5		0.93320	34.38000	296.92000	87.78000		0.59232	34.38000	

25 points sampled

Sq.Rt.ΔP

QC-Check: Field Averages

0.5923 0.9332 34.3800 296.9200 87.7800

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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Field Data Printout

Test Method: USEPA Method 13B
Analyte: Total Fluorides

Location: Unit 3 FF Outlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchens 569
Probe Operator:
Test Date: 3/30/11
Start Time: 13:04
Stop Time: 14:12
Leak Rate Before: 0.003 cfm @ 12 "Hg
Leak Rate After: 0.001 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -8.2
O₂ (dry volume %): 9.18
CO₂ (dry volume %): 10.38
N₂+CO (dry volume %): 80.44

Nozzle ID No: 274-1
Nozzle Diameter (D_n): 0.274
Probe ID No: 67-8-14
Pitot C_p: 0.812
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 232.5
H₂O (silica, g): 10.7
Actual Moisture (%): 23.42

Meter Box ID. No: 61-5
Meter ΔH@: 1.76760
Meter Y_d: 0.99360

Traverse Point	Run Time 2.5 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
1-01	2.5	0.50	1.30	369.370	297	86	85	0.71	1.77	111.4*
1-02	5.0	0.54	1.40	372.840	298	88	86	0.73	1.70	102.7
1-03	7.5	0.48	1.30	374.500	297	89	86	0.69	1.66	106.2
1-04	10.0	0.43	1.10	376.130	295	90	86	0.66	1.63	109.9
1-05	12.5	0.48	1.30	377.640	295	90	86	0.69	1.51	96.4
LEAK CHECK	12.5			377.715						
2-01	15.0	0.55	1.50	379.430	298	90	86	0.74	1.72	102.5
2-02	17.5	0.53	1.40	381.150	299	91	86	0.73	1.72	104.7
2-03	20.0	0.48	1.30	382.790	298	92	86	0.69	1.64	104.7
2-04	22.5	0.50	1.30	384.440	298	92	87	0.71	1.65	103.1
2-05	25.0	0.48	1.30	386.080	298	93	87	0.69	1.64	104.5
LEAK CHECK	25.0			386.150						
3-01	27.5	0.42	1.10	387.660	297	90	87	0.65	1.51	103.0
3-02	30.0	0.48	1.30	389.290	298	91	87	0.69	1.63	104.1
3-03	32.5	0.48	1.30	390.920	299	91	86	0.69	1.63	104.2
3-04	35.0	0.39	1.00	392.390	296	91	87	0.62	1.47	103.9
3-05	37.5	0.37	0.99	393.805	298	91	87	0.61	1.42	102.8
LEAK CHECK	37.5			393.895						
4-01	40.0	0.37	0.99	395.320	296	90	87	0.61	1.43	103.5
4-02	42.5	0.37	0.99	396.760	298	91	87	0.61	1.44	104.6
4-03	45.0	0.45	1.20	398.330	299	91	87	0.67	1.57	103.6
4-04	47.5	0.41	1.10	399.890	298	91	87	0.64	1.56	107.7
4-05	50.0	0.39	1.00	401.520	297	91	87	0.62	1.63	115.3*
LEAK CHECK	50.0			401.600						
5-01	52.5	0.36	0.96	402.830	296	90	86	0.60	1.23	90.6
5-02	55.0	0.35	0.93	404.210	296	90	86	0.59	1.38	103.1
5-03	57.5	0.37	0.99	405.640	296	90	87	0.61	1.43	103.9
5-04	60.0	0.38	1.00	407.090	299	91	87	0.62	1.45	104.0
5-05	62.5	0.38	1.00	408.545	298	91	87	0.62	1.46	104.3
Final	62.5		1.16200	38.86000	297.36000	88.48000		0.65989	38.86000	

25 points sampled
QC-Check: Field Averages

Sq. Rt. ΔP _s	0.6599	1.1620	38.8600	297.3600	88.4800
☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

042611 103307
0

Field Data Printout

Test Method: USEPA Method 13B
Analyte: Total Fluorides

Location: Unit 3 FF Outlet
Test Run: 3
Client: Wheelabrator South Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator:
Test Date: 3/30/11
Start Time: 14:26
Stop Time: 15:30
Leak Rate Before: 0.003 cfm @ 13 "Hg
Leak Rate After: 0.001 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -6.5
O₂ (dry volume %): 8.29
CO₂ (dry volume %): 11.31
N₂+CO (dry volume %): 80.40

Nozzle ID No: 274-1
Nozzle Diameter (D_n): 0.274
Probe ID No: 67-8-14
Pitot C_p: 0.812
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 225.1
H₂O (silica, g): 8.7
Actual Moisture (%): 24.23

Meter Box ID. No: 61-5
Meter ΔH@: 1.76760
Meter Y_d: 0.99360

Traverse Point	Run Time 2.5 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			408.940						
5-01	2.5	0.35	0.93	410.330	297	87	86	0.59	1.39	105.1
5-02	5.0	0.35	0.93	411.720	299	87	86	0.59	1.39	105.2
5-03	7.5	0.30	0.80	413.000	297	88	86	0.55	1.28	104.4
5-04	10.0	0.37	0.99	414.400	297	89	86	0.61	1.40	102.8
5-05	12.5	0.33	0.88	415.750	298	90	86	0.57	1.35	104.9
LEAK CHECK	12.5			415.815						
4-01	15.0	0.38	1.00	417.260	297	89	86	0.62	1.44	104.7
4-02	17.5	0.38	1.00	418.680	298	90	86	0.62	1.42	102.8
4-03	20.0	0.38	1.00	420.120	298	90	87	0.62	1.44	104.2
4-04	22.5	0.35	0.93	421.500	298	91	87	0.59	1.38	103.9
4-05	25.0	0.38	1.00	422.920	299	91	87	0.62	1.42	102.7
LEAK CHECK	25.0			423.099						
3-01	27.5	0.44	1.20	424.700	298	90	87	0.66	1.60	107.7
3-02	30.0	0.46	1.20	426.280	300	92	88	0.68	1.58	103.8
3-03	32.5	0.40	1.10	427.800	299	92	88	0.63	1.52	107.0
3-04	35.0	0.38	1.00	429.250	298	92	87	0.62	1.45	104.7
3-05	37.5	0.32	0.85	430.575	297	92	87	0.57	1.32	104.2
LEAK CHECK	37.5			430.655						
2-01	40.0	0.38	1.00	432.070	297	90	87	0.62	1.42	102.3
2-02	42.5	0.44	1.20	433.700	299	91	87	0.66	1.63	109.6
2-03	45.0	0.40	1.10	435.150	299	92	87	0.63	1.45	102.2
2-04	47.5	0.39	1.00	436.600	298	92	87	0.62	1.45	103.4
2-05	50.0	0.38	1.00	438.015	300	93	88	0.62	1.41	102.2
LEAK CHECK	50.0			438.090						
1-01	52.5	0.35	0.93	439.470	297	91	88	0.59	1.38	103.8
1-02	55.0	0.35	0.93	440.860	297	93	88	0.59	1.39	104.3
1-03	57.5	0.32	0.85	442.160	295	92	88	0.57	1.30	102.0
1-04	60.0	0.38	1.00	443.650	298	93	88	0.62	1.49	107.4
1-05	62.5	0.40	1.10	445.115	295	93	88	0.63	1.47	102.8
Final	62.5									
25 points sampled										
QC-Check: Field Averages		Sq.Rt.ΔP								
		0.6111	0.9968	35.7760	297.8000	88.9200		0.61113	35.77600	

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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USEPA Method 3 Laboratory Data

Location: Unit 3 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Method: EPA Method 3A

Fuel Type: Municipal Waste

F_o for Fuel: 1.03 to 1.3

Test Method:

USEPA Method 13B

Analyte:

Total Fluorides

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:		11.44000		8.00000	80.56000	30.15040	1.12762	☒ Fo value within expected range.
2	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		10.38000		9.18000	80.44000	30.02800	1.12909	☒ Fo value within expected range.
3	1							
	2							
	3							
	Avg.							
CEM or Other Avg:		11.31000		8.29000	80.40000	30.14120	1.11494	☒ Fo value within expected range.
	1							
	2							
	3							
	Avg.							
CEM or Other Avg:								☐ Fo value within expected range.

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KOL@

USEPA Method 4 Laboratory Data

Location: Unit 3 FF Outlet

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Test Method: USEPA Method 13B

Analyte: Total Fluorides

Analyst: R. Vicere

Analyst Emp No: 563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	759.4	634.7	124.7
Impinger 2	DI Water	611.7	546.0	65.7
Impinger 3	Empty	454.0	437.0	17.0
Impinger 4	Silica Gel	738.9	725.2	13.7
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

207.4 Liquid (gm)

0.0 less rinse (gm)

207.4 Net Liquid (gm)

+ 13.7 Silica Gel (gm)

221.1 Total Vlc (gm)

Field Data Check

207.4

13.7

221.1

☒ QA/QC OK

☒ QA/QC OK

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	710.0	548.0	162.0
Impinger 2	DI Water	623.5	564.5	59.0
Impinger 3	Empty	457.2	445.7	11.5
Impinger 4	Silica Gel	771.3	760.6	10.7
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

232.5 Liquid (gm)

0.0 less rinse (gm)

232.5 Net Liquid (gm)

+ 10.7 Silica Gel (gm)

243.2 Total Vlc (gm)

Field Data Check

232.5

10.7

243.2

☒ QA/QC OK

☒ QA/QC OK

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water	814.6	633.9	180.7
Impinger 2	DI Water	586.3	546.4	39.9
Impinger 3	Empty	444.6	440.1	4.5
Impinger 4	Silica Gel	747.5	738.8	8.7
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

225.1 Liquid (gm)

0.0 less rinse (gm)

225.1 Net Liquid (gm)

+ 8.7 Silica Gel (gm)

233.8 Total Vlc (gm)

Field Data Check

225.1

8.7

233.8

☒ QA/QC OK

☒ QA/QC OK

☒ QA/QC OK

Rinse: (ml or gm)

Test Run:

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	DI Water			
Impinger 2	DI Water			
Impinger 3	Empty			
Impinger 4	Silica Gel			
Impinger 5				
Impinger 6				
Impinger 7				
Impinger 8				

Liquid (gm)

less rinse (gm)

Net Liquid (gm)

Silica Gel (gm)

Total Vlc (gm)

Field Data Check

☐ QA/QC OK

☐ QA/QC OK

☐ QA/QC OK

Rinse: (ml or gm)

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KOLB

Field Data Printout

Test Method:

USEPA Method 23

Analyte:

PCDD/F

Location: Unit 3 FF Outlet

Test Run: 1

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: C. Slimp 558

Probe Operator: C. Slimp 558

Test Date: 3/28/11

Start Time: 10:05

Stop Time: 14:25

Leak Rate Before: 0.004 cfm @ 12 "Hg

Leak Rate After: 0.004 cfm @ 13 "Hg

Bar. Press. (in. Hg): 29.95

Static P: -7.5

O₂ (dry volume %): 8.96

CO₂ (dry volume %): 10.53

N₂+CO (dry volume %): 80.51

Nozzle ID No: 271-1

Nozzle Diameter (D_n): 0.271

Probe ID No: 67-8-10

Pitot C_p: 0.822

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 842.5

H₂O (silica, g): 48.3

Actual Moisture (%): 22.47

Meter Box ID. No: 61-5

Meter ΔH@: 1.76760

Meter Y_d: 0.99360

Traverse Point	Run Time 10.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
5-01	10.0	0.39	1.10	745.425	298	90	88	0.62	6.13	108.1
5-02	20.0	0.39	1.00	757.650	296	94	88	0.62	6.10	107.1
5-03	30.0	0.42	1.10	763.610	297	97	89	0.65	5.96	100.6
5-04	40.0	0.40	1.00	769.670	299	96	90	0.63	6.06	104.9
5-05	50.0	0.42	1.10	775.705	299	95	89	0.65	6.04	102.1
LEAK CHECK	50.0			775.770						
4-01	60.0	0.37	0.95	781.350	298	90	87	0.61	5.58	101.2
4-02	70.0	0.36	0.93	786.860	297	91	86	0.60	5.51	101.2
4-03	80.0	0.36	0.93	792.340	297	87	83	0.60	5.48	101.3
4-04	90.0	0.36	0.93	797.760	299	86	81	0.60	5.42	100.6
4-05	100.0	0.33	0.85	803.110	298	85	80	0.57	5.35	103.8
LEAK CHECK	100.0			803.170						
3-01	110.0	0.38	0.98	808.720	298	84	80	0.62	5.55	100.5
3-02	120.0	0.34	0.88	814.270	296	87	80	0.58	5.55	105.8
3-03	130.0	0.37	0.95	819.840	298	89	81	0.61	5.57	101.6
3-04	140.0	0.39	1.00	825.570	298	91	82	0.62	5.73	101.6
3-05	150.0	0.38	0.98	831.225	296	92	83	0.62	5.65	101.2
LEAK CHECK	150.0			831.280						
2-01	160.0	0.44	1.10	837.330	298	89	85	0.66	6.05	100.9
2-02	170.0	0.47	1.20	843.620	294	94	85	0.69	6.29	100.8
2-03	180.0	0.53	1.40	850.280	298	96	87	0.73	6.66	100.4
2-04	190.0	0.46	1.20	857.010	299	97	88	0.68	6.73	108.8
2-05	200.0	0.47	1.20	863.600	296	98	89	0.69	6.59	105.0
LEAK CHECK	200.0			863.640						
1-01	210.0	0.46	1.20	870.120	295	95	89	0.68	6.48	104.5
1-02	220.0	0.47	1.20	876.570	296	98	90	0.69	6.45	102.6
1-03	230.0	0.50	1.40	883.350	295	99	91	0.71	6.78	104.4
1-04	240.0	0.49	1.30	890.010	298	99	91	0.70	6.66	103.8
1-05	250.0	0.49	1.30	896.655	299	98	91	0.70	6.64	103.7
Final	250.0									
25 points sampled		Sq.Rt. ΔP								
QC-Check: Field Averages		0.6448	1.0872	151.0100	297.2800	89.4000		0.64483	151.01000	

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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Field Data Printout

Test Method: USEPA Method 23
Analyte: PCDD/F

Location: Unit 3 FF Outlet

Test Run: 2

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: C. Slimp 558

Probe Operator: C. Slimp 558

Test Date: 3/29/11

Start Time: 07:41

Stop Time: 11:59

Leak Rate Before: 0.003 cfm @ 14 "Hg

Leak Rate After: 0.003 cfm @ 13 "Hg

Bar. Press. (in. Hg): 30.00

Static P: -7.3

O₂ (dry volume %): 9.05

CO₂ (dry volume %): 10.29

N₂+CO (dry volume %): 80.66

Nozzle ID No: 271-1

Nozzle Diameter (D_n): 0.271

Probe ID No: 67-8-10

Pitot C_p: 0.822

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 881.8

H₂O (silica, g): 47.3

Actual Moisture (%): 23.10

Meter Box ID. No: 61-5

Meter ΔH@: 1.76760

Meter Y_d: 0.99360

Traverse Point	Run Time 10.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			897.065						
5-01	10.0	0.43	1.10	902.390	297	74	74	0.66	5.32	92.6
5-02	20.0	0.40	1.00	908.040	298	80	76	0.63	5.65	101.1
5-03	30.0	0.44	1.10	914.020	296	84	77	0.66	5.98	101.5
5-04	40.0	0.39	0.99	919.920	298	85	78	0.62	5.90	106.3
5-05	50.0	0.44	1.10	925.815	297	87	79	0.66	5.90	99.7
LEAK CHECK	50.0			925.885						
4-01	60.0	0.42	1.10	931.760	296	85	80	0.65	5.88	101.7
4-02	70.0	0.42	1.10	937.570	296	88	81	0.65	5.81	100.2
4-03	80.0	0.40	1.00	943.380	294	89	82	0.63	5.81	102.3
4-04	90.0	0.38	0.96	949.010	297	91	83	0.62	5.63	101.6
4-05	100.0	0.37	0.94	954.535	296	91	83	0.61	5.52	101.0
LEAK CHECK	100.0			954.605						
3-01	110.0	0.50	1.30	961.020	295	89	84	0.71	6.41	101.0
3-02	120.0	0.44	1.10	967.270	298	92	85	0.66	6.25	104.7
3-03	130.0	0.45	1.10	973.380	298	94	85	0.67	6.11	101.0
3-04	140.0	0.42	1.10	979.190	297	93	86	0.65	5.81	99.3
3-05	150.0	0.45	1.10	985.505	297	94	86	0.67	6.31	104.2
LEAK CHECK	150.0			985.595						
2-01	160.0	0.57	1.30	991.930	296	90	87	0.75	6.33	93.1
2-02	170.0	0.53	1.30	998.390	296	94	88	0.73	6.46	98.0
2-03	180.0	0.49	1.20	1004.890	296	96	88	0.70	6.50	102.4
2-04	190.0	0.49	1.20	1011.270	296	96	89	0.70	6.38	100.4
2-05	200.0	0.43	1.10	1017.460	292	96	89	0.66	6.19	103.7
LEAK CHECK	200.0			1017.575						
1-01	210.0	0.49	1.20	1023.650	290	93	89	0.70	6.07	95.5
1-02	220.0	0.47	1.20	1029.890	289	93	88	0.69	6.24	100.2
1-03	230.0	0.51	1.30	1036.350	289	95	88	0.71	6.46	99.4
1-04	240.0	0.36	0.91	1041.850	293	96	88	0.60	5.50	100.8
1-05	250.0	0.56	1.40	1048.475	296	96	89	0.75	6.63	97.6
Final	250.0		1.12800	151.06500	295.32000	87.26000		0.66958	151.06500	

25 points sampled
QC-Check: Field Averages

Sq. Rt. ΔP.	0.6696	1.1280	151.0650	295.3200	87.2600

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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Field Data Printout

Test Method: USEPA Method 23
Analyte: PCDD/F

Location: Unit 3 FF Outlet
Test Run: 3
Client: Wheelabrator South Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: C. Slimp 558
Probe Operator: C. Slimp 558
Test Date: 3/29/11
Start Time: 12:38
Stop Time: 16:59
Leak Rate Before: 0.003 cfm @ 14 "Hg
Leak Rate After: 0.002 cfm @ 13 "Hg

Bar. Press. (in. Hg): 30.00
Static P: -9.2
O₂ (dry volume %): 8.99
CO₂ (dry volume %): 10.57
N₂+CO (dry volume %): 80.44

Nozzle ID No: 271-1
Nozzle Diameter (D_n): 0.271
Probe ID No: 67-8-10
Pitot C_p: 0.822
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 932.4
H₂O (silica, g): 50.4
Actual Moisture (%): 23.79

Meter Box ID. No: 61-5
Meter ΔH@: 1.76760
Meter Y_d: 0.99360

Traverse Point	Run Time 10.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			50.510						
5-01	10.0	0.36	0.91	56.120	297	87	86	0.60	5.61	105.2
5-02	20.0	0.39	1.00	61.780	297	91	87	0.62	5.66	101.5
5-03	30.0	0.44	1.10	67.720	298	94	87	0.66	5.94	100.1
5-04	40.0	0.39	1.00	73.530	297	96	89	0.62	5.81	103.6
5-05	50.0	0.34	0.87	78.885	298	94	89	0.58	5.36	102.5
LEAK CHECK	50.0			78.975						
4-01	60.0	0.44	1.10	84.780	295	92	88	0.66	5.81	97.8
4-02	70.0	0.54	1.40	91.670	296	95	89	0.73	6.89	104.5
4-03	80.0	0.42	1.10	98.110	298	97	89	0.65	6.44	110.6*
4-04	90.0	0.51	1.30	104.560	299	97	89	0.71	6.45	100.7
4-05	100.0	0.57	1.40	111.440	295	93	89	0.75	6.88	101.7
LEAK CHECK	100.0			111.510						
3-01	110.0	0.50	1.30	118.130	299	94	89	0.71	6.62	104.6
3-02	120.0	0.62	1.60	125.410	299	95	89	0.79	7.28	103.3
3-03	130.0	0.50	1.30	132.150	296	92	88	0.71	6.74	106.6
3-04	140.0	0.43	1.10	138.370	298	93	88	0.66	6.22	106.1
3-05	150.0	0.42	1.10	144.585	295	93	87	0.65	6.22	107.1
LEAK CHECK	150.0			144.660						
2-01	160.0	0.42	1.10	150.480	295	91	87	0.65	5.82	100.5
2-02	170.0	0.41	1.00	156.280	295	92	88	0.64	5.80	101.2
2-03	180.0	0.44	1.10	162.270	296	92	87	0.66	5.99	101.0
2-04	190.0	0.45	1.20	168.590	297	92	86	0.67	6.32	105.6
2-05	200.0	0.51	1.30	175.110	298	92	86	0.71	6.52	102.4
LEAK CHECK	200.0			175.255						
1-01	210.0	0.42	1.10	181.130	285	89	85	0.65	5.88	101.2
1-02	220.0	0.50	1.30	187.590	285	90	85	0.71	6.46	101.9
1-03	230.0	0.30	0.77	192.560	296	90	85	0.55	4.97	101.8
1-04	240.0	0.51	1.30	198.910	295	90	85	0.71	6.35	99.8
1-05	250.0	0.51	1.30	205.400	296	90	84	0.71	6.49	102.2
Final	250.0									

25 points sampled
QC-Check: Field Averages

Sq Rt ΔP

0.6713	1.1620	154.5100	295.8000	89.8400

☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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N

USEPA Method 3 Laboratory Data

Location: Unit 3 FF Outlet
 Client: Wheelabrator South Broward, Inc.
 Project No: 11182
 Method: EPA Method 3A
 Fuel Type: Municipal Waste
 F_o for Fuel: 1.03 to 1.3

Test Method: USEPA Method 23
 Analyte: PCDD/F

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:		10.53000		8.96000	80.51000	30.04320	1.13390	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.29000		9.05000	80.66000	30.00840	1.15160	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		10.57000		8.99000	80.44000	30.05080	1.12677	☒ Fo value within expected range.
	1							
	2							
	3							
Avg.								
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Location: Unit 3 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11182

Test Method: USEPA Method 23
Analyte: PCDD/F
Analyst: D. Luckhard
Analyst Emp No: 568

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	1416.4	604.5	811.9
Impinger 2	HPLC Water	537.0	531.5	5.5
Impinger 3	HPLC Water	544.1	543.6	0.5
Impinger 4	Empty	455.4	452.0	3.4
Impinger 5	XAD Trap	339.6	318.4	21.2
Impinger 6	Silica Gel	821.8	773.5	48.3
Impinger 7				
Impinger 8				

842.5 Liquid (gm)	Field Data Check
0.0 less rinse (gm)	
842.5 Net Liquid (gm)	842.5 ☒ QA/QC OK
+ 48.3 Silica Gel (gm)	48.3 ☒ QA/QC OK
890.8 Total Vlc (gm)	890.8 ☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	1500.4	643.3	857.1
Impinger 2	HPLC Water	564.0	562.0	2.0
Impinger 3	HPLC Water	541.7	541.3	0.4
Impinger 4	Empty	444.8	438.4	6.4
Impinger 5	XAD Trap	419.1	403.2	15.9
Impinger 6	Silica Gel	808.0	760.7	47.3
Impinger 7				
Impinger 8				

881.8 Liquid (gm)	Field Data Check
0.0 less rinse (gm)	
881.8 Net Liquid (gm)	881.8 ☒ QA/QC OK
+ 47.3 Silica Gel (gm)	47.3 ☒ QA/QC OK
929.1 Total Vlc (gm)	929.1 ☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	Empty	1506.2	604.7	901.5
Impinger 2	HPLC Water	533.3	531.7	1.6
Impinger 3	HPLC Water	549.0	544.6	4.4
Impinger 4	Empty	457.1	452.8	4.3
Impinger 5	XAD Trap	367.8	347.2	20.6
Impinger 6	Silica Gel	783.9	733.5	50.4
Impinger 7				
Impinger 8				

932.4 Liquid (gm)	Field Data Check
0.0 less rinse (gm)	
932.4 Net Liquid (gm)	932.4 ☒ QA/QC OK
+ 50.4 Silica Gel (gm)	50.4 ☒ QA/QC OK
982.8 Total Vlc (gm)	982.8 ☒ QA/QC OK

Rinse: (ml or gm)

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			
Impinger 7				
Impinger 8				

Liquid (gm)	Field Data Check
less rinse (gm)	
Net Liquid (gm)	☐ QA/QC OK
Silica Gel (gm)	☐ QA/QC OK
Total Vlc (gm)	☐ QA/QC OK

Rinse: (ml or gm)

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Field Data Printout

Test Method: SEPA Modified Method 26A

Analyte: HCl

Location: Unit 3 SDA Inlet

Test Run: 1

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 60.13205

Meter Operator: B. Arnold 770

Probe Operator:

Test Date: 3/30/11

Start Time: 07:47

Stop Time: 08:47

Leak Rate Before: 0.004 cfm @ 15 "Hg

Leak Rate After: 0.005 cfm @ 22 "Hg

Bar. Press. (in. Hg): 30.05

Static P: -1.5

O₂ (dry volume %): 7.99

CO₂ (dry volume %): 11.53

N₂+CO (dry volume %): 80.48

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-5

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 178.1

H₂O (silica, g): 18.0

Actual Moisture (%): 20.44

Meter Box ID. No: 66-4

Meter ΔH@: 1.69790

Meter Y_d: 0.99830

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} T _{m-out} (°F) (°F)		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			189.122						
1-01	5.0		1.20	192.230	478	88	88		3.11	
1-01	10.0		1.20	195.300	481	87	87		3.07	
1-01	15.0		1.20	198.420	482	88	88		3.12	
1-01	20.0		1.20	201.510	474	88	88		3.09	
1-01	25.0		1.20	204.590	471	89	89		3.08	
1-01	30.0		1.20	207.700	473	89	89		3.11	
1-01	35.0		1.20	210.810	478	90	89		3.11	
1-01	40.0		1.20	213.930	474	90	89		3.12	
1-01	45.0		1.20	217.040	472	90	89		3.11	
1-01	50.0		1.20	220.130	471	90	89		3.09	
1-01	55.0		1.20	223.220	471	90	90		3.09	
1-01	60.0		1.20	226.269	479	90	89		3.05	
Final	60.0		1.20000	37.14700	475.33333	88.87500		0.00000	37.14700	

1 points sampled

Sq.Rt.ΔP

QC-Check: Field Averages

1.2000	37.1470	475.3333	88.8750

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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0

Field Data Printout

Test Method: 3EPA Modified Method 26A
Analyte: HCl

Location: Unit 3 SDA Inlet
Test Run: 2
Client: Wheelabrator South Broward, Inc.
Project No: 11182
Source Area (ft²): 60.13205
Meter Operator: B. Arnold 770
Probe Operator:
Test Date: 3/30/11
Start Time: 09:06
Stop Time: 10:06
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.005 cfm @ 19 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -1.4
O₂ (dry volume %): 8.00
CO₂ (dry volume %): 11.62
N₂+CO (dry volume %): 80.38

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-5
Pilot C_p: NA
Pilot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 178.7
H₂O (silica, g): 12.7
Actual Moisture (%): 20.09

Meter Box ID. No: 66-4
Meter ΔH@: 1.69790
Meter Y_d: 0.99830

Traverse Point	Run Time 5.0 min/read	Pilot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
1-01	0.0		1.20	226.447	470	89	89		3.24	
1-01	5.0		1.20	229.690	471	89	89		2.98	
1-01	10.0		1.20	232.670	470	92	90		3.10	
1-01	15.0		1.20	235.770	468	93	90		3.11	
1-01	20.0		1.20	238.880	466	93	90		3.08	
1-01	25.0		1.20	241.960	468	93	91		3.10	
1-01	30.0		1.20	245.060	466	93	91		3.11	
1-01	35.0		1.20	248.170	469	93	91		3.12	
1-01	40.0		1.20	251.290	468	93	91		3.11	
1-01	45.0		1.20	254.400	468	93	91		3.08	
1-01	50.0		1.20	257.480	471	93	91		3.08	
1-01	55.0		1.20	260.560	472	93	91		3.10	
1-01	60.0		1.20	263.656						
Final	60.0		1.20000	37.20900	468.91667	91.33333		0.00000	37.20900	

1 points sampled
QC-Check: Field Averages

Sq. RLΔP	1.2000	37.2090	468.9166	91.3330
☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK

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H

Field Data Printout

Test Method: SEPA Modified Method 26A

Analyte: HCl

Location: Unit 3 SDA Inlet

Test Run: 3

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 60.13205

Meter Operator: B. Arnold 770

Probe Operator:

Test Date: 3/30/11

Start Time: 10:22

Stop Time: 11:22

Leak Rate Before: 0.003 cfm @ 15 "Hg

Leak Rate After: 0.005 cfm @ 21 "Hg

Bar. Press. (in. Hg): 30.05

Static P: -1.3

O₂ (dry volume %): 6.98

CO₂ (dry volume %): 12.50

N₂+CO (dry volume %): 80.52

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-5

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 184.4

H₂O (silica, g): 12.6

Actual Moisture (%): 20.87

Meter Box ID. No: 66-4

Meter ΔH@: 1.69790

Meter Y_d: 0.99830

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
						T _{m-in} (°F)	T _{m-out} (°F)			
	0.0			263.919						
1-01	5.0		1.20	276.030	471	91	91		12.11	
1-01	10.0		1.20	270.110	467	93	91		-5.92	
1-01	15.0		1.20	273.170	468	93	91		3.06	
1-01	20.0		1.20	276.210	466	93	91		3.04	
1-01	25.0		1.20	279.300	469	93	91		3.09	
1-01	30.0		1.20	282.420	475	94	92		3.12	
1-01	35.0		1.20	285.530	471	94	92		3.11	
1-01	40.0		1.20	288.640	471	94	92		3.11	
1-01	45.0		1.20	291.740	471	94	92		3.10	
1-01	50.0		1.20	294.760	467	94	92		3.02	
1-01	55.0		1.10	297.670	463	92	92		2.91	
1-01	60.0		0.98	300.511	465	92	92		2.84	
Final	60.0		1.17333	36.59200	468.66667	92.33333		0.00000	36.59200	

1 points sampled

Sq.Rt.ΔP

QC-Check: Field Averages

1.1733	36.5920	468.6666	92.3333

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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L

USEPA Method 3 Laboratory Data

Location: Unit 3 SDA Inlet
 Client: Wheelabrator South Broward, Inc.
 Project No: 11182
 Method: EPA Method 3A
 Fuel Type: Municipal Waste
 F_o for Fuel: 1.03 to 1.3

Test Method: EPA Modified Method 26A
 Analyte: HCl

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:		11.53000		7.99000	80.48000	30.16440	1.11969	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		11.62000		8.00000	80.38000	30.17920	1.11015	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		12.50000		6.98000	80.52000	30.27920	1.11360	☒ Fo value within expected range.
	1							
	2							
	3							
Avg.								
CEM or Other Avg:								☐ Fo value within expected range.

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 OHL

USEPA Method 4 Laboratory Data

Test Method: SEPA Modified Method 26A

Location: Unit 3 SDA Inlet

Analyte: HCl

Client: Wheelabrator South Broward, Inc.

Analyst: R. Vicere

Project No: 11182

Analyst Emp No: 563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	491.1	459.0	32.1
Impinger 2	100 ml 0.1N H2SO4	659.5	558.4	101.1
Impinger 3	100 ml 0.1N H2SO4	592.1	554.4	37.7
Impinger 4	Empty	452.2	445.0	7.2
Impinger 5	Silica Gel	741.8	723.8	18.0
Impinger 6				
Impinger 7				
Impinger 8				

178.1 Liquid (gm) Field Data Check

0.0 less rinse (gm)

178.1 Net Liquid (gm) 178.1

+ 18.0 Silica Gel (gm) 18.0

196.1 Total Vlc (gm) 196.1

Rinse: (ml or gm)

☒ QA/QC OK☒ QA/QC OK☒ QA/QC OK

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	513.8	459.4	54.4
Impinger 2	100 ml 0.1N H2SO4	637.1	539.0	98.1
Impinger 3	100 ml 0.1N H2SO4	574.5	552.5	22.0
Impinger 4	Empty	528.3	524.1	4.2
Impinger 5	Silica Gel	779.8	767.1	12.7
Impinger 6				
Impinger 7				
Impinger 8				

178.7 Liquid (gm) Field Data Check

0.0 less rinse (gm)

178.7 Net Liquid (gm) 178.7

+ 12.7 Silica Gel (gm) 12.7

191.4 Total Vlc (gm) 191.4

Rinse: (ml or gm)

☒ QA/QC OK☒ QA/QC OK☒ QA/QC OK

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	524.0	460.2	63.8
Impinger 2	100 ml 0.1N H2SO4	650.3	562.1	88.2
Impinger 3	100 ml 0.1N H2SO4	581.0	554.8	26.2
Impinger 4	Empty	451.2	445.0	6.2
Impinger 5	Silica Gel	754.4	741.8	12.6
Impinger 6				
Impinger 7				
Impinger 8				

184.4 Liquid (gm) Field Data Check

0.0 less rinse (gm)

184.4 Net Liquid (gm) 184.4

+ 12.6 Silica Gel (gm) 12.6

197.0 Total Vlc (gm) 197.0

Rinse: (ml or gm)

☒ QA/QC OK☒ QA/QC OK☒ 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				

Liquid (gm) Field Data Check

less rinse (gm)

Net Liquid (gm)

Silica Gel (gm)

Total Vlc (gm)

Rinse: (ml or gm)

☐ QA/QC OK☐ QA/QC OK☐ QA/QC OK042611 103336
OHL

Field Data Printout

Test Method: 3EPA Modified Method 26A
Analyte: HCl

Location: Unit 3 FF Outlet
Test Run: 1
Client: Wheelabrator South Broward, Inc.
Project No: 11182
Source Area (ft²): 64.00000
Meter Operator: N. Hitchins 569
Probe Operator:
Test Date: 3/30/11
Start Time: 07:47
Stop Time: 08:47
Leak Rate Before: 0.003 cfm @ 14 "Hg
Leak Rate After: 0.002 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.05
Static P: -9.1
O₂ (dry volume %): 8.34
CO₂ (dry volume %): 11.06
N₂+CO (dry volume %): 80.60

Nozzle ID No: NA
Nozzle Diameter (D_n): NA
Probe ID No: 67-4-1
Pitot C_p: NA
Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 261.6
H₂O (silica, g): 14.4
Actual Moisture (%): 24.17

Meter Box ID. No: 61-5
Meter ΔH@: 1.76760
Meter Y_d: 0.99360

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
	0.0			207.110						
3-01	5.0		1.50	210.730	299	79	77		3.62	
3-01	10.0		1.50	214.160	298	81	77		3.43	
3-01	15.0		1.50	217.640	300	84	78		3.48	
3-01	20.0		1.50	221.130	299	86	78		3.49	
3-01	25.0		1.50	224.590	298	87	79		3.46	
3-01	30.0		1.50	228.050	298	88	80		3.46	
3-01	35.0		1.50	231.540	299	89	80		3.49	
3-01	40.0		1.50	235.020	298	89	82		3.48	
3-01	45.0		1.50	238.490	299	89	81		3.47	
3-01	50.0		1.50	241.950	299	89	81		3.46	
3-01	55.0		1.50	245.510	298	89	81		3.56	
3-01	60.0		1.50	248.980	299	89	82		3.47	
Final	60.0		1.50000	41.87000	298.66667	83.12500		0.00000	41.87000	
3 points sampled QC-Check: Field Averages				Sq.Rt.ΔP						
				1.5000	41.8700	298.6667	83.1250			
				☐ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK	☒ Avg. OK		

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0

Field Data Printout

Test Method: 3EPA Modified Method 26A
Analyte: HCl

Location: Unit 3 FF Outlet

Test Run: 2

Client: Wheelabrator South Broward, Inc.

Project No: 11182

Source Area (ft²): 64.00000

Meter Operator: N. Hitchins 569

Probe Operator:

Test Date: 3/30/11

Start Time: 09:06

Stop Time: 10:06

Leak Rate Before: 0.004 cfm @ 12 "Hg

Leak Rate After: 0.002 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.05

Static P: -5.8

O₂ (dry volume %): 7.59

CO₂ (dry volume %): 11.22

N₂+CO (dry volume %): 81.19

Nozzle ID No: NA

Nozzle Diameter (D_n): NA

Probe ID No: 67-4-1

Pitot C_p: NA

Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 262.5

H₂O (silica, g): 13.1

Actual Moisture (%): 24.23

Meter Box ID. No: 61-5

Meter ΔH@: 1.76760

Meter Y_d: 0.99360

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} T _{m-out} (°F) (°F)		√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft³)	Isokinetics (calculated) (%)
	0.0			249.480						
3-01	5.0		1.50	253.080	300	83	81		3.60	
3-01	10.0		1.50	256.620	300	86	81		3.54	
3-01	15.0		1.50	260.070	300	89	82		3.45	
3-01	20.0		1.50	263.560	297	90	83		3.49	
3-01	25.0		1.50	267.110	299	90	83		3.55	
3-01	30.0		1.50	270.630	300	90	83		3.52	
3-01	35.0		1.50	274.120	299	90	84		3.49	
3-01	40.0		1.50	277.590	305	91	84		3.47	
3-01	45.0		1.50	281.050	299	91	84		3.46	
3-01	50.0		1.50	284.510	300	91	84		3.46	
3-01	55.0		1.50	287.990	301	90	84		3.48	
3-01	60.0		1.50	291.375	299	90	84		3.38	
Final	60.0		1.50000	41.89500	299.91667	86.16667		0.00000	41.89500	

3 points sampled

Sq. Rt. ΔP

QC-Check: Field Averages

1.5000	41.8950	299.9167	86.1667

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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Field Data Printout

Test Method: 3EPA Modified Method 26A

Analyte: HCl

Location: Unit 3 FF Outlet
 Test Run: 3
 Client: Wheelabrator South Broward, Inc.
 Project No: 11182
 Source Area (ft²): 64.00000
 Meter Operator: N. Hitchins 569
 Probe Operator:
 Test Date: 3/30/11
 Start Time: 10:22
 Stop Time: 11:22
 Leak Rate Before: 0.004 cfm @ 12 "Hg
 Leak Rate After: 0.002 cfm @ 6 "Hg

Bar. Press. (in. Hg): 30.05
 Static P: -5.8
 O₂ (dry volume %): 7.73
 CO₂ (dry volume %): 11.77
 N₂+CO (dry volume %): 80.50

Nozzle ID No: NA
 Nozzle Diameter (D_n): NA
 Probe ID No: 67-41
 Pitot C_p: NA
 Pitot Leak Check: ☒ Pass ☐ Fail

H₂O (condensate, ml or gm): 259.4
 H₂O (silica, g): 14.5
 Actual Moisture (%): 24.20

Meter Box ID. No: 61-5
 Meter ΔH@: 1.76760
 Meter Y_d: 0.99360

Traverse Point	Run Time 5.0 min/read	Pitot ΔP _s (in. H ₂ O)	Sample ΔH (in. H ₂ O)	Metered (dcf)	Stack T _s (°F)	Dry Gas Meter T _{m-in} (°F)	T _{m-out} (°F)	√ΔP _s (calculated) (√in. H ₂ O)	Volume (calculated) (ft ³)	Isokinetics (calculated) (%)
3-01	0.0		1.50	291.975	298	85	85		3.58	
3-01	5.0		1.50	295.560	297	89	85		3.59	
3-01	10.0		1.50	299.150	298	91	87		3.47	
3-01	15.0		1.50	302.620	298	92	87		3.51	
3-01	20.0		1.50	306.130	298	92	86		3.48	
3-01	25.0		1.50	309.610	300	92	86		3.46	
3-01	30.0		1.50	313.070	298	92	86		3.48	
3-01	35.0		1.50	316.550	299	93	87		3.47	
3-01	40.0		1.50	320.020	299	92	87		3.52	
3-01	45.0		1.50	323.540	298	93	87		3.35	
3-01	50.0		1.50	326.890	297	93	87		3.54	
3-01	55.0		1.50	330.430	298	93	87		3.46	
3-01	60.0		1.50	333.895						
Final	60.0		1.50000	41.92000	298.16667	88.91667		0.00000	41.92000	
3 points sampled										
QC-Check: Field Averages										
Sq.Rt.ΔP				1.5000	41.9200	298.1667	88.9167			

☐ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK ☒ Avg. OK

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USEPA Method 3 Laboratory Data

Test Method: EPA Modified Method 26A
Analyte: HCl

Location: Unit 3 FF Outlet
Client: Wheelabrator South Broward, Inc.
Project No: 11182
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:		11.06000		8.34000	80.60000	30.10320	1.13562	☒ Fo value within expected range.
2	1							
	2							
	3							
Avg.								
CEM or Other Avg:		11.22000		7.59000	81.19000	30.09880	1.18627	☒ Fo value within expected range.
3	1							
	2							
	3							
Avg.								
CEM or Other Avg:		11.77000		7.73000	80.50000	30.19240	1.11895	☒ Fo value within expected range.
	1							
	2							
	3							
Avg.								
CEM or Other Avg:								☐ Fo value within expected range.

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USEPA Method 4 Laboratory Data

Test Method: SEPA Modified Method 26A

Location: Unit 3 FF Outlet

Analyte: HCl

Client: Wheelabrator South Broward, Inc.

Analyst: R. Vicere

Project No: 11182

Analyst Emp No: 563

Test Run: 1

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	549.0	455.0	94.0
Impinger 2	100 ml 0.1N H2SO4	650.9	526.8	124.1
Impinger 3	100 ml 0.1N H2SO4	573.2	537.4	35.8
Impinger 4	Empty	455.0	447.3	7.7
Impinger 5	Silica Gel	754.6	740.2	14.4
Impinger 6				
Impinger 7				
Impinger 8				

261.6 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

261.6 Net Liquid (gm)

261.6

☒ QA/QC OK

+ 14.4 Silica Gel (gm)

14.4

☒ QA/QC OK

276.0 Total Vlc (gm)

276.0

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 2

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	532.9	455.7	77.2
Impinger 2	100 ml 0.1N H2SO4	675.4	541.0	134.4
Impinger 3	100 ml 0.1N H2SO4	595.2	554.1	41.1
Impinger 4	Empty	439.5	429.7	9.8
Impinger 5	Silica Gel	770.0	756.9	13.1
Impinger 6				
Impinger 7				
Impinger 8				

262.5 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

262.5 Net Liquid (gm)

262.5

☒ QA/QC OK

+ 13.1 Silica Gel (gm)

13.1

☒ QA/QC OK

275.6 Total Vlc (gm)

275.6

☒ QA/QC OK

Rinse: (ml or gm)

Test Run: 3

	Contents	Gross (gm)	Tare (gm)	Net (gm)
Impinger 1	50 ml 0.1N H2SO4	541.7	461.2	80.5
Impinger 2	100 ml 0.1N H2SO4	689.8	565.8	124.0
Impinger 3	100 ml 0.1N H2SO4	589.1	543.5	45.6
Impinger 4	Empty	449.8	440.5	9.3
Impinger 5	Silica Gel	793.6	779.1	14.5
Impinger 6				
Impinger 7				
Impinger 8				

259.4 Liquid (gm)

Field Data Check

0.0 less rinse (gm)

259.4 Net Liquid (gm)

259.4

☒ QA/QC OK

+ 14.5 Silica Gel (gm)

14.5

☒ QA/QC OK

273.9 Total Vlc (gm)

273.9

☒ QA/QC OK

Rinse: (ml or gm)

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				

Liquid (gm)

Field Data Check

less rinse (gm)

Net Liquid (gm)

☐ QA/QC OK

Silica Gel (gm)

☐ QA/QC OK

Total Vlc (gm)

☐ QA/QC OK

Rinse: (ml or gm)

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 28, 2011
Start Time 11:04
Stop time 11:29

IGS Bag Analysis

		Channel 1 CO2	Channel 2 O2
		FF Outlet %dv	FF Outlet %dv
Calibration Checks			
C _{ol}	Initial zero	-0.002	-0.012
C _{ul}	Initial upscale	5.853	14.080
C _{of}	Final zero	0.008	-0.009
C _{uf}	Final upscale	5.863	14.159
C _{ma}	Actual gas value	5.93	14.10
C _{lin}	Actual gas value (linearity)	13.90	6.05
Analyzer Averages (concentrations)			U1 R1 in 26A
C _{Avg}	Average conc.	10.76	8.40
C _{Gas}	Bias adjusted	10.90	8.39
Analyzer Averages (concentrations)			U1 R2 in 26A
C _{Avg}	Average conc.	10.75	8.50
C _{Gas}	Bias adjusted	10.88	8.50
Analyzer Averages (concentrations)			U1 R3 in 26A
C _{Avg}	Average conc.	11.27	7.92
C _{Gas}	Bias adjusted	11.41	7.91
Analyzer Averages (concentrations)			U1 R1 out 26A
C _{Avg}	Average conc.	9.92	9.48
C _{Gas}	Bias adjusted	10.05	9.47
Analyzer Averages (concentrations)			U1 R2 out 26A
C _{Avg}	Average conc.	9.64	9.78
C _{Gas}	Bias adjusted	9.76	9.77
Analyzer Averages (concentrations)			U1 R3 out 26A
C _{Avg}	Average conc.	10.44	8.83
C _{Gas}	Bias adjusted	10.57	8.82
Analyzer Averages (concentrations)			U3 R1 5/29
C _{Avg}	Average conc.	10.00	9.27
C _{Gas}	Bias adjusted	10.13	9.26
Analyzer Averages (concentrations)			U3 R2 5/29
C _{Avg}	Average conc.	10.10	9.24
C _{Gas}	Bias adjusted	10.23	9.23

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11:05:27	-0.002	-0.012	
11:05:42	-1.665	4.185	
11:05:27	-0.002	-0.012	zero

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 28, 2011
Start Time 11:04
Stop time 11:29

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
11:05:42	-1.665	4.185	
11:05:57	-1.720	20.948	
11:06:12	0.061	21.752	
11:06:27	-0.093	21.759	
11:06:42	0.266	21.096	
11:06:57	5.442	15.105	
11:07:12	6.164	14.696	
11:07:27	6.182	14.683	
11:07:42	6.188	14.673	
11:07:57	6.194	14.185	
11:08:12	3.500	17.677	
11:08:27	11.128	8.166	
11:08:42	14.088	6.061	
11:08:57	12.297	9.364	
11:09:12	2.452	17.807	
11:09:27	5.714	14.137	
11:09:42	5.858	14.076	
11:09:57	5.853	14.080	span
11:10:12	5.856	14.087	
11:10:27	4.022	17.044	
11:10:42	8.158	10.532	
11:10:57	13.867	6.073	
11:11:12	13.920	6.046	
11:11:27	13.944	6.038	linearity
11:11:42	12.092	9.685	
11:11:57	0.781	20.513	
11:12:12	0.140	20.889	
11:12:27	0.116	20.913	
11:12:42	2.312	17.015	
11:12:57	10.447	8.601	
11:13:12	10.759	8.403	
11:13:27	10.765	8.401	U1 R1 in 26A
11:13:42	10.026	10.450	
11:13:57	0.973	20.401	
11:14:12	1.179	18.608	
11:14:27	10.074	8.898	
11:14:42	10.735	8.513	
11:14:57	10.747	8.505	U1 R2 in 26A
11:15:12	10.733	8.887	
11:15:27	2.473	19.478	
11:15:42	2.287	17.091	
11:15:57	10.907	8.115	
11:16:12	11.257	7.924	
11:16:27	11.269	7.915	U1 R3 in 26A
11:16:42	11.278	7.954	
11:16:57	3.639	18.503	
11:17:12	0.186	20.690	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 28, 2011
Start Time 11:04
Stop time 11:29

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
11:17:27	7.639	10.982	
11:17:42	9.894	9.492	
11:17:57	9.917	9.479	
11:18:12	9.923	9.476	U1 R1 out 26A
11:18:27	9.926	9.480	
11:18:42	3.632	18.348	
11:18:57	0.164	20.956	
11:19:12	6.358	12.311	
11:19:27	9.601	9.821	
11:19:42	9.626	9.807	
11:19:57	9.641	9.783	U1 R2 out 26A
11:20:12	9.639	9.783	
11:20:27	4.682	17.007	
11:20:42	0.193	20.909	
11:20:57	2.923	16.212	
11:21:12	10.185	8.919	
11:21:27	10.288	8.818	
11:21:42	10.352	8.801	
11:21:57	10.439	8.833	U1 R3 out 26A
11:22:12	10.445	8.826	
11:22:27	6.137	15.368	
11:22:42	0.219	20.870	
11:22:57	4.321	14.629	
11:23:12	9.921	9.348	
11:23:27	10.007	9.287	
11:23:42	10.000	9.267	U3 R1 5/29
11:23:57	10.017	9.265	
11:24:12	10.023	9.268	
11:24:27	10.019	9.276	
11:24:42	9.220	11.328	
11:24:57	0.853	20.466	
11:25:12	1.596	18.053	
11:25:27	9.631	9.499	
11:25:42	10.084	9.249	
11:25:57	10.100	9.241	U3 R2 5/29
11:26:12	10.106	9.239	
11:26:27	9.757	10.539	
11:26:42	1.390	19.719	
11:26:57	5.100	14.607	
11:27:12	5.863	14.161	
11:27:27	5.861	14.160	
11:27:42	5.863	14.159	span
11:27:57	3.637	17.607	
11:28:12	0.164	10.589	
11:28:27	0.034	0.138	
11:28:42	0.016	0.016	
11:28:57	0.012	0.010	
11:29:12	0.008	-0.009	zero
11:29:27	0.006	-0.007	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 28, 2011
Start Time 14:59
Stop time 15:19

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2
	FF Outlet %dv	FF Outlet %dv
Calibration Checks		
C _{oi} Initial zero	0.000	0.177
C _{ui} Initial upscale	5.808	14.101
C _{of} Final zero	0.007	0.143
C _{uf} Final upscale	5.771	14.007
C _{ma} Actual gas value	5.93	14.10
C _{lin} Actual gas value (linearity)	13.90	6.05
Analyzer Averages (concentrations)		U3 R2 5/29
C _{Avg} Average conc.	10.40	8.89
C _{Gas} Bias adjusted	10.66	8.86
Analyzer Averages (concentrations)		U3 R1 23
C _{Avg} Average conc.	10.27	8.99
C _{Gas} Bias adjusted	10.53	8.96
Analyzer Averages (concentrations)		U1 R1 13B
C _{Avg} Average conc.	9.80	9.63
C _{Gas} Bias adjusted	10.04	9.61
Analyzer Averages (concentrations)		U1 R2 13B
C _{Avg} Average conc.	9.83	9.56
C _{Gas} Bias adjusted	10.08	9.54
Analyzer Averages (concentrations)		U1 R3 13B
C _{Avg} Average conc.	10.08	9.31
C _{Gas} Bias adjusted	10.33	9.29

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15:00:03	0.000	0.247	
15:00:18	0.000	0.187	
15:00:33	0.000	0.177	
15:00:03	0.000	0.247	
15:00:18	0.000	0.187	
15:00:33	0.000	0.177	zero
15:00:48	0.000	0.173	
15:01:03	0.294	11.667	
15:01:18	5.067	14.442	
15:01:33	5.668	14.194	
15:01:48	5.687	14.205	
15:02:03	5.033	15.658	
15:02:18	0.432	20.671	
15:02:33	9.238	9.311	
15:02:48	13.577	6.210	
15:03:03	13.611	6.182	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 28, 2011
Start Time 14:59
Stop time 15:19

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
15:03:18	13.730	6.171	
15:03:33	13.836	6.227	
15:03:48	5.103	16.575	
15:04:03	5.573	14.234	
15:04:18	5.808	14.101	span
15:04:33	5.420	15.139	
15:04:48	5.387	13.714	
15:05:03	13.660	6.238	
15:05:18	13.828	6.144	
15:05:33	13.841	6.138	linearity
15:05:48	13.378	7.789	
15:06:03	1.700	19.969	
15:06:18	0.149	20.836	
15:06:33	5.373	13.322	
15:06:48	10.329	8.963	
15:07:03	10.353	8.927	
15:07:18	10.336	8.883	
15:07:33	10.401	8.890	U3 R2 5/29
15:07:48	10.412	8.920	
15:08:03	10.417	8.920	
15:08:18	4.382	17.430	
15:08:33	0.688	19.371	
15:08:48	9.207	9.621	
15:09:03	10.256	8.983	
15:09:18	10.273	8.985	U3 R1 23
15:09:33	10.282	8.980	
15:09:48	8.033	12.967	
15:10:03	0.458	20.601	
15:10:18	0.128	20.829	
15:10:33	1.674	17.898	
15:10:48	9.383	9.856	
15:11:03	9.779	9.640	
15:11:18	9.795	9.628	U1 R1 13B
15:11:33	9.790	9.614	
15:11:48	8.360	12.487	
15:12:03	0.556	20.516	
15:12:18	0.177	20.397	
15:12:33	7.745	10.908	
15:12:48	9.804	9.559	
15:13:03	9.823	9.561	
15:13:18	9.835	9.561	
15:13:33	9.834	9.556	U1 R2 13B
15:13:48	9.461	10.833	
15:14:03	1.264	20.003	
15:14:18	0.144	20.756	
15:14:33	0.118	20.762	
15:14:48	4.390	14.490	
15:15:03	9.982	9.382	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 28, 2011
Start Time 14:59
Stop time 15:19

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
15:15:18	10.069	9.328	
15:15:33	10.080	9.319	
15:15:48	10.084	9.313	U1 R3 13B
15:16:03	9.904	10.210	
15:16:18	1.579	19.766	
15:16:33	4.160	15.168	
15:16:48	5.757	14.013	
15:17:03	5.769	14.006	
15:17:18	5.771	14.007	span
15:17:33	5.150	15.374	
15:17:48	0.437	6.915	
15:18:03	0.032	0.200	
15:18:18	0.006	0.152	
15:18:33	0.007	0.143	zero
15:18:48	0.005	2.675	
15:19:03	0.074	19.599	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 29, 2011
Start Time 11:59
Stop time 12:27

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2
	FF Outlet %dv	FF Outlet %dv
Calibration Checks		
C _{oi} Initial zero	0.000	0.035
C _{ui} Initial upscale	5.910	14.053
C _{of} Final zero	0.006	-0.055
C _{uf} Final upscale	5.908	13.963
C _{ma} Actual gas value	5.93	14.10
C _{lin} Actual gas value (linearity)	13.90	6.05
Analyzer Averages (concentrations)		
C _{avg} Average conc.	10.87	U2 R1 in 26A 8.39
C _{gas} Bias adjusted	10.91	8.45
Analyzer Averages (concentrations)		
C _{avg} Average conc.	11.24	U2 R2 in 26A 8.05
C _{gas} Bias adjusted	11.28	8.11
Analyzer Averages (concentrations)		
C _{avg} Average conc.	11.05	U2 R3 in 26A 8.26
C _{gas} Bias adjusted	11.09	8.31
Analyzer Averages (concentrations)		
C _{avg} Average conc.	9.84	U2 R1 out 26A 9.49
C _{gas} Bias adjusted	9.88	9.56
Analyzer Averages (concentrations)		
C _{avg} Average conc.	10.03	U2 R2 out 26A 9.30
C _{gas} Bias adjusted	10.06	9.36
Analyzer Averages (concentrations)		
C _{avg} Average conc.	10.35	U2 R3 out 26A 9.02
C _{gas} Bias adjusted	10.39	9.08
Analyzer Averages (concentrations)		
C _{avg} Average conc.	10.03	U1 R1 5/29 8.90
C _{gas} Bias adjusted	10.07	8.97
Analyzer Averages (concentrations)		
C _{avg} Average conc.	10.26	U3 R2 M23 8.99
C _{gas} Bias adjusted	10.29	9.05

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12:00:49	0.000	0.121
12:01:04	-0.001	0.039
12:01:19	0.000	0.035
12:00:49	0.000	0.121
12:01:04	-0.001	0.039

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 29, 2011
Start Time 11:59
Stop time 12:27

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
12:01:19	0.000	0.035	zero
12:01:34	0.000	0.021	
12:01:49	-0.059	1.088	
12:02:04	0.056	19.003	
12:02:19	2.694	16.929	
12:02:34	5.859	14.072	
12:02:49	5.912	14.056	
12:03:04	5.910	14.053	span
12:03:19	5.900	14.217	
12:03:34	1.455	19.601	
12:03:49	10.811	8.070	
12:04:04	14.005	6.162	
12:04:19	14.040	6.149	linearity
12:04:34	12.934	8.759	
12:04:49	1.130	20.219	
12:05:04	0.135	20.771	
12:05:19	0.109	20.783	
12:05:34	5.636	12.962	
12:05:49	10.801	8.429	
12:06:04	10.863	8.387	
12:06:19	10.873	8.386	U2 R1 in 26A
12:06:34	10.381	10.007	
12:06:49	1.173	20.112	
12:07:04	7.519	10.812	
12:07:19	11.182	8.076	
12:07:34	11.236	8.046	
12:07:49	11.239	8.048	U2 R2 in 26A
12:08:04	11.239	8.034	
12:08:19	11.240	8.048	
12:08:34	11.091	8.001	
12:08:49	11.187	7.962	
12:09:04	11.233	8.175	
12:09:19	3.024	18.835	
12:09:34	0.152	20.665	
12:09:49	5.662	12.917	
12:10:04	10.986	8.285	
12:10:19	11.029	8.236	
12:10:34	11.052	8.256	U2 R3 in 26A
12:10:49	11.074	8.266	
12:11:04	4.360	17.529	
12:11:19	0.163	20.689	
12:11:34	0.120	20.696	
12:11:49	5.537	13.088	
12:12:04	9.779	9.524	
12:12:19	9.834	9.497	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 29, 2011
Start Time 11:59
Stop time 12:27

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
12:12:34	9.839	9.492	U2 R1 out 26A
12:12:49	9.849	9.491	
12:13:04	6.367	14.878	
12:13:19	0.681	19.602	
12:13:34	8.272	10.360	
12:13:49	10.007	9.301	
12:14:04	10.027	9.295	U2 R2 out 26A
12:14:19	9.450	10.985	
12:14:34	0.990	20.153	
12:14:49	0.132	20.650	
12:15:04	5.715	12.945	
12:15:19	10.160	9.002	
12:15:34	10.152	9.012	
12:15:49	10.356	9.047	
12:16:04	10.353	9.020	U2 R3 out 26A
12:16:19	10.377	9.060	
12:16:34	10.378	9.060	
12:16:49	10.234	9.839	
12:17:04	1.734	19.764	
12:17:19	0.143	20.716	
12:17:34	0.117	20.747	
12:17:49	0.110	20.744	
12:18:04	0.108	20.734	
12:18:19	5.194	13.429	
12:18:34	10.143	9.058	
12:18:49	10.201	8.982	
12:19:04	10.028	8.903	U1 R1 5/29
12:19:19	10.236	9.009	
12:19:34	10.216	9.380	
12:19:49	2.306	19.378	
12:20:04	0.146	20.714	
12:20:19	0.123	20.741	
12:20:34	0.112	20.745	
12:20:49	5.215	13.413	
12:21:04	10.173	9.027	
12:21:19	10.248	8.987	
12:21:34	10.255	8.988	U3 R2 M23
12:21:49	10.253	9.195	
12:22:04	2.620	19.135	
12:22:19	0.505	19.773	
12:22:34	5.391	14.301	
12:22:49	5.908	13.982	
12:23:04	5.908	13.963	span
12:23:19	5.909	13.947	
12:23:34	5.522	14.976	
12:23:49	0.549	11.823	
12:24:04	0.019	0.081	
12:24:19	0.010	-0.043	
12:24:34	0.006	-0.055	zero
12:24:49	0.007	4.723	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 29, 2011
Start Time 17:16
Stop time 17:38

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2
	FF Outlet %dv	FF Outlet %dv
Calibration Checks		
C _{0i} Initial zero	-0.011	0.107
C _{0i} Initial upscale	5.812	14.050
C _{0f} Final zero	0.017	0.024
C _{0f} Final upscale	5.808	14.035
C _{ma} Actual gas value	5.93	14.10
C _{lin} Actual gas value (linearity)	13.90	6.05
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	10.36	U3 R3 23 8.97
C _{GAS} Bias adjusted	10.57	8.99
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	10.65	U2 R4 out 26A 8.68
C _{GAS} Bias adjusted	10.87	8.69
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	11.31	U2 R4 in 26A 7.84
C _{GAS} Bias adjusted	11.55	7.85
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	10.44	U2 R1 13B 8.83
C _{GAS} Bias adjusted	10.66	8.84
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	11.41	U2 R2 13B 7.90
C _{GAS} Bias adjusted	11.65	7.91
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	10.72	U2 R3 13B 8.76
C _{GAS} Bias adjusted	10.94	8.77
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	10.28	U1 R2 5/29 8.95
C _{GAS} Bias adjusted	10.49	8.96
Analyzer Averages (concentrations)		
C _{AVG} Average conc.	10.08	U1 R3 5/29 9.41
C _{GAS} Bias adjusted	10.29	9.43

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17:17:46	-0.011	0.098
17:18:01	-0.011	0.116

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 29, 2011
Start Time 17:16
Stop time 17:38

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
17:18:16	-0.017	0.110	
17:18:31	-0.011	0.107	zero
17:18:46	1.557	7.653	
17:18:01	2.668	14.539	
17:18:16	4.532	14.745	
17:18:31	5.324	15.013	
17:18:46	11.670	15.008	
17:19:01	13.358	6.345	
17:19:16	13.850	6.192	
17:19:31	7.957	14.217	
17:19:46	3.044	16.516	
17:20:01	5.766	14.021	
17:20:16	5.812	14.050	span
17:20:31	5.611	14.737	
17:20:46	5.384	13.795	
17:21:01	13.663	6.253	
17:21:16	13.874	6.151	
17:21:31	13.881	6.142	linearity
17:21:46	12.571	8.946	
17:22:01	1.185	20.065	
17:22:16	3.510	15.492	
17:22:31	10.165	9.068	
17:22:46	10.357	8.974	U3 R3 23
17:23:01	9.627	10.779	
17:23:16	1.058	20.095	
17:23:31	0.139	20.697	
17:23:46	2.290	16.888	
17:24:01	10.240	8.879	
17:24:16	10.540	8.665	
17:24:31	10.645	8.680	U2 R4 out 26A
17:24:46	10.649	8.678	
17:25:01	8.512	12.482	
17:25:16	-1.188	20.371	
17:25:31	0.130	20.695	
17:25:46	4.758	13.896	
17:26:01	11.166	7.969	
17:26:16	11.302	7.861	
17:26:31	11.310	7.844	U2 R4 in 26A
17:26:46	11.318	7.846	
17:27:01	5.299	16.363	
17:27:16	0.207	20.602	
17:27:31	0.119	20.666	
17:27:46	0.102	20.691	
17:28:01	3.047	15.910	
17:28:16	10.179	8.953	
17:28:31	10.417	8.823	
17:28:46	10.443	8.833	U2 R1 13B
17:29:01	10.084	10.101	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 29, 2011
Start Time 17:16
Stop time 17:38

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
17:29:16	1.520	19.714	
17:29:31	0.142	20.542	
17:29:46	8.120	10.230	
17:30:01	11.369	7.922	
17:30:16	11.412	7.904	U2 R2 13B
17:30:31	11.422	7.901	
17:30:46	5.310	16.447	
17:31:01	0.256	20.581	
17:31:16	3.155	15.945	
17:31:31	10.488	8.879	
17:31:46	10.705	8.765	
17:32:01	10.720	8.760	U2 R3 13B
17:32:16	10.726	8.748	
17:32:31	9.431	11.355	
17:32:46	0.802	20.253	
17:33:01	1.408	18.094	
17:33:16	9.681	9.284	
17:33:31	10.267	8.960	
17:33:46	10.277	8.950	U1 R2 5/29
17:34:01	10.287	8.952	
17:34:16	5.665	15.759	
17:34:31	0.226	20.644	
17:34:46	1.072	18.643	
17:35:01	9.334	9.851	
17:35:16	10.063	9.418	
17:35:31	10.081	9.413	U1 R3 5/29
17:35:46	10.087	9.473	
17:36:01	3.185	18.604	
17:36:16	0.177	20.547	
17:36:31	4.390	14.996	
17:36:46	5.790	14.045	
17:37:01	5.808	14.035	span
17:37:16	5.809	14.097	
17:37:31	1.767	14.794	
17:37:46	0.053	0.676	
17:38:01	0.012	0.044	
17:38:16	0.017	0.024	zero
17:38:31	0.004	1.667	
17:38:46	0.061	19.031	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 30, 2011
Start Time 11:31
Stop time 11:52

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2
	FF Outlet %dv	FF Outlet %dv
Calibration Checks		
C _{oi} Initial zero	0.043	-0.018
C _{ui} Initial upscale	5.860	14.085
C _{of} Final zero	0.052	0.098
C _{uf} Final upscale	5.838	14.072
C _{ma} Actual gas value	5.93	14.10
C _{lin} Actual gas value (linearity)	13.90	6.05
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	10.87	U3 R1 out 26A 8.35
C _{Gas} Bias adjusted	11.06	8.34
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	11.02	U3 R2 out 26A 7.60
C _{Gas} Bias adjusted	11.22	7.59
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	11.56	U3 R3 out 26A 7.74
C _{Gas} Bias adjusted	11.77	7.73
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	11.33	U3 R1 in 26A 8.00
C _{Gas} Bias adjusted	11.53	7.99
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	11.41	U3 R2 in 26A 8.01
C _{Gas} Bias adjusted	11.62	8.00
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	12.27	U3 R3 in M26A 6.98
C _{Gas} Bias adjusted	12.50	6.98
Analyzer Averages (concentrations)		
C _{Avg} Average conc.	11.09	U3 R1 5/29 8.05
C _{Gas} Bias adjusted	11.28	8.04

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11:32:29	0.043	-0.018	
11:32:44	0.050	5.306	
11:32:59	1.530	17.948	
11:32:29	0.043	-0.018	zero
11:32:44	0.050	5.306	
11:32:59	1.530	17.948	
11:33:14	5.715	14.124	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 30, 2011
Start Time 11:31
Stop time 11:52

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
11:33:29	5.854	14.073	
11:33:44	5.860	14.085	span
11:33:59	5.199	15.594	
11:34:14	2.020	17.578	
11:34:29	13.165	6.419	
11:34:44	13.893	6.128	
11:34:59	13.909	6.124	linearity
11:35:14	13.025	8.517	
11:35:29	1.238	20.347	
11:35:44	0.195	20.937	
11:35:59	0.173	20.970	
11:36:14	0.165	20.992	
11:36:29	0.161	21.009	
11:36:44	2.056	17.447	
11:36:59	10.525	8.535	
11:37:14	10.853	8.350	
11:37:29	10.869	8.348	U3 R1 out 26A
11:37:44	10.875	8.349	
11:37:59	10.878	8.352	
11:38:14	5.378	16.464	
11:38:29	1.386	18.471	
11:38:44	10.790	8.121	
11:38:59	11.318	7.530	
11:39:14	11.640	7.552	
11:39:29	11.021	7.599	U3 R2 out 26A
11:39:44	11.393	7.526	
11:39:59	11.518	7.603	
11:40:14	7.954	13.682	
11:40:29	0.333	20.990	
11:40:44	2.802	16.577	
11:40:59	11.324	7.882	
11:41:14	11.571	7.746	
11:41:29	11.565	7.741	U3 R3 out 26A
11:41:44	11.598	7.732	
11:41:59	6.936	14.863	
11:42:14	1.646	18.105	
11:42:29	10.822	8.282	
11:42:44	11.316	8.003	
11:42:59	11.329	7.997	U3 R1 in 26A
11:43:14	11.331	8.003	
11:43:29	8.040	13.487	
11:43:44	0.331	20.934	
11:43:59	5.137	13.748	
11:44:14	11.326	8.055	
11:44:29	11.404	8.012	
11:44:44	11.415	8.008	U3 R2 in 26A
11:44:59	11.420	8.023	
11:45:14	3.910	18.413	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 30, 2011
Start Time 11:31
Stop time 11:52

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
11:45:29	0.267	20.573	
11:45:44	9.882	8.463	
11:45:59	12.251	7.004	
11:46:14	12.273	6.985	U3 R3 in M26A
11:46:29	12.281	6.975	
11:46:44	9.962	11.341	
11:46:59	0.536	20.804	
11:47:14	0.220	20.693	
11:47:29	8.640	9.668	
11:47:44	11.047	8.056	
11:47:59	11.072	8.044	
11:48:14	11.087	8.046	U3 R1 5/29
11:48:29	11.095	8.054	
11:48:44	5.026	16.932	
11:48:59	0.354	20.289	
11:49:14	5.075	14.443	
11:49:29	5.838	14.072	span
11:49:44	5.689	14.206	
11:49:59	5.109	15.873	
11:50:14	0.359	8.250	
11:50:29	0.061	0.175	
11:50:44	0.052	0.110	
11:50:59	0.052	0.098	zero
11:51:14	0.050	1.733	
11:51:29	0.145	19.531	
11:51:44	0.023	20.795	
11:51:59	0.040	20.765	
11:52:14	-1.711	20.827	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 30, 2011
Start Time 15:32
Stop time 15:47

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2
	FF Outlet %dv	FF Outlet %dv
Calibration Checks		
C _{0i} Initial zero	0.040	0.082
C _{0f} Initial upscale	5.832	13.999
C _{0i} Final zero	0.045	0.131
C _{0f} Final upscale	5.858	14.145
C _{ma} Actual gas value	5.93	14.10
C _{lin} Actual gas value (linearity)	13.90	6.05
Analyzer Averages (concentrations)		U2 R2 5/29
C _{Avg} Average conc.	10.60	8.54
C _{Gas} Bias adjusted	10.79	8.52
Analyzer Averages (concentrations)		U2 R3 5/29
C _{Avg} Average conc.	10.80	8.49
C _{Gas} Bias adjusted	10.99	8.46
Analyzer Averages (concentrations)		U3 R1 13B
C _{Avg} Average conc.	11.23	8.03
C _{Gas} Bias adjusted	11.44	8.00
Analyzer Averages (concentrations)		U3 R2 13B
C _{Avg} Average conc.	10.20	9.20
C _{Gas} Bias adjusted	10.38	9.18
Analyzer Averages (concentrations)		U3 R3 13B
C _{Avg} Average conc.	11.11	8.32
C _{Gas} Bias adjusted	11.31	8.29

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15:33:04	0.041	0.154	
15:33:19	0.040	0.123	
15:33:34	0.040	0.099	
15:33:49	0.040	0.082	zero
15:34:04	0.840	0.269	
15:34:19	2.639	3.638	
15:34:34	13.407	5.764	
15:34:49	13.512	6.232	
15:35:04	13.803	6.073	
15:33:04	0.267	10.857	
15:33:19	4.882	14.336	
15:33:34	5.713	13.989	
15:33:49	5.823	13.997	
15:34:04	5.832	13.999	span
15:34:19	5.639	14.638	
15:34:34	5.407	13.764	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 30, 2011
Start Time 15:32
Stop time 15:47

IGS Bag Analysis

	Channel 1 CO2	Channel 2 O2	
	FF Outlet %dv	FF Outlet %dv	
15:34:49	13.512	6.232	
15:35:04	13.803	6.073	
15:35:19	13.823	6.059	linearity
15:35:34	12.632	8.718	
15:35:49	1.415	19.947	
15:36:04	0.420	19.839	
15:36:19	8.512	9.622	
15:36:34	10.538	8.549	
15:36:49	10.457	8.532	
15:37:04	10.601	8.543	U2 R2 5/29
15:37:19	10.488	9.282	
15:37:34	2.103	19.445	
15:37:49	2.722	16.543	
15:38:04	10.414	8.702	
15:38:19	10.768	8.488	
15:38:34	10.796	8.488	U2 R3 5/29
15:38:49	10.793	8.483	
15:39:04	4.737	17.058	
15:39:19	0.265	20.739	
15:39:34	4.412	14.490	
15:39:49	10.597	8.032	
15:40:04	11.238	8.039	
15:40:19	11.232	8.030	U3 R1 13B
15:40:34	11.261	8.046	
15:40:49	6.477	15.112	
15:41:04	0.343	20.721	
15:41:19	1.850	17.772	
15:41:34	9.633	9.560	
15:41:49	10.171	9.214	
15:42:04	10.194	9.210	
15:42:19	10.186	9.201	
15:42:34	10.202	9.198	U3 R2 13B
15:42:49	10.198	9.201	
15:43:04	8.697	12.142	
15:43:19	0.825	20.201	
15:43:34	8.146	10.401	
15:43:49	11.068	8.335	
15:44:04	11.113	8.320	U3 R3 13B
15:44:19	11.115	8.319	
15:44:34	11.102	8.579	
15:44:49	4.010	17.127	
15:45:04	5.586	14.307	
15:45:19	5.856	14.147	
15:45:34	5.858	14.145	span
15:45:49	5.385	15.304	
15:46:04	0.609	7.150	
15:46:19	0.076	0.213	
15:46:34	0.063	0.136	

Wheelabrator
CleanAir Project No. 11182
South Broward
FF Outlet, SDA Inlet

March 30, 2011
Start Time 15:32
Stop time 15:47

IGS Bag Analysis

	Channel 1 CO2 FF Outlet %dv	Channel 2 O2 FF Outlet %dv	
15:46:49	0.045	0.131	zero
15:47:04	0.059	0.121	
15:47:19	0.061	0.119	
15:47:34	0.091	11.659	
15:47:49	0.130	20.700	

WHEELABRATOR SOUTH BROWARD, INC.

Clean Air Project No: 11182

Location: Ash Unloading / Conveyor

Date (2010): March 30

Start Time: 7:33

End Time: 8:43

METHOD 22 FIELD DATA PRINTOUT

Run	Clock Time (start)	Observation Period (minutes)	Opacity (%)
1	7:33 7:53	20	0
2	7:58 8:18	20	0
3	8:23 8:43	20	0
Minimum			0
Average			0
Maximum			0

WHEELABRATOR SOUTH BROWARD, INC.

Clean Air Project No: 11182

Location: Roll up Door to Baghouse

Date (2010): March 30

Start Time: 8:48

End Time: 9:58

METHOD 22 FIELD DATA PRINTOUT

Run	Clock Time (start)	Observation Period (minutes)	Opacity (%)
1	8:48 9:08	20	0
2	9:13 9:33	20	0
3	9:38 9:58	20	0
Minimum			0
Average			0
Maximum			0

WHEELABRATOR SOUTH BROWARD, INC.

Clean Air Project No: 11182

Location: Roll up Door to Baghouse

Date (2010): March 30

Start Time: 14:42

End Time: 15:52

METHOD 22 FIELD DATA PRINTOUT

Run	Clock Time (start)	Observation Period (minutes)	Opacity (%)
1	14:42 15:02	20	0
2	15:07 15:27	20	0
3	15:32 15:52	20	0
Minimum			0
Average			0
Maximum			0

WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

LABORATORY DATA

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

QA/QC Initials:

Date:



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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Method 5 (FPM) Gravimetric Laboratory Data Summary for FPM

Run No. ☐ Draft Lab Data

	Blank	1	2	3
Date (2011)		Mar 29	Mar 29	Mar 29
Start Time (approx.)		07:41	10:15	15:16
Stop Time (approx.)		09:53	15:00	17:27

Analytical Detection Limits

MDL _f	Minimum detection limit for filter (g)	0.00010
MDL _s	Minimum detection limit for solvent rinse (g)	0.00010

Filter(s)

m _{f1}	Filter No. 1 residue mass (g)	0.00030	0.00100	0.00050
m _{f2}	Filter No. 2 residue mass (g)			
m _{f3}	Filter No. 3 residue mass (g)			
m _{f4}	Filter No. 4 residue mass (g)			
m _{filter}	Total filter residue (g)	0.00030	0.00100	0.00050

First Solvent Rinse

Acetone

p ₁	Density (g/mL)	0.785		
v _{s1}	Sample volume (mL)		100	92
v _{a1}	Aliquot volume (mL)	146	100	92
r _{a1}	Aliquot residue mass (g)	nd	0.00270	0.00180
r _{s1}	Sample residue mass (g)		0.00270	0.00180
m _{b1}	Allowable blank correction (g)		0.00000	0.00000
m ₁	Net residue mass (g)		0.00270	0.00180

Second Solvent Rinse

N/A

p ₂	Density (g/mL)			
v _{s2}	Sample volume (mL)			
v _{a2}	Aliquot volume (mL)			
r _{a2}	Aliquot residue mass (g)			
r _{s2}	Sample residue mass (g)			
m _{b2}	Allowable blank correction (g)			
m ₂	Net residue mass (g)		0.00000	0.00000
m _s	Total Solvent Residue (g)		0.00270	0.00180
m _T	Total Gravimetric Result (g)		0.00300	0.00280
m _D	Total Gravimetric Detection Limit (g)		0.00020	0.00020
m _n	Total Filterable Particulate Matter (g)		0.00300	0.00280
n _{MDL}	Number of Non-Detectable Fractions		N/A	N/A
DLC	Detection Level Classification		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

Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Method 5 (FPM) Gravimetric Laboratory Data Summary for FPM

Run No. ☐ Draft Lab Data

	Blank	1	2	3
Date (2011)		Mar 30	Mar 30	Mar 30
Start Time (approx.)		07:31	09:59	12:29
Stop Time (approx.)		09:42	12:10	14:41

Analytical Detection Limits

MDL _f	Minimum detection limit for filter (g)	0.00010
MDL _s	Minimum detection limit for solvent rinse (g)	0.00010

Filter(s)

m _{f1}	Filter No. 1 residue mass (g)	0.00090	0.00170	0.00110
m _{f2}	Filter No. 2 residue mass (g)			
m _{f3}	Filter No. 3 residue mass (g)			
m _{f4}	Filter No. 4 residue mass (g)			
m _{filter}	Total filter residue (g)	0.00090	0.00170	0.00110

First Solvent Rinse

Acetone

ρ ₁	Density (g/mL)	0.785		
V _{s1}	Sample volume (mL)		94	88
V _{a1}	Aliquot volume (mL)	146	94	88
r _{a1}	Aliquot residue mass (g)	nd	0.00030	0.00150
r _{s1}	Sample residue mass (g)		0.00030	0.00150
m _{b1}	Allowable blank correction (g)		0.00000	0.00000
m ₁	Net residue mass (g)		0.00030	0.00150

Second Solvent Rinse

N/A

ρ ₂	Density (g/mL)			
V _{s2}	Sample volume (mL)			
V _{a2}	Aliquot volume (mL)			
r _{a2}	Aliquot residue mass (g)			
r _{s2}	Sample residue mass (g)			
m _{b2}	Allowable blank correction (g)			
m ₂	Net residue mass (g)		0.00000	0.00000

m _s	Total Solvent Residue (g)	0.00030	0.00150	0.00100
m _T	Total Gravimetric Result (g)	0.00120	0.00320	0.00210
m _D	Total Gravimetric Detection Limit (g)	0.00020	0.00020	0.00020
m _n	Total Filterable Particulate Matter (g)	0.00120	0.00320	0.00210
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: 11182
Unit 3 FF Outlet

USEPA Method 5 (FPM) Gravimetric Laboratory Data Summary for FPM

Run No.	☐ Draft Lab Data	Blank	1	2	3
Date (2011)			Mar 28	Mar 28	Mar 28
Start Time (approx.)			07:31	10:05	12:43
Stop Time (approx.)			09:43	12:19	14:55
Analytical Detection Limits					
MDL _f	Minimum detection limit for filter (g)	0.00010			
MDL _s	Minimum detection limit for solvent rinse (g)	0.00010			
Filter(s)					
m _{f1}	Filter No. 1 residue mass (g)	0.00100	nd	0.00130	
m _{f2}	Filter No. 2 residue mass (g)				
m _{f3}	Filter No. 3 residue mass (g)				
m _{f4}	Filter No. 4 residue mass (g)				
m _{filter}	Total filter residue (g)	0.00100	0.00000	0.00130	
First Solvent Rinse					
<u>Acetone</u>					
p ₁	Density (g/mL)	0.785			
v _{s1}	Sample volume (mL)		102	100	74
v _{a1}	Aliquot volume (mL)	146	102	100	74
r _{a1}	Aliquot residue mass (g)	nd	0.00140	0.00170	0.00220
r _{s1}	Sample residue mass (g)		0.00140	0.00170	0.00220
m _{b1}	Allowable blank correction (g)		0.00000	0.00000	0.00000
m ₁	Net residue mass (g)		0.00140	0.00170	0.00220
Second Solvent Rinse					
<u>N/A</u>					
p ₂	Density (g/mL)				
v _{s2}	Sample volume (mL)				
v _{a2}	Aliquot volume (mL)				
r _{a2}	Aliquot residue mass (g)				
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)		0.00140	0.00170	0.00220
m _T	Total Gravimetric Result (g)		0.00240	0.00170	0.00350
m _D	Total Gravimetric Detection Limit (g)		0.00020	0.00020	0.00020
m _n	Total Filterable Particulate Matter (g)		0.00240	0.00170	0.00350
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: 11182
 Unit 1 FF Outlet

USEPA Method 5/29 Mercury (Hg) Laboratory Parameters

Blank Analysis

m _{1b-B}	Fraction 1B Blank (µg)	<0.1000
m _{2b-B}	Fraction 2B Blank (µg)	<0.2000
m _{3a-B}	Fraction 3A Blank (µg)	<0.2000
m _{3b-B}	Fraction 3B Blank (µg)	<0.5000
m _{3c-B}	Fraction 3C Blank (µg)	<0.4000
m _{total-B}	Total Blank Amount (µg)	<1.4000

Run No.

	1	2	3
Date (2011)	Mar 29	Mar 29	Mar 29
Start Time (approx.)	07:41	10:15	15:16
Stop Time (approx.)	09:53	15:00	17:27

Sample Analysis

m _{1b-S}	Fraction 1B Sample (µg)	0.1015	<0.1000	<0.1000
m _{2b-S}	Fraction 2B Sample (µg)	2.0538	1.8062	2.0364
m _{3a-S}	Fraction 3A Sample (µg)	<0.2000	<0.2000	<0.2000
m _{3b-S}	Fraction 3B Sample (µg)	<0.5000	<0.5000	<0.5000
m _{3c-S}	Fraction 3C Sample (µg)	<0.4000	<0.4000	<0.4000
m _{total-S}	Total Sample Amount (µg)	2.1553	1.8062	2.0364

Allowable Blank

m _{T-B-allow}	Total Allowable Blank (µg)	0.0000	0.0000	0.0000

Sample Corrected for Blank

m _n	Total Sample Amount (µg)	2.1553	1.8062	2.0364

Sample Corrected for Blank

m _{n-1b}	Fraction 1B (µg)	0.1015	<0.1000	<0.1000
m _{n-2b}	Fraction 2B (µg)	2.0538	1.8062	2.0364
m _{n-3a}	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000
m _{n-3b}	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000
m _{n-3c}	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

**USEPA Method 5/29
Beryllium (Be) Laboratory Parameters**

Run No.	1	2	3
Date (2011)	Mar 29	Mar 29	Mar 29
Start Time (approx.)	07:41	10:15	15:16
Stop Time (approx.)	09:53	15:00	17:27

Combined Front and Back Analyses

m _{F-DL}	Front half detection limit (µg)	0.0500	0.0500	0.0500
m _{FS}	Matter collected in front half sample (µg)	<0.0500	<0.0500	<0.0500
m _{FB}	Matter collected in front half blank (µg)	<0.0500	<0.0500	<0.0500
m _{FB-allow}	Allowable front half blank correction (µg)	0.0000	0.0000	0.0000
m _n	Total matter corrected for allowable blanks (µg)	<0.0500	<0.0500	<0.0500

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

**USEPA Method 5/29
Cadmium (Cd) Laboratory Parameters**

Run No.	1	2	3
Date (2011)	Mar 29	Mar 29	Mar 29
Start Time (approx.)	07:41	10:15	15:16
Stop Time (approx.)	09:53	15:00	17:27
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)	<0.2000	<0.2000	0.3149
m _{FB} Matter collected in front half blank (µg)	<0.2000	<0.2000	<0.2000
m _{FB-allow} Allowable front half blank correction (µg)	0.0000	0.0000	0.0000
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2000	0.3149

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

**USEPA Method 5/29
Lead (Pb) Laboratory Parameters**

Run No.	1	2	3
Date (2011)	Mar 29	Mar 29	Mar 29
Start Time (approx.)	07:41	10:15	15:16
Stop Time (approx.)	09:53	15:00	17:27
Combined Front and Back Analyses			
m _{F-DL} Front half detection limit (µg)	0.1000	0.1000	0.1000
m _{FS} Matter collected in front half sample (µg)	1.9136	0.9753	1.2472
m _{FB} Matter collected in front half blank (µg)	0.6776	0.6776	0.6776
m _{FB-allow} Allowable front half blank correction (µg)	0.6776	0.6776	0.6776
m _n Total matter corrected for allowable blanks (µg)	1.2360	0.2977	0.5696

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

**USEPA Method 5/29
Mercury (Hg) Laboratory Parameters**

Blank Analysis

m _{1b-B}	Fraction 1B Blank (µg)	<0.1000
m _{2b-B}	Fraction 2B Blank (µg)	<0.2000
m _{3a-B}	Fraction 3A Blank (µg)	<0.2000
m _{3b-B}	Fraction 3B Blank (µg)	<0.5000
m _{3c-B}	Fraction 3C Blank (µg)	<0.4000
m _{total-B}	Total Blank Amount (µg)	<1.4000

Run No.

	1	2	3
Date (2011)	Mar 30	Mar 30	Mar 30
Start Time (approx.)	07:31	09:59	12:29
Stop Time (approx.)	09:42	12:10	14:41

Sample Analysis

m _{1b-S}	Fraction 1B Sample (µg)	<0.1000	<0.1000	<0.1000
m _{2b-S}	Fraction 2B Sample (µg)	1.6143	1.5609	1.9198
m _{3a-S}	Fraction 3A Sample (µg)	<0.2000	<0.2000	0.6568
m _{3b-S}	Fraction 3B Sample (µg)	<0.5000	<0.5000	0.5106
m _{3c-S}	Fraction 3C Sample (µg)	<0.4000	<0.4000	<0.4000
m _{total-S}	Total Sample Amount (µg)	1.6143	1.5609	3.0872

Allowable Blank

m _{T-B-allow}	Total Allowable Blank (µg)	0.0000	0.0000	0.0000

Sample Corrected for Blank

m _n	Total Sample Amount (µg)	1.6143	1.5609	3.0872

Sample Corrected for Blank

m _{n-1b}	Fraction 1B (µg)	<0.1000	<0.1000	<0.1000
m _{n-2b}	Fraction 2B (µg)	1.6143	1.5609	1.9198
m _{n-3a}	Fraction 3A (µg)	<0.2000	<0.2000	0.6568
m _{n-3b}	Fraction 3B (µg)	<0.5000	<0.5000	0.5106
m _{n-3c}	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

**USEPA Method 5/29
Beryllium (Be) Laboratory Parameters**

Run No.	1	2	3
Date (2011)	Mar 30	Mar 30	Mar 30
Start Time (approx.)	07:31	09:59	12:29
Stop Time (approx.)	09:42	12:10	14:41
Combined Front and Back Analyses			
m _{F-DL} Front half detection limit (µg)	0.0500	0.0500	0.0500
m _{FS} Matter collected in front half sample (µg)	<0.0500	<0.0500	<0.0500
m _{FB} Matter collected in front half blank (µg)	<0.0500	<0.0500	<0.0500
m _{FB-allow} Allowable front half blank correction (µg)	0.0000	0.0000	0.0000
m _n Total matter corrected for allowable blanks (µg)	<0.0500	<0.0500	<0.0500

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

**USEPA Method 5/29
Cadmium (Cd) Laboratory Parameters**

Run No.	1	2	3
Date (2011)	Mar 30	Mar 30	Mar 30
Start Time (approx.)	07:31	09:59	12:29
Stop Time (approx.)	09:42	12:10	14:41
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)	0.3306	0.3264	0.4915
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)	0.3306	0.3264	0.4915

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

**USEPA Method 5/29
Lead (Pb) Laboratory Parameters**

Run No.	1	2	3
Date (2011)	Mar 30	Mar 30	Mar 30
Start Time (approx.)	07:31	09:59	12:29
Stop Time (approx.)	09:42	12:10	14:41
Combined Front and Back Analyses			
m _{F-DL} Front half detection limit (µg)	0.1000	0.1000	0.1000
m _{FS} Matter collected in front half sample (µg)	2.6812	2.7077	2.7547
m _{FB} Matter collected in front half blank (µg)	0.6776	0.6776	0.6776
m _{FB-allow} Allowable front half blank correction (µg)	0.6776	0.6776	0.6776
m _n Total matter corrected for allowable blanks (µg)	2.0036	2.0300	2.0770

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 5/29 Mercury (Hg) Laboratory Parameters

Blank Analysis

m _{1b-B}	Fraction 1B Blank (µg)	<0.1000
m _{2b-B}	Fraction 2B Blank (µg)	<0.2000
m _{3a-B}	Fraction 3A Blank (µg)	<0.2000
m _{3b-B}	Fraction 3B Blank (µg)	<0.5000
m _{3c-B}	Fraction 3C Blank (µg)	<0.4000
m _{total-B}	Total Blank Amount (µg)	<1.4000

Run No.

	1	2	3
Date (2011)	Mar 28	Mar 28	Mar 28
Start Time (approx.)	07:31	10:05	12:43
Stop Time (approx.)	09:43	12:19	14:55

Sample Analysis

m _{1b-S}	Fraction 1B Sample (µg)	<0.1000	<0.1000	<0.1000
m _{2b-S}	Fraction 2B Sample (µg)	2.3159	2.6142	2.5786
m _{3a-S}	Fraction 3A Sample (µg)	<0.2000	<0.2000	<0.2000
m _{3b-S}	Fraction 3B Sample (µg)	<0.5000	<0.5000	<0.5000
m _{3c-S}	Fraction 3C Sample (µg)	<0.4000	<0.4000	<0.4000
m _{total-S}	Total Sample Amount (µg)	2.3159	2.6142	2.5786

Allowable Blank

m _{T-B-allow}	Total Allowable Blank (µg)	0.0000	0.0000	0.0000

Sample Corrected for Blank

m _n	Total Sample Amount (µg)	2.3159	2.6142	2.5786

Sample Corrected for Blank

m _{n-1b}	Fraction 1B (µg)	<0.1000	<0.1000	<0.1000
m _{n-2b}	Fraction 2B (µg)	2.3159	2.6142	2.5786
m _{n-3a}	Fraction 3A (µg)	<0.2000	<0.2000	<0.2000
m _{n-3b}	Fraction 3B (µg)	<0.5000	<0.5000	<0.5000
m _{n-3c}	Fraction 3C (µg)	<0.4000	<0.4000	<0.4000

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

**USEPA Method 5/29
Beryllium (Be) Laboratory Parameters**

Run No.	1	2	3
Date (2011)	Mar 28	Mar 28	Mar 28
Start Time (approx.)	07:31	10:05	12:43
Stop Time (approx.)	09:43	12:19	14:55
Combined Front and Back Analyses			
m _{F-DL} Front half detection limit (µg)	0.0500	0.0500	0.0500
m _{FS} Matter collected in front half sample (µg)	<0.0500	<0.0500	<0.0500
m _{FB} Matter collected in front half blank (µg)	<0.0500	<0.0500	<0.0500
m _{FB-allow} Allowable front half blank correction (µg)	0.0000	0.0000	0.0000
m _n Total matter corrected for allowable blanks (µg)	<0.0500	<0.0500	<0.0500

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

**USEPA Method 5/29
Cadmium (Cd) Laboratory Parameters**

Run No.	1	2	3
Date (2011)	Mar 28	Mar 28	Mar 28
Start Time (approx.)	07:31	10:05	12:43
Stop Time (approx.)	09:43	12:19	14:55
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)	<0.2000	<0.2000	<0.2000
m _{FB} Matter collected in front half blank (µg)	<0.2000	<0.2000	<0.2000
m _{FB-allow} Allowable front half blank correction (µg)	0.0000	0.0000	0.0000
m _n Total matter corrected for allowable blanks (µg)	<0.2000	<0.2000	<0.2000

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

**USEPA Method 5/29
Lead (Pb) Laboratory Parameters**

Run No.	1	2	3
Date (2011)	Mar 28	Mar 28	Mar 28
Start Time (approx.)	07:31	10:05	12:43
Stop Time (approx.)	09:43	12:19	14:55
Combined Front and Back Analyses			
m _{F-DL} Front half detection limit (µg)	0.1000	0.1000	0.1000
m _{FS} Matter collected in front half sample (µg)	1.1163	1.0964	0.8071
m _{FB} Matter collected in front half blank (µg)	0.6776	0.6776	0.6776
m _{FB-allow} Allowable front half blank correction (µg)	0.6776	0.6776	0.6776
m _n Total matter corrected for allowable blanks (µg)	0.4387	0.4188	0.1294

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Clean Air Engineering, Inc.

500 West Wood Street
Palatine, IL 60067

Project Number: 11182SB

Particulate Matter, Beryllium,
Cadmium, Lead and Mercury

EPA Methods 29 & 5 Analyses

Analytical Report
16423



Element One, Inc.
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910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 16423
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:



Daphne Woodman, Chemist
April 26, 2011

Report Reviewed and Finalized By:



Ken Smith, Laboratory Director
April 26, 2011

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SUMMARY OF RESULTS

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Summary of Analysis

Unit 1 - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front half µg	H ₂ O ₂ /HNO ₃ µg	Empty Impinger µg	KMnO ₄ µg	HCl µg
U1 FF Outlet R1	#1	2.16	0.101	2.12	< 0.2	< 0.5	< 0.4
	#2		0.102	1.98	< 0.2	< 0.5	< 0.4
U1 FF Outlet R2	#1	1.81	< 0.1	1.81	< 0.2	< 0.5	< 0.4
	#2		< 0.1	1.80	< 0.2	< 0.5	< 0.4
U1 FF Outlet R3	#1	2.04	< 0.1	2.02	< 0.2	< 0.5	< 0.4
	#2		< 0.1	2.05	< 0.2	< 0.5	< 0.4

Unit 1 - Summary of Method 5 Particulate Analysis

	U1-FF-O-R1 e16423-1 Catch, mg	U1-FF-O-R2 e16423-2 Catch, mg	U1-FF-O-R3 e16423-3 Catch, mg
Fraction			
Filter	0.3	1.0	0.5
Rinse	2.7	1.8	1.7
Total PM	3.0	2.8	2.2

Unit 1 - Summary of Method 29 Metals Analysis

Element	U1 FF-O-R1 e16423-1 Total µg	U1 FF-O-R2 e16423-2 Total µg	U1 FF-O-R2 e16423-2 dup Total µg	U1 FF-O-R3 e16423-3 Total µg
Beryllium	< 0.05	< 0.05	< 0.05	< 0.05
Cadmium	< 0.2	< 0.2	< 0.2	0.315
Lead	1.91	0.972	0.978	1.25

Summary of Analysis

Unit 2 - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front half µg	H ₂ O ₂ /HNO ₃ µg	Empty Impinger µg	KMnO ₄ µg	HCl µg
U2 FF Outlet R1	#1	1.61	< 0.1	1.58	< 0.2	< 0.5	< 0.4
	#2		< 0.1	1.65	< 0.2	< 0.5	< 0.4
U2 FF Outlet R2	#1	1.56	< 0.1	1.58	< 0.2	< 0.5	< 0.4
	#2		< 0.1	1.54	< 0.2	< 0.5	< 0.4
U2 FF Outlet R3	#1	3.09	< 0.1	1.93	0.653	0.513	< 0.4
	#2		< 0.1	1.91	0.660	0.508	< 0.4

Unit 2 - Summary of Method 5 Particulate Analysis

Fraction	U2-FF-O-R1 e16423-4 Catch, mg	U2-FF-O-R2 e16423-5 Catch, mg	U2-FF-O-R3 e16423-6 Catch, mg
Filter	0.9	1.7	1.1
Rinse	0.3	1.5	1.0
Total PM	1.2	3.2	2.1

Unit 2 - Summary of Method 29 Metals Analysis

Element	U2 FF-O-R1 e16423-4 Total µg	U2 FF-O-R2 e16423-5 Total µg	U2 FF-O-R2 e16423-5 dup Total µg	U2 FF-O-R3 e16423-6 Total µg
Beryllium	< 0.05	< 0.05	< 0.05	< 0.05
Cadmium	0.331	0.330	0.323	0.492
Lead	2.68	2.70	2.72	2.75

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Summary of Analysis

Unit 3 - Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front half µg	H ₂ O ₂ /HNO ₃ µg	Empty Impinger µg	KMnO ₄ µg	HCl µg
U3 FF Outlet R1	#1	2.32	< 0.1	2.31	< 0.2	< 0.5	< 0.4
	#2		< 0.1	2.32	< 0.2	< 0.5	< 0.4
U3 FF Outlet R2	#1	2.61	< 0.1	2.58	< 0.2	< 0.5	< 0.4
	#2		< 0.1	2.64	< 0.2	< 0.5	< 0.4
U3 FF Outlet R3	#1	2.58	< 0.1	2.58	< 0.2	< 0.5	< 0.4
	#2		< 0.1	2.58	< 0.2	< 0.5	< 0.4
Field Blank	#1	< 0.5	< 0.1	< 0.3	< 0.2	< 0.5	-----
	#2		< 0.1	< 0.3	< 0.2	< 0.5	-----
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

Unit 3 - Summary of Method 5 Particulate Analysis

Fraction	U3-FF-O-R1 e16423-7 Catch, mg	U3-FF-O-R2 e16423-8 Catch, mg	U3-FF-O-R3 e16423-9 Catch, mg	Reagent Blank e16423-11 Total µg
Filter	1.0	< 0.1	1.3	NA
Rinse	1.4	1.7	2.2	< 0.1
Total PM	2.4	1.7	3.5	< 0.1

Unit 3 - Summary of Method 29 Metals Analysis

Element	U3 FF-O-R1 e16423-7 Total µg	U3 FF-O-R2 e16423-8 Total µg	U3 FF-O-R2 e16423-8 dup Total µg	U3 FF-O-R3 e16423-9 Total µg
Beryllium	< 0.05	< 0.05	< 0.05	< 0.05
Cadmium	< 0.2	< 0.2	< 0.2	< 0.2
Lead	1.12	1.10	1.09	0.807

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Summary of Analysis

Summary of Method 29 Metals Analysis

Element	Field Blank e16423-10	Reagent Blank e16423-11
	Total µg	Total µg
Beryllium	< 0.05	< 0.05
Cadmium	< 0.2	< 0.2
Lead	0.573	0.678

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ANALYTICAL NARRATIVE

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Element One Analytical Narrative

Client:	Clean Air, IL	Element One #:	16423
Client ID:	11182SB/S. Broward	Analyst:	KMS,ESM & KLS
Method:	Methods 29 & 5	Dates Received:	04/05/11
Analytes:	PM, Be, Cd, Pb & Hg	Dates Analyzed:	04/11-18/11

Summary of Analysis

The Method 5 particulate samples were analyzed in accordance with EPA Method 5 guidelines. 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 limits were 0.25µg/L for beryllium and 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.

*Ref Page 12: The beryllium spike recoveries for U1 FF-O-R3, U2 FF-O-R3 and U3 FF-O-R3 were outside of the laboratory guidelines of ±25%. The samples were analyzed at a two-fold dilution resulting in spike recoveries of 82% for U1 FF-O-R3, 82% for U2 FF-O-R3 and 80% for U3 FF-O-R3.

All other 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 Field Blank and Reagent Blank samples revealed detectable concentrations of lead.

QUALITY CONTROL SUMMARY

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Summary of Quality Control Data

Mercury Duplicate Analysis RPD

(Method 29 QC limits: < 10% for RPD)

Run Number	Front half	H ₂ O ₂ /HNO ₃	Empty Imp	KMnO ₄	HCl
U1 FF Outlet R1	0.8%	6.9%	NA	NA	NA
U1 FF Outlet R2	NA	0.5%	NA	NA	NA
U1 FF Outlet R3	NA	1.5%	NA	NA	NA
U2 FF Outlet R1	NA	4.6%	NA	NA	NA
U2 FF Outlet R2	NA	2.2%	NA	NA	NA
U2 FF Outlet R3	NA	0.7%	1.0%	0.9%	NA
U3 FF Outlet R1	NA	0.8%	NA	NA	NA
U3 FF Outlet R2	NA	2.3%	NA	NA	NA
U3 FF Outlet R3	NA	0.1%	NA	NA	NA
Field Blank	NA	NA	NA	NA	NA
Reagent Blank	NA	NA	NA	NA	NA

Mercury Spike Recoveries

(Method 29 QC limits: ± 25% for Spike Recoveries)

Run Number		Front half	H ₂ O ₂ /HNO ₄	Empty Imp	KMnO ₄	HCl
U1 FF Outlet R3	#1	113%	118%	89%	79%	93%
	#2	113%	118%	88%	79%	92%
U2 FF Outlet R3	#1	108%	100%	77%	86%	104%
	#2	108%	98%	79%	84%	104%
U3 FF Outlet R3	#1	99%	96%	86%	113%	95%
	#2	99%	97%	87%	113%	93%

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Summary of Quality Control Data

Metals Duplicate Analysis RPD

(Method 29 QC limits: < 20% for RPD)

Element	U1-FF-O-R2 RPD	U2-FF-O-R2 RPD	U3-FF-O-R2 RPD
Beryllium	NA	NA	NA
Cadmium	NA	2.2%	NA
Lead	0.6%	0.5%	1.2%

Metals Analysis Spike Recoveries

(Method 29 QC limits: $\pm 25\%$ for Spike Recoveries)

Element	U1-FF-O-R3 Recovery	U2-FF-O-R3 Recovery	U3-FF-O-R3 Recovery
Beryllium	*65%	*66%	*69%
Cadmium	84%	91%	87%
Lead	101%	105%	103%

*See Analytical Narrative, page 9.

Second Source Calibration Check Recoveries

(QC limits: $\pm 10\%$ for Second Source Continuing Check Standard*)

Element	0.25 ppb	1 ppb	50 ppb	100 ppb*	250 ppb
Beryllium	95%	97%	103%	104%	102%
Cadmium		104%	99%	101%	100%
Lead		108%	101%	103%	102%

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SAMPLE CUSTODY

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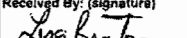
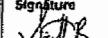
16423

CLIENT <u>Wheelabrator</u>			PROJECT <u>11182SB</u>			66-11182SB-9						
PLANT <u>South Broward</u>			DEPT. <u>66</u>									
PROJECT MANAGER <u>S. Brown</u>			 500 West Wood Street Palatine, IL 60067 800-627-0033 (phone) 847-991-3385 (fax)			ANALYSIS REQUESTED <table border="1" style="width: 100%; text-align: center;"> <tr> <td>Gravimetric</td> <td>Metals</td> <td>Mercury</td> <td>Archives</td> </tr> </table>			Gravimetric	Metals	Mercury	Archives
Gravimetric	Metals	Mercury							Archives			
ANALYTICAL METHOD <u>USEPA M-5729</u>	CONTAINER NUMBER <u>1</u>	SAMPLE FRACTION <u>QUARTZ FILTER</u> <u>PETRI DISH</u>										
FORWARDING LAB Element One, Inc. 5022-C Wightsville Avenue Wilmington, NC 28403 910-793-0128 (phone) 910-752-8853 (fax)												
ADDITIONAL INFORMATION												
LAB ID NUMBER	DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED?	LIQUID LEVEL MARKED?					
	3/29	Unit 1 FF Outlet	1	Quartz Filter No. e-23	1			X X X				
	3/29	Unit 1 FF Outlet	2	Quartz Filter No. e-24	1			X X X				
	3/29	Unit 1 FF Outlet	3	Quartz Filter No. e-25	1			X X X				
	3/29	FF Outlet	Field Blank	Quartz Filter No. e3-30	1			X X				
	3/30	Unit 2 FF Outlet	1	Quartz Filter No. e3-26	1			X X X				
	3/30	Unit 2 FF Outlet	2	Quartz Filter No. e3-27	1			X X X				
	3/30	Unit 2 FF Outlet	3	Quartz Filter No. e3-28	1			X X X				
	3/28	Unit 3 FF Outlet	1	Quartz Filter No. e3-20	1			X X X				
	3/28	Unit 3 FF Outlet	2	Quartz Filter No. e3-22	1			X X X				
	3/28	Unit 3 FF Outlet	3	Quartz Filter No. e3-21	1			X X X				
Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	This form completed by:						
S. Brown	4/11/2011 13:00					S. Brown						
Received By: (signature)	Date / Time	Received By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Signature Date						
<i>S. Brown</i>	4/15/11 1028					<i>S. Brown</i> 4/4/2011						

Samples received in good condition in Fishbrand containers. No empty container received.

16423

CLIENT <u>Wheelabrator</u>		PROJECT <u>11182SB</u>		66-11182SB-10				
PLANT <u>South Broward</u>		DEPT. <u>66</u>						
PROJECT MANAGER <u>S. Brown</u>		 Clean Air ENGINEERING 500 West Wood Street Palatka, IL 60067 800-827-0033 (phone) 847-991-3385 (fax)		ANALYSIS REQUESTED Gravimetric Metals Mercury Archive				
ANALYTICAL METHOD <u>USEPA M-5/29</u>	CONTAINER NUMBER <u>2</u>					SAMPLE FRACTION <u>FRONT HALF ACETONE RINSE</u> <u>250 mL CLEAR GLASS</u>	FORWARDING LAB Element One, Inc. 5022-C Wrightsville Avenue Wilmington, NC 28403 910-793-0128 (phone) 910-792-6853 (fax)	
						ADDITIONAL INFORMATION		
LAB ID NUMBER	DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX				
	3/29	Unit 1 FF Outlet	1	Front Half Acetone Rinse, 250 mL Clear Glass	1 X X X			
	3/29	Unit 1 FF Outlet	2	Front Half Acetone Rinse, 250 mL Clear Glass	1 X X X			
	3/29	Unit 1 FF Outlet	3	Front Half Acetone Rinse, 250 mL Clear Glass	1 X X X			
	3/29	FF Outlet	Field Blank	Front Half Acetone Rinse, 250 mL Clear Glass	1 X X			
	3/30	Unit 2 FF Outlet	1	Front Half Acetone Rinse, 250 mL Clear Glass	1 X X X			
	3/30	Unit 2 FF Outlet	2	Front Half Acetone Rinse, 250 mL Clear Glass	1 X X X			
	3/30	Unit 2 FF Outlet	3	Front Half Acetone Rinse, 250 mL Clear Glass	1 X X X			
	3/28	Unit 3 FF Outlet	1	Front Half Acetone Rinse, 250 mL Clear Glass	1 X X X			
	3/28	Unit 3 FF Outlet	2	Front Half Acetone Rinse, 250 mL Clear Glass	1 X X X			
	3/28	Unit 3 FF Outlet	3	Front Half Acetone Rinse, 250 mL Clear Glass	1 X X X			
Relinquished By: (signature) <u>S. Brown</u> Received By: (signature) <u>Log Brown</u> Date / Time <u>4/11/2011 13:00</u> Date / Time <u>4/5/11 1028</u> Relinquished By: (signature) Received By: (signature) Date / Time Date / Time Relinquished By: (signature) Relinquished By: (signature) Date / Time Date / Time This form completed by: <u>S. Brown</u> Signature <u>[Signature]</u> Date <u>4/4/2011</u>								

CLIENT		Wheelabrator		PROJECT		11182SB				66-11182SB-1			
PLANT		South Broward		DEPT.		66							
PROJECT MANAGER				S. Brown		 CleanAir ANALYTICAL 500 West Wood Street Palatine, IL 60067 800-627-0033 (phone) 847-991-3385 (fax)		NUMBER OF CONTAINERS CONTAINER SEALED? LIQUID LEVEL MARKED?		ANALYSIS REQUESTED Gravimetric Metals Mercury Archive		FORWARDING LAB Element One, Inc. 5022-C Wrightsville Avenue Wilmington, NC 28403 910-793-0128 (phone) 910-792-8853 (fax)	
ANALYTICAL METHOD		CONTAINER NUMBER		SAMPLE FRACTION									
USEPA M-5/29		3		FRONT HALF HNO ₃ RINSE 250 mL HDLP									
LAB ID NUMBER	DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX									
	3/29	Unit 1 FF Outlet	1	Front Half HNO ₃ Rinse, 250 mL HDLP	1		X	X					
	3/29	Unit 1 FF Outlet	2	Front Half HNO ₃ Rinse, 250 mL HDLP	1		X	X					
	3/29	Unit 1 FF Outlet	3	Front Half HNO ₃ Rinse, 250 mL HDLP	1		X	X					
	3/29	FF Outlet	Field Blank	Front Half HNO ₃ Rinse, 250 mL HDLP	1		X	X					
	3/30	Unit 2 FF Outlet	1	Front Half HNO ₃ Rinse, 250 mL HDLP	1		X	X					
	3/30	Unit 2 FF Outlet	2	Front Half HNO ₃ Rinse, 250 mL HDLP	1		X	X					
	3/30	Unit 2 FF Outlet	3	Front Half HNO ₃ Rinse, 250 mL HDLP	1		X	X					
	3/28	Unit 3 FF Outlet	1	Front Half HNO ₃ Rinse, 250 mL HDLP	1		X	X					
	3/28	Unit 3 FF Outlet	2	Front Half HNO ₃ Rinse, 250 mL HDLP	1		X	X					
	3/28	Unit 3 FF Outlet	3	Front Half HNO ₃ Rinse, 250 mL HDLP	1		X	X					
Relinquished By: (signature)					Date / Time	Relinquished By: (signature)					Date / Time		
S. Brown					4/11/2011 13:00	S. Brown					4/11/2011 13:00		
Received By: (signature)					Date / Time	Received By: (signature)					Date / Time		
					4/5/11 1028						4/4/2011		

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16423

CLIENT <u>Wheelabrator</u>			PROJECT <u>11182SB</u>			66-11182SB-15										
PLANT <u>South Broward</u>			DEPT. <u>66</u>													
PROJECT MANAGER <u>S. Brown</u>			 Clean Air ENGINEERING 500 West Wood Street Palatine, IL 60067 800-627-0033 (phone) 847-991-3385 (fax)			ANALYSIS REQUESTED <table border="1" style="width: 100%; text-align: center;"> <tr> <td>Gravimetric</td> <td>Metals</td> <td>Mercury</td> <td>Asbestos</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>			Gravimetric	Metals	Mercury	Asbestos				
Gravimetric	Metals	Mercury							Asbestos							
ANALYTICAL METHOD USEPA M-5/28	CONTAINER NUMBER 5C	SAMPLE FRACTION IMPINGERS 5-6 8N HCL RINSE 250 mL AMBER GLASS				FORWARDING LAB Element One, Inc. 5022-C Wrightsville Avenue Wilmington, NC 28403 910-793-0128 (phone) 910-782-6853 (fax)										
			NUMBER OF CONTAINERS CONTAINER SEALED? LIQUID LEVEL MARKED?			ADDITIONAL INFORMATION										
LAB ID NUMBER	DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX												
	3/28	Unit 1 FF Outlet	1	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X								
	3/29	Unit 1 FF Outlet	2	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X								
	3/28	Unit 1 FF Outlet	3	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X								
	3/30	Unit 2 FF Outlet	1	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X								
	3/30	Unit 2 FF Outlet	2	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X								
	3/30	Unit 2 FF Outlet	3	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X								
	3/28	Unit 3 FF Outlet	1	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X								
	3/28	Unit 3 FF Outlet	2	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X								
	3/28	Unit 3 FF Outlet	3	Impingers 5-6 8N HCl Rinse, 250 mL Amber Glass	1			X								
Relinquished By: (signature)		Date / Time	Relinquished By: (signature)		Date / Time	Relinquished By: (signature)		Date / Time								
S. Brown		4/11/2011 13:00														
Received By: (signature)		Date / Time	Received By: (signature)		Date / Time	Received By: (signature)		Date / Time								
<i>S. Brown</i>		4/5/11 12:28														
					This form completed by:											
					S. Brown											
					Signature Date											
					<i>S. Brown</i> 4/4/2011											

16423.

ANALYTICAL DATA

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Analytical Calculations

Metals-

$$\text{Element Results } (\mu\text{g}) = \text{ICP Results } (\mu\text{g/L}) * \text{Dilution} * \text{Final Volume (L)}$$

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= $\frac{\text{Received Volume (BV)} * \text{Final Volume (FV)}}{\text{Aliquot (Used)}}$ --*Sample Submission*

Combined Results= FH+BH

Mercury-

$$\text{Mercury Results } (\mu\text{g}) = \frac{\text{CVAA Results } (\mu\text{g}) * \text{Final Volume (ml)}}{\text{Aliquot (ml)}}$$

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-

$$\text{Spike (\%)} = \frac{(\text{Spiked Result } (\mu\text{g/L}) - \text{Sample Result } (\mu\text{g/L}))}{\text{Spike Amount } (\mu\text{g/L})} \times 100$$

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-

$$\text{RPD (\%)} = \frac{(\text{Duplicate Result } (\mu\text{g/L}) - \text{Sample Result } (\mu\text{g/L}))}{\text{Average } (\mu\text{g/L})} \times 100$$

Where-

Sample Result and Duplicate Results=Raw sample concentration (ppb)--*ICP-Data Sheet*

$$\text{Average} = \frac{(\text{Duplicate} + \text{Sample Results})}{2}$$

elementOne AIR TESTING SAMPLE SUBMISSION FORM Lab ID 16423

Analysis Due Date 04.13.11
QA/QC/Report Due Date 04.15.11

Client Clean Air IL
Project No 11182SB

Date Rec 04.05.11
Time Rec 1028

HNO₃ Lot: 1110070 HF Lot: 3109120 HCl Lot: 4110060
Volume Marked 10 N Volume Loss Y/N? Autotest lot # 50147 Ref. Method: 29/5

Sample Identification					
1	U1 FF Outlet R1	4	U2 FF Outlet R1	7	U3 FF Outlet R1
2	U1 FF Outlet R2	5	U2 FF Outlet R2	8	U3 FF Outlet R2
	U1 FF Outlet R2 Duplicate		U2 FF Outlet R2 Duplicate		U3 FF Outlet R2 Duplicate
3	U1 FF Outlet R3	6	U2 FF Outlet R3	9	U3 FF Outlet R3
	U1 FF Outlet R3 Spike		U2 FF Outlet R3 Spike		U3 FF Outlet R3 Spike
				10	Field Blank
				11	Reagent Blank (p.2)

Analyses Requested
Samples 1-11 Hg
Samples 1-11 Be, Cd, Pb
Samples 1-11 PM

Runs / FB	Fil / Ace (FH)		HNO ₃ (FH)		5% HNO ₃ /10% H ₂ O ₂ (BH)			HNO ₃ (A)		KMnO ₄ (B)		HCl (C)	
	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	3-23	100	115	100	730	365	50	110	200	380	560	240	400
2.D	3-24	92	125		705	353		105		380		240	
3.S	3-25	65	123		735	368		110		370		250	
4	3-26	94	105		675	338		105		390		235	
5.D	3-27	88	103		710	385		105		310		230	
6.S	3-29	89	112		700	350		105		380		240	
7	3-20	102	105		670	335		105		310		235	
8.D	3-22	100	127		660	330		105		300		230	
9.S	3-21	74	130		690	345		105		365		250	
10	3-30	92	108		500	150		105		380			

M-29 Reagent Blank					
Lab ID	Fil ID	Fraction	BV, ml	FV, ml	Comments
11	C-7	FH	Acetone Blank	146	
	C-8A	FH	0.1N HNO ₃	305	used 100mL
	C-8A	A	0.1N HNO ₃	305	
	C-8B	B	DI H ₂ O	205	172
	C-9	BH	5% HNO ₃ /10% H ₂ O ₂	196	50 used 98mL
	C-10	B	4% KMnO ₄ /10% H ₂ SO ₄	180	100/33 used 33mL of (88
	C-11	C	8N HCl DI H ₂ O	240	462
	C-12	FH	Filter		

Lab Communications
URBT spiked w/ 25ppm Stda (021411-1) 200mL FH, 100mL BH KLS 4.13.11
M29: Received C1, C2, C3, C4, C5a, C5b, C5c; RB C12, C7, C8a, C8b, C9, C10, C11—04.05.11 LLB

SS Page 1 of 1
4/8/2011 9:42:07 AM
SS by JPP
Labeled By/Date JPP 4/8/11

FH Prep By/Date KLS 4.13.11 A Prep By/Date JPP 4/8/11
BH Prep By/Date KLS 4.13.11 B Prep By/Date JPP 4/8/11
BH/FH Prep By/Date KLS 4.13.11 C Prep By/Date JPP 4/8/11
PM Prep By/Date KLS 4.8.11 ID Verification By/Date KLS 4.8.11

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Client CAE

Balance checks

Date: 4.11.11

Date: 4.12.11

Date:

Method 5 Particulate

2 g = 2.0000

2g = 1.9999

Lab # 16423

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Acetone Concentration
0.00E+00 mg/mg

Filters

Sample ID #	Filter ID	Bag ID	A	B		B		B		Catch Description and Loading
			Bag Tare, g	Date - 4.11.11 Initials - KLS		Date - 4.12.11 Initials - ESM		Date - 4.12.11 Initials - ESM		
				Time	Bag & Filter Weight, g	Time	Bag & Filter Weight, g	Time	Bag & Filter Weight, g	
16423-1	3-23	423-1	0	1500	0.3943	900	0.3932	1600	0.3936	
16423-2	3-24	423-2	0	1500	0.3988	900	0.3990	1600	0.3997	
16423-3	3-25	423-3	0	1500	0.3935	900	0.3937			
16423-4	3-26	423-4	0	1500	0.3726	900	0.3721			
16423-5	3-27	423-5	0	1500	0.3718	900	0.3718			
16423-6	3-29	423-6	0	1500	0.3736	900	0.3729	1600	0.3737	
Client Bk HERE										
E1 Blank										

Acetone Rinses

Sample ID #	Sample Volume, ml	Bag ID	C	D		D		D		Catch Description and Loading
			Bag Tare, g	Date - 4.11.11 Initials - KLS		Date - 4.12.11 Initials - ESM		Date - 4.12.11 Initials - ESM		
				Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	
16423-1	100	661	10.5021	1500	10.5048	900	10.5048			
16423-2	92	688	10.3180	1500	10.3203	900	10.3198			
16423-3	65	584	10.0977	1500	10.0995	900	10.0994			
16423-4	94	645	10.0146	1500	10.0150	900	10.0141	1600	10.0149	
16423-5	88	571	10.4546	1500	10.4566	900	10.4561	1600	10.4562	
16423-6	89	665	10.3741	1500	10.3751	900	10.3753			
Client Ace Bk HERE	146	653	10.3687	1500	10.3668	900	10.3672			
E1 Acetone Blank	100	503	10.3579	1500	10.3531	900	10.3527			

Total Catches

Sample ID #	Filter ID	Filter Tare, g	Final Filter + Catch, g	Filter Catch, mg	Acetone Bag ID	Bag Tare, g	Final Bag + Acetone Weight, g	Acetone blank, mg	Acetone Catch, mg	Total Catch, mg
16423-1	3-23	0.3929	0.3932	0.3	661	10.5021	10.5048	0.0	2.7	3.0
16423-2	3-24	0.3987	0.3997	1.0	688	10.3180	10.3198	0.0	1.8	2.8
16423-3	3-25	0.3930	0.3935	0.5	584	10.0977	10.0994	0.0	1.7	2.2
16423-4	3-26	0.3712	0.3721	0.9	645	10.0146	10.0149	0.0	0.3	1.2
16423-5	3-27	0.3701	0.3718	1.7	571	10.4546	10.4561	0.0	1.5	3.2
16423-6	3-29	0.3725	0.3736	1.1	665	10.3741	10.3751	0.0	1.0	2.1
Client Ace Bk HERE					653	10.3687	10.3668	0.0	<0.1	<0.1
E1 Acetone Blank					503	10.3579	10.3527	0.0	<0.1	<0.1

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Client CAE

Balance checks

Date: 4.11.11

Date: 4.12.11

Date:

Method 5 Particulate

2 g = 2.0000

2g = 1.9999

Lab # 16423

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Acetone Concentration

0.00E+00

mg/mg

Filters

			A	B		B		B		Catch Description and Loading
Sample ID #	Filter ID	Bag ID	Bag Tare, g	Date - 4.11.11 Initials - KLS		Date - 4.12.11 Initials - ESM		Date - 4.12.11 Initials - ESM		
				Time	Bag & Filter Weight, g	Time	Bag & Filter Weight, g	Time	Bag & Filter Weight, g	
16423-7	3-20	423-7	0	1500	0.3860	900	0.3858			
16423-8	3-22	423-8	0	1500	0.3945	900	0.3941			
16423-9	3-21	423-9	0	1500	0.3996	900	0.3988	1600	0.3995	
16423-10	3-30	423-10	0	1500	0.3705	900	0.3699	1600	0.3703	
Client Blk HERE										
E1 Blank										

Acetone Rinses

Sample ID #	Sample Volume, ml	Bag ID	C	D		D		D		Catch Description and Loading
			Bag Tare, g	Date - 4.11.11 Initials - KLS		Date - 4.12.11 Initials - ESM		Date - Initials -		
				Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	
16423-7	102	678	10.3873	1500	10.3887	900	10.3892			
16423-8	100	X98	10.1160	1500	10.1179	900	10.1177			
16423-9	74	X23	9.9158	1500	9.9180	900	9.9181			
16423-10	92	619	10.0380	1500	10.0378	900	10.0380			
Client Ace Blk HERE	146	653	10.3687	1500	10.3668	900	10.3672			
E1 Acetone Blank	100	503	10.3579	1500	10.3531	900	10.3527			

Total Catches

Sample ID #	Filter ID	Filter Tare, g	Final Filter + Catch, g	Filter Catch, mg	Acetone Bag ID	Bag Tare, g	Final Bag + Acetone Weight, g	Acetone blank, mg	Acetone Catch, mg	Total Catch, mg
16423-7	3-20	0.3848	0.3858	1.0	678	10.3873	10.3887	0.0	1.4	2.4
16423-8	3-22	0.3941	0.3941	<0.1	X98	10.1160	10.1177	0.0	1.7	1.7
16423-9	3-21	0.3982	0.3995	1.3	X23	9.9158	9.9180	0.0	2.2	3.5
16423-10	3-30	0.3692	0.3699	0.7	619	10.0380	10.0378	0.0	<0.1	0.7
Client Ace Blk HERE					653	10.3687	10.3668	0.0	<0.1	<0.1
E1 Acetone Blank					503	10.3579	10.3527	0.0	<0.1	<0.1

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Sample/Batch Report

User Name: icp
 Computer Name: D8D4DWD1
 Sample File: C:\elandata_icp\Sample\Y1.sam
 Report Date/Time: Thursday, April 14, 2011 13:02:39

A/S Loc.	Batch ID	Sample ID	Description	Sample Type	Init. Quant.	Prep. Vol.	Aliquot Vol.	Diluted Vol.	Solids Ratio
5		QC Std 2		Sample					
14		16454-1		Sample					
15		16454-2		Sample					
16	d	16454-2		Duplicate of 3					
17		16454-3		Sample					
18	s	16454-3		Spike - 1 of 5					
19		16454-4		Sample					
1		QC Std 1		Sample					
3		QC Std 4		Sample					
5		QC Std 2		Sample					
22		16423-1		Sample					
23		16423-2		Sample					
24	d	16423-2		Duplicate of 12					
25		16423-3		Sample					
26	s	16423-3		Spike - 1 of 14					
27		16423-4		Sample					
28		16423-5		Sample					
29	d	16423-5		Duplicate of 17					
30		16423-6		Sample					
31	s	16423-6		Spike - 1 of 19					
32		16423-7		Sample					
33		16423-8		Sample					
34	d	16423-8		Duplicate of 22					
35		16423-9		Sample					
36	s	16423-9		Spike - 1 of 24					
37		16423-10		Sample					
38		16423-11		Sample					
1		QC Std 1		Sample					
3		QC Std 4		Sample					
5		QC Std 2		Sample					
41		16470-1		Sample					
42		16470-2		Sample					
43	d	16470-2		Duplicate of 32					
44		16470-3		Sample					
45	s	16470-3		Spike - 1 of 34					
46		16470-4		Sample					
5		QC Std 2		Sample					
50	x2	16423-3		Sample					
51	x2s	16423-3		Spike - 1 of 38					
52	x2	16423-6		Sample					
53	x2s	16423-6		Spike - 1 of 40					
54	x2	16423-9		Sample					
55	x2s	16423-9		Spike - 1 of 42					

Dataset Report

User Name: icp
Computer Name: D8D4DWD1
Dataset File Path: C:\elandata_icp\DataSet\041311-1\
Report Date/Time: Thursday, April 14, 2011 13:02:31

Autosampler Position: 4

The Dataset

Time	Sample ID	Batch ID	Read Type	Description	Init. Quant	Prep. Vol.	Aliquot Vol.	Diluted V
21:11:54 Wed 13-Apr-11	Blank		Blank					
21:13:32 Wed 13-Apr-11	Standard 1		Standard #1					
21:15:10 Wed 13-Apr-11	Standard 2		Standard #2					
21:16:50 Wed 13-Apr-11	Standard 3		Standard #3					
21:18:28 Wed 13-Apr-11	QC Std 1		QC Std #1					
21:20:07 Wed 13-Apr-11	QC Std 2		QC Std #2					
21:21:46 Wed 13-Apr-11	QC Std 3		QC Std #3					
21:23:24 Wed 13-Apr-11	QC Std 4		QC Std #4					
21:25:03 Wed 13-Apr-11	QC Std 5		QC Std #5					
21:26:42 Wed 13-Apr-11	QC Std 9		QC Std #9					
21:28:22 Wed 13-Apr-11	QC Std 10		QC Std #10					
21:30:03 Wed 13-Apr-11	QC Std 2		Sample					
21:31:42 Wed 13-Apr-11	16454-1		Sample					
21:33:20 Wed 13-Apr-11	16454-2		Sample					
21:34:57 Wed 13-Apr-11	16454-2	d	Duplicate of 1					
21:36:35 Wed 13-Apr-11	16454-3		Sample					
21:38:13 Wed 13-Apr-11	16454-3	s	Spike - 1 of 16					
21:39:51 Wed 13-Apr-11	16454-4		Sample					
21:41:29 Wed 13-Apr-11	QC Std 1		Sample					
21:43:07 Wed 13-Apr-11	QC Std 4		Sample					
21:44:46 Wed 13-Apr-11	Blank		Blank					
21:46:24 Wed 13-Apr-11	Standard 1		Standard #1					
21:48:39 Wed 13-Apr-11	Standard 2		Standard #2					
21:50:37 Wed 13-Apr-11	Standard 3		Standard #3					
21:52:34 Wed 13-Apr-11	QC Std 1		QC Std #1					
21:54:31 Wed 13-Apr-11	QC Std 2		QC Std #2					
21:56:29 Wed 13-Apr-11	QC Std 3		QC Std #3					
21:58:26 Wed 13-Apr-11	QC Std 4		QC Std #4					
22:00:22 Wed 13-Apr-11	QC Std 5		QC Std #5					
22:02:20 Wed 13-Apr-11	QC Std 7		QC Std #7					
22:04:18 Wed 13-Apr-11	QC Std 8		QC Std #8					
22:06:16 Wed 13-Apr-11	QC Std 9		QC Std #9					
22:08:13 Wed 13-Apr-11	QC Std 10		QC Std #10					
22:10:12 Wed 13-Apr-11	QC Std 2		Sample	CAE				
22:12:09 Wed 13-Apr-11	QC Std 1		QC Std #1					
22:14:06 Wed 13-Apr-11	QC Std 4		QC Std #4					
22:16:04 Wed 13-Apr-11	16423-1		Sample	CAE				
22:18:02 Wed 13-Apr-11	16423-2		Sample	CAE				
22:20:01 Wed 13-Apr-11	16423-2	d	Duplicate of 38	CAE				
22:22:00 Wed 13-Apr-11	16423-3		Sample	CAE				
22:23:58 Wed 13-Apr-11	16423-3	s	Spike - 1 of 40	CAE				
22:25:55 Wed 13-Apr-11	16423-4		Sample	CAE				
22:27:51 Wed 13-Apr-11	16423-5		Sample	CAE				

22:29:48 Wed 13-Apr-11	16423-5	d	Duplicate of 43CAE
22:31:45 Wed 13-Apr-11	16423-6		Sample CAE
22:33:42 Wed 13-Apr-11	16423-6	s	Spike - 1 of 45 CAE
22:35:39 Wed 13-Apr-11	QC Std 1		QC Std #1
22:37:36 Wed 13-Apr-11	QC Std 4		QC Std #4
22:39:33 Wed 13-Apr-11	16423-7		Sample CAE
22:41:30 Wed 13-Apr-11	16423-8		Sample CAE
22:43:28 Wed 13-Apr-11	16423-8	d	Duplicate of 50CAE
22:45:27 Wed 13-Apr-11	16423-9		Sample CAE
22:47:26 Wed 13-Apr-11	16423-9	s	Spike - 1 of 52 CAE
22:49:25 Wed 13-Apr-11	16423-10		Sample CAE
22:51:23 Wed 13-Apr-11	13423-11		Sample CAE
22:53:20 Wed 13-Apr-11	QC Std 1		Sample CAE
22:55:17 Wed 13-Apr-11	QC Std 4		Sample CAE
22:57:14 Wed 13-Apr-11	Blank		Blank
22:58:45 Wed 13-Apr-11	Standard 1		Standard #1
23:00:18 Wed 13-Apr-11	Standard 2		Standard #2
23:01:51 Wed 13-Apr-11	Standard 3		Standard #3
23:03:23 Wed 13-Apr-11	QC Std 1		QC Std #1
23:04:56 Wed 13-Apr-11	QC Std 2		QC Std #2
23:06:29 Wed 13-Apr-11	QC Std 3		QC Std #3
23:08:01 Wed 13-Apr-11	QC Std 4		QC Std #4
23:09:33 Wed 13-Apr-11	QC Std 5		QC Std #5
23:11:05 Wed 13-Apr-11	QC Std 7		QC Std #7
23:12:39 Wed 13-Apr-11	QC Std 9		QC Std #9
23:14:11 Wed 13-Apr-11	QC Std 10		QC Std #10
23:15:45 Wed 13-Apr-11	QC Std 2		Sample
23:17:18 Wed 13-Apr-11	QC Std 1		QC Std #1
23:18:50 Wed 13-Apr-11	QC Std 4		QC Std #4
23:20:23 Wed 13-Apr-11	16470-1		Sample
23:21:55 Wed 13-Apr-11	16470-2		Sample
23:23:29 Wed 13-Apr-11	16470-2	d	Duplicate of 74
23:25:02 Wed 13-Apr-11	16470-3		Sample
23:26:35 Wed 13-Apr-11	16470-3	s	Spike - 1 of 76
23:28:08 Wed 13-Apr-11	16470-4		Sample
23:29:41 Wed 13-Apr-11	QC Std 1		QC Std #1
23:31:13 Wed 13-Apr-11	QC Std 4		QC Std #4
09:00:46 Thu 14-Apr-11	Blank		Blank
09:02:42 Thu 14-Apr-11	Standard 1		Standard #1
09:04:39 Thu 14-Apr-11	Standard 2		Standard #2
09:06:37 Thu 14-Apr-11	Standard 3		Standard #3
09:08:34 Thu 14-Apr-11	QC Std 1		QC Std #1
09:10:31 Thu 14-Apr-11	QC Std 2		QC Std #2
09:12:29 Thu 14-Apr-11	QC Std 3		QC Std #3
09:14:26 Thu 14-Apr-11	QC Std 4		QC Std #4
09:16:23 Thu 14-Apr-11	QC Std 5		QC Std #5
09:18:20 Thu 14-Apr-11	QC Std 7		QC Std #7
09:20:18 Thu 14-Apr-11	QC Std 8		QC Std #8
09:22:16 Thu 14-Apr-11	QC Std 9		QC Std #9
09:24:13 Thu 14-Apr-11	QC Std 10		QC Std #10
09:26:12 Thu 14-Apr-11	QC Std 2		Sample CAE
09:28:10 Thu 14-Apr-11	16423-3	x2	Sample CAE
09:30:08 Thu 14-Apr-11	16423-3	x2s	Spike - 1 of 95 CAE
09:32:05 Thu 14-Apr-11	16423-6	x2	Sample CAE
09:34:03 Thu 14-Apr-11	16423-6	x2s	Spike - 1 of 97 CAE
09:36:01 Thu 14-Apr-11	16423-9	x2	Sample CAE

09:37:59 Thu 14-Apr-11	16423-9	x2s	Spike - 1 of 99 CAE
09:39:56 Thu 14-Apr-11	QC Std 1		QC Std #1
09:41:52 Thu 14-Apr-11	QC Std 4		QC Std #4
08:58:42 Thu 14-Apr-11	Blank		Blank
10:02:08 Thu 14-Apr-11	Standard 1		Standard #1
10:05:35 Thu 14-Apr-11	Standard 2		Standard #2
10:09:04 Thu 14-Apr-11	Standard 3		Standard #3
10:12:31 Thu 14-Apr-11	QC Std 1		QC Std #1
10:15:58 Thu 14-Apr-11	QC Std 2		QC Std #2
10:19:26 Thu 14-Apr-11	QC Std 3		QC Std #3
10:22:53 Thu 14-Apr-11	QC Std 4		QC Std #4
10:26:20 Thu 14-Apr-11	QC Std 5		QC Std #5
10:29:47 Thu 14-Apr-11	QC Std 9		QC Std #9
10:33:15 Thu 14-Apr-11	QC Std 10		QC Std #10
10:36:43 Thu 14-Apr-11	QC Std 2		Sample
10:40:11 Thu 14-Apr-11	16473-1.1		Sample
10:43:38 Thu 14-Apr-11	16473-1.1	s	Spike - 1 of 11:
10:47:04 Thu 14-Apr-11	16480-1.1		Sample
10:50:31 Thu 14-Apr-11	16481-1.1		Sample
10:53:58 Thu 14-Apr-11	16481-1.1	s	Spike - 1 of 11:
10:57:24 Thu 14-Apr-11	16482-1.1		Sample
11:00:52 Thu 14-Apr-11	16483-1.1		Sample
11:04:19 Thu 14-Apr-11	16483-1.1	x20	Sample
11:07:47 Thu 14-Apr-11	16484-1.1		Sample
11:11:16 Thu 14-Apr-11	16484-1.1	d	Duplicate of 12
11:14:43 Thu 14-Apr-11	QC Std 1		QC Std #1
11:18:10 Thu 14-Apr-11	QC Std 4		QC Std #4
11:21:38 Thu 14-Apr-11	16485-1.1		Sample
11:25:07 Thu 14-Apr-11	16485-1.1	x20	Sample
11:28:35 Thu 14-Apr-11	16486-1.1		Sample
11:32:02 Thu 14-Apr-11	16489-1.1		Sample
11:35:29 Thu 14-Apr-11	16489-1.1	x20	Sample
11:38:56 Thu 14-Apr-11	16418-1	x2	Sample
11:42:23 Thu 14-Apr-11	16418-1	x2d	Duplicate of 12
11:45:50 Thu 14-Apr-11	16418-1	x100	Sample
11:49:18 Thu 14-Apr-11	16418-1	x100d	Duplicate of 13
11:52:44 Thu 14-Apr-11	QC Std 1		QC Std #1
11:56:11 Thu 14-Apr-11	QC Std 4		QC Std #4
12:33:49 Thu 14-Apr-11	16473-1.1	x20	Sample
12:37:17 Thu 14-Apr-11	16473-1.1	x20s	Spike - 1 of 13:
12:40:45 Thu 14-Apr-11	16489-1.1	x50	Sample

elementOne
Analyst--KMS--

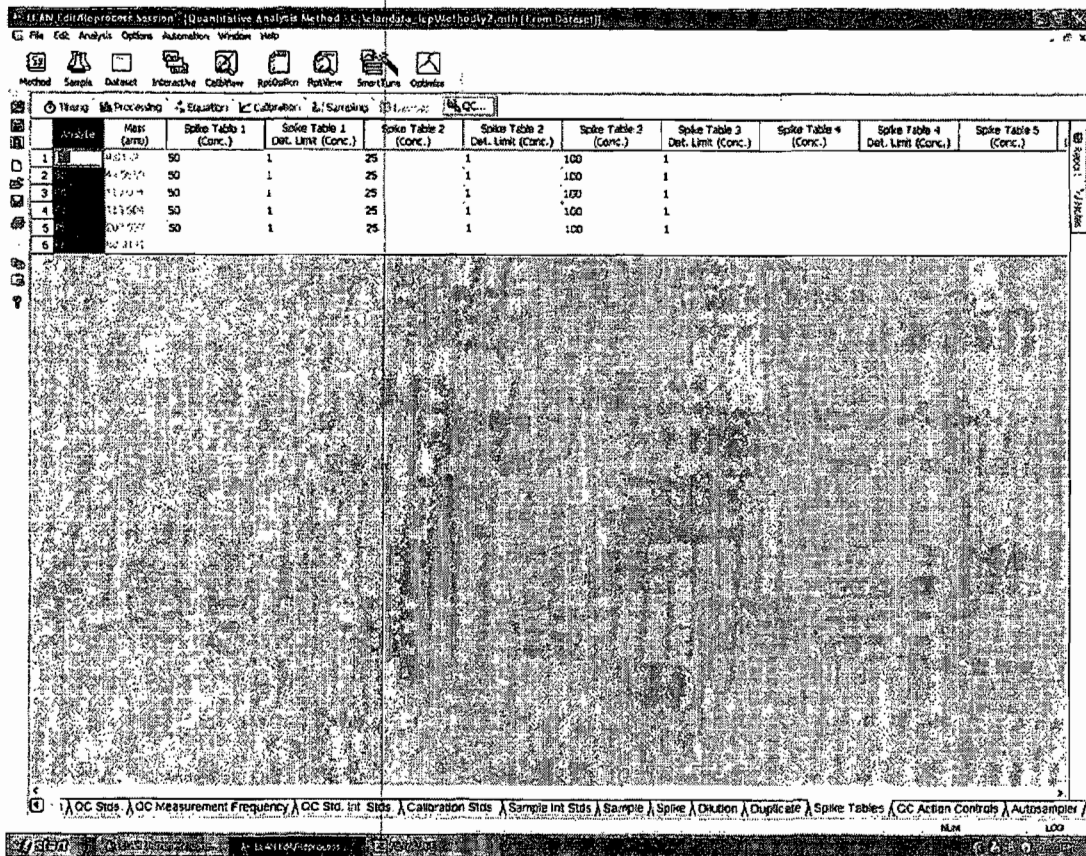
ICP-MS RUN SHEET
4/14/2011

Job Number:

A/S Loc.	Dilution	Sample ID	Client	Type	Weight (g)	Prep Vol (ml)
5		QC Std 2	CAE	Sample		
22		16423-1	CAE	Sample		100x2
23		16423-2	CAE	Sample		100x2
24	d	16423-2	CAE	Duplicate of 12		100x2
25		16423-3	CAE	Sample		100x2
26	s	16423-3	CAE	Spike - 1 of 14		100x2
27		16423-4	CAE	Sample		100x2
28		16423-5	CAE	Sample		100x2
29	d	16423-5	CAE	Duplicate of 17		100x2
30		16423-6	CAE	Sample		100x2
31	s	16423-6	CAE	Spike - 1 of 19		100x2
32		16423-7	CAE	Sample		100x2
33		16423-8	CAE	Sample		100x2
34	d	16423-8	CAE	Duplicate of 22		100x2
35		16423-9	CAE	Sample		100x2
36	s	16423-9	CAE	Spike - 1 of 24		100x2
37		16423-10	CAE	Sample		100x2
38		13423-11	CAE	Sample		100x2
1		QC Std 1	CAE	Sample		
3		QC Std 4	CAE	Sample		
5		QC Std 2	CAE	Sample		
50	x2	16423-3	CAE	Sample		100x2
51	x2s	16423-3	CAE	Spike - 1 of 38		100x2
52	x2	16423-6	CAE	Sample		100x2
53	x2s	16423-6	CAE	Spike - 1 of 40		100x2
54	x2	16423-9	CAE	Sample		100x2
55	x2s	16423-9	CAE	Spike - 1 of 42		100x2

Spikes are post at 0.02mL of 25ppm spiking solutions lot 021410-ABCD & F in a final volume of 10mL

Submitted for QC by:	Date/Time:	QC Review By:	Date/Time:
KMS	4/14/11 13:05	DBL	4/16/11 1400
Re-Test Required:	No: ☒ Yes: ☐	Comments:	
Resubmitted for QC by:	Date/Time:	QC Review:	By: Date/Time:



Thursday, Apr 14, 2011 01:03 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	48	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	50	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														

elementOne

elementOne

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Blank

Sample Date: Wednesday, April 13, 2011 21:44:46

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	58994		ppb
-	Be	9	9.7		ppb
-	Sc	45	247841.7		ppb
>	Rh	103	582840.5		ppb
	Cd	111	68.2		ppb
-	Cd	114	121.8		ppb
>	Ho	165	988182.5		ppb
-	Pb	208	3813		ppb
	Kr	83	177.7		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Date: Wednesday, April 13, 2011 21:46:42

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	59553.4		ppb
-	Be	9	470.3	0.92566	ppb
-	Sc	45	250413.2		ppb
>	Rh	103	591410.4		ppb
	Cd	111	3244.7	1.02004	ppb
-	Cd	114	7615.2	1.06505	ppb
>	Ho	165	996967.7		ppb
-	Pb	208	47185.3	1.06568	ppb
	Kr	83	-23.2		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Date: Wednesday, April 13, 2011 21:48:39

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	57944.9		ppb
-	Be	9	44668.1	92.57304	ppb
-	Sc	45	249102.7		ppb
>	Rh	103	583709.6		ppb
	Cd	111	316044.6	102.74847	ppb
-	Cd	114	735403.1	105.84553	ppb
>	Ho	165	995427.1		ppb
-	Pb	208	4293938.8	105.56934	ppb
	Kr	83	-18885.7		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Date: Wednesday, April 13, 2011 21:50:37

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	52275		ppb
-	Be	9	202408.9	500.09117	ppb
-	Sc	45	238784.3		ppb
>	Rh	103	559785.1		ppb
	Cd	111	1482844.3	499.58086	ppb
-	Cd	114	3420192.6	499.40547	ppb
>	Ho	165	950767.3		ppb
-	Pb	208	20061092	499.58632	ppb
	Kr	83	-90311.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Date: Wednesday, April 13, 2011 21:52:34

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	54549		ppb
-	Be	9	21	0.02882	ppb
-	Sc	45	246546.5		ppb
>	Rh	103	591504.2		ppb
	Cd	111	171.4	0.03277	ppb
-	Cd	114	414.5	0.04039	ppb
>	Ho	165	988395.8		ppb
-	Pb	208	5887.1	0.04985	ppb
	Kr	83	195.8		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Da Wednesday, April 13, 2011 21:54:31

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	53073.6		ppb
-	Be	9	407.7	0.97097	ppb
-	Sc	45	241752		ppb
>	Rh	103	580475		ppb
	Cd	111	3253.2	1.03497	ppb
-	Cd	114	7592	1.05211	ppb
>	Ho	165	961287.6		ppb
-	Pb	208	47690.4	1.08356	ppb
	Kr	83	180.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Da Wednesday, April 13, 2011 21:56:29

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	53588		ppb
-	Be	9	105562.1	254.39559	ppb
-	Sc	45	244937.3		ppb
>	Rh	103	591840.6		ppb
	Cd	111	785851.2	250.40762	ppb
-	Cd	114	1827591.6	252.42593	ppb
>	Ho	165	966089		ppb
-	Pb	208	10439249	255.8112	ppb
	Kr	83	-47304.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Da Wednesday, April 13, 2011 21:58:26

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	54221.3		ppb
-	Be	9	43475	103.54404	ppb
-	Sc	45	251720		ppb
>	Rh	103	599756.5		ppb
	Cd	111	321400.4	101.05728	ppb
-	Cd	114	748091.3	101.9594	ppb
>	Ho	165	992381.5		ppb
-	Pb	208	4302561.2	102.58601	ppb
	Kr	83	-19089.1		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Da Wednesday, April 13, 2011 22:00:22

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	53847.7		ppb
-	Be	9	21412.9	51.33622	ppb
-	Sc	45	248579.1		ppb
>	Rh	103	592391.2		ppb
	Cd	111	155685.1	49.53925	ppb
-	Cd	114	365162.2	50.36964	ppb
>	Ho	165	987374.9		ppb
-	Pb	208	2112661	50.58027	ppb
	Kr	83	211.8		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Da Wednesday, April 13, 2011 22:02:20

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	54643.3		ppb
-	Be	9	10.3	0.00338	ppb
-	Sc	45	250681.4		ppb
>	Rh	103	582472.3		ppb
	Cd	111	15776.4	5.08567	ppb
-	Cd	114	45388.9	6.35243	ppb
>	Ho	165	994215.1		ppb
-	Pb	208	8955	0.12195	ppb
	Kr	83	133.3		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 8

Sample Da Wednesday, April 13, 2011 22:04:18

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	59889.1		ppb
-	Be	9	120.3	0.2382	ppb
-	Sc	45	247427.7		ppb
>	Rh	103	613885.9		ppb
	Cd	111	904.3	0.25578	ppb
-	Cd	114	2180	0.27329	ppb
>	Ho	165	1016653		ppb
-	Pb	208	21576.7	0.41126	ppb
	Kr	83	107.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 9

Sample Da Wednesday, April 13, 2011 22:06:16

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	63023.8		ppb
-	Be	9	8.7	-0.00329	ppb
-	Sc	45	279962.2		ppb
>	Rh	103	611200.1		ppb
	Cd	111	750.1	0.20944	ppb
-	Cd	114	468.8	0.04568	ppb
>	Ho	165	1026680		ppb
-	Pb	208	158886.3	3.57487	ppb
	Kr	83	15.8		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 10

Sample Da Wednesday, April 13, 2011 22:08:13

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	61508		ppb
-	Be	9	18379.9	38.5762	ppb
-	Sc	45	267621.9		ppb
-	Rh	103	628354.5		ppb
-	Cd	111	133332.9	40.00642	ppb
-	Cd	114	307976.3	40.05413	ppb
>	Ho	165	1054205.4		ppb
-	Pb	208	2137824.7	47.94244	ppb
	Kr	83	-166.2		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Da Wednesday, April 13, 2011 22:10:12

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	60572.4		ppb
-	Be	9	422	0.8786	ppb
-	Sc	45	241799.9		ppb
>	Rh	103	575480.2		ppb
-	Cd	111	3243.9	1.04104	ppb
-	Cd	114	7614.6	1.06444	ppb
>	Ho	165	960040.3		ppb
-	Pb	208	47971	1.09201	ppb
	Kr	83	154.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Da Wednesday, April 13, 2011 22:12:09

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	61461.8		ppb
-	Be	9	6.3	-0.00796	ppb
-	Sc	45	239930.3		ppb
>	Rh	103	575606		ppb
	Cd	111	65.7	-0.0005	ppb
-	Cd	114	92.9	-0.00389	ppb
>	Ho	165	964286		ppb
-	Pb	208	3294.2	-0.01047	ppb
	Kr	83	164.3		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Da Wednesday, April 13, 2011 22:14:06

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	59768.1		ppb
-	Be	9	44484.9	96.10194	ppb
-	Sc	45	240015.4		ppb
>	Rh	103	582718.8		ppb
	Cd	111	310322.7	100.43685	ppb
-	Cd	114	727940.1	102.1206	ppb
>	Ho	165	971530.7		ppb
-	Pb	208	4228374.5	102.97927	ppb
	Kr	83	-18976.8		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-1

Sample Da Wednesday, April 13, 2011 22:16:04

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	71193.5		ppb
-	Be	9	30	0.03343	ppb
-	Sc	45	618221.6		ppb
>	Rh	103	502411.3		ppb
	Cd	111	2356.1	0.86234	ppb
-	Cd	114	2725.3	0.42651	ppb
>	Ho	165	869515		ppb
-	Pb	208	354655.6	9.56792	ppb
	Kr	83	-183.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-2

Sample Da Wednesday, April 13, 2011 22:18:02

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	68825		ppb
-	Be	9	13.7	0.00444	ppb
-	Sc	45	302510		ppb
>	Rh	103	530251.6		ppb
	Cd	111	1780.8	0.61131	ppb
-	Cd	114	2081	0.30341	ppb
>	Ho	165	934688.9		ppb
-	Pb	208	195474.5	4.86103	ppb
	Kr	83	4		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-3

Sample Da Wednesday, April 13, 2011 22:20:01

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	69100		ppb
-	Be	9	7.7	-0.00686	ppb
-	Sc	45	290241.5		ppb
>	Rh	103	509603.1		ppb
	Cd	111	1817.2	0.65049	ppb
-	Cd	114	2103.8	0.32043	ppb
>	Ho	165	901110.2		ppb
-	Pb	208	189643.1	4.89234	ppb
	Kr	83	-34.4		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-3

Sample Da Wednesday, April 13, 2011 22:22:00

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	71861.3		ppb
-	Be	9	14.7	0.00529	ppb
-	Sc	45	335193.5		ppb
>	Rh	103	498661.5		ppb
	Cd	111	4220.9	1.57431	ppb
-	Cd	114	7339.5	1.18669	ppb
>	Ho	165	876054.5		ppb
-	Pb	208	204722.6	5.44247	ppb
	Kr	83	69.5		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-3

Sample Da Wednesday, April 13, 2011 22:23:58

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	71481.6		ppb
-	Be	9	18060.9	32.62536	ppb
-	Sc	45	325139.8		ppb
>	Rh	103	487340		ppb
	Cd	111	112466.1	43.50028	ppb
-	Cd	114	262632.9	44.04218	ppb
>	Ho	165	876587.6		ppb
-	Pb	208	2024319.9	54.59938	ppb
	Kr	83	72.9		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-4

Sample Da Wednesday, April 13, 2011 22:25:55

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	71041		ppb
-	Be	9	88	0.13876	ppb
-	Sc	45	290954.4		ppb
>	Rh	103	495585.7		ppb
	Cd	111	4401.5	1.65301	ppb
-	Cd	114	7582.7	1.23345	ppb
>	Ho	165	877720.9		ppb
-	Pb	208	500256.1	13.40619	ppb
	Kr	83	60.8		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-5

Sample Da Wednesday, April 13, 2011 22:27:51

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	69432.5		ppb
-	Be	9	12.7	0.0023	ppb
-	Sc	45	721459.7		ppb
>	Rh	103	461770.9		ppb
	Cd	111	4094.5	1.65024	ppb
-	Cd	114	6431.7	1.12169	ppb
>	Ho	165	818639.2		ppb
-	Pb	208	469685.8	13.50141	ppb
	Kr	83	448.2		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-5

Sample Da Wednesday, April 13, 2011 22:29:48

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	68100.9		ppb
-	Be	9	13	0.0034	ppb
-	Sc	45	687123.1		ppb
>	Rh	103	465160.4		ppb
	Cd	111	4034	1.61385	ppb
-	Cd	114	6282.9	1.08709	ppb
>	Ho	165	811759.7		ppb
-	Pb	208	468409.1	13.57517	ppb
	Kr	83	466.1		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-6

Sample Da Wednesday, April 13, 2011 22:31:45

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	67287		ppb
-	Be	9	13	0.00374	ppb
-	Sc	45	350164.5		ppb
>	Rh	103	446445.8		ppb
	Cd	111	5393.7	2.25678	ppb
-	Cd	114	9812.7	1.77957	ppb
>	Ho	165	789998.6		ppb
-	Pb	208	451498.8	13.44314	ppb
	Kr	83	189		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-6

Sample Da Wednesday, April 13, 2011 22:33:42

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	67485		ppb
-	Be	9	17312.1	33.12278	ppb
-	Sc	45	353755.5		ppb
>	Rh	103	462563.5		ppb
	Cd	111	109811.2	44.74548	ppb
-	Cd	114	256238.5	45.2625	ppb
>	Ho	165	813775.3		ppb
-	Pb	208	2209778.7	64.22376	ppb
	Kr	83	179.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Da Wednesday, April 13, 2011 22:35:39

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	63354.8		ppb
-	Be	9	11.7	0.0026	ppb
-	Sc	45	217281.2		ppb
>	Rh	103	505948.9		ppb
	Cd	111	65.7	0.00247	ppb
-	Cd	114	125.3	0.00318	ppb
>	Ho	165	900971.5		ppb
-	Pb	208	3367.3	-0.00284	ppb
	Kr	83	125.1		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Da Wednesday, April 13, 2011 22:37:35

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	61402.8		ppb
-	Be	9	42525.9	89.42332	ppb
-	Sc	45	220431.8		ppb
>	Rh	103	515384.5		ppb
	Cd	111	289638.8	105.98384	ppb
-	Cd	114	677292.9	107.41388	ppb
>	Ho	165	929690.7		ppb
-	Pb	208	4073132.7	103.66165	ppb
	Kr	83	-17241.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-7

Sample Da Wednesday, April 13, 2011 22:39:33

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	65279.8		ppb
-	Be	9	15.7	0.01007	ppb
-	Sc	45	584290.3		ppb
>	Rh	103	469364.6		ppb
	Cd	111	2347	0.92143	ppb
-	Cd	114	2674	0.45069	ppb
>	Ho	165	837818.9		ppb
-	Pb	208	200665.8	5.5816	ppb
	Kr	83	534.1		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-8

Sample Da Wednesday, April 13, 2011 22:41:30

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	67246.2		ppb
-	Be	9	13	0.00378	ppb
-	Sc	45	359986.6		ppb
>	Rh	103	493909.5		ppb
	Cd	111	1947.8	0.72182	ppb
-	Cd	114	2455.3	0.39006	ppb
>	Ho	165	881591.8		ppb
-	Pb	208	208736.7	5.51616	ppb
	Kr	83	343.5		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-8

Sample Da Wednesday, April 13, 2011 22:43:28

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	65605.9		ppb
-	Be	9	10.7	0.00007	ppb
-	Sc	45	361002		ppb
>	Rh	103	505402		ppb
-	Cd	111	2023.6	0.73373	ppb
-	Cd	114	1943.8	0.29683	ppb
>	Ho	165	905033		ppb
-	Pb	208	211708.8	5.44787	ppb
	Kr	83	219.8		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-9

Sample Da Wednesday, April 13, 2011 22:45:27

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	66172.3		ppb
-	Be	9	11.3	0.001	ppb
-	Sc	45	255441.4		ppb
>	Rh	103	530486.5		ppb
-	Cd	111	1547	0.52799	ppb
-	Cd	114	1082.7	0.14906	ppb
>	Ho	165	946577.8		ppb
-	Pb	208	126159.1	3.06579	ppb
	Kr	83	-118.6		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-9

Sample Da Wednesday, April 13, 2011 22:47:26

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	66752.8		ppb
-	Be	9	17823.1	34.46788	ppb
-	Sc	45	258257		ppb
>	Rh	103	535415.2		ppb
-	Cd	111	122797.5	43.24819	ppb
-	Cd	114	286467.6	43.73229	ppb
>	Ho	165	962820.8		ppb
-	Pb	208	2165063.2	53.1647	ppb
	Kr	83	-123.3		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-10

Sample Da Wednesday, April 13, 2011 22:49:25

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	64655.4		ppb
-	Be	9	14.7	0.00808	ppb
-	Sc	45	340581.2		ppb
>	Rh	103	504881.3		ppb
-	Cd	111	1402.6	0.5021	ppb
-	Cd	114	65.7	-0.00725	ppb
>	Ho	165	916351.2		ppb
-	Pb	208	114306.4	2.86254	ppb
	Kr	83	-81.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 13423-11

Sample Da Wednesday, April 13, 2011 22:51:23

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	63746.3		ppb
-	Be	9	4.3	-0.01243	ppb
-	Sc	45	282610.4		ppb
>	Rh	103	518978.7		ppb
-	Cd	111	677.9	0.22398	ppb
-	Cd	114	-263.3	-0.0585	ppb
>	Ho	165	945190.9		ppb
-	Pb	208	138862	3.38811	ppb
	Kr	83	96.1		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Da: Wednesday, April 13, 2011 22:53:20

Sample De: CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	59432.9		ppb
-	Be	9	6.7	-0.00667	ppb
-	Sc	45	229330.8		ppb
>	Rh	103	549597.7		ppb
	Cd	111	52.1	-0.00418	ppb
-	Cd	114	91.1	-0.00355	ppb
>	Ho	165	978261.9		ppb
-	Pb	208	3303.9	-0.01139	ppb
	Kr	83	128.4		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Da: Wednesday, April 13, 2011 22:55:17

Sample De: CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	58330.8		ppb
-	Be	9	42264	93.55263	ppb
-	Sc	45	237556.8		ppb
>	Rh	103	557044.7		ppb
	Cd	111	309116.8	104.65296	ppb
-	Cd	114	726252.2	106.56091	ppb
>	Ho	165	999102.9		ppb
-	Pb	208	4344657.3	102.9167	ppb
	Kr	83	-18471.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: Blank

Sample Da: Thursday, April 14, 2011 09:00:46

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	40792.2		ppb
-	Be	9	9.7		ppb
-	Sc	45	246593.1		ppb
>	Rh	103	607296.2		ppb
	Cd	111	81.4		ppb
-	Cd	114	163.1		ppb
>	Ho	165	1021010.1		ppb
-	Pb	208	3887.7		ppb
	Kr	83	167.3		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 1

Sample Da: Thursday, April 14, 2011 09:02:42

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	42194.4		ppb
-	Be	9	363	1.08008	ppb
-	Sc	45	251578.8		ppb
>	Rh	103	618872.2		ppb
	Cd	111	3397.4	1.01001	ppb
-	Cd	114	7848.5	1.01471	ppb
>	Ho	165	1044682.1		ppb
-	Pb	208	48041.4	0.99901	ppb
	Kr	83	-10		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 2

Sample Da: Thursday, April 14, 2011 09:04:39

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	41456.1		ppb
-	Be	9	35132.1	109.0093	ppb
-	Sc	45	251144.8		ppb
>	Rh	103	609804.6		ppb
	Cd	111	322701.3	99.87377	ppb
-	Cd	114	757767	101.61714	ppb
>	Ho	165	1029341		ppb
-	Pb	208	4350048.8	100.06849	ppb
	Kr	83	-19528.8		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: Standard 3

Sample Da: Thursday, April 14, 2011 09:06:37

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	38257.7		ppb
-	Be	9	159751.8	499.71955	ppb
-	Sc	45	237156.6		ppb
>	Rh	103	569646.5		ppb
-	Cd	111	1498979.9	499.89736	ppb
-	Cd	114	3381620.9	499.10909	ppb
>	Ho	165	972284.9		ppb
-	Pb	208	19805855	499.29913	ppb
	Kr	83	-91748.5		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Da: Thursday, April 14, 2011 09:08:34

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	39643.3		ppb
-	Be	9	25.7	0.04903	ppb
-	Sc	45	241273.1		ppb
>	Rh	103	597391.5		ppb
-	Cd	111	240.8	0.05173	ppb
-	Cd	114	598.6	0.06237	ppb
>	Ho	165	999285.2		ppb
-	Pb	208	7248.2	0.0853	ppb
	Kr	83	167.8		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Da: Thursday, April 14, 2011 09:10:31

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	40005		ppb
-	Be	9	363.7	1.06028	ppb
-	Sc	45	236686.8		ppb
>	Rh	103	583921.3		ppb
-	Cd	111	3318.8	1.05431	ppb
-	Cd	114	7615.3	1.07386	ppb
>	Ho	165	985945.5		ppb
-	Pb	208	48400.2	1.11021	ppb
	Kr	83	193.8		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 3

Sample Da: Thursday, April 14, 2011 09:12:29

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	40630.4		ppb
-	Be	9	85807.1	252.77103	ppb
-	Sc	45	241347.1		ppb
>	Rh	103	592733.4		ppb
-	Cd	111	784644.1	251.42881	ppb
-	Cd	114	1834833.8	260.21424	ppb
>	Ho	165	994365.8		ppb
-	Pb	208	10405202	256.45662	ppb
	Kr	83	-47330.9		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Da: Thursday, April 14, 2011 09:14:26

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	41862.1		ppb
-	Be	9	35098.3	100.30891	ppb
-	Sc	45	247750.8		ppb
>	Rh	103	606131.4		ppb
-	Cd	111	321760.6	100.83817	ppb
-	Cd	114	762494.8	105.7402	ppb
>	Ho	165	1020008.8		ppb
-	Pb	208	4307668.9	103.44304	ppb
	Kr	83	-19466.7		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 5

Sample Da: Thursday, April 14, 2011 09:16:23

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	42314.1		ppb
-	Be	9	17494.2	49.45192	ppb
-	Sc	45	246685.4		ppb
>	Rh	103	606407.9		ppb
	Cd	111	159172.7	49.83689	ppb
-	Cd	114	370460.7	51.33603	ppb
>	Ho	165	1020855.3		ppb
-	Pb	208	2173231.6	52.09781	ppb
	Kr	83	215		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 7

Sample Da: Thursday, April 14, 2011 09:18:20

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	40385.9		ppb
-	Be	9	10.3	0.00227	ppb
-	Sc	45	254563.2		ppb
>	Rh	103	597401.7		ppb
	Cd	111	16130.1	5.10293	ppb
-	Cd	114	45493.2	6.379	ppb
>	Ho	165	1045896.6		ppb
-	Pb	208	9755.4	0.13545	ppb
	Kr	83	150.6		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 8

Sample Da: Thursday, April 14, 2011 09:20:18

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	43887.9		ppb
-	Be	9	106.7	0.26307	ppb
-	Sc	45	260503.6		ppb
>	Rh	103	650149.2		ppb
	Cd	111	937.3	0.24826	ppb
-	Cd	114	2341.2	0.28013	ppb
>	Ho	165	1096997		ppb
-	Pb	208	22645.4	0.41271	ppb
	Kr	83	119.1		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 9

Sample Da: Thursday, April 14, 2011 09:22:16

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	45771.9		ppb
-	Be	9	7.3	-0.00933	ppb
-	Sc	45	278441.5		ppb
>	Rh	103	639744.8		ppb
	Cd	111	786.3	0.20787	ppb
-	Cd	114	539.2	0.04827	ppb
>	Ho	165	1079049.8		ppb
-	Pb	208	167245.8	3.70654	ppb
	Kr	83	18.7		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 10

Sample Da: Thursday, April 14, 2011 09:24:13

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	45070.5		ppb
-	Be	9	14860.1	39.45901	ppb
-	Sc	45	266322.2		ppb
>	Rh	103	652676.5		ppb
	Cd	111	139064.4	40.45171	ppb
-	Cd	114	322812.8	41.56159	ppb
>	Ho	165	1103092.9		ppb
-	Pb	208	2202366.9	48.84762	ppb
	Kr	83	-202.1		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 2

Sample Da Thursday, April 14, 2011 09:26:12

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	43312.9		ppb
-	Be	9	382.7	1.02914	ppb
-	Sc	45	256474.4		ppb
>	Rh	103	629041.1		ppb
	Cd	111	3627.3	1.07066	ppb
-	Cd	114	8183.1	1.07104	ppb
>	Ho	165	1031622		ppb
-	Pb	208	50754.7	1.11278	ppb
	Kr	83	173.1		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-3

Sample Da Thursday, April 14, 2011 09:28:10

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	42388.6		ppb
-	Be	9	8	-0.00579	ppb
-	Sc	45	280117.2		ppb
>	Rh	103	544560.7		ppb
	Cd	111	2651.1	0.8994	ppb
-	Cd	114	4677.6	0.69941	ppb
>	Ho	165	933825.5		ppb
-	Pb	208	122316.6	3.11807	ppb
	Kr	83	78.8		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-3

Sample Da Thursday, April 14, 2011 09:30:08

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	36628		ppb
-	Be	9	12490.3	40.80853	ppb
-	Sc	45	246544.4		ppb
>	Rh	103	458916.4		ppb
	Cd	111	107762.7	44.59483	ppb
-	Cd	114	251664.7	46.0839	ppb
>	Ho	165	798227.8		ppb
-	Pb	208	1753159.4	53.73462	ppb
	Kr	83	98.1		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-6

Sample Da Thursday, April 14, 2011 09:32:05

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	48113.3		ppb
-	Be	9	9	-0.00574	ppb
-	Sc	45	320029.5		ppb
>	Rh	103	574202.6		ppb
	Cd	111	3788.4	1.22883	ppb
-	Cd	114	7111.6	1.02074	ppb
>	Ho	165	995046.2		ppb
-	Pb	208	283321	6.88664	ppb
	Kr	83	356.7		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-6

Sample Da Thursday, April 14, 2011 09:34:03

Sample De CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Mear Report Unit
>	Li	6	47182.6		ppb
-	Be	9	16076.9	40.75251	ppb
-	Sc	45	309297.1		ppb
>	Rh	103	540257.3		ppb
	Cd	111	133218.1	46.81588	ppb
-	Cd	114	309045.4	48.06863	ppb
>	Ho	165	946217.5		ppb
-	Pb	208	2289303	59.22013	ppb
	Kr	83	220.4		mg/L

PerkinElmer ELAN 6100 ICP-MS

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-9

Sample Da: Thursday, April 14, 2011 09:36:01

Sample De: CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	41171.2		ppb
-	Be	9	8	-0.005	ppb
-	Sc	45	209016.8		ppb
>	Rh	103	475098.4		ppb
	Cd	111	872.6	0.32347	ppb
-	Cd	114	822.2	0.12288	ppb
>	Ho	165	833233.4		ppb
-	Pb	208	71748.5	2.01766	ppb
	Kr	83	60.6		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: 16423-9

Sample Da: Thursday, April 14, 2011 09:37:59

Sample De: CAE

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	38961.1		ppb
-	Be	9	13022	39.98509	ppb
-	Sc	45	198197.9		ppb
>	Rh	103	454364.2		ppb
	Cd	111	108463.7	44.48565	ppb
-	Cd	114	248459	45.95054	ppb
>	Ho	165	788598		ppb
-	Pb	208	1722004	53.43697	ppb
	Kr	83	30.3		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 1

Sample Da: Thursday, April 14, 2011 09:39:56

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	49363.3		ppb
-	Be	9	13.7	0.00471	ppb
-	Sc	45	248584.6		ppb
>	Rh	103	600529.8		ppb
	Cd	111	131.2	0.01606	ppb
-	Cd	114	273.4	0.01574	ppb
>	Ho	165	1035803.1		ppb
-	Pb	208	4716.2	0.0183	ppb
	Kr	83	148.7		mg/L

Method 6020 & 200.8 Metals Summary Report

Sample ID: QC Std 4

Sample Da: Thursday, April 14, 2011 09:41:52

Sample Description:

Concentration Results

	Analyte	Mass	Meas. Intens	Conc.	Meas Report Unit
>	Li	6	49192.5		ppb
-	Be	9	39297.1	95.57566	ppb
-	Sc	45	250408.8		ppb
>	Rh	103	602331.4		ppb
	Cd	111	325837.8	102.76803	ppb
-	Cd	114	760598.8	106.1594	ppb
>	Ho	165	1045279.5		ppb
-	Pb	208	4428727.4	103.78484	ppb
	Kr	83	-19483.1		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	4/12/2011	16:36:50	0.0009707			µg	4	200	0.0009707					
STD1=.004ug	4/12/2011	16:38:04	0.0006582			µg	4	200	0.0006582					
STD2=.04ug	4/12/2011	16:39:18	0.0091008			µg	4	200	0.0091008					
STD3=.08ug	4/12/2011	16:40:34	0.0161685			µg	4	200	0.0161685					
STD4=.16ug	4/12/2011	16:41:50	0.034567			µg	4	200	0.034567					
STD5=.2ug	4/12/2011	16:43:08	0.0447861			µg	4	200	0.0447861					
Reagent Blank	4/12/2011	16:44:54	2.551E-05	0.0001162	0.0001162	µg	4	200	1.421E-05	6.474E-05	6.474E-05	3.682E-05	0.0001677	0.0001677
0.004ug = DL	4/12/2011	16:46:07	0.0008277	0.0037698	0.0037698	µg	4	200	0.0008277	0.0037698	0.0037698			
0.080ug = STD.2	4/12/2011	16:47:23	0.0173078	0.0788321	0.0788321	µg	4	200	0.0173078	0.0788321	0.0788321			
0.080ug = QC STD 3	4/12/2011	16:48:42	0.0185186	0.0843473	0.0843473	µg	4	200	0.0185186	0.0843473	0.0843473			
REAGENT BLANK	4/12/2011	16:49:58	4.306E-05	0.0001961	0.0001961	µg	4	200	4.306E-05	0.0001961	0.0001961			
16423-1a	4/12/2011	16:55:23	-0.0003798	-0.0017299	-0.0864975	µg	4	200	-0.000394	-0.0017949	-0.0897458	-0.0003655	-0.0016649	-0.0832492
16423-2a	4/12/2011	16:57:09	-0.0005298	-0.0024131	-0.1206595	µg	4	200	-0.0005411	-0.0024649	-0.1232488	-0.0005184	-0.0023614	-0.1180702
16423-2a dup	4/12/2011	16:58:51	-0.0005753	-0.0026203	-0.1310184	µg	4	200	-0.000583	-0.0026557	-0.1327869	-0.0005675	-0.0025849	-0.1292498
16423-3a	4/12/2011	17:00:34	-0.0005888	-0.0026821	-0.134105	µg	4	200	-0.0005874	-0.0026757	-0.1337887	-0.0005902	-0.0026884	-0.1344214
16423-3a spk	4/12/2011	17:02:18	0.0156079	0.0710896	3.554478	µg	4	200	0.0157036	0.0715257	3.576283	0.0155121	0.0706535	3.5326731
16423-4a	4/12/2011	17:04:02	-0.0005706	-0.0025989	-0.1299487	µg	4	200	-0.0005741	-0.002615	-0.130753	-0.000567	-0.0025828	-0.1291444
0.004ug = DL	4/12/2011	17:08:44	0.0008249	0.0037573	0.0037573	µg	4	200	0.0008249	0.0037573	0.0037573			
0.080ug = STD.2	4/12/2011	17:09:59	0.0173187	0.0788817	0.0788817	µg	4	200	0.0173187	0.0788817	0.0788817			
REAGENT BLANK	4/12/2011	17:11:14	-0.0000301	-0.0001373	-0.0001373	µg	4	200	-0.0000301	-0.0001373	-0.0001373			
16423-6a	4/12/2011	17:12:59	0.002884	0.0131357	0.6567842	µg	4	200	0.0028693	0.013069	0.6534487	0.0028966	0.0132024	0.6601196
16423-6a spk	4/12/2011	17:14:45	0.0165555	0.0754057	3.7702839	µg	4	200	0.016439	0.0748753	3.7437657	0.0166719	0.075936	3.796802
16423-7a	4/12/2011	17:16:31	-0.0002823	-0.0012861	-0.0643096	µg	4	200	-0.0002881	-0.0013126	-0.06563	-0.0002765	-0.0012597	-0.0629893
16423-8a	4/12/2011	17:18:18	-0.000271	-0.0012347	-0.0617391	µg	4	200	-0.0002807	-0.0012785	-0.0639281	-0.0002614	-0.001191	-0.0595501
16423-8a dup	4/12/2011	17:20:06	-0.0002556	-0.0011645	-0.0582271	µg	4	200	-0.0002469	-0.0011249	-0.0562472	-0.0002643	-0.0012041	-0.060207
16423-9a	4/12/2011	17:21:54	-0.0001187	-0.0005407	-0.0270367	µg	4	200	-0.0001276	-0.0005812	-0.0290647	-0.0001098	-0.0005001	-0.0250088
16423-9a spk	4/12/2011	17:23:42	0.01515	0.069004	3.4501977	µg	4	200	0.0150689	0.0686349	3.4317443	0.015231	0.069373	3.4686511
16423-10a	4/12/2011	17:25:30	-0.0002745	-0.0012507	-0.0625353	µg	4	200	-0.000276	-0.0012574	-0.0628707	-0.0002731	-0.001244	-0.0622
16423-11a	4/12/2011	17:27:20	-0.0002297	-0.0010464	-0.05232	µg	4	200	-0.0002233	-0.0010174	-0.050874	-0.000236	-0.0010753	-0.0537659
16423-1b	4/12/2011	17:29:05	-0.0002504	-0.0011407	-0.1425927	µg	4	500	-0.0002542	-0.0011578	-0.1447303	-0.0002466	-0.0011236	-0.1404551
0.004ug = DL	4/12/2011	17:30:17	0.0007902	0.0035992	0.0035992	µg	4	500	0.0007902	0.0035992	0.0035992			
0.080ug = STD.2	4/12/2011	17:31:34	0.0174794	0.0796137	0.0796137	µg	4	500	0.0174794	0.0796137	0.0796137			
REAGENT BLANK	4/12/2011	17:32:50	-0.0000167	-0.0000763	-0.0000763	µg	4	500	-0.0000167	-0.0000763	-0.0000763			
16423-2b	4/12/2011	17:34:33	-0.0003327	-0.0015155	-0.1894463	µg	4	500	-0.0003402	-0.0015499	-0.1937401	-0.0003252	-0.0014812	-0.1851524
16423-2b dup	4/12/2011	17:36:16	-0.0002214	-0.0010087	-0.1260941	µg	4	500	-0.0002267	-0.0010327	-0.1290904	-0.0002162	-0.0009847	-0.1230978
16423-3b	4/12/2011	17:37:59	-0.000147	-0.0006695	-0.083697	µg	4	500	-0.0001252	-0.0005704	-0.071305	-0.0001687	-0.0007687	-0.096089
16423-3b spk	4/12/2011	17:39:43	0.0138089	0.0628957	7.861968	µg	4	500	0.0137906	0.0628125	7.8515665	0.0138272	0.062979	7.8723694
16423-4b	4/12/2011	17:41:28	-0.0002821	-0.0012853	-0.106637	µg	4	500	-0.0002731	-0.001244	-0.1555036	-0.0002912	-0.0013265	-0.1658237
16423-5b	4/12/2011	17:43:13	-0.0002191	-0.000998	-0.1247619	µg	4	500	-0.0002332	-0.0010624	-0.1328111	-0.0002049	-0.0009337	-0.1167127
16423-5b dup	4/12/2011	17:44:58	-0.000196	-0.0008929	-0.1116197	µg	4	500	-0.0002006	-0.000914	-0.1142573	-0.0001914	-0.0008718	-0.108982
16423-6b	4/12/2011	17:46:44	0.0008968	0.0040846	0.5105807	µg	4	500	0.000901	0.0041039	0.5129875	0.0008926	0.0040654	0.5081739
16423-6b spk	4/12/2011	17:48:30	0.0158198	0.072055	9.0068792	µg	4	500	0.0160097	0.0729195	9.1149431	0.01563	0.0711905	8.9888153
16423-7b	4/12/2011	17:50:17	-0.0000431	-0.0001966	-0.0245786	µg	4	500	-0.0000497	-0.0002263	-0.0282983	-0.0000366	-0.0001668	-0.0208589
0.004ug = DL	4/12/2011	17:51:32	0.0009592	0.0043689	0.0043689	µg	4	500	0.0009592	0.0043689	0.0043689			
0.080ug = STD.2	4/12/2011	17:52:48	0.0189444	0.0862867	0.0862867	µg	4	500	0.0189444	0.0862867	0.0862867			
REAGENT BLANK	4/12/2011	17:54:04	-0.0009231	-0.0042048	-0.0042048	µg	4	500	-0.0009231	-0.0042048	-0.0042048			
16423-8b	4/12/2011	17:55:50	0.0007948	0.0036201	0.4525149	µg	4	500	0.0007899	0.0035976	0.4497055	0.0007997	0.0036426	0.4553243
16423-8b dup	4/12/2011	17:57:38	4.769E-05	0.0002172	0.0271547	µg	4	500	7.752E-05	0.0003531	0.0441376	1.786E-05	8.137E-05	0.0101717
16423-9b	4/12/2011	17:59:26	-0.0001883	-0.000858	-0.1072507	µg	4	500	-0.000172	-0.0007837	-0.0979749	-0.0002046	-0.0009322	-0.1165266
16423-9b spk	4/12/2011	18:01:14	0.0198638	0.0904742	11.309272	µg	4	500	0.019893	0.0906072	11.3259	0.0198346	0.0903411	11.292643
16423-10b	4/12/2011	18:02:59	-0.0000881	-0.0004015	-0.0501908	µg	4	500	-0.0000636	-0.00029	-0.0362565	-0.0001126	-0.000513	-0.064125
16423-11b	4/12/2011	18:04:41	-0.0001386	-0.0006313	-0.0789126	µg	4	500	-0.000109	-0.0004966	-0.0620809	-0.0001681	-0.0007659	-0.0957443
Sample002	4/12/2011	18:14:40	0.000696	0.0031699	0.0031699	µg	4	500	0.000696	0.0031699	0.0031699			
Sample002	4/12/2011	18:16:31	0.0022232	0.0101259	0.0101259	µg	4	500	0.0022068	0.0100516	0.0100516	0.0022395	0.0102002	0.0102002
Sample008	4/12/2011	18:18:36	0.0182617	0.0831772	0.0831772	µg	4	500	0.0184063	0.0838357	0.0818172	0.0181172	0.0825186	0.0825186
Sample001	4/12/2011	18:20:23	-0.000941	-0.0042861	-0.0042861	µg	4	500	-0.0009312	-0.0042418	-0.0042418	-0.0009507	-0.0043304	-0.0043304
Calib Blank	4/13/2011	10:11:52	0.0012285			µg			0.0012285					
STD1=.004ug	4/13/2011	10:13:08	0.0010615			µg			0.0010615					
STD2=.04ug	4/13/2011	10:14:23	0.0108037			µg			0.0108037					
STD3=.08ug	4/13/2011	10:15:40	0.0239361			µg			0.0239361					
STD4=.16ug	4/13/2011	10:16:58	0.0423314			µg			0.0423314					
STD5=.2ug	4/13/2011	10:18:17	0.0530911			µg			0.0530911					
Reagent Blank	4/13/2011	10:20:05	0.0000178	6.632E-05	6.632E-05	µg			7.075E-05	0.0002635	0.0002635	-0.0000351	-0.0001308	-0.0001308
0.004ug = DL	4/13/2011	10:21:19	0.0010236	0.0038118	0.0038118	µg			0.0010236	0.0038118	0.0038118			
0.080ug = STD.2	4/13/2011	10:22:35	0.021214	0.0790014	0.0790014	µg			0.021214	0.0790014	0.0790014			
REAGENT BLANK	4/13/2011	10:23:53	6.097E-05	0.0002271	0.0002271	µg			6.097E-05	0.0002271	0.0002271			
0.080ug = QC STD 3	4/13/2011	10:25:10	0.0207817	0.0773915	0.0773915	µg			0.0207817	0.0773915	0.0773915			
REAGENT BLANK	4/13/2011	10:26:27	4.561E-05	0.0001699	0.0001699	µg			4.561E-05	0.0001699	0.0001699			
16423-1c	4/13/2011	10:28:13	-0.0000511	-0.0001903	-0.0190375	µg	4	400	-0.0000484	-0.0001803	-0.0180306	-0.0000538	-0.0002004	-0.0200444
16423-2c	4/13/2011	10:29:59	-0.000137	-0.0005104	-0.0510488	µg	4	400	-0.0001268	-0.0004723	-0.0472315	-0.0001473	-0.0005486	-0.0548662
16423-2c dup	4/13/2011	10:31:46	1.481E-05	5.518E-05	0.0055183	µg	4	400	3.299E-05	0.0001229	0.0122875	-0.0000033	-0.0000125	-0.0012509
16423-3c	4/13/2011	10:33:34	-0.0001012	-0.0003771	-0.0377122	µg	4	400	-0.0001054	-0.0003928	-0.0392834	-0.0		

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
0.004ug = DL	4/13/2011	10:45:44	0.0010695	0.0039827	0.0039827	µg	4	400	0.0010695	0.0039827	0.0039827			
0.080ug = STD.2	4/13/2011	10:47:01	0.0215914	0.0804069	0.0804069	µg	4	400	0.0215914	0.0804069	0.0804069			
REAGENT BLANK	4/13/2011	10:48:18	0.0000485	0.0001806	0.0001806	µg	4	400	0.0000485	0.0001806	0.0001806			
16423-7c	4/13/2011	10:50:04	0.0002696	0.0010041	0.1004079	µg	4	400	0.0002386	0.0008886	0.0888618	0.0003006	0.0011195	0.1119541
16423-8c	4/13/2011	10:51:50	0.0001104	0.0004112	0.0411158	µg	4	400	0.0001105	0.0004116	0.0411554	0.0001103	0.0004108	0.0410763
16423-8c dup	4/13/2011	10:53:36	4.179E-05	0.0001556	0.0155644	µg	4	400	5.521E-05	0.0002056	0.0205604	2.837E-05	0.0001057	0.0105683
16423-9c	4/13/2011	10:55:23	-0.0000462	-0.0001722	-0.0172268	µg	4	400	-0.0000482	-0.0001798	-0.0179884	-0.0000442	-0.0001646	-0.0164673
16423-9c spk	4/13/2011	10:57:11	0.020268	0.0754786	7.5478552	µg	4	400	0.0204874	0.0762955	7.6295517	0.0200486	0.0746616	7.4661587
0.004ug = DL	4/13/2011	11:07:35	0.0011022	0.0041046	0.0041046	µg	0.1	100	0.0011022	0.0041046	0.0041046			
0.080ug = STD.2	4/13/2011	11:08:51	0.0219895	0.0818895	0.0818895	µg	0.1	100	0.0219895	0.0818895	0.0818895			
REAGENT BLANK	4/13/2011	11:10:09	1.785E-05	6.647E-05	6.647E-05	µg	0.1	100	1.785E-05	6.647E-05	6.647E-05			
Calib Blank	4/14/2011	14:38:33	0.0009523			µg			0.0009523					
STD1=.004ug	4/14/2011	14:39:48	0.0016703			µg			0.0016703					
STD2=.04ug	4/14/2011	14:41:04	0.0130846			µg			0.0130846					
STD3=.08ug	4/14/2011	14:42:21	0.0247591			µg			0.0247591					
STD4=.16ug	4/14/2011	14:43:39	0.0486421			µg			0.0486421					
STD5=.2ug	4/14/2011	14:44:57	0.0595342			µg			0.0595342					
Reagent Blank	4/14/2011	14:46:45	-0.0000345	-0.0001144	-0.0001144	µg			1.505E-05	4.991E-05	4.991E-05	-0.0000841	-0.0002788	-0.0002788
0.004ug = DL	4/14/2011	14:50:27	0.0011615	0.0038502	0.0038502	µg			0.0011615	0.0038502	0.0038502			
0.080ug = STD.2	4/14/2011	14:51:44	0.025751	0.085359	0.085359	µg			0.025751	0.085359	0.085359			
0.080ug = QC STD 3	4/14/2011	14:53:04	0.0254122	0.084236	0.084236	µg			0.0254122	0.084236	0.084236			
REAGENT BLANK	4/14/2011	14:54:21	-0.000078	-0.0002586	-0.0002586	µg			-0.000078	-0.0002586	-0.0002586			
16423-lrb	4/14/2011	14:56:07	0.0001181	0.0003915	0.0097883	µg	4	100	8.327E-05	0.000276	0.0069006	0.000153	0.000507	0.012676
16423-lrb spk	4/14/2011	14:57:53	0.0206029	0.068294	4.2683777	µg	1.6	100	0.0206269	0.0683737	4.2733571	0.0205788	0.0682144	4.2633984
16423-1fh	4/14/2011	14:59:40	0.0012254	0.0040619	0.1015466	µg	4	100	0.0012203	0.004045	0.1011257	0.0012305	0.0040787	0.1019675
16423-2fh	4/14/2011	15:01:28	-0.0000118	-0.0000394	-0.0009859	µg	4	100	-0.0009105	-0.0030182	-0.0754563	0.0008867	0.0029394	0.0734845
16423-2fh dup	4/14/2011	15:03:17	0.0007221	0.0023935	0.059837	µg	4	100	0.0006801	0.0022543	0.0563585	0.000764	0.0025326	0.0633155
16423-3fh	4/14/2011	15:05:07	0.0008438	0.002797	0.0699244	µg	4	100	0.0008975	0.0029749	0.0743724	0.0007901	0.0026191	0.0654764
126423-3fh spk	4/14/2011	15:06:58	0.0272925	0.0904685	2.2617128	µg	4	100	0.0272886	0.0904558	2.2613953	0.0272963	0.0904812	2.2620303
16423-4fh	4/14/2011	15:08:50	0.0007563	0.0025069	0.062673	µg	4	100	0.0007708	0.0025551	0.0638785	0.0007417	0.0024587	0.0614676
16423-5fh	4/14/2011	15:10:38	0.0010541	0.0034941	0.073526	µg	4	100	0.0011165	0.003701	0.0925244	0.0009917	0.0032872	0.0821808
16423-5fh dup	4/14/2011	15:12:23	0.0006695	0.0022192	0.0554812	µg	4	100	0.0007018	0.0023262	0.0581545	0.0006372	0.0021123	0.0528078
0.004ug = DL	4/14/2011	15:13:37	0.0011208	0.0037152	0.0037152	µg	4	100	0.0011208	0.0037152	0.0037152			
0.080ug = STD.2	4/14/2011	15:14:54	0.0263182	0.0872391	0.0872391	µg	4	100	0.0263182	0.0872391	0.0872391			
REAGENT BLANK	4/14/2011	15:16:11	7.285E-05	0.0002415	0.0002415	µg	4	100	7.285E-05	0.0002415	0.0002415			
16423-6fh	4/14/2011	15:17:57	0.0005764	0.0019106	0.0477647	µg	4	100	0.0007013	0.0023245	0.0581126	0.0004515	0.0014967	0.0374168
16423-6fh spk	4/14/2011	15:19:43	0.0261359	0.0866096	2.165873	µg	4	100	0.0261283	0.0866096	2.1652404	0.0261436	0.0866602	2.1665055
16423-7fh	4/14/2011	15:21:29	0.0007654	0.0025373	0.0634322	µg	4	100	0.0007651	0.0025362	0.0634038	0.0007658	0.0025384	0.0634606
16423-8fh	4/14/2011	15:23:16	0.0014143	0.0046883	0.1172064	µg	4	100	0.001402	0.0046473	0.1161829	0.0014267	0.0047292	0.11823
16423-8fh dup	4/14/2011	15:25:04	0.0011688	0.0038745	0.0968616	µg	4	100	0.0011659	0.0038647	0.0966169	0.0011718	0.0038842	0.0971062
16423-9fh	4/14/2011	15:26:52	0.0005118	0.0016966	0.042416	µg	4	100	0.0005122	0.0016978	0.0424457	0.0005115	0.0016955	0.0423863
16423-9fh spk	4/14/2011	15:28:40	0.023834	0.0790044	1.9751109	µg	4	100	0.0238118	0.0789308	1.9732694	0.0238562	0.0790781	1.9769525
16423-10fh	4/14/2011	15:30:29	0.0006951	0.0023304	0.0575998	µg	4	100	0.0007164	0.0023748	0.0583702	0.0006737	0.0022332	0.0558293
16423-11fh	4/14/2011	15:32:19	0.0005031	0.0016676	0.0416892	µg	4	100	0.0004736	0.0015699	0.0392468	0.0005325	0.0017653	0.0441316
16423-1bh	4/14/2011	15:34:09	0.003395	0.0112535	2.0537674	µg	4	730	0.0035121	0.0116419	2.1246399	0.0032778	0.0108652	1.9828949
0.004ug = DL	4/14/2011	15:35:25	0.0011724	0.0038864	0.0038864	µg	4	730	0.0011724	0.0038864	0.0038864			
0.080ug = STD.2	4/14/2011	15:36:42	0.0264138	0.0875558	0.0875558	µg	4	730	0.0264138	0.0875558	0.0875558			
REAGENT BLANK	4/14/2011	15:37:59	9.023E-05	0.0002991	0.0002991	µg	4	730	9.023E-05	0.0002991	0.0002991			
16423-2bh	4/14/2011	15:39:47	0.0030917	0.0102482	1.8062462	µg	4	705	0.0030992	0.0102731	1.8106257	0.0030842	0.0102234	1.8018667
16423-2bh dup	4/14/2011	15:41:38	0.0035965	0.0119216	2.1011741	µg	4	705	0.0036587	0.0121279	2.1375471	0.0035342	0.0117152	2.0648011
16423-3bh	4/14/2011	15:43:30	0.0033433	0.0110822	2.0363586	µg	4	735	0.0033168	0.0109979	2.0208564	0.0033687	0.0111666	2.0518609
16423-3bh spk	4/14/2011	15:45:18	0.0318736	0.1056539	19.413903	µg	4	735	0.0319331	0.1058513	19.450169	0.031814	0.1054565	19.377637
16423-4bh	4/14/2011	15:47:02	0.0028859	0.0095661	1.6142731	µg	4	675	0.0028196	0.0093462	1.5771796	0.0029522	0.0097859	1.6513666
16423-6bh	4/14/2011	15:52:20	0.0033095	0.0109702	1.9197937	µg	4	700	0.0033207	0.0110075	1.9263094	0.0032983	0.010933	1.9132781
16423-6bh spk	4/14/2011	15:54:06	0.0272748	0.0904101	15.821769	µg	4	700	0.0275023	0.0911642	15.953471	0.0270473	0.089656	15.689798
16423-7bh	4/14/2011	15:55:53	0.004171	0.013826	2.3158623	µg	4	670	0.0041548	0.0137724	2.3068761	0.0041872	0.0138797	2.3248485
0.004ug = DL	4/14/2011	15:57:08	0.0011963	0.0039654	0.0039654	µg	4	670	0.0011963	0.0039654	0.0039654			
0.080ug = STD.2	4/14/2011	15:59:44	0.0262159	0.0869001	0.0869001	µg	4	670	0.0262159	0.0869001	0.0869001			
REAGENT BLANK	4/14/2011	16:01:01	0.0001059	0.0003511	0.0003511	µg	4	670	0.0001059	0.0003511	0.0003511			
16423-8bh	4/14/2011	16:02:48	0.0045878	0.0152076	2.5092509	µg	4	660	0.0046419	0.015387	2.5388473	0.0045337	0.0150282	2.4796544
16423-8bh dup	4/14/2011	16:04:36	0.0047797	0.0158437	2.6142045	µg	4	660	0.0047237	0.0156582	2.5835973	0.0048357	0.0160292	2.6448116
16423-9bh	4/14/2011	16:06:24	0.0045096	0.0149483	2.5785828	µg	4	690	0.0045077	0.014942	2.5774892	0.0045115	0.0149546	2.5796763
16423-9bh spk	4/14/2011	16:08:12	0.0279104	0.0925168	15.959153	µg	4	690	0.027789	0.0921146	15.889768	0.0280317	0.0929191	16.028537
16423-10bh	4/14/2011	16:10:01	-0.0001057	-0.0003504	-0.0262845	µg	4	300	-0.0001096	-0.0003636	-0.0272721	-0.0001017	-0.0003372	-0.0252969
16423-11bh	4/14/2011	16:11:51	0.0003112	0.0010315	0.0505444	µg	4	196	0.0002507	0.0008309	0.040716	0.0003717	0.0012321	0.0603729
0.004ug = DL	4/14/2011	16:20:25	0.0011513	0.0038164	0.0038164	µg	4	200	0.0011513	0.0038164	0.0038164			
0.080ug = STD.2	4/14/2011	16:21:42	0.0262387	0.0869754	0.0869754	µg	4	200	0.0262387	0.0869754	0.0869754			
REAGENT BLANK	4/14/2011	16:22:59	8.235E-05	0.000273	0.000273	µg	4	200	8.235E-05	0.000273	0.000273			
Calib Blank	4/15/2011	11:51:22	0.0010767			µg	4	500	0.0010767					
STD1=.004ug	4/15/2011	11:52:37	0.0012342			µg	4	500	0.0012342					
STD2=.04ug	4/15													

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	4/15/2011	12:07:51	-0.0000325	-0.0001006	-0.0001006	µg	4	500	-0.0000325	-0.0001006	-0.0001006			
0.004ug = DL	4/15/2011	12:27:07	0.0013	0.0040138	0.0040138	µg	0.5	1	0.0013	0.0040138	0.0040138			
0.080ug = STD.2	4/15/2011	12:28:24	0.0254803	0.0786732	0.0786732	µg	0.5	1	0.0254803	0.0786732	0.0786732			
REAGENT BLANK	4/15/2011	12:29:41	-0.0000157	-0.0000485	-0.0000485	µg	0.5	1	-0.0000157	-0.0000485	-0.0000485			
16423-11c	4/15/2011	12:40:25	-0.0000098	-0.0000303	-0.0030383	µg	4	400	1.41E-06	4.36E-06	0.000436	-0.000021	-0.0000651	-0.0065126
16423-5a	4/15/2011	12:42:14	0.000869	0.0020656	0.103281	µg	4	200	0.0006965	0.0021505	0.1075256	0.0006415	0.0019807	0.0990365
16423-5a dup	4/15/2011	12:44:04	0.0006515	0.0020116	0.1005816	µg	4	200	0.0006598	0.0020373	0.1018646	0.0006432	0.001986	0.0992986
0.004ug = DL	4/15/2011	12:49:01	0.0013488	0.0041646	0.0041646	µg	4	100	0.0013488	0.0041646	0.0041646			
0.080ug = STD.2	4/15/2011	12:50:18	0.0258651	0.0798614	0.0798614	µg	4	100	0.0258651	0.0798614	0.0798614			
REAGENT BLANK	4/15/2011	12:51:34	0.000014	4.325E-05	4.325E-05	µg	4	100	0.000014	4.325E-05	4.325E-05			

Wheelabrator South Broward, Inc.
 Clean Air Project No: 11182
 Unit 1 FF Outlet

USEPA Method 13B Fluoride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 28	Mar 28	Mar 28
Start Time (approx.)		12:03	13:33	15:02
Stop Time (approx.)		13:12	14:44	16:11

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg F⁻/liter) 0.0090

HF as Total Fluoride
 B_F Blank concentration (mg F⁻/liter) <0.0470

S _{F-1}	Fraction 1 concentration (mg F ⁻ /liter)	<0.0470	<0.0470	<0.0470
S _{F-2}	Fraction 2 concentration (mg F ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	873.0	860.0	825.0
v ₂	Fraction 2 sample volume (ml)			
m _{HF}	HF collected before blank subtraction (mg)	<0.0432	<0.0426	<0.0408
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HF collected after blank subtraction (mg)	<0.0432	<0.0426	<0.0408
m _{MDL}	Minimum detectable HF (mg)	0.0083	0.0082	0.0078
m _n	Total HF used in emission calculations (mg)	<0.0432	<0.0426	<0.0408

042611 122719
I

Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Method 13B Fluoride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 29	Mar 29	Mar 29
Start Time (approx.)		13:21	14:49	16:11
Stop Time (approx.)		14:30	15:57	17:23

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg F⁻/liter) 0.0090

HF as Total Fluoride

B_F Blank concentration (mg F⁻/liter) <0.0470

S _{F-1}	Fraction 1 concentration (mg F ⁻ /liter)	<0.0470	<0.0470	<0.0470
S _{F-2}	Fraction 2 concentration (mg F ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	770.0	800.0	827.0
v ₂	Fraction 2 sample volume (ml)			
m _{HF}	HF collected before blank subtraction (mg)	<0.0381	<0.0396	<0.0409
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HF collected after blank subtraction (mg)	<0.0381	<0.0396	<0.0409
m _{MDL}	Minimum detectable HF (mg)	0.0073	0.0076	0.0078
m _n	Total HF used in emission calculations (mg)	<0.0381	<0.0396	<0.0409

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Q

Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Method 13B Fluoride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 30	Mar 30	Mar 30
Start Time (approx.)		11:40	13:04	14:26
Stop Time (approx.)		12:47	14:12	15:30

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg F⁻/liter) 0.0090

HF as Total Fluoride
B_F Blank concentration (mg F⁻/liter) <0.0470

S _{F-1}	Fraction 1 concentration (mg F ⁻ /liter)	<0.0470	<0.0470	<0.0470
S _{F-2}	Fraction 2 concentration (mg F ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	785.0	809.0	830.0
v ₂	Fraction 2 sample volume (ml)			
m _{HF}	HF collected before blank subtraction (mg)	<0.0389	<0.0400	<0.0411
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HF collected after blank subtraction (mg)	<0.0389	<0.0400	<0.0411
m _{MDL}	Minimum detectable HF (mg)	0.0074	0.0077	0.0079
m _n	Total HF used in emission calculations (mg)	<0.0389	<0.0400	<0.0411

042611 122740
M



Laboratory Analysis for Anions

Performed For:
Palatine Engineering Group
500 West Wood Street
Palatine, IL 60067

Customer Reference No: 11182
Laboratory Project No: 28695

Revision 0 - Dated: 04/05/2011

To the best of our knowledge, the data presented in this report are accurate, complete, error free, legible and representative of the samples received by the laboratory.

Digitally signed
by Eric Ewing
Date: 2011.04.05
16:26:35 -05'00'

Eric Ewing
Title: Analyst
email: eewing@cleanair.com
Ph: 847-654-4519

Digitally signed by
Douglas D. Rhoades
Date: 2011.04.05
16:30:41 -05'00'

Douglas D. Rhoades
Title: Team Leader
email: drhoades@cleanair.com
Ph: 847-654-4504



CERTIFICATE OF ANALYSIS
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Laboratory Sample Identification Number	Sample Identification	Sample Volume (mL)	Fluoride Sample Conc. (mg/L)	Method Detection Limit (mg/L)	Method Reporting Limit (mg/L)
Reagent Blank					
28695-01	DI + Filter Blank	300	<	0.009	0.047
Unit 1 FF Outlet					
28695-02	C&R R1	873	<	0.009	0.047
28695-03	C&R R2	860	<	0.009	0.047
28695-04	C&R R3	825	<	0.009	0.047
Unit 2 FF Outlet					
28695-05	C&R R1	770	<	0.009	0.047
28695-06	C&R R2	800	<	0.009	0.047
28695-07	C&R R3	827	<	0.009	0.047
Unit 3 FF Outlet					
28695-08	C&R R1	785	<	0.009	0.047
28695-09	C&R R2	809	<	0.009	0.047
28695-10	C&R R3	830	<	0.009	0.047

Analysis Case Narrative

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Summary of Analysis

This report summarizes the results of the analysis performed on samples received on: 04/04/11
 The samples were analyzed 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 AS-14 column, 4.5mM/1.4mM sodium carbonate/bicarbonate eluent, and 50mN 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 Method Reporting Limit (MRL) was determined by multiplying the Method Detection Limit (MDL) by a factor of 5. Values between these limits were quantified, but should be used with discretion as they were below the MRL. 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 included on the calibration page of this report and may also be found in Table 1 below. In addition, the dilution scheme used for the preparation of standards has been included in this report.

Table 1: Standard Lot Numbers Used For Analysis

Standard Type	Lot Number	Concentration of Analyte
Stock Standard	03181102-64-00000-01	502.53 mg/L
QC Standard	03181102-64-00000-02	138.36 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
4/3/2011	04011102-64-00000-02	1051-64-00000-01
4/4/2011	04011102-64-00000-02	1051-64-00000-01

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 performed. The pre test calibration and post test calibration average peak area for any standard must agree within $\pm 5\%$ of any observed area.

Analysis Case Narrative

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

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 purpostfully left blank as no data was acquired 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 Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

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.

Clean Air Laboratory Services is accredited by NELAP in the following states. Please visit the NELAP website to view our current status and a comprehensive list of our accredited services.

Table 3: Specific NELAC Accreditation and Expiration Date

State	Certificate Number	Expiration Date
Texas	T104704431-10-1	6/30/2011
New Jersey	IL004	6/30/2011
Louisiana	169249	6/30/2011

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Stock Standard: 502.53 mg/L
 Working Stock Conc.: 5.0253 mg/L
 CCV: 0.50 mg/L
 QC: 138.36 mg/L

Analyte:

		Fluoride Standards Calibration Data						
Calibration Point Conc. (mg/L)	Date of Injection	1 0.0000	2 0.0754	3 0.2010	4 0.4020	5 0.6282	6 1.0051	7 1.2563
Cal 1 Trial 1	04/03/2011	0.0000	0.0773	0.1891	0.3533	0.5261	0.8185	1.0124
Cal 1 Trial 2		0.0000	0.0767	0.1885	0.3575	0.5271	0.8112	1.0188
Cal 2 Trial 1	04/04/2011			0.1851	0.3445			
Cal 2 Trial 2				0.1857	0.3511			
Cal 3 Trial 1	04/05/2011		0.0756	0.1929	0.3446	0.5327	0.8271	1.0063
Cal 3 Trial 2			0.0788	0.1896	0.3586	0.5263	0.8369	1.0198

n	2	4	6	6	4	4	4
Average	0.0000	0.0771	0.1885	0.3516	0.5281	0.8234	1.0143
Standard Deviation	0.0000	0.0013	0.0028	0.0061	0.0031	0.0111	0.0063
%RSD	0.00	1.73	1.51	1.74	0.59	1.35	0.62

Measured Area Counts (Counts)	Actual Concentration (mg/L)	Regression Concentration (mg/L)	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	-0.022	1.78%	Yes	0.00%	Yes
0.0771	0.075	0.074	0.11%	Yes	1.91%	Yes
0.1885	0.201	0.213	-0.95%	Yes	-5.96%	Yes
0.3516	0.402	0.417	-1.16%	Yes	-3.64%	Yes
0.5281	0.628	0.637	-0.70%	Yes	-1.40%	Yes
0.8234	1.005	1.006	-0.05%	Yes	-0.06%	Yes
1.0143	1.256	1.244	0.98%	Yes	0.98%	Yes

Regression Constants

Slope m = 1.2485
 Intercept b = -0.0223
 Coeff. R² = 0.9992

Is Coefficient
of Regression
> 0.995?
Yes

Stock Solution Standard Mixing Recipe (Anions)

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Order of Elution

Analyte	8	9	10	11	12	13	14	15
Analyte Weight (g/g-mole)	Fluoride	Chloride	Nitrite	Bromide	Nitrate	Phosphate	Sulfate	Iodide
Solid Formula	NaF	NaCl	NaNO ₂	NaBr	NaNO ₃	Na ₂ HPO ₄	Na ₂ SO 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%	60.68%	66.68%	77.66%	72.95%	66.90%	67.63%	84.66%

Recommended 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

0.5553 g	0.8332 g	1.9331 g					

Actual Concentration (mg/L)

502.53	1010.85	3002.33					

Concentration in the Five Cal Flasks (mg/L)**Stock (1 liter Flask) Solution Concentrations**

10 ml Original Solution Used	5.0253	10.1085	30.0233				

Dilution Flask Size**Aliquot Stock**

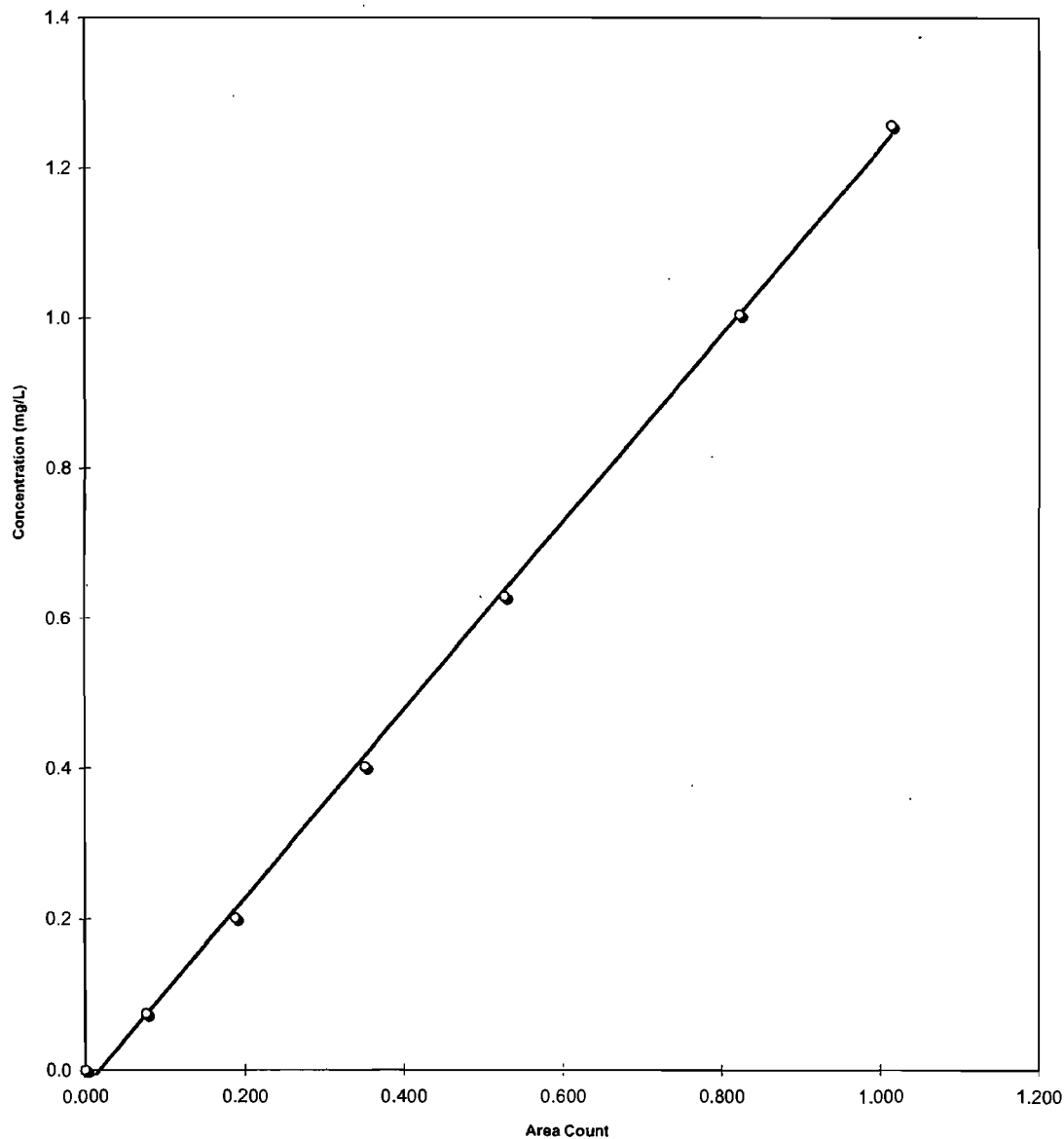
200	3	0.0754	0.1516	0.4503			
250	10	0.2010	0.4043	1.2009			
250	20	0.4020	0.8087	2.4019			
200	20	0.5025	1.0108	3.0023			
200	25	0.6282	1.2636	3.7529			
100	20	1.0051	2.0217	6.0047			
200	50	1.2563	2.5271	7.5058			

1
2
3
CCV
4
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CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Fluoride Calibration Curve



Sample Information

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Sample Identification			Sample Identification	Sample Recovery		Field Tech	Sample Volume (mL)
Number	Sample Location	Run No.		Date			
28695-01	Blank	RB	DI + Filter Blank	3/28/2011		RV	300
28695-02	Unit 1 FF Outlet	1	C&R R1	3/28/2011		RV	873
28695-03	Unit 1 FF Outlet	2	C&R R2	3/28/2011		RV	860
28695-04	Unit 1 FF Outlet	3	C&R R3	3/28/2011		DL	825
28695-05	Unit 2 FF Outlet	1	C&R R1	3/29/2011		DL	770
28695-06	Unit 2 FF Outlet	2	C&R R2	3/29/2011		DL	800
28695-07	Unit 2 FF Outlet	3	C&R R3	3/29/2011		DL	827
28695-08	Unit 3 FF Outlet	1	C&R R1	3/30/2011		RV	785
28695-09	Unit 3 FF Outlet	2	C&R R2	3/30/2011		RV	809
28695-10	Unit 3 FF Outlet	3	C&R R3	3/30/2011		RV	830

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

MDL=	0.008 mg/L	Average Flow Rate 0.80 mL/min
MRL=	0.047 mg/L	

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 _{tot} (Total Sample Volume, mL)	C _{reg} (Concentration, mg/L from Reg Curve)	M _{analyte} Total Amount of Analyte (mg)
Blank	28695-01	DI + Filler Blank	04/04/11	0.0000	0.0000	0.0000	1	300.0	<	<0.014
Unit 1 FF Outlet	28695-02	C&R R1	04/04/11	0.0000	0.0000	0.0000	1	873.0	<	<0.041
Unit 1 FF Outlet	28695-03	C&R R2	04/04/11	0.0000	0.0000	0.0000	1	880.0	<	<0.040
Unit 1 FF Outlet	28695-04	C&R R3	04/04/11	0.0000	0.0000	0.0000	1	825.0	<	<0.039
Unit 2 FF Outlet	28695-05	C&R R1	04/04/11	0.0000	0.0000	0.0000	1	770.0	<	<0.036
Unit 2 FF Outlet	28695-06	C&R R2	04/04/11	0.0000	0.0000	0.0000	1	800.0	<	<0.037
Unit 2 FF Outlet	28695-07	C&R R3	04/04/11	0.0000	0.0000	0.0000	1	827.0	<	<0.039
Unit 3 FF Outlet	28695-08	C&R R1	04/04/11	0.0000	0.0000	0.0000	1	785.0	<	<0.037
Unit 3 FF Outlet	28695-09	C&R R2	04/04/11	0.0000	0.0000	0.0000	1	809.0	<	<0.038
Unit 3 FF Outlet	28695-10	C&R R3	04/05/11	0.0000	0.0000	0.0000	1	830.0	<	<0.039

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

QUALITY CONTROL CHECKS

Sample Location	Sample Identification Number	Sample Identification	Date of Injection	Area Counts		Area Count Average	Area Count Duplicate Difference	Duplicate Relative Difference (%)	Is Duplicate Difference < 5%?
				Trial 1	Trial 2				
Blank	28695-01	DI + Filter Blank	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 1 FF Outlet	28695-02	C&R R1	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 1 FF Outlet	28695-03	C&R R2	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 1 FF Outlet	28695-04	C&R R3	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 2 FF Outlet	28695-05	C&R R1	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 2 FF Outlet	28695-06	C&R R2	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 2 FF Outlet	28695-07	C&R R3	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 3 FF Outlet	28695-08	C&R R1	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 3 FF Outlet	28695-09	C&R R2	04/04/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 3 FF Outlet	28695-10	C&R R3	04/05/11	0.0000	0.0000	0.0000	na	na	Yes

CHROMATOGRAPHIC DATA REDUCTION

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:		U.S. EPA Method 26A		Analyte:	
				Fluoride	

CCV Concentration: 0.50 mg/L
 QC Concentration: 138.36 mg/L

MDL=	0.009 mg/L
MRL=	0.047 mg/L

QC Dilution Factor
200

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	28695-00	CCB	04/03/11	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28695-990	CCV	04/03/11	0.4177	0.4308	0.4243	0.0131	3.1%	0.51	0.96%	Yes
CleanAir	28695-991	QC	04/04/11	0.5769	0.5628	0.5699	0.0141	2.5%	137.83	0.39%	Yes
CleanAir	28695-00	CCB	04/05/11	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28695-992	CCV	04/05/11	0.4149	0.4071	0.4110	0.0078	1.9%	0.49	2.33%	Yes

Matrix Spike Recoveries

									Precision	Spike Recovery	Is Spike Recovery Between 90-110%
Matrix Spike	28695-05	C&R R1	04/05/11	0.4979	0.4882	0.4931	0.0097	2.0%		97.2%	Yes
Matrix Spike	28695-05	C&R R1	04/05/11	0.4941	0.4948	0.4945	0.0007	0.1%	0.3%	97.5%	Yes

Determination of Method Detection Limit

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A				
				Analyte:	Fluoride

MDL Reference		40 CFR 136, Appendix B	Non-Iterative Study		
CleanAir Reference		SOP EPA5-11			
Matrix		Deionized Water			
Analyte		Fluoride			
Spike Concentration		0.0754 mg/L			
Slope		1.2485			
Intercept		-0.0223			
Coefficient of Corr.		0.9992			
			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	0.0831	0.081
2	0.0813	0.079
3	0.0773	0.074
4	0.0767	0.073
5	0.0797	0.077
6	0.0777	0.075
7	0.0756	0.072
8	0.0788	0.076

Average Spike Concentration:	0.076	Is the spike level higher than the MDL?	Yes
Recovery (R_s):	100.97%	Does the spike level exceed ten times the MDL?	No
Standard Deviation (S_d):	0.00312	Is the Avg Recovery between 90% < R_s < 110%?	Yes
RMS Deviation:	4.1%		
$t_{(n-1, 0.99)}$:	2.998		
MDL:	0.009		
MRL:	0.047		

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Fluoride

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

1. Difference between duplicate injections for pre-test calibration (Pre Cal 1).

$$\Delta_{Injection} = |Area_{Trial\ 2} - Area_{Trial\ 1}|$$

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

$$\Delta_{Injection} = 0.0006$$

$$Area_{Trial2} = 0.1885$$

$$Area_{Trial1} = 0.1891$$

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)

$$Avg_{Inj} = 0.1888$$

$$Area_{Trial2} = 0.1885$$

$$Area_{Trial1} = 0.1891$$

Sample Calculations

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

3. Difference between individual injection and average area count for pre-test calibration.

$$\Delta_{PreMean\%} = \frac{|Area_{Trial2} - Avg_{PreInj}|}{Avg_{PreInj}} 100$$

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)

$$\Delta_{PreMean\%} = 0.1592$$

$$Avg_{PreInj} = 0.1888$$

$$Area_{Trial2} = 0.1885$$

Note: EPA Method 26 requires $\Delta_{PreMean\%}$ to be less than 5%.

4. Average of all area count values for a given calibration point.

$$\bar{X} = \frac{\sum_{i=1}^n x_i}{n}$$

Where:

$\bar{X}$ = 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.

$$\bar{X} = 0.1885$$

$$x_1 = 0.1891$$

$$x_2 = 0.1885$$

$$n = 6$$

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Fluoride	

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

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.

$\overline{Y}_{All}$ = 0.5097
 y_1 = 0.0000
 y_2 = 0.0754
 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.

$\overline{X}_{All}$ = 0.4337
 x_1 = 0.1891
 x_2 = 0.1885
 n = 30

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Fluoride	

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

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 = $\bar{X}_{All}$
 y_i = Actual area concentration values for each individual injection.
 $\bar{y}$ = Average of all concentration values = $\bar{Y}_{All}$
 i = Iteration value.
 n = Number of injections.

m = 1.24848
 x_1 = 0.1891
 x_2 = 0.1885
 $\bar{x}$ = 0.4337
 y_1 = 0.0000
 y_2 = 0.0754
 $\bar{y}$ = 0.5097
 n = 30

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 = $\bar{X}_{All}$
 $\bar{y}$ = Average of all concentration values = $\bar{Y}_{All}$
 b = -0.02232
 m = 1.24848
 $\bar{x}$ = 0.4337
 $\bar{y}$ = 0.5097

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Fluoride

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

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	=	0.99921
r	=	0.99960
x_1	=	0.1891
x_2	=	0.1885
$\bar{x}$	=	0.4337
y_1	=	0.0000
y_2	=	0.0754
$\bar{y}$	=	0.5097
n	=	30

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Fluoride

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

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} = 0.0000

$Area_{Trial2}$ = 0.0000

$Area_{Trial1}$ = 0.0000

11. Difference between duplicate injections for the sample.

$$\Delta_{Injection} = |Area_{Trial2} - Area_{Trial1}|$$

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

$\Delta_{Injection}$ = 0.0000

$Area_{Trial2}$ = 0.0000

$Area_{Trial1}$ = 0.0000

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Fluoride

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

12. Difference between individual injection and average area count for the sample.

$$\Delta_{Injection} = \frac{|Area_{Trial2} - Avg_{Inj}|}{Avg_{Inj}} 100$$

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)

$\Delta_{Injection}$ = na

Avg_{Inj} = 0.0000

$Area_{Trial2}$ = 0.0000

Note: EPA Method 26 requires $\Delta_{Injection}$ to be less than 5%.

13. Determination of sample concentration from least-squares regression curve (mg/L).

$$C_{Reg} = DF [m(Avg_{Inj}) + b]$$

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} = <

DF = 1

Avg_{Inj} = 0.0000

m = 1.2485

b = -0.0223

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Fluoride

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

14. Determination of total amount of analyte in sample (total mg).

$$M_{\text{Analyte}} = \frac{(C_{\text{Reg}})(V_{\text{Soln}})}{1000}$$

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} = <0.040
 C_{Reg} = <
 V_{Soln} = 860.0

15. Determination of Detection Limits.

15a. Determination of average spike result.

$$\text{Avg}M_{f-i} = \frac{\sum_{i=1}^n M_{f-i}}{n}$$

Where:

$\text{Avg}M_{f-i}$ = 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.

$\text{Avg}M_{f-i}$	=	0.076			
M_{f-1}	=	0.081	M_{f-5}	=	0.077
M_{f-2}	=	0.079	M_{f-6}	=	0.075
M_{f-3}	=	0.074	M_{f-7}	=	0.072
M_{f-4}	=	0.073	M_{f-8}	=	0.076
n	=	8			

Sample Calculations

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

15b. Determination of standard deviation of spike result.

$$\sigma_{f-i} = \sqrt{\frac{\sum_{i=1}^n (M_{f-i} - \text{Avg}M_{f-i})^2}{(n-1)}}$$

Where:

σ_{f-i} = Standard deviation of spike result.
 $\text{Avg}M_{f-i}$ = 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}	=	0.0031			
$\text{Avg}M_{f-i}$	=	0.076			
M_{f-1}	=	0.081	M_{f-5}	=	0.077
M_{f-2}	=	0.079	M_{f-6}	=	0.075
M_{f-3}	=	0.074	M_{f-7}	=	0.072
M_{f-4}	=	0.073	M_{f-8}	=	0.076
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}	=	9.72E-06
σ_{f-i}	=	0.0031

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Fluoride

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

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} = 0.0410
 σ_{f-i} = 0.0031
 $AvgM_{f-i}$ = 0.0760

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 = 100.9%
 $AvgM_{f-i}$ = 0.07603
RA = 0.07538

Sample Calculations

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Fluoride

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

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.

$\sigma_{f,i}$ = Standard deviation of spike result.

MDL = 0.009

$t_{(n-1, 0.99)}$ = 2.998

$\sigma_{f,i}$ = 0.0031

Sample Calculations
Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Fluoride

Calibration Point No: 3
Sample No: 28695-03
Sample Location: Unit 1 FF Outlet

15h. Determination of Method Reporting Limit (MRL).

$$MRL = 5(MDL)$$

Where:

MRL = Method reporting limit (mg/L)
MDL = Method detection Limit (mg/L)
5 = Constant

MRL = 0.047
MDL = 0.009

AS40 Log Sheet

Customer: 66
 Plant: Wheelabrator North Howard
 Customer Project No: 11182
 Lab Project No: 28691 (28695)
 Date: 7/17/11
 Analyst: Eric Gung

Analyte(s): F

Date Received: 7/29/11
 Shipping Person: Scott Brown

Inj Type: Loop Conc

Inj Mode: Prop Cnst

Inj / Vial: 1/2 3

Serial Dilution Data

Cartridge ID: 1A

Pos	Sample #	Identification	Volume	Dilution Ratio
1		Blank		
2		Cal 01		
3		Cal 01		
4		Cal 02		
5		Cal 03		
6		Cal 04		

Cartridge ID: 2A

Pos	Sample #	Identification	Volume	Dilution Ratio
1		Cal 05		
2		Cal 06		
3		Blank		
4		Cal		
5		Blank		
6		DI + Filter Blank	300	1

Cartridge ID: 3A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	691-02	V1 FF outflow CDR R1	930	1
2	691-03	" " " " R2	1022	1
3	691-04	" " " " R3	878	1
4	691-05	V2 " " " R1	860	1
5	691-06	" " " " R2	935	1
6	691-07	" " " " R3	908	1

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

Analyst Signature

Eric Gung

AS40 Log Sheet

Customer: 66
 Plant: Whetstone
 Customer Project No: 11182
 Lab Project No: 25691/28695
 Date: 4/27/11
 Analyst: Eric Ewing

Analyte(s): F

Date Received:
 Shipping Person:

Inj Type: Loop / Conc

Inj Mode: Prop Const

Inj / Vial: 1 2 3

Serial Dilution Data

Cartridge ID: 4A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	511-08	U3 FF Outlet CHER1	789	1
2	511-09	" " " " R2	820	1
3	511-10	" " " " R3	860	1
4	Blank			
5		QC		200
6	Blank			

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 5A

Pos	Sample #	Identification	Volume	Dilution Ratio
1		Cal 02		
2	Blank			
3				
4				
5				
6				

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 1A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	Blank			
2		Cal 03		
3	Blank			
4		QC		200
5	Blank			
6	25691-01	DE + Filler Blank	300	1

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Analyst Signature

Eric Ewing

Page: 2 of 4

AS40 Log Sheet

Customer: 66 Analyte(s): F
 Plant: Wheelabrator
 Customer Project No: 11182
 Lab Project No: 28691/28695
 Date: 4/4/11
 Analyst: Eric Bush

Date Received: _____
 Shipping Person: _____

Inj Type: Loop / Conc

Inj Mode: Prop / Cnst

Inj / Vial: 1 @ 3

Serial Dilution DataCartridge ID: 2A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	28695-02	U1 FF Catrol CCR R1	873	1
2	28695-03	" " " " R2	860	1
3	28695-04	" " " " R3	825	1
4	28695-05	V2 " " " R1	570	1
5	28695-06	" " " " R2	800	1
6	28695-07	" " " " R3	827	1

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 3A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	28695-08	U3 FF Catrol CCR R1	785	1
2	28695-09	" " " " R2	809	1
3	28695-10	" " " " R3	870	1
4	Blank			
5				
6	Blank	CCV		

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 4A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	28691-05	Matrix Spike		
2	28691-05	Matrix Spike		1
3	28691-05	Matrix Spike		1
4	28695-05	Matrix Spike		1
5	Blank			
6		Cal 9		

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Analyst Signature

Eric Bush

AS40 Log Sheet

Customer: 66 Analyte(s): F
 Plant: Wheelabrator
 Customer Project No: 0182
 Lab Project No: 28691 (28695)
 Date: 4/1/11
 Analyst: Eric Ewing

Date Received:
 Shipping Person:

Inj Type: Loop ConcInj Mode: Prop / CnstInj / Vial: 1 2 3Serial Dilution DataCartridge ID: 5A

Pos	Sample #	Identification	Volume	Dilution Ratio
1		<u>C-1 01</u>		
2		<u>C-1 02</u>		
3		<u>C-1 03</u>		
4		<u>C-1 04</u>		
5		<u>C-1 05</u>		
6		<u>C-1 06</u>		

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 6A

Pos	Sample #	Identification	Volume	Dilution Ratio
1		<u>Blank</u>		
2				
3				
4				
5				
6				

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID:

Pos	Sample #	Identification	Volume	Dilution Ratio
1				
2				
3				
4				
5				
6				

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Analyst Signature

Eric EwingPage: 4 of 4

Lab Project No.: 28695

Date Received: 4/4/2011

CleanAir No.: 11182

66

Customer : 66

Contact : Scott Brown

Phone :

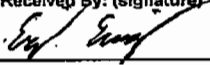
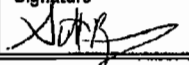
Fax :

Email : sbrown@cleanair.com

Requested Analysis

Due	Analyst	Status	Sample	Type	Container	Method
4/18/2011	EE	In Queue	1-10	Imp C&R	Nalgene	EPA Method 26A Fluoride
4/18/2011	EE	In Queue	11-30	Imp C&R	Nalgene	EPA Method 26A Chloride
4/18/2011	EE	In Queue	31-32	Imp C&R	Nalgene	Archive

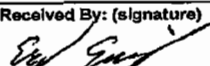
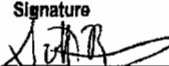
Printed 2011/04/04 08:20:39

CLIENT <u>Wheelabrator</u>		PROJECT <u>11182SB</u>		66-11182SB-4							
PLANT <u>South Broward</u>		DEPT. <u>66</u>									
PROJECT MANAGER <u>S. Brown</u>		 CleanAir ENGINEERING 500 West Wood Street Palatine, IL 60067 800-627-0033 (phone) 847-991-3385 (fax)		NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	ANALYSIS REQUESTED				FORWARDING LAB CleanAir Analytical Services 500 West Wood Street Palatine, IL 60067 800-627-0033 (phone) 847-991-3385 (fax) ADDITIONAL INFORMATION	
ANALYTICAL METHOD	CONTAINER NUMBER					SAMPLE FRACTION	Total Fluorides				Archive
USEPA M-13B	1					FILTER, IMPINGER CATCH, AND SAMPLE TRAIN RINSE 1000 mL HDPE					
LAB ID NUMBER	DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX							
R	3/28	Unit 1 FF Outlet	1	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X					
R	3/28	Unit 1 FF Outlet	2	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X					
R	3/28	Unit 1 FF Outlet	3	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X					
f	3/29	Unit 2 FF Outlet	1	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X					
R	3/29	Unit 2 FF Outlet	2	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X					
R	3/29	Unit 2 FF Outlet	3	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X					
k	3/28	Reagent Blank	All	DI Water (~500 mL) and Filter, 1000 mL HDPE	1	X					
t	3/30	Unit 3 FF Outlet	1	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X					
t	3/30	Unit 3 FF Outlet	2	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X					
t	3/30	Unit 3 FF Outlet	3	Filter, Impinger Catch, and Sample Train 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		3/30/2011 18:00							S. Brown		
Received By: (signature)		Date / Time	Received By: (signature)		Date / Time	Relinquished By: (signature)		Date / Time	Signature Date		
		7/7/11 8:00							 3/30/2011		

[illegible]

CLIENT <u>Wheelabrator</u>			PROJECT <u>11182SB</u>		66-11182SB-7			
PLANT <u>South Broward</u>			DEPT. <u>66</u>					
PROJECT MANAGER <u>S. Brown</u>			 CleanAir ENGINEERING 500 West Wood Street Palatine, IL 60067 800-627-0033 (phone) 847-991-3385 (fax)		ANALYSIS REQUESTED Chloride Bromide Archive			
ANALYTICAL METHOD	CONTAINER NUMBER	SAMPLE FRACTION					FORWARDING LAB CleanAir Analytical Services 500 West Wood Street Palatine, IL 60067 800-627-0033 (phone) 847-991-3385 (fax) ADDITIONAL INFORMATION	
USEPA M-26	2	ALKALINE IMPINGER CATCH AND RINSE 1000 mL HDPE						

LAB ID NUMBER	DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	ANALYSIS REQUESTED		
K	3/28	Unit 1 FF Outlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X		
R	3/28	Unit 1 FF Outlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X		
R	3/28	Unit 1 FF Outlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X		
K	3/28	Unit 1 SDA Inlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X		
R	3/28	Unit 1 SDA Inlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X		
R	3/28	Unit 1 SDA Inlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X		
K	3/29	Unit 2 FF Outlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1				X
R	3/29	Unit 2 FF Outlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X		
R	3/29	Unit 2 FF Outlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X		
R	3/29	Unit 2 FF Outlet	4	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X		
K	3/29	Unit 2 SDA Inlet	1	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1				X
R	3/29	Unit 2 SDA Inlet	2	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X		
R	3/29	Unit 2 SDA Inlet	3	Acidic Impinger Catch and Rinse, 1000 mL HDPE	1		X		
R	3/29	Unit 2 SDA Inlet	4	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	3/30/2011 18:00					
Received By: (signature)	Date / Time	Received By: (signature)	Date / Time	Relinquished By: (signature)	Date / Time	Signature Date
	4/4/11 8:00					 3/30/2011

[illegible]

ANALYTICAL PERSPECTIVES

20 April 2011

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.	11182SB
AP Project No.	A3125
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	none
Date Received	31-Mar-2011
Condition Received	good
Temperature upon Receipt (C)	3 (XAD, filters), 17 (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

2714 EXCHANGE DRIVE
WILMINGTON, NC 28405
PH.: 910-794-1613
1 / 3



QC Annotations:

See Appendix A&B for data qualifier, data attributes, and lab identifier information.

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,

Kimberly Mace, Ph.D.
Project Manager

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 $\leq 10\times$ 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.

¹Denotes data qualifiers/attributes whose use will be phased out over time

A3125 - TEQ
Project ID: 11182SB

Sample Summary
Part 1



Method 23

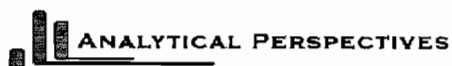
Analyte	Method Blank	Unit 3 FF Outlet- Field Blank	Unit 3 FF Outlet- Run 1	Unit 3 FF Outlet- Run 2	Unit 3 FF Outlet- Run 3
	pg	pg	pg	pg	pg
2,3,7,8-TCDD	(1.19)	[0.664]	(1.01)	(1.14)	(1.05)
1,2,3,7,8-PeCDD	(0.926)	(1.19)	[2.66]	[1.47]	2.36
1,2,3,4,7,8-HxCDD	(0.975)	(1.03)	3.58	[2.32]	2.79
1,2,3,6,7,8-HxCDD	(1.03)	(1)	[8.17]	6.73	8.91
1,2,3,7,8,9-HxCDD	1.96	[1.32]	6.15	4.44	5.04
1,2,3,4,6,7,8-HpCDD	1.38	[1.87]	66.8	43.2	72.7
OCDD	[6.67]	9.46	140	97.3	159
2,3,7,8-TCDF	(0.885)	(0.96)	[5.6]	[4.39]	4.95
1,2,3,7,8-PeCDF	(0.734)	(0.849)	3.84	3.09	2.97
2,3,4,7,8-PeCDF	(0.702)	(0.785)	6.03	5.01	5.57
1,2,3,4,7,8-HxCDF	(0.586)	[1.5]	6.11	5.24	5.67
1,2,3,6,7,8-HxCDF	(0.584)	(0.72)	5.9	4.98	5.02
2,3,4,6,7,8-HxCDF	(0.588)	(0.714)	7.52	5.7	6.55
1,2,3,7,8,9-HxCDF	(0.764)	(0.919)	(1.01)	0.921	0.912
1,2,3,4,6,7,8-HpCDF	(0.733)	5.06	22.9	19.6	21.3
1,2,3,4,7,8,9-HpCDF	(1.15)	(1.01)	[1.2]	1.6	1.64
OCDF	(2.55)	8.45	5.54	6.26	7.22
ITEF TEQ (ND=0; EMPC=0)	0.210	0.0685	7.18	6.21	9.22
ITEF TEQ (ND=0; EMPC=EMPC)	0.217	1.03	9.90	7.61	9.22
ITEF TEQ (ND=DL/2; EMPC=0)	1.51	1.52	8.20	7.12	9.75
ITEF TEQ (ND=DL/2; EMPC=EMPC)	1.52	1.82	10.5	8.18	9.75
ITEF TEQ (ND=DL; EMPC=EMPC)	2.82	2.61	11.0	8.75	10.3
Checkcode	275-593-NPZ	779-681-NGB	607-814-JLJ	563-327-VFM	099-119-JLG
Lab ID	MB1_8611_DF_SDS	A3125_8611_DF_001	A3125_8611_DF_002	A3125_8611_DF_003	A3125_8611_DF_004

() = DL
[] = EMPC

A3125 - WHO-2005-TEQ

Project ID: 11182SB

Sample Summary Part 1



Method 23

Analyte	Method Blank	Unit 3 FF Outlet- Field Blank	Unit 3 FF Outlet- Run 1	Unit 3 FF Outlet- Run 2	Unit 3 FF Outlet- Run 3
	pg	pg	pg	pg	pg
2,3,7,8-TCDD	(1.19)	[0.664]	(1.01)	(1.14)	(1.05)
1,2,3,7,8-PeCDD	(0.926)	(1.19)	[2.66]	[1.47]	2.36
1,2,3,4,7,8-HxCDD	(0.975)	(1.03)	3.58	[2.32]	2.79
1,2,3,6,7,8-HxCDD	(1.03)	(1)	[8.17]	6.73	8.91
1,2,3,7,8,9-HxCDD	1.96	[1.32]	6.15	4.44	5.04
1,2,3,4,6,7,8-HpCDD	1.38	[1.87]	66.8	43.2	72.7
OCDD	[6.67]	9.46	140	97.3	159
2,3,7,8-TCDF	(0.885)	(0.96)	[5.6]	[4.39]	4.95
1,2,3,7,8-PeCDF	(0.734)	(0.849)	3.84	3.09	2.97
2,3,4,7,8-PeCDF	(0.702)	(0.785)	6.03	5.01	5.57
1,2,3,4,7,8-HxCDF	(0.586)	[1.5]	6.11	5.24	5.67
1,2,3,6,7,8-HxCDF	(0.584)	(0.72)	5.9	4.98	5.02
2,3,4,6,7,8-HxCDF	(0.588)	(0.714)	7.52	5.7	6.55
1,2,3,7,8,9-HxCDF	(0.764)	(0.919)	(1.01)	0.921	0.912
1,2,3,4,6,7,8-HpCDF	(0.733)	5.06	22.9	19.6	21.3
1,2,3,4,7,8,9-HpCDF	(1.15)	(1.01)	[1.2]	1.6	1.64
OCDF	(2.55)	8.45	5.54	6.26	7.22
WHO-2005 TEQ (ND=0; EMPC=0)	0.210	0.056	5.79	5.07	9.11
WHO-2005 TEQ (ND=0; EMPC=EMPC)	0.212	1.02	9.84	7.21	9.11
WHO-2005 TEQ (ND=DL/2; EMPC=0)	1.66	1.72	7.17	6.24	9.64
WHO-2005 TEQ (ND=DL/2; EMPC=EMPC)	1.67	2.02	10.4	7.78	9.64
WHO-2005 TEQ (ND=DL; EMPC=EMPC)	3.12	3.02	11.0	8.35	10.2
Checkcode	275-593-NPZ	779-681-NGB	607-814-JLJ	563-327-VFM	099-119-JLG
Lab ID	MB1_8611_DF_SDS	A3125_8611_DF_001	A3125_8611_DF_002	A3125_8611_DF_003	A3125_8611_DF_004

() = DL
[] = EMPC

A3125 - Totals

Project ID: 11182SB

Sample Summary Part 2



Method 23

Analyte	Method Blank	Unit 3 FF Outlet- Field Blank	Unit 3 FF Outlet- Run 1	Unit 3 FF Outlet- Run 2	Unit 3 FF Outlet- Run 3
	pg	pg	pg	pg	pg
Totals					
TCDDs	1.92	0	127	93.2	124
PeCDDs	0	0	131	99.5	149
HxCDDs	1.96	0	204	143	245
HpCDDs	1.38	1.71	137	89.7	150
OCDD	6.67	9.46	140	97.3	159
TCDFs	0	0	144	137	137
PeCDFs	0	0	105	83.4	91.1
HxCDFs	0	1.13	62.7	42.9	53.9
HpCDFs	0	5.06	30.2	23.9	30.1
OCDF	0	8.45	5.54	6.26	7.22
Total PCDD/Fs (ND=0; EMPC=0)	5.26	25.8	1090	816	1150
Total PCDD/Fs (ND=0; EMPC=EMPC)	11.9	34.2	1140	853	1180
Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)	25.3	43.4	1150	855	1180
Total 2378s (ND=0; EMPC=0)	3.34	23.0	274	204	313
Total 2378s (ND=0.5; EMPC=0)	11.1	29.7	278	206	313
Total 2378s (ND=1; EMPC=0)	18.9	36.4	281	208	314
Total 2378s (ND=0; EMPC=1)	10.0	28.3	292	212	313
Total 2378s (ND=0.5; EMPC=1)	16.7	32.9	293	213	313
Total 2378s (ND=1; EMPC=1)	23.4	37.5	294	213	314
Checkcode	275-593-NPZ	779-681-NGB	607-814-JLJ	563-327-VFM	099-119-JLG
Lab ID	MB1_8611_DF_SDS	A3125_8611_DF_001	A3125_8611_DF_002	A3125_8611_DF_003	A3125_8611_DF_004

() = DL
[] = EMPC

A3125 - Others
Project ID: 11182SB

Sample Summary		 ANALYTICAL PERSPECTIVES			Method 23
Part 3					
Analyte	Method Blank	Unit 3 FF Outlet- Field Blank	Unit 3 FF Outlet- Run 1	Unit 3 FF Outlet- Run 2	Unit 3 FF Outlet- Run 3
	pg	pg	pg	pg	pg
Other PCDD/Fs (ND=0, EMPC=0)					
Other TCDD	1.92	0.000	127	93.2	124
Other PeCDD	0.000	0.000	131	99.5	147
Other HxCDD	0.000	0.000	194	131	228
Other HpCDD	0.000	1.71	69.8	46.5	76.9
Other TCDF	0.000	0.000	144	137	132
Other PeCDF	0.000	0.000	94.7	75.3	82.6
Other HxCDF	0.000	1.13	43.2	26.1	35.8
Other HpCDF	0.000	0.000	7.26	2.73	7.13
Other PCDD/Fs (ND=0, EMPC=EMPC)					
Other TCDD	1.92	2.14	127	96.8	128
Other PeCDD	0.000	0.000	138	102	151
Other HxCDD	0.000	0.000	200	136	231
Other HpCDD	0.000	1.71	69.8	46.5	76.9
Other TCDF	0.000	0.000	163	137	142
Other PeCDF	0.000	0.000	104	79.4	89.3
Other HxCDF	0.000	1.13	44.7	38.2	45.5
Other HpCDF	0.000	0.897	7.26	5.12	7.13
Checkcode	275-593-NPZ	779-681-NGB	607-814-JLJ	563-327-VFM	099-119-JLG
Lab ID	MB1_8611_DF_SDS	A3125_8611_DF_001	A3125_8611_DF_002	A3125_8611_DF_003	A3125_8611_DF_004

() = DL
 [] = EMPC

A3125 - DLs
Project ID: 11182SB

Sample Summary
Part 5 (DLs)

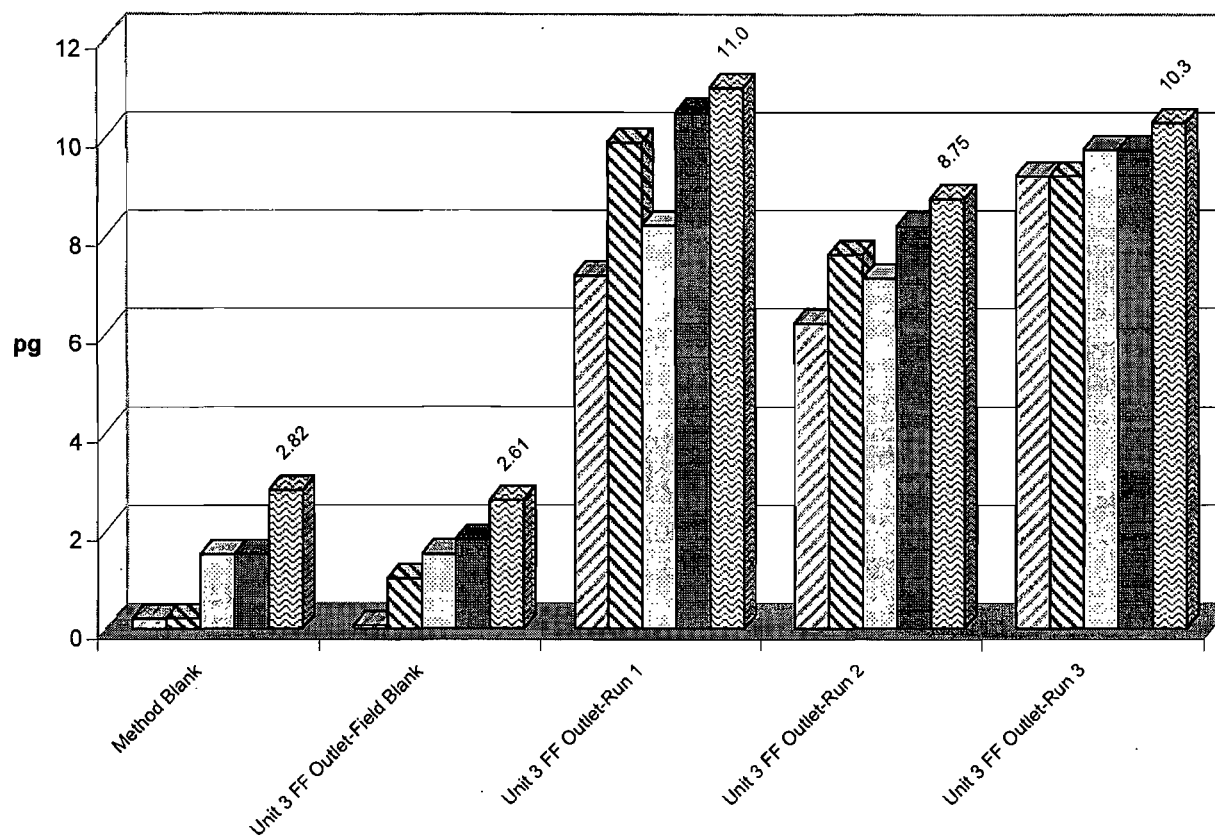


Method 23

Analyte	Method Blank	Unit 3 FF Outlet- Field Blank	Unit 3 FF Outlet- Run 1	Unit 3 FF Outlet- Run 2	Unit 3 FF Outlet- Run 3
	pg	pg	pg	pg	pg
2,3,7,8-TCDD	1.19	1.14	1.01	1.14	1.05
1,2,3,7,8-PeCDD	0.926	1.19	1.41	0.999	0.890
1,2,3,4,7,8-HxCDD	0.975	1.03	1.12	0.892	0.830
1,2,3,6,7,8-HxCDD	1.03	1.00	1.17	0.873	0.884
1,2,3,7,8,9-HxCDD	1.11	1.10	1.25	0.982	0.957
1,2,3,4,6,7,8-HpCDD	1.35	1.23	1.52	1.25	1.22
OCDD	2.16	1.99	2.02	1.72	1.44
2,3,7,8-TCDF	0.885	0.960	1.07	0.963	0.963
1,2,3,7,8-PeCDF	0.734	0.849	1.06	0.834	0.890
2,3,4,7,8-PeCDF	0.702	0.785	1.03	0.747	0.841
1,2,3,4,7,8-HxCDF	0.586	0.749	0.763	0.658	0.545
1,2,3,6,7,8-HxCDF	0.584	0.720	0.735	0.623	0.525
2,3,4,6,7,8-HxCDF	0.588	0.714	0.720	0.661	0.537
1,2,3,7,8,9-HxCDF	0.764	0.919	1.01	0.786	0.728
1,2,3,4,6,7,8-HpCDF	0.733	0.610	0.71	0.696	0.690
1,2,3,4,7,8,9-HpCDF	1.15	1.01	1.20	1.13	1.08
OCDF	2.55	2.66	2.56	2.13	2.38
Total TCDD	1.19	1.14	1.01	1.14	1.05
Total PeCDD	0.926	1.19	1.41	0.999	0.89
Total HxCDD	1.04	1.04	1.17	0.913	0.888
Total HpCDD	1.35	1.23	1.52	1.25	1.22
Total TCDF	0.885	0.960	1.07	0.963	0.963
Total PeCDF	0.718	0.817	1.04	0.790	0.865
Total HxCDF	0.625	0.769	0.798	0.677	0.577
Total HpCDF	0.912	0.782	0.921	0.880	0.857
Checkcode	275-593-NPZ	779-681-NGB	607-814-JLJ	563-327-VFM	099-119-JLG
Lab ID	MB1_8611_DF_SDS	A3125_8611_DF_001	A3125_8611_DF_002	A3125_8611_DF_003	A3125_8611_DF_004

ITEF-TEQ
Project ID: 11182SB
A3125

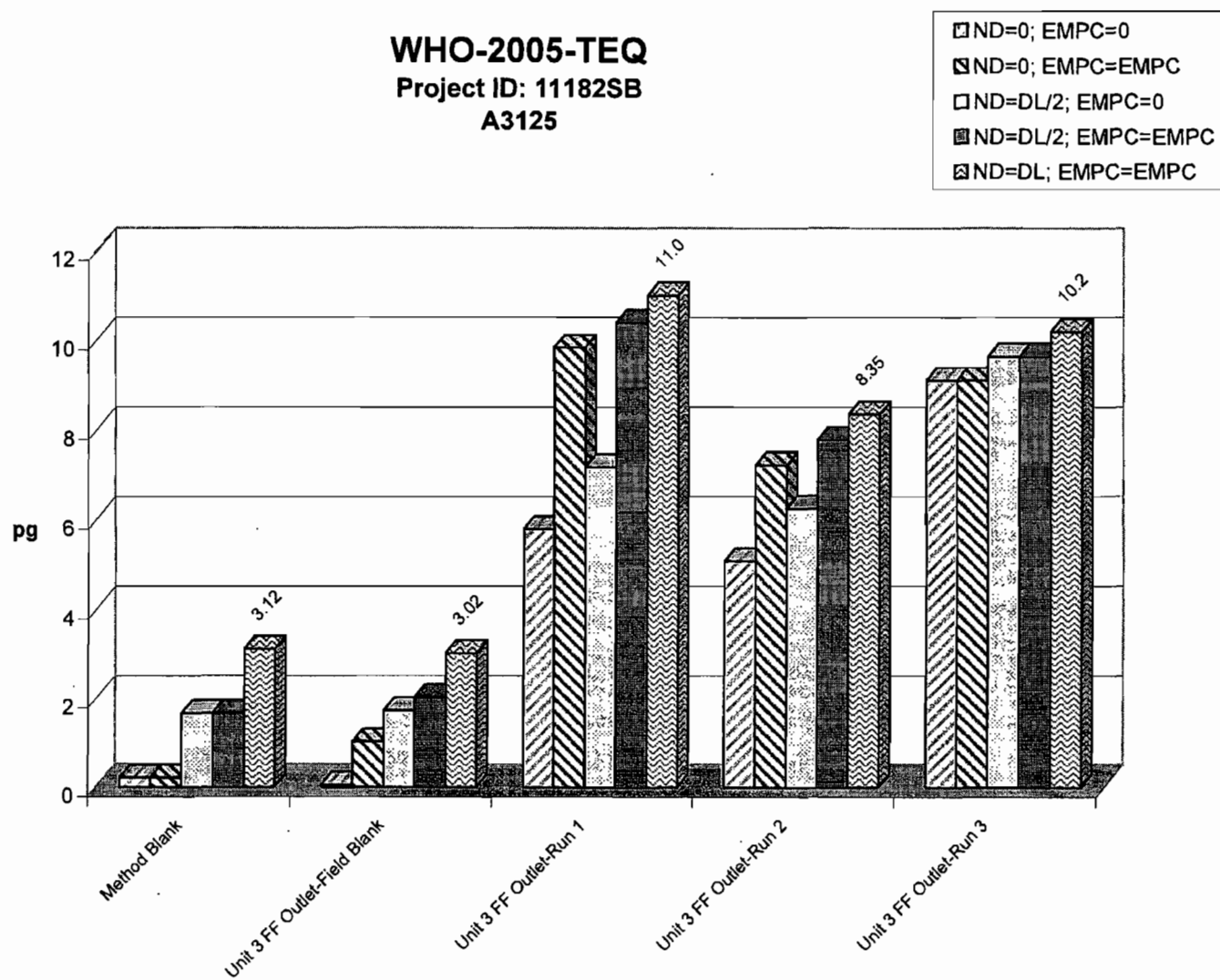
□ ND=0; EMPC=0
▨ ND=0; EMPC=EMPC
□ ND=DL/2; EMPC=0
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▨ ND=DL; EMPC=EMPC



WHO-2005-TEQ

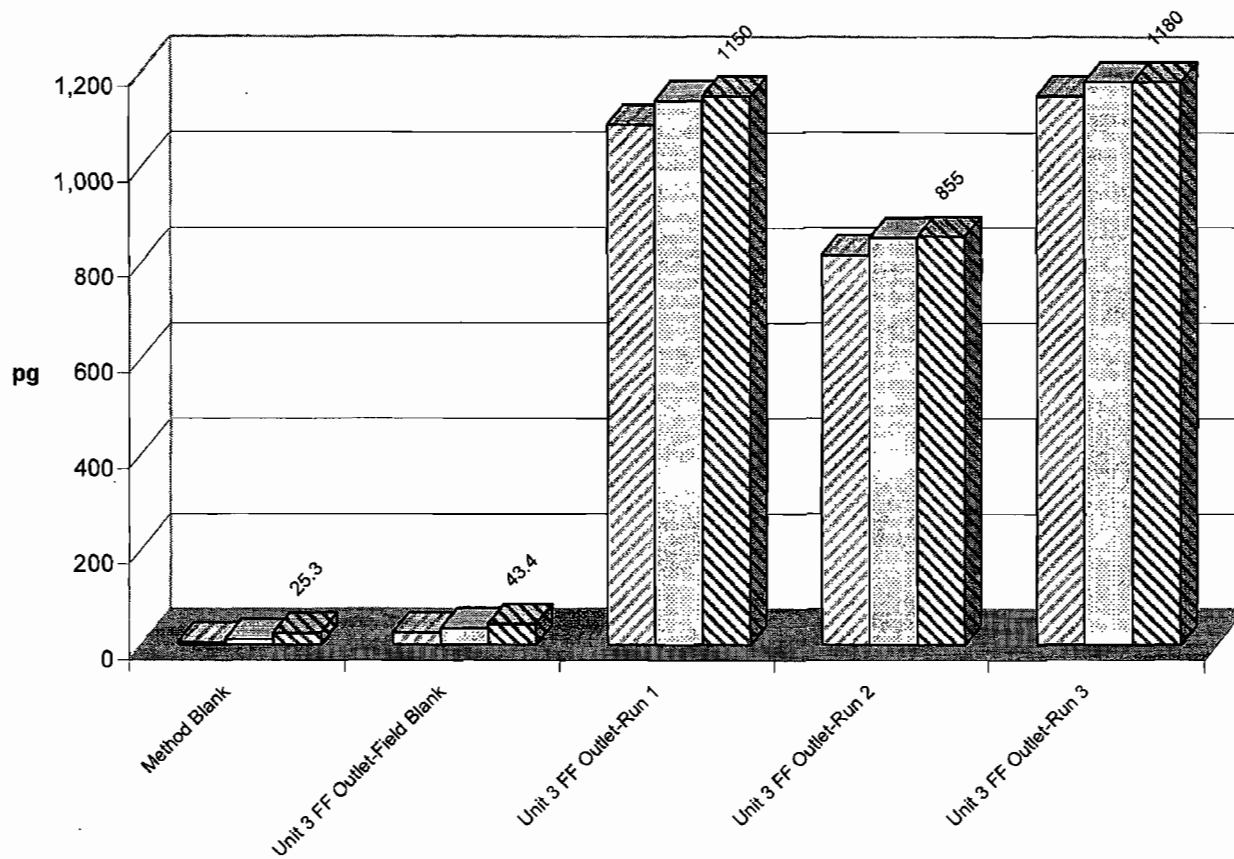
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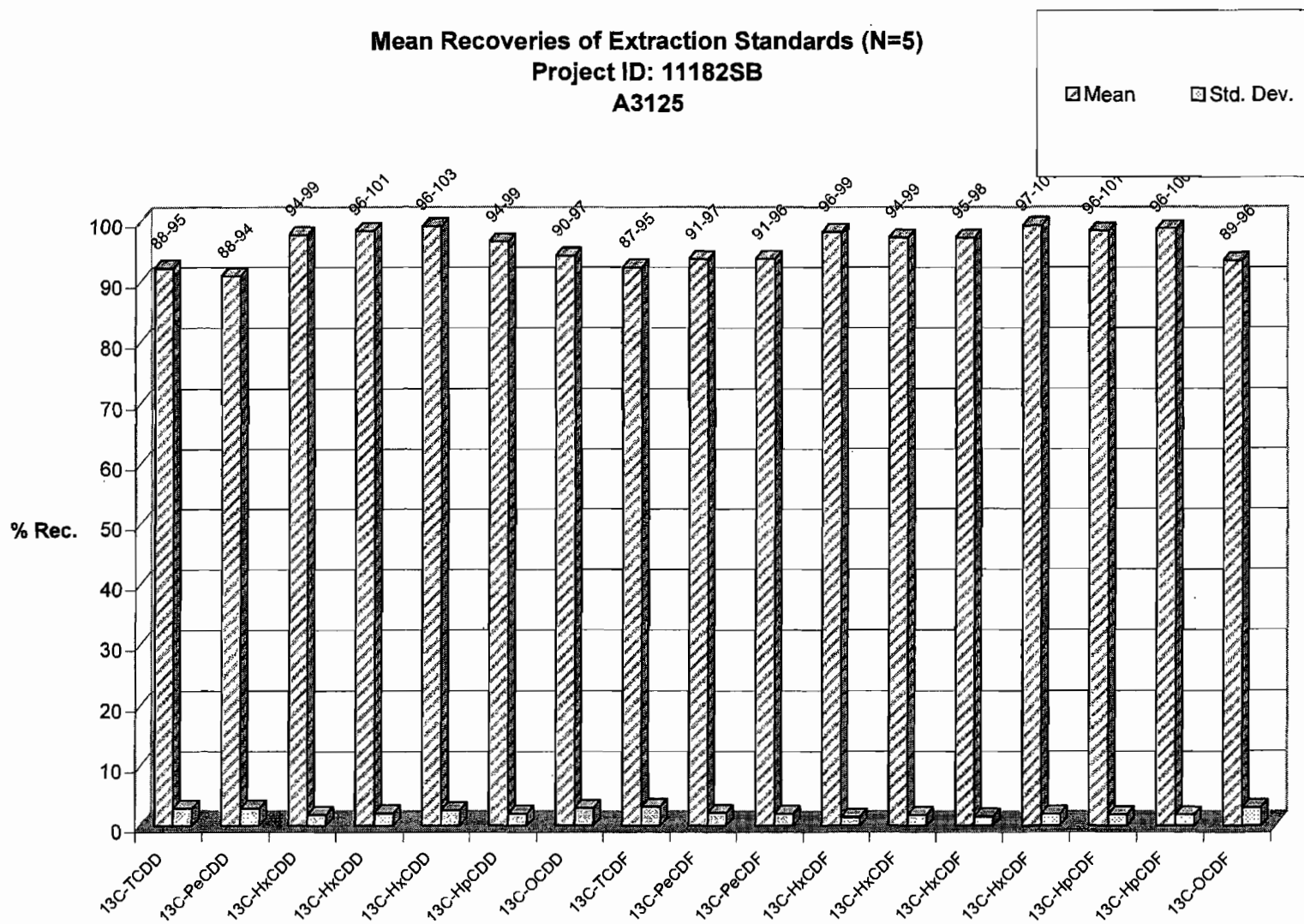
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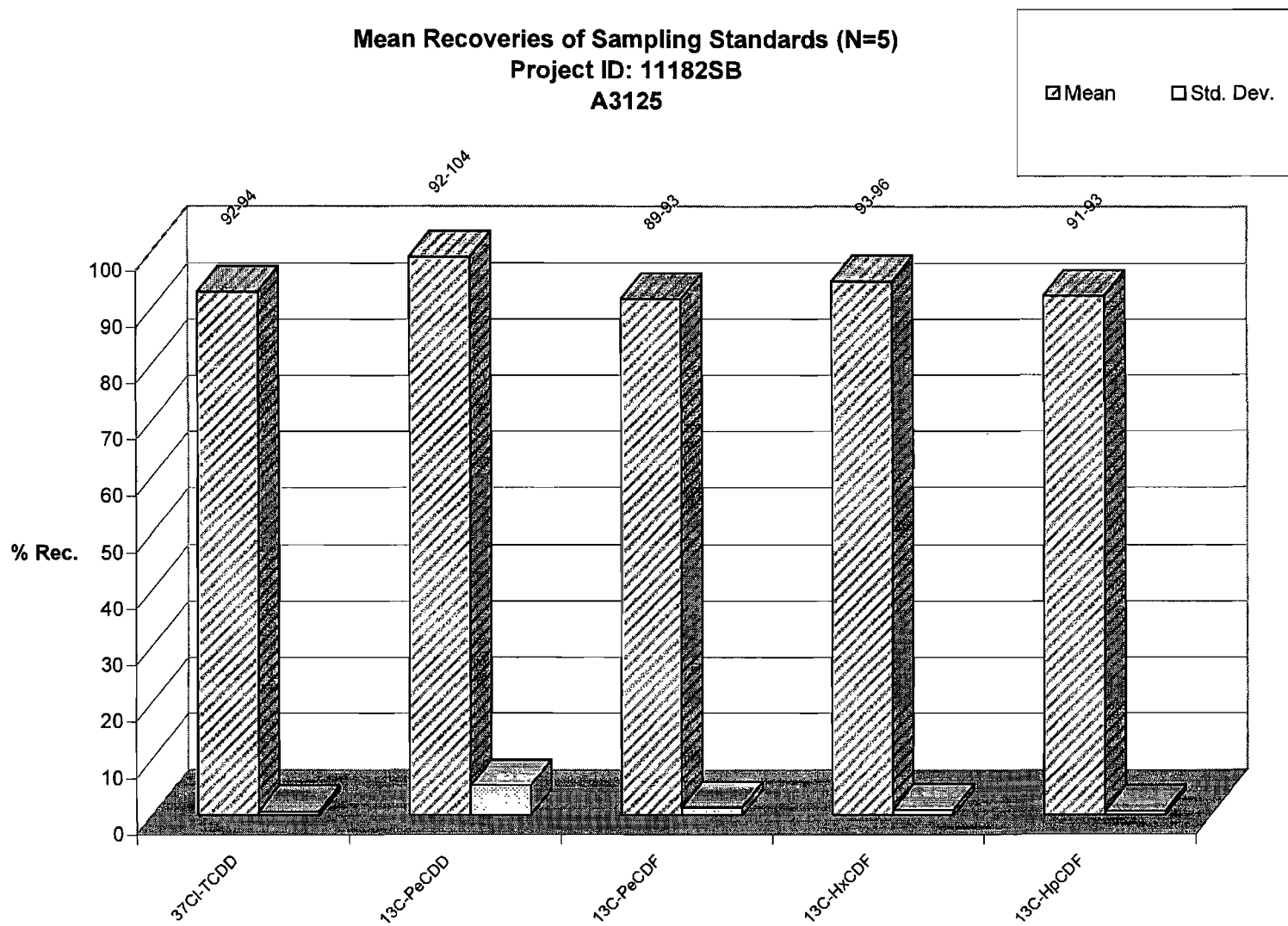
Totals
Project ID: 11182SB
A3125

▨ Total PCDD/Fs (ND=0; EMPC=0)
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▩ Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)

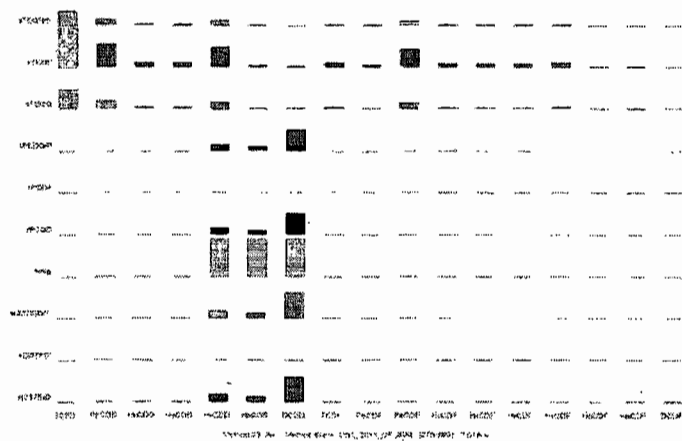




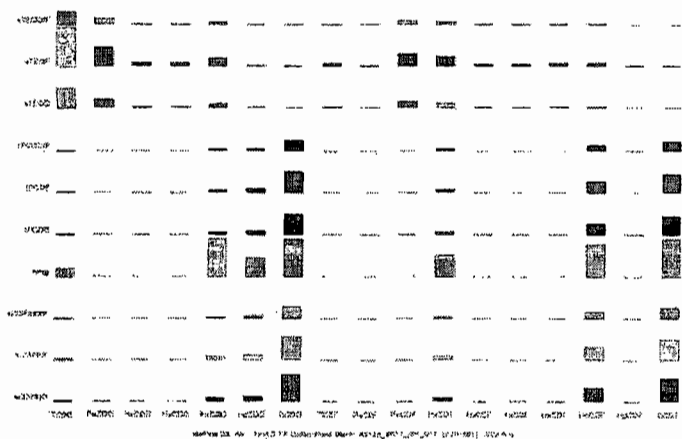
Method Specification Limits: Tetra-Hexa ES: 40-130%, Hepta-Octa ES: 25-130% (F = fail)



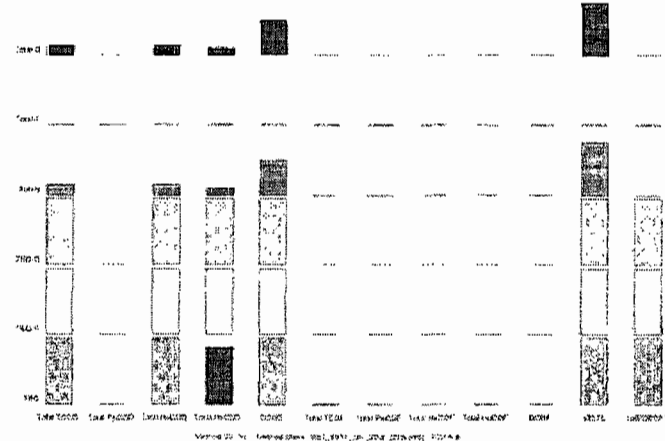
Method Specification Limits: Tetra-Octa SS: 70-130% (F = fail)

ANALYTICAL PERSPECTIVES

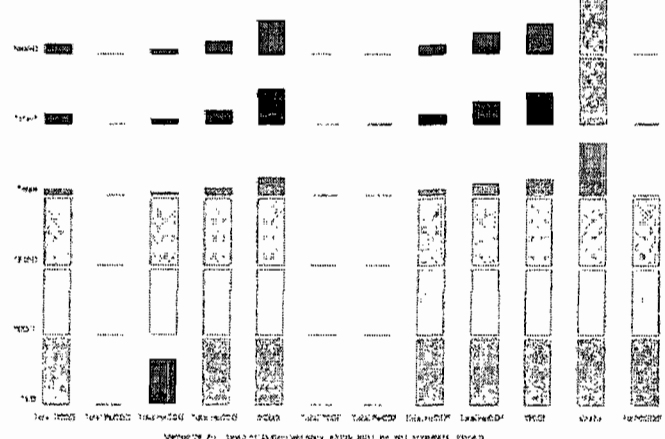
ANALYTICAL PERSPECTIVES



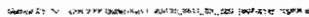
ANALYTICAL REPRESENTIVES



ANALYTICAL PERSPECTIVES



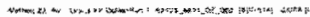
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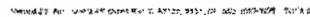
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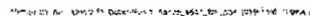
15



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1



2



Sample ID: Method Blank

Method 23

Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A3125	Date Received:	n/a
Project ID:	11182SB	Weight/Volume:	1	Lab Sample ID:	MB1_8611_DF_SDS	Date Extracted:	13-Apr-2011
Date Collected:	n/a			QC Batch No:	8611	Date Analyzed:	20-Apr-2011
		Split:	2	Dilution:	-	Time Analyzed:	01:30:39
Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	1.19			ES 2378-TCDD	93.7	
12378-PeCDD	ND	0.926			ES 12378-PeCDD	94.4	
123478-HxCDD	ND	0.975			ES 123478-HxCDD	97.8	
123678-HxCDD	ND	1.03			ES 123678-HxCDD	99.5	
123789-HxCDD	1.96			J	ES 123789-HxCDD	99.6	
1234678-HpCDD	1.38			J	ES 1234678-HpCDD	95.8	
OCDD	EMPC		6.67	J	ES OCDD	94	
2378-TCDF	ND	0.885			ES 2378-TCDF	95.1	
12378-PeCDF	ND	0.734			ES 12378-PeCDF	96.6	
23478-PeCDF	ND	0.702			ES 23478-PeCDF	96	
123478-HxCDF	ND	0.586			ES 123478-HxCDF	99.3	
123678-HxCDF	ND	0.584			ES 123678-HxCDF	98.1	
234678-HxCDF	ND	0.588			ES 234678-HxCDF	98.3	
123789-HxCDF	ND	0.764			ES 123789-HxCDF	100	
1234678-HpCDF	ND	0.733			ES 1234678-HpCDF	98.9	
1234789-HpCDF	ND	1.15			ES 1234789-HpCDF	99.7	
OCDF	ND	2.55			ES OCDF	93.6	
Totals					Standard	SS/AS Recoveries	
Total TCDD	1.92		1.92		SS 37CI-2378-TCDD	93.5	
Total PeCDD	ND	0.926	ND		SS 12347-PeCDD	98.9	
Total HxCDD	1.96		1.96		SS 12346-PeCDF	91.7	
Total HpCDD	1.38		1.38		SS 123469-HxCDF	95.7	
					SS 1234689-HpCDF	91	
Total TCDF	ND	0.885	ND		AS 1368-TCDD	84.9	
Total PeCDF	ND	0.718	ND		AS 1368-TCDF	87	
Total HxCDF	ND	0.625	ND				
Total HpCDF	ND	0.912	ND				
Total PCDD/Fs	5.26		11.9				
ITEF TEQs							
TEQ: ND=0	0.21		0.217				
TEQ: ND=DL/2	1.51	1.36	1.52				
TEQ: ND=DL	2.81	2.73	2.82				


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Sample ID: Unit 3 FF Outlet-Field Blank

Method 23

Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A3125	Date Received:	31-Mar-2011
Project ID:	11182SB	Weight/Volume:	1	Lab Sample ID:	A3125_8611_DF_001	Date Extracted:	13-Apr-2011
Date Collected:	29-Mar-2011	Split:	2	QC Batch No:	8611	Date Analyzed:	20-Apr-2011
				Dilution:	-	Time Analyzed:	02:23:44
Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	EMPC		0.664	J	ES 2378-TCDD	88.1	
12378-PeCDD	ND	1.19			ES 12378-PeCDD	88.7	
123478-HxCDD	ND	1.03			ES 123478-HxCDD	94.5	
123678-HxCDD	ND	1			ES 123678-HxCDD	95.6	
123789-HxCDD	EMPC		1.32	J	ES 123789-HxCDD	97.9	
1234678-HpCDD	EMPC		1.87	J	ES 1234678-HpCDD	93.5	
OCDD	9.46			J	ES OCDD	90.2	
2378-TCDF	ND	0.96			ES 2378-TCDF	87.4	
12378-PeCDF	ND	0.849			ES 12378-PeCDF	91.1	
23478-PeCDF	ND	0.785			ES 23478-PeCDF	91.4	
123478-HxCDF	EMPC		1.5	J	ES 123478-HxCDF	96	
123678-HxCDF	ND	0.72			ES 123678-HxCDF	94.3	
234678-HxCDF	ND	0.714			ES 234678-HxCDF	94.6	
123789-HxCDF	ND	0.919			ES 123789-HxCDF	96.6	
1234678-HpCDF	5.06			J	ES 1234678-HpCDF	95.9	
1234789-HpCDF	ND	1.01			ES 1234789-HpCDF	95.8	
OCDF	8.45			J	ES OCDF	89.2	
Totals					Standard	SS/AS Recoveries	
Total TCDD	ND		2.81		SS 37CI-2378-TCDD	93.4	
Total PeCDD	ND	1.19	ND		SS 12347-PeCDD	91.8	
Total HxCDD	ND		1.32		SS 12346-PeCDF	89.4	
Total HpCDD	1.71		3.58		SS 123469-HxCDF	94.4	
					SS 1234689-HpCDF	92.5	
Total TCDF	ND	0.96	ND		AS 1368-TCDD	81.2	
Total PeCDF	ND	0.817	ND		AS 1368-TCDF	79.8	
Total HxCDF	1.13		2.63				
Total HpCDF	5.06		5.96				
Total PCDD/Fs	25.8		34.2				
ITEF TEQs							
TEQ: ND=0	0.0685		1.03				
TEQ: ND=DL/2	1.52	1.46	1.82				
TEQ: ND=DL	2.98	2.92	2.61				


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Sample ID: Unit 3 FF Outlet-Run 1

Method 23

Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A3125	Date Received:	31-Mar-2011
Project ID:	11182SB	Weight/Volume:	1	Lab Sample ID:	A3125_8611_DF_002	Date Extracted:	13-Apr-2011
Date Collected:	28-Mar-2011	Split:	2	QC Batch No:	8611	Date Analyzed:	20-Apr-2011
				Dilution:	-	Time Analyzed:	03:16:49
Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	1.01			ES 2378-TCDD	95.1	
12378-PeCDD	EMPC		2.66	J	ES 12378-PeCDD	93.6	
123478-HxCDD	3.58			J	ES 123478-HxCDD	99	
123678-HxCDD	EMPC		8.17	J	ES 123678-HxCDD	98.6	
123789-HxCDD	6.15			J	ES 123789-HxCDD	99.1	
1234678-HpCDD	66.8				ES 1234678-HpCDD	97.5	
OCDD	140				ES OCDD	96.8	
2378-TCDF	EMPC		5.6	J	ES 2378-TCDF	94.9	
12378-PeCDF	3.84			J	ES 12378-PeCDF	95	
23478-PeCDF	6.03			J	ES 23478-PeCDF	95.7	
123478-HxCDF	6.11			J	ES 123478-HxCDF	98.7	
123678-HxCDF	5.9			J	ES 123678-HxCDF	98.1	
234678-HxCDF	7.52			J	ES 234678-HxCDF	97.5	
123789-HxCDF	ND	1.01			ES 123789-HxCDF	101	
1234678-HpCDF	22.9			J	ES 1234678-HpCDF	97.8	
1234789-HpCDF	EMPC		1.2	J	ES 1234789-HpCDF	100	
OCDF	5.54			J	ES OCDF	96.3	
Totals					Standard	SS/AS Recoveries	
Total TCDD	127		127		SS 37Cl-2378-TCDD	92.6	
Total PeCDD	131		140		SS 12347-PeCDD	96.3	
Total HxCDD	204		217		SS 12346-PeCDF	91.9	
Total HpCDD	137		137		SS 123469-HxCDF	93.4	
					SS 1234689-HpCDF	92.6	
Total TCDF	144		168		AS 1368-TCDD	85.3	
Total PeCDF	105		114		AS 1368-TCDF	84.6	
Total HxCDF	62.7		64.2				
Total HpCDF	30.2		31.4				
Total PCDD/Fs	1090		1140				
ITEF TEQs							
TEQ: ND=0	7.18		9.9				
TEQ: ND=DL/2	8.2	1.55	10.5				
TEQ: ND=DL	9.23	3.11	11				



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Sample ID: Unit 3 FF Outlet-Run 2

Method 23

Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A3125	Date Received:	31-Mar-2011
Project ID:	11182SB	Weight/Volume:	1	Lab Sample ID:	A3125_8611_DF_003	Date Extracted:	13-Apr-2011
Date Collected:	29-Mar-2011	Split:	2	QC Batch No:	8611	Date Analyzed:	20-Apr-2011
				Dilution:	-	Time Analyzed:	04:09:48
Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	1.14			ES 2378-TCDD	90.2	
12378-PeCDD	EMPC		1.47	J	ES 12378-PeCDD	88.3	
123478-HxCDD	EMPC		2.32	J	ES 123478-HxCDD	98.3	
123678-HxCDD	6.73			J	ES 123678-HxCDD	101	
123789-HxCDD	4.44			J	ES 123789-HxCDD	103	
1234678-HpCDD	43.2			J	ES 1234678-HpCDD	98.8	
OCDD	97.3			J	ES OCDD	97.4	
2378-TCDF	EMPC		4.39	J	ES 2378-TCDF	91.3	
12378-PeCDF	3.09			J	ES 12378-PeCDF	92.2	
23478-PeCDF	5.01			J	ES 23478-PeCDF	92.4	
123478-HxCDF	5.24			J	ES 123478-HxCDF	99.4	
123678-HxCDF	4.98			J	ES 123678-HxCDF	98.9	
234678-HxCDF	5.7			J	ES 234678-HxCDF	98.3	
123789-HxCDF	0.921			J	ES 123789-HxCDF	101	
1234678-HpCDF	19.6			J	ES 1234678-HpCDF	101	
1234789-HpCDF	1.6			J	ES 1234789-HpCDF	100	
OCDF	6.26			J	ES OCDF	96.3	
Totals					Standard	SS/AS Recoveries	
Total TCDD	93.2		96.8		SS 37CI-2378-TCDD	93.1	
Total PeCDD	99.5		103		SS 12347-PeCDD	104	
Total HxCDD	143		150		SS 12346-PeCDF	92.1	
Total HpCDD	89.7		89.7		SS 123469-HxCDF	94.8	
Total TCDF	137		141		SS 1234689-HpCDF	92.7	
Total PeCDF	83.4		87.5		AS 1368-TCDD	82.8	
Total HxCDF	42.9		55		AS 1368-TCDF	84	
Total HpCDF	23.9		26.3				
Total PCDD/Fs	816		853				
ITEF TEQs							
TEQ: ND=0	6.21		7.61				
TEQ: ND=DL/2	7.12	1.37	8.18				
TEQ: ND=DL	8.04	2.73	8.75				



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Sample ID: Unit 3 FF Outlet-Run 3

Method 23

Client Data		Sample Data		Laboratory Data			
Name:	Clean Air Engineering	Matrix:	Air	Lab Project ID:	A3125	Date Received:	31-Mar-2011
Project ID:	11182SB	Weight/Volume:	1	Lab Sample ID:	A3125_8611_DF_004	Date Extracted:	13-Apr-2011
Date Collected:	29-Mar-2011	Split:	2	QC Batch No:	8611	Date Analyzed:	20-Apr-2011
				Dilution:	-	Time Analyzed:	05:02:46
Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2378-TCDD	ND	1.05			ES 2378-TCDD	93.8	
12378-PeCDD	2.36			J	ES 12378-PeCDD	89.6	
123478-HxCDD	2.79			J	ES 123478-HxCDD	98.6	
123678-HxCDD	8.91			J	ES 123678-HxCDD	97.1	
123789-HxCDD	5.04			J	ES 123789-HxCDD	96.1	
1234678-HpCDD	72.7				ES 1234678-HpCDD	97.2	
OCDD	159				ES OCDD	92.7	
2378-TCDF	4.95			J	ES 2378-TCDF	92.8	
12378-PeCDF	2.97			J	ES 12378-PeCDF	93.6	
23478-PeCDF	5.57			J	ES 23478-PeCDF	93.2	
123478-HxCDF	5.67			J	ES 123478-HxCDF	97.4	
123678-HxCDF	5.02			J	ES 123678-HxCDF	96.9	
234678-HxCDF	6.55			J	ES 234678-HxCDF	97.3	
123789-HxCDF	0.912			J	ES 123789-HxCDF	97.8	
1234678-HpCDF	21.3			J	ES 1234678-HpCDF	98.1	
1234789-HpCDF	1.64			J	ES 1234789-HpCDF	98.2	
OCDF	7.22			J	ES OCDF	91.9	
Totals					Standard	SS/AS Recoveries	
Total TCDD	124		128		SS 37CI-2378-TCDD	91.7	
Total PeCDD	149		153		SS 12347-PeCDD	104	
Total HxCDD	245		248		SS 12346-PeCDF	93.1	
Total HpCDD	150		150		SS 123469-HxCDF	95.5	
Total TCDF	137		147		SS 1234689-HpCDF	92.4	
Total PeCDF	91.1		97.8		AS 1368-TCDD	85	
Total HxCDF	53.9		63.6		AS 1368-TCDF	84.7	
Total HpCDF	30.1		30.1				
Total PCDD/Fs	1150		1180				
ITEF TEQs							
TEQ: ND=0	9.22		9.22				
TEQ: ND=DL/2	9.75	1.3	9.75				
TEQ: ND=DL	10.3	2.59	10.3				



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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 SDA Inlet

USEPA Modified Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 28	Mar 28	Mar 28
Start Time (approx.)		07:48	09:11	10:35
Stop Time (approx.)		08:48	10:11	11:35

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter) 0.0160

HCl as Total Chloride
B_{Cl} Blank concentration (mg Cl⁻/liter) <0.0780

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	941.3000	826.1400	775.1000
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	690.0	764.0	750.0
v ₂	Fraction 2 sample volume (ml)			
m _{HCl}	HCl collected before blank subtraction (mg)	667.6829	648.8437	597.6021
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HCl collected after blank subtraction (mg)	667.6829	648.8437	597.6021
m _{MDL}	Minimum detectable HCl (mg)	0.0113	0.0126	0.0123
m _n	Total HCl used in emission calculations (mg)	667.6829	648.8437	597.6021

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 1 FF Outlet

USEPA Modified Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 28	Mar 28	Mar 28
Start Time (approx.)		07:48	09:11	10:35
Stop Time (approx.)		08:48	10:11	11:35

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter) 0.0160

HCl as Total Chloride

B_{Cl} Blank concentration (mg Cl⁻/liter) <0.0780

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	17.9100	17.6700	14.9000
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	842.0	825.0	853.0
v ₂	Fraction 2 sample volume (ml)			
m _{HCl}	HCl collected before blank subtraction (mg)	15.5025	14.9859	13.0656
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HCl collected after blank subtraction (mg)	15.5025	14.9859	13.0656
m _{MDL}	Minimum detectable HCl (mg)	0.0138	0.0136	0.0140
m _n	Total HCl used in emission calculations (mg)	15.5025	14.9859	13.0656
EFF	Collection QC Check (% collected in Fraction 2)	0.00%	0.00%	0.00%

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Wheelabrator South Broward, Inc.
 Clean Air Project No: 11182
 Unit 2 SDA Inlet

USEPA Modified Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3	4
Date (2011)		Mar 29	Mar 29	Mar 29	Mar 29
Start Time (approx.)		07:50	09:23	10:39	11:54
Stop Time (approx.)		08:50	10:23	11:39	12:54

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter) 0.0160

HCl as Total Chloride
 B_{Cl} Blank concentration (mg Cl⁻/liter) <0.0780

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	773.7900	988.4200	1051.8900
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	740.0	703.0	733.0
v ₂	Fraction 2 sample volume (ml)			
m _{HCl}	HCl collected before blank subtraction (mg)	588.6375	714.3153	792.6244
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HCl collected after blank subtraction (mg)	588.6375	714.3153	792.6244
m _{MDL}	Minimum detectable HCl (mg)	0.0122	0.0116	0.0121
m _n	Total HCl used in emission calculations (mg)	588.6375	714.3153	792.6244

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 2 FF Outlet

USEPA Modified Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3	4
Date (2011)		Mar 29	Mar 29	Mar 29	Mar 29
Start Time (approx.)		07:50	09:23	10:39	11:54
Stop Time (approx.)		08:50	10:23	11:39	12:54

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter)

HCl as Total Chloride

B_{Cl} Blank concentration (mg Cl⁻/liter)

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	5.4700	7.0400	6.0300
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	816.0	854.0	825.0
v ₂	Fraction 2 sample volume (ml)			
m _{HCl}	HCl collected before blank subtraction (mg)	4.5885	6.1805	5.1140
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HCl collected after blank subtraction (mg)	4.5885	6.1805	5.1140
m _{MDL}	Minimum detectable HCl (mg)	0.0134	0.0140	0.0136
m _n	Total HCl used in emission calculations (mg)	4.5885	6.1805	5.1140

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 SDA Inlet

USEPA Modified Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 30	Mar 30	Mar 30
Start Time (approx.)		07:47	09:06	10:22
Stop Time (approx.)		08:47	10:06	11:22

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter) 0.0160

HCl as Total Chloride

B_{Cl} Blank concentration (mg Cl⁻/liter) <0.0780

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	826.8000	818.4800	934.2900
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)			
v ₁	Fraction 1 sample volume (ml)	732.0	767.0	760.0
v ₂	Fraction 2 sample volume (ml)			
m _{HCl}	HCl collected before blank subtraction (mg)	622.1637	645.3518	729.9421
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000
m _{nb}	HCl collected after blank subtraction (mg)	622.1637	645.3518	729.9421
m _{MDL}	Minimum detectable HCl (mg)	0.0120	0.0126	0.0125
m _n	Total HCl used in emission calculations (mg)	622.1637	645.3518	729.9421

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Wheelabrator South Broward, Inc.
Clean Air Project No: 11182
Unit 3 FF Outlet

USEPA Modified Method 26A Chloride Laboratory Data Summary

Run No.	Blank	1	2	3
Date (2011)		Mar 30	Mar 30	Mar 30
Start Time (approx.)		07:47	09:06	10:22
Stop Time (approx.)		08:47	10:06	11:22

☐ DRAFT LAB DATA

MDL Min. detectable limit (mg Cl⁻/liter) 0.0160

HCl as Total Chloride

B_{Cl} Blank concentration (mg Cl⁻/liter) <0.0780

S _{Cl-1}	Fraction 1 concentration (mg Cl ⁻ /liter)	21.5800	13.2600	11.8400	
S _{Cl-2}	Fraction 2 concentration (mg Cl ⁻ /liter)				
v ₁	Fraction 1 sample volume (ml)	832.0	860.0	819.0	
v ₂	Fraction 2 sample volume (ml)				
m _{HCl}	HCl collected before blank subtraction (mg)	18.4573	11.7229	9.9685	
m _b	Allowable blank subtraction (mg)	0.0000	0.0000	0.0000	
m _{nb}	HCl collected after blank subtraction (mg)	18.4573	11.7229	9.9685	
m _{MDL}	Minimum detectable HCl (mg)	0.0137	0.0141	0.0135	
m _n	Total HCl used in emission calculations (mg)	18.4573	11.7229	9.9685	

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Laboratory Analysis for Anions

Performed For:
Palatine Engineering Group
500 West Wood Street
Palatine, IL 60067

Customer Reference No: 11182
Laboratory Project No: 28695

Revision 0 - Dated: 04/11/2011

To the best of our knowledge, the data presented in this report are accurate, complete, error free, legible and representative of the samples received by the laboratory.

Digitally signed
by Eric Ewing
Date: 2011.04.11
14:54:40 -05'00'

Eric Ewing
Title: Analyst
email: eewing@cleanair.com
Ph: 847-654-4519

Digitally signed by
Douglas D. Rhoades
Date: 2011.04.11
15:13:16 -05'00'

Douglas D. Rhoades
Title: Team Leader
email: drhoades@cleanair.com
Ph: 847-654-4504



CERTIFICATE OF ANALYSIS
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
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)	Method Reporting Limit (mg/L)
Reagent Blanks					
28695-11	DI H2O Blank	300	<	0.016	0.078
28695-12	0.1N H2SO4 Blank	300	<	0.016	0.078
Unit 1 SDA Inlet					
28695-13	Imp C&R R1	690	941.30	0.016	0.078
28695-14	Imp C&R R2	764	826.14	0.016	0.078
28695-15	Imp C&R R3	750	775.10	0.016	0.078
Unit 2 SDA Inlet					
28695-16	Imp C&R R1	740	773.79	0.016	0.078
28695-17	Imp C&R R2	703	988.42	0.016	0.078
28695-18	Imp C&R R3	733	1,051.89	0.016	0.078
Unit 3 SDA Inlet					
28695-19	Imp C&R R1	732	826.80	0.016	0.078
28695-20	Imp C&R R2	767	818.48	0.016	0.078
28695-21	Imp C&R R3	760	934.29	0.016	0.078
Unit 1 FF Outlet					
28695-22	Imp C&R R1	842	17.91	0.016	0.078
28695-23	Imp C&R R2	825	17.67	0.016	0.078
28695-24	Imp C&R R3	853	14.90	0.016	0.078
Unit 2 FF Outlet					
28695-25	Imp C&R R2	816	5.47	0.016	0.078
28695-26	Imp C&R R3	854	7.04	0.016	0.078
28695-27	Imp C&R R4	825	6.03	0.016	0.078
Unit 3 FF Outlet					
28695-28	Imp C&R R1	832	21.58	0.016	0.078
28695-29	Imp C&R R2	860	13.26	0.016	0.078
28695-30	Imp C&R R3	819	11.84	0.016	0.078

Analysis Case Narrative

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
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: 04/04/11
The samples were analyzed 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 AS-14 column, 4.5mM/1.4mM sodium carbonate/bicarbonate eluent, and 50mN 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 Method Reporting Limit (MRL) was determined by multiplying the Method Detection Limit (MDL) by a factor of 5. Values between these limits were quantified, but should be used with discretion as they were below the MRL. 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 included on the calibration page of this report and may also be found in Table 1 below. In addition, the dilution scheme used for the preparation of standards has been included in this report

Table 1: Standard Lot Numbers Used For Analysis

Standard Type	Lot Number	Concentration of Analyte
Stock Standard	03181102-64-00000-01	1010.85 mg/L
QC Standard	03181102-64-00000-02	183.56 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
4/5/2011	04041102-64-00000-01	1051-64-00000-01
4/6/2011	04061102-64-00000-01	1051-64-00000-01
4/7/2011	04061102-64-00000-01	1051-64-00000-01
4/8/2011	04061102-64-00000-01	1051-64-00000-01

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 performed. The pre test calibration and post test calibration average peak area for any standard must agree within $\pm 5\%$ of any observed area.

Analysis Case Narrative

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

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 purposely left blank as no data was acquired 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 than 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 Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
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.

Clean Air Laboratory Services is accredited by NELAC in the following states. Please visit the NELAP website to view our current status and a comprehensive list of our accredited services.

Table 3: Specific NELAC Accreditation and Expiration Date

State	Certificate Number	Expiration Date
Texas	T104704431-10-1	6/30/2011
New Jersey	IL004	6/30/2011
Louisiana	169249	6/30/2011

Table 4 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.

Table 4: 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	Unit 1 SDA Inlet	847.52	85.14	10.05%
Imp C&R	Unit 2 SDA Inlet	938.03	145.73	15.54%
Imp C&R	Unit 3 SDA Inlet	859.86	64.60	7.51%
Imp C&R	Unit 1 FF Outlet	16.83	1.67	9.94%
Imp C&R	Unit 2 FF Outlet	6.18	0.79	12.85%
Imp C&R	Unit 3 FF Outlet	15.56	5.26	33.81%

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

Stock Standard: 1010.85 mg/L
 Working Stock Conc.: 10.1085 mg/L
 CCV: 1.01 mg/L
 QC: 183.56 mg/L

Analyte:

		Chloride Standards Calibration Data						
Calibration Point Conc. (mg/L)	Date of Injection	1 0.0000	2 0.1516	3 0.4043	4 0.8087	5 1.2636	6 2.0217	7 2.5271
Cal 1 Trial 1	04/05/2011	0.0000	0.0705	0.2095	0.4060	0.6324	1.0567	1.3569
Cal 1 Trial 2		0.0000	0.0690	0.2070	0.3996	0.6586	1.0490	1.3452
Cal 2 Trial 1	04/05/2011			0.2039				
Cal 2 Trial 2				0.2092				
Cal 3 Trial 1	04/06/2011				0.4100	0.6585		
Cal 3 Trial 2					0.4184	0.6465		
Cal 4 Trial 1	04/08/2011		0.0737	0.2013	0.4181	0.6546	1.0910	1.3594
Cal 4 Trial 2			0.0704	0.2024	0.4137	0.6307	1.0871	1.3345

n	2	4	6	6	6	4	4
Average	0.0000	0.0709	0.2056	0.4110	0.6469	1.0710	1.3490
Standard Deviation	0.0000	0.0020	0.0035	0.0073	0.0127	0.0212	0.0115
%RSD	0.00	2.80	1.71	1.78	1.96	1.98	0.85

Quality Control Checks							
Measured Area Counts (Counts)	Actual Concentration (mg/L)	Regression Concentration (mg/L)	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	0.023	-0.89%	Yes	0.00%	Yes	
0.0709	0.152	0.155	-0.14%	Yes	-2.33%	Yes	
0.2056	0.404	0.407	-0.10%	Yes	-0.63%	Yes	
0.4110	0.809	0.791	0.70%	Yes	2.19%	Yes	
0.6469	1.264	1.232	1.25%	Yes	2.50%	Yes	
1.0710	2.022	2.025	-0.12%	Yes	-0.15%	Yes	
1.3490	2.527	2.545	-0.69%	Yes	-0.69%	Yes	
Regression Constants			Is Coefficient of Regression > 0.995?				
Slope	m =	1.8695	Yes				
Intercept	b =	0.0226					
Coeff.	R ² =	0.9996					

Stock Solution Standard Mixing Recipe (Anions)

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
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 ₂ HPO ₄	Na ₂ SO 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%	84.86%

Recommended 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

0.5553 g	0.8332 g	1.9331 g					

Actual Concentration (mg/L)

502.53 1010.85 3002.33

Concentration in the Five Cal Flasks (mg/L)

Stock (1 liter Flask) Solution Concentrations

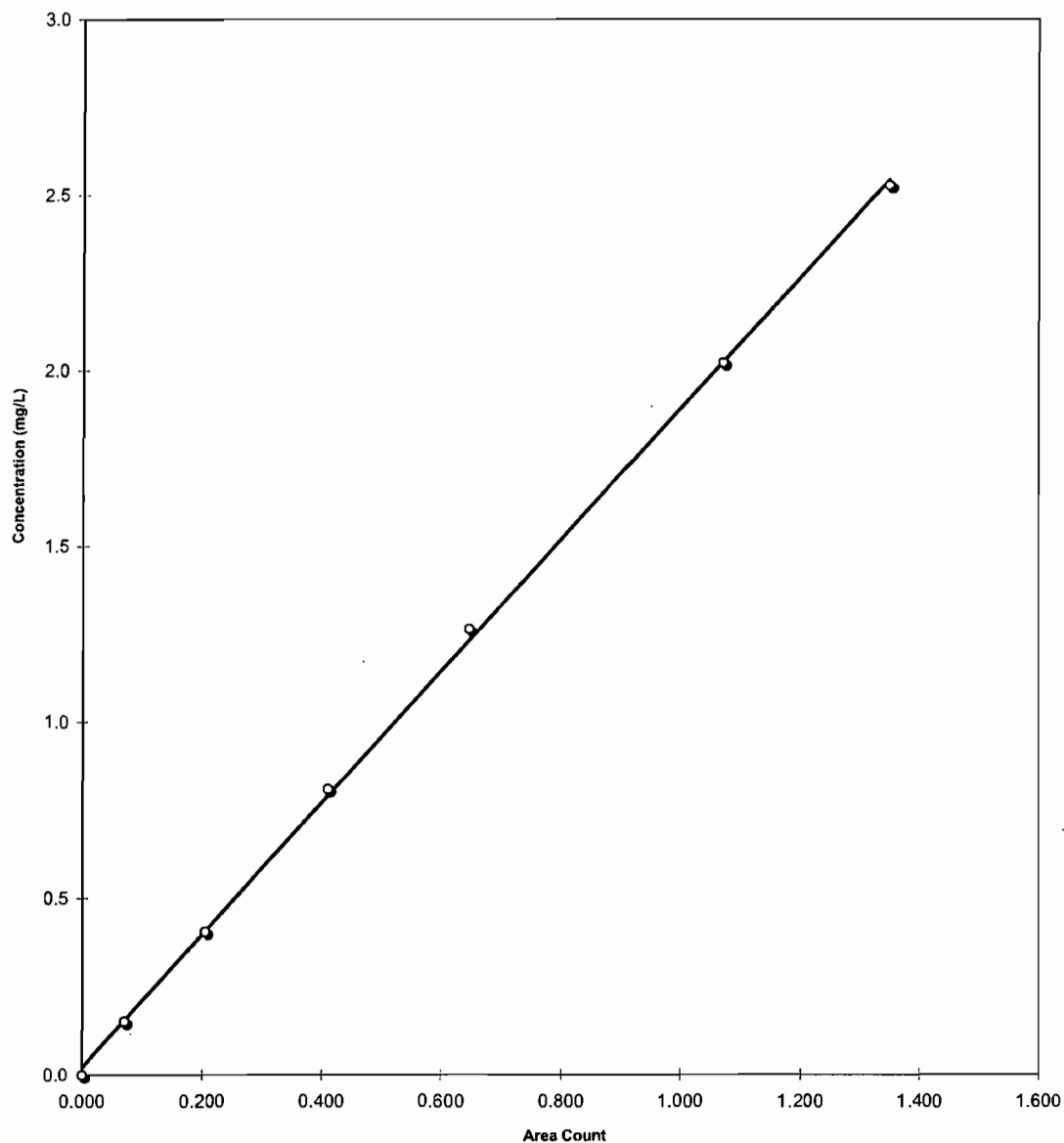
10 ml Original Solution Used 5.0253 10.1085 30.0233

Dilution Flask Size	Aliquot Stock				
200	3	0.0754	0.1516	0.4503	1
250	10	0.2010	0.4043	1.2009	2
250	20	0.4020	0.8087	2.4019	3
200	20	0.5025	1.0108	3.0023	4
200	25	0.6282	1.2636	3.7529	5
100	20	1.0051	2.0217	6.0047	6
200	50	1.2563	2.5271	7.5058	

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

Chloride Calibration Curve



Sample Information

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

Sample Identification			Sample		Sample Recovery		Field Tech	Sample Volume (mL)
Number	Sample Location	Run No.	Identification		Date			
28695-11	Blank	RB	DI H2O Blank		3/28/2011		RV	300
28695-12	Blank	RB	0.1N H2SO4 Blank		3/28/2011		RV	300
28695-13	Unit 1 SDA Inlet	1	Imp C&R R1		3/28/2011		DL	690
28695-14	Unit 1 SDA Inlet	2	Imp C&R R2		3/28/2011		DL	764
28695-15	Unit 1 SDA Inlet	3	Imp C&R R3		3/28/2011		DL	750
28695-16	Unit 2 SDA Inlet	1	Imp C&R R1		3/29/2011		DL	740
28695-17	Unit 2 SDA Inlet	2	Imp C&R R2		3/29/2011		DL	703
28695-18	Unit 2 SDA Inlet	3	Imp C&R R3		3/29/2011		DL	733
28695-19	Unit 3 SDA Inlet	1	Imp C&R R1		3/30/2011		RV	732
28695-20	Unit 3 SDA Inlet	2	Imp C&R R2		3/30/2011		DL	767
28695-21	Unit 3 SDA Inlet	3	Imp C&R R3		3/30/2011		RV	760
28695-22	Unit 1 FF Outlet	1	Imp C&R R1		3/28/2011		RV	842
28695-23	Unit 1 FF Outlet	2	Imp C&R R2		3/28/2011		RV	825
28695-24	Unit 1 FF Outlet	3	Imp C&R R3		3/28/2011		RV	853
28695-25	Unit 2 FF Outlet	1	Imp C&R R2		3/29/2011		RV	816
28695-26	Unit 2 FF Outlet	2	Imp C&R R3		3/29/2011		RV	854
28695-27	Unit 2 FF Outlet	3	Imp C&R R4		3/29/2011		RV	825
28695-28	Unit 3 FF Outlet	1	Imp C&R R1		3/30/2011		RV	832
28695-29	Unit 3 FF Outlet	2	Imp C&R R2		3/30/2011		RV	860
28695-30	Unit 3 FF Outlet	3	Imp C&R R3		3/30/2011		RV	819

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

MDL=	0.016 mg/L	Average Flow Rate 0.80 mL/min
MRL=	0.078 mg/L	

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 _{total} (Total Sample Volume, mL)	C _{reg} (Concentration, mg/L from Reg Curve)	M _{reg} Total Amount of Analyte (ng)
Blank	28695-11	DI H2O Blank	04/05/11	0.0000	0.0000	0.0000	1	300.0	<	<0.023
Blank	28695-12	0.1N H2SO4 Blank	04/05/11	0.0000	0.0000	0.0000	1	300.0	<	<0.023
Unit 1 SDA Inlet	28695-13	Imp C&R R1	04/06/11	0.4883	0.4945	0.4914	1000	890.0	941.30	649.50
Unit 1 SDA Inlet	28695-14	Imp C&R R2	04/06/11	0.4287	0.4309	0.4298	1000	764.0	826.14	631.17
Unit 1 SDA Inlet	28695-15	Imp C&R R3	04/06/11	0.4078	0.3972	0.4025	1000	750.0	775.10	581.33
Unit 2 SDA Inlet	28695-16	Imp C&R R1	04/06/11	0.3978	0.4058	0.4018	1000	740.0	773.79	572.61
Unit 2 SDA Inlet	28695-17	Imp C&R R2	04/06/11	0.5247	0.5085	0.5166	1000	703.0	988.42	694.86
Unit 2 SDA Inlet	28695-18	Imp C&R R3	04/06/11	0.5419	0.5592	0.5506	1000	733.0	1,051.89	771.03
Unit 3 SDA Inlet	28695-19	Imp C&R R1	04/06/11	0.4353	0.4250	0.4302	1000	732.0	826.80	605.21
Unit 3 SDA Inlet	28695-20	Imp C&R R2	04/07/11	0.4169	0.4345	0.4257	1000	767.0	818.48	627.77
Unit 3 SDA Inlet	28695-21	Imp C&R R3	04/07/11	0.4884	0.4869	0.4877	1000	760.0	934.29	710.06
Unit 1 FF Outlet	28695-22	Imp C&R R1	04/07/11	0.4679	0.4661	0.4670	20	842.0	17.91	15.08
Unit 1 FF Outlet	28695-23	Imp C&R R2	04/07/11	0.4511	0.4700	0.4606	20	825.0	17.67	14.58
Unit 1 FF Outlet	28695-24	Imp C&R R3	04/07/11	0.3853	0.3876	0.3865	20	853.0	14.90	12.71
Unit 2 FF Outlet	28695-25	Imp C&R R2	04/07/11	0.5824	0.5643	0.5734	5	818.0	5.47	4.47
Unit 2 FF Outlet	28695-26	Imp C&R R3	04/07/11	0.7297	0.7520	0.7409	5	854.0	7.04	6.01
Unit 2 FF Outlet	28695-27	Imp C&R R4	04/07/11	0.6185	0.6468	0.6327	5	825.0	6.03	4.97
Unit 3 FF Outlet	28695-28	Imp C&R R1	04/07/11	0.5526	0.5775	0.5651	20	832.0	21.58	17.95
Unit 3 FF Outlet	28695-29	Imp C&R R2	04/07/11	0.7115	0.6831	0.6973	10	860.0	13.26	11.41
Unit 3 FF Outlet	28695-30	Imp C&R R3	04/07/11	0.6260	0.6165	0.6213	10	818.0	11.84	9.70

CHROMATOGRAPHIC DATA REDUCTION
Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
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%?
Blank	28695-11	DI H2O Blank	04/05/11	0.0000	0.0000	0.0000	na	na	Yes
Blank	28695-12	0.1N H2SO4 Blank	04/05/11	0.0000	0.0000	0.0000	na	na	Yes
Unit 1 SDA Inlet	28695-13	Imp C&R R1	04/06/11	0.4883	0.4945	0.4914	0.0062	1.3%	Yes
Unit 1 SDA Inlet	28695-14	Imp C&R R2	04/06/11	0.4287	0.4309	0.4298	0.0022	0.5%	Yes
Unit 1 SDA Inlet	28695-15	Imp C&R R3	04/06/11	0.4078	0.3972	0.4025	0.0106	2.6%	Yes
Unit 2 SDA Inlet	28695-16	Imp C&R R1	04/06/11	0.3978	0.4058	0.4018	0.0080	2.0%	Yes
Unit 2 SDA Inlet	28695-17	Imp C&R R2	04/06/11	0.5247	0.5085	0.5166	0.0162	3.1%	Yes
Unit 2 SDA Inlet	28695-18	Imp C&R R3	04/06/11	0.5419	0.5592	0.5506	0.0173	3.1%	Yes
Unit 3 SDA Inlet	28695-19	Imp C&R R1	04/06/11	0.4353	0.4250	0.4302	0.0103	2.4%	Yes
Unit 3 SDA Inlet	28695-20	Imp C&R R2	04/07/11	0.4169	0.4345	0.4257	0.0176	4.1%	Yes
Unit 3 SDA Inlet	28695-21	Imp C&R R3	04/07/11	0.4884	0.4869	0.4877	0.0015	0.3%	Yes
Unit 1 FF Outlet	28695-22	Imp C&R R1	04/07/11	0.4679	0.4661	0.4670	0.0018	0.4%	Yes
Unit 1 FF Outlet	28695-23	Imp C&R R2	04/07/11	0.4511	0.4700	0.4606	0.0189	4.1%	Yes
Unit 1 FF Outlet	28695-24	Imp C&R R3	04/07/11	0.3853	0.3876	0.3865	0.0023	0.6%	Yes
Unit 2 FF Outlet	28695-25	Imp C&R R2	04/07/11	0.5824	0.5643	0.5734	0.0181	3.2%	Yes
Unit 2 FF Outlet	28695-26	Imp C&R R3	04/07/11	0.7297	0.7520	0.7409	0.0223	3.0%	Yes
Unit 2 FF Outlet	28695-27	Imp C&R R4	04/07/11	0.6185	0.6468	0.6327	0.0283	4.5%	Yes
Unit 3 FF Outlet	28695-28	Imp C&R R1	04/07/11	0.5526	0.5775	0.5651	0.0249	4.4%	Yes
Unit 3 FF Outlet	28695-29	Imp C&R R2	04/07/11	0.7115	0.6831	0.6973	0.0284	4.1%	Yes
Unit 3 FF Outlet	28695-30	Imp C&R R3	04/07/11	0.6260	0.6165	0.6213	0.0095	1.5%	Yes

CHROMATOGRAPHIC DATA REDUCTION

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

CCV Concentration: 1.01 mg/L
 QC Concentration: 183.56 mg/L

MDL=	0.016 mg/L
MRL=	0.078 mg/L

QC Dilution Factor
200

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 _{avg} (Concentration, mg/L from Reg Curve)	Percent Difference from Actual Value (%)	Is Percent Difference from Actual Value < 10%?
CleanAir	28695-00	CCB	04/05/11	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28695-990	CCV	04/05/11	0.5183	0.5256	0.5220	0.0073	1.4%	1.00	1.23%	Yes
CleanAir	28695-991	QC	04/06/11	0.4703	0.4810	0.4757	0.0107	2.2%	182.37	0.65%	Yes
CleanAir	28695-00	CCB	04/07/11	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28695-992	CCV	04/07/11	0.5171	0.5279	0.5225	0.0108	2.1%	1.00	1.13%	Yes
CleanAir	28695-993	QC	04/07/11	0.4761	0.4627	0.4694	0.0134	2.9%	180.04	1.92%	Yes
CleanAir	28695-00	CCB	04/08/11	0.0000	0.0000	0.0000	na	na	<		
CleanAir	28695-994	CCV	04/08/11	0.5251	0.5400	0.5326	0.0149	2.8%	1.02	0.73%	Yes

Sample Duplicate Analysis Area Count Check

									Precision	Is Precision < 5%
Unit 2 SDA Inlet	28695-18	Imp C&R R3	04/06/11	0.5419	0.5592	0.5506	0.0173	3.1%		
Unit 2 SDA Inlet	28695-18	Imp C&R R3	04/08/11	0.5653	0.5633	0.5643	0.0020	0.4%	2.5%	Yes
Unit 3 FF Outlet	28695-28	Imp C&R R1	04/07/11	0.5526	0.5775	0.5651	0.0249	4.4%		
Unit 3 FF Outlet	28695-28	Imp C&R R1	04/08/11	0.5467	0.5559	0.5513	0.0092	1.7%	2.5%	Yes

Matrix Spike Recoveries

									Precision	Spike Recovery	Is Spike Recovery Between 90-110%
Matrix Spike	28695-19	Imp C&R R1	04/07/11	0.9065	0.8956	0.9011	0.0109	1.2%			
Matrix Spike	28695-19	Imp C&R R1	04/07/11	0.9223	0.9472	0.9348	0.0249	2.7%	3.7%	102.1%	Yes
Matrix Spike	28695-28	Imp C&R R1	04/07/11	0.9112	0.9140	0.9126	0.0028	0.3%		92.5%	Yes

Determination of Method Detection Limit
Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

MDL Reference		Non-Iterative Study	
CleanAir Reference		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
Matrix	Deionized Water		
Analyte	Chloride		
Spike Concentration	0.1516 mg/L		
Slope	1.8685		
Intercept	0.0226		
Coefficient of Corr.	0.9996		

Spike Aliquots	Spike Result Area Count	Measured Concentration (mg/L)
1	0.0727	0.159
2	0.0749	0.163
3	0.0705	0.154
4	0.0690	0.152
5	0.0737	0.160
6	0.0704	0.154
7	0.0666	0.147
8	0.0689	0.151

Average Spike Concentration:	0.155	Is the spike level higher than the MDL?	Yes
Recovery (R_a):	102.26%	Does the spike level exceed ten times the MDL?	No
Standard Deviation (S_d):	0.00517	Is the Avg Recovery between 90% < R_a < 110%?	Yes
RMS Deviation:	3.3%		
$t_{(n-1,0.99)}$:	2.998		
MDL:	0.016		
MRL:	0.078		

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Chloride

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 SDA Inlet

1. Difference between duplicate injections for pre-test calibration (Pre Cal 1).

$$\Delta_{Injection} = |Area_{Trial\ 2} - Area_{Trial\ 1}|$$

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

$\Delta_{Injection}$ = 0.0025

$Area_{Trial2}$ = 0.2070

$Area_{Trial1}$ = 0.2095

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} = 0.2083

$Area_{Trial2}$ = 0.2070

$Area_{Trial1}$ = 0.2095

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 SDA Inlet

3. Difference between individual injection and average area count for pre-test calibration.

$$\Delta_{PreMean\%} = \frac{|Area_{Trial2} - Avg_{PreInj}|}{Avg_{PreInj}} \times 100$$

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)

$$\Delta_{PreMean\%} = 0.6039$$

$$Avg_{PreInj} = 0.2083$$

$$Area_{Trial2} = 0.2070$$

Note: EPA Method 26 requires $\Delta_{PreMean\%}$ to be less than 5%.

4. Average of all area count values for a given calibration point.

$$\bar{X} = \frac{\sum_{i=1}^n x_i}{n}$$

Where:

$\bar{X}$ = 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.

$$\bar{X} = 0.2056$$

$$x_1 = 0.2095$$

$$x_2 = 0.2070$$

$$n = 6$$

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 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.

$\overline{Y}_{All}$ = 1.0253
 y_1 = 0.0000
 y_2 = 0.1516
 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.

$\overline{X}_{All}$ = 0.5482
 x_1 = 0.2095
 x_2 = 0.2070
 n = 32

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 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 = $\bar{X}_{All}$
 y_i = Actual area concentration values for each individual injection.
 $\bar{y}$ = Average of all concentration values = $\bar{Y}_{All}$
 i = Iteration value.
 n = Number of injections.

m = 1.86954
 x_1 = 0.2095
 x_2 = 0.2070
 $\bar{x}$ = 0.5482
 y_1 = 0.0000
 y_2 = 0.1516
 $\bar{y}$ = 1.0253
 n = 32

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 = $\bar{X}_{All}$
 $\bar{y}$ = Average of all concentration values = $\bar{Y}_{All}$

b = 0.02261
 m = 1.86954
 $\bar{x}$ = 0.5482
 $\bar{y}$ = 1.0253

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 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 = $\bar{X}_{All}$
- $\bar{y}$ = Average of all concentration values = $\bar{Y}_{All}$
- i = Iteration value.
- n = Number of injections.

r^2	=	0.99961
r	=	0.99981
x_1	=	0.2095
x_2	=	0.2070
$\bar{x}$	=	0.5482
y_1	=	0.0000
y_2	=	0.1516
$\bar{y}$	=	1.0253
n	=	32

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 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} = 0.4914

$Area_{Trial2}$ = 0.4945

$Area_{Trial1}$ = 0.4883

11. Difference between duplicate injections for the sample.

$$\Delta_{Injection} = |Area_{Trial2} - Area_{Trial1}|$$

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

$\Delta_{Injection}$ = 0.0062

$Area_{Trial2}$ = 0.4945

$Area_{Trial1}$ = 0.4883

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 SDA Inlet

12. Difference between individual injection and average area count for the sample.

$$\Delta_{Injection} = \frac{|Area_{Trial2} - Avg_{Inj}|}{Avg_{Inj}} \times 100$$

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)

$\Delta_{Injection}$ = 0.6%

Avg_{Inj} = 0.4914

$Area_{Trial2}$ = 0.4945

Note: EPA Method 26 requires $\Delta_{Injection}$ to be less than 5%.

13. Determination of sample concentration from least-squares regression curve (mg/L).

$$C_{Reg} = DF [m(Avg_{Inj}) + b]$$

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} = 941.30

DF = 1000

Avg_{Inj} = 0.4914

m = 1.8695

b = 0.0226

Sample Calculations

Ion Chromatography Analysis

Customer:	Palatine Engineering Group	Lab Project No:	28695	Analyst:	Eric Ewing
Plant:	Wheelabrator South Broward	Customer Reference No:	11182	Received:	4/4/11
Applicable Analytical Method:	U.S. EPA Method 26A			Analyte:	Chloride

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 SDA Inlet

14. Determination of total amount of analyte in sample (total mg).

$$M_{\text{Analyte}} = \frac{(C_{\text{Reg}})(V_{\text{Soln}})}{1000}$$

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} = 649.50
 C_{Reg} = 941.3049
 V_{Soln} = 690.0

15. Determination of Detection Limits.

15a. Determination of average spike result.

$$\text{Avg}M_{f-i} = \frac{\sum_{i=1}^n M_{f-i}}{n}$$

Where:

$\text{Avg}M_{f-i}$ = 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.

$\text{Avg}M_{f-i}$	=	0.155			
M_{f-1}	=	0.159	M_{f-5}	=	0.160
M_{f-2}	=	0.163	M_{f-6}	=	0.154
M_{f-3}	=	0.154	M_{f-7}	=	0.147
M_{f-4}	=	0.152	M_{f-8}	=	0.151
n	=	8			

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 SDA Inlet

15b. Determination of standard deviation of spike result.

$$\sigma_{f-i} = \sqrt{\frac{\sum_{i=1}^n (M_{f-i} - \text{Avg}M_{f-i})^2}{(n-1)}}$$

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}	=	0.0052		
AvgM _{f-i}	=	0.155		
M _{f-1}	=	0.159	M _{f-5}	= 0.160
M _{f-2}	=	0.163	M _{f-6}	= 0.154
M _{f-3}	=	0.154	M _{f-7}	= 0.147
M _{f-4}	=	0.152	M _{f-8}	= 0.151
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}	=	2.67E-05
σ_{f-i}	=	0.0052

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Chloride

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 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} = 0.0334
 σ_{f-i} = 0.0052
 $AvgM_{f-i}$ = 0.1550

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 = 102.3%
 $AvgM_{f-i}$ = 0.15505
RA = 0.15163

Sample Calculations

Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A	Analyte: Chloride	

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 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 = 0.016

$t_{(n-1, 0.99)}$ = 2.998

σ_{f_i} = 0.0052

Sample Calculations
Ion Chromatography Analysis

Customer: Palatine Engineering Group	Lab Project No: 28695	Analyst: Eric Ewing
Plant: Wheelabrator South Broward	Customer Reference No: 11182	Received: 4/4/11
Applicable Analytical Method: U.S. EPA Method 26A		Analyte: Chloride

Calibration Point No: 3
Sample No: 28695-13
Sample Location: Unit 1 SDA Inlet

15h. Determination of Method Reporting Limit (MRL).

$$MRL = 5(MDL)$$

Where:

MRL = Method reporting limit (mg/L)
MDL = Method detection Limit (mg/L)
5 = Constant

MRL = 0.078
MDL = 0.016

AS40 Log Sheet

Customer: CG
 Plant: Wheelabrator South Broward
 Customer Project No: 1182
 Lab Project No: 25695
 Date: 4/5/11
 Analyst: Eric Gering

Analyte(s): CI

Date Received: 4/3/11
 Shipping Person: Scott Brown

Inj Type: Loop Conc

Inj Mode: Prop Cnst

Inj / Vial: 1/2 3

Serial Dilution Data

Cartridge ID: 14

Pos	Sample #	Identification	Volume	Dilution Ratio
1	<u>Blank</u>			
2		<u>Cal or</u>		
3	<u>Blank</u>			
4		<u>CCV</u>		
5	<u>Blank</u>			
6	<u>-11</u>	<u>D2 H₂O Blank</u>	<u>300</u>	<u>1</u>

Cartridge ID: 2A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	<u>-12</u>	<u>0.1N H₂SO₄ Blank</u>	<u>500</u>	<u>1</u>
2	<u>-22</u>	<u>UF FF Outlet Inj OR R1</u>	<u>842</u>	<u>1</u>
3	<u>-27</u>	<u>" " " " " " R2</u>	<u>825</u>	<u>1</u>
4	<u>-24</u>	<u>" " " " " " R3</u>	<u>853</u>	<u>1</u>
5	<u>-25</u>	<u>V2 " " " " " " R2</u>	<u>816</u>	<u>1</u>
6	<u>-26</u>	<u>" " " " " " R3</u>	<u>854</u>	<u>1</u>

Cartridge ID: 3A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	<u>-27</u>	<u>V2 FF Outlet Inj OR R1</u>	<u>825</u>	<u>1</u>
2	<u>-28</u>	<u>V3 " " " " " " R1</u>	<u>822</u>	<u>1</u>
3	<u>-29</u>	<u>" " " " " " R2</u>	<u>860</u>	<u>1</u>
4	<u>-30</u>	<u>" " " " " " R3</u>	<u>819</u>	<u>1</u>
5	<u>Blank</u>			
6		<u>QC</u>		<u>2.00</u>

Analyst Signature

Eric Gering

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

Cal Curve
run on
4/5/11

AS40 Log Sheet

Customer: 66
 Plant: Whitewater South Broward
 Customer Project No: 11182
 Lab Project No: 88695
 Date: 4/11
 Analyst: Eric Furing

Analyte(s): CI

Date Received:
 Shipping Person:

Inj Type: Loop Conc

Inj Mode: Prop Cnst

Inj / Vial: 1/23

Cartridge ID: 4A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	Blank			
2		Cal 03		
3	Blank			
4				
5				
6				

Cartridge ID: 1A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	Blank			
2		Cal 04		
3	Blank			
4		GC		200
5	Blank			
6	-17	01 SDA Inlet Imp Ck R1	640	1000

Cartridge ID: 2A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	-14	01 SDA Inlet Imp Ck R2	764	1000
2	-15	" " " " " R3	780	1000
3	-16	" " " " " R4	740	1000
4	-17	" " " " " R5	703	1000
5	-18	" " " " " R6	733	1000
6	-19	" " " " " R1	732	1000

Serial Dilution Data

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size
7850	1	0255	1000

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size
7850	1	4927	1000
7850	1	4947	1000
7850	1	0242	1000
7850	1	0257	1000
7850	1	A822	1000
4402	2	2372	2000

Analyst Signature

Eric Furing

AS40 Log Sheet

Customer: 66 Analyte(s): CI
 Plant: Whitewater South Branch
 Customer Project No: 11182
 Lab Project No: 28695
 Date: 4/6/11
 Analyst: Eric Goring

Date Received:
 Shipping Person:

Inj Type: Loop/ConcInj Mode: Prop / CnstInj / Vial: 1@3Cartridge ID: 3A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	-20	U3 SDA Inlet Day Ckt 12	767	1000
2	-21	" " " " " " 13	560	1000
3	-22			80
4	Blank			
5		cc		
6	Blank			

Cartridge ID: 4A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	-23			20
2	-24			20
3	-25			5
4	-26			5
5	-27			5
6	-28			20

Cartridge ID: 5A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	-29			10
2	-30			10
3	Blank			
4		GC		200
5	Blank			
6		cc		

Serial Dilution Data

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size
9402	2	2462	2000
9402	2	2794	2000
2477	5	5630	100

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size
2477	5	5624	100
2477	5	5647	100
4827	10	8062	50
4827	10	3388	50
4827	10	1844	50
2477	5	5673	100

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size
2477	5	3725	50
2477	5	4823	50

Analyst Signature

Eric GoringPage: 3 of 4

AS40 Log Sheet

Customer:	66	Analyte(s):	Cr
Plant:	Wheelabrator South Broward		
Customer Project No:	11182		
Lab Project No:	26695		
Date:	4/6/11		
Analyst:	Eric Gwinn		

Date Received: _____
Shipping Person: _____

Inj Type: Loop / ConcInj Mode: Prop ConstInj / Vial: 1 (2) 3Serial Dilution DataCartridge ID: 6A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	Blank			
2	-19	Matrix spike		1000
3	-19	Matrix spike		1000
4	-25	Matrix spike		20
5	Blank			
6		Cal 01		

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 7A

Pos	Sample #	Identification	Volume	Dilution Ratio
1		Cal 01		
2		Cal 02		
3		Cal 03		
4		Cal 04		
5		Cal 05		
6		Cal 06		

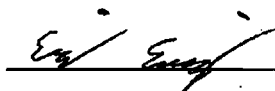
Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size

Cartridge ID: 8A

Pos	Sample #	Identification	Volume	Dilution Ratio
1	Blank			
2	-18	Duplicate		1000
3	-25	Duplicate		20
4	Blank			
5		CO		
6	Blank			

Pipet Serial No.	Pipet Size	Flask Serial No.	Flask Size
7850	1	4927	1000
2977	1	5624	100

Analyst Signature


Page: 4 of 4

Lab Project No.: 28695

Date Received: 4/4/2011

CleanAir No.: 11182

66

Customer : 66

Contact : Scott Brown

Phone :

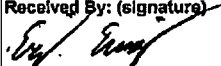
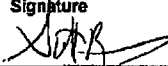
Fax :

Email : sbrown@cleanair.com

Requested Analysis

Due	Analyst	Status	Sample	Type	Container	Method
4/18/2011	EE	In Queue	1-10	Imp C&R	Nalgene	EPA Method 26A Fluoride
4/18/2011	EE	In Queue	11-30	Imp C&R	Nalgene	EPA Method 26A Chloride
4/18/2011	EE	In Queue	31-32	Imp C&R	Nalgene	Archive

Printed 2011/04/04 08:20:39

CLIENT <u>Wheelabrator</u>		PROJECT <u>11182SB</u>		66-11182SB-4				
PLANT <u>South Broward</u>		DEPT. <u>66</u>						
PROJECT MANAGER <u>S. Brown</u>		 CleanAir ENGINEERING 500 West Wood Street Palatine, IL 60067 800-627-0033 (phone) 847-991-3385 (fax)		ANALYSIS REQUESTED Total Fluorides Archive				
ANALYTICAL METHOD	CONTAINER NUMBER					SAMPLE FRACTION	FORWARDING LAB	
USEPA M-13B	1					FILTER, IMPINGER CATCH, AND SAMPLE TRAIN RINSE 1000 mL HDPE	CleanAir Analytical Services 500 West Wood Street Palatine, IL 60067 800-627-0033 (phone) 847-991-3385 (fax)	
LAB ID NUMBER	DATE (2011)	TEST LOCATION	RUN NUMBER	SAMPLE MATRIX	NUMBER OF CONTAINERS	CONTAINER SEALED? LIQUID LEVEL MARKED?	ADDITIONAL INFORMATION	
							DI water rinse	
R	3/28	Unit 1 FF Outlet	1	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X		
R	3/28	Unit 1 FF Outlet	2	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X		
R	3/28	Unit 1 FF Outlet	3	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X		
F	3/29	Unit 2 FF Outlet	1	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X		
R	3/29	Unit 2 FF Outlet	2	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X		
R	3/29	Unit 2 FF Outlet	3	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X		
k	3/28	Reagent Blank	All	DI Water (~500 mL) and Filter, 1000 mL HDPE	1	X		
t	3/30	Unit 3 FF Outlet	1	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X		
k	3/30	Unit 3 FF Outlet	2	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X		
k	3/30	Unit 3 FF Outlet	3	Filter, Impinger Catch, and Sample Train Rinse, 1000 mL HDPE	1	X		
Relinquished By: (signature)		Date / Time	Relinquished By: (signature)		Date / Time	Relinquished By: (signature)		Date / Time
S. Brown		3/30/2011 18:00						
Received By: (signature)		Date / Time	Received By: (signature)		Date / Time	Received By: (signature)		Date / Time
		9/4/11 8:00						
						This form completed by:		
						S. Brown		
						Signature		Date
								3/30/2011

Signature _____ Date 3/30/2011

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WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

PERTINENT CERTIFICATIONS

I

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

QA/QC Initials:

Date: 5/9/11



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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 9, 2011

Expiration Date: September 9, 2011

AeroMet Instructor:

VF Schlieder

Foster Schlieder

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: 3/9/11

Expires: 9/9/11

Questions? Call 573.636.6393

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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
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The winner of each public school will be announced within 7 days of the drawing. The winner will be notified by email and must claim the prize within 30 days of the announcement.



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WHEELABRATOR SOUTH BROWARD, INC.
FT. LAUDERDALE, FL

Client Reference No: Service Agreement
CleanAir Project No: 11182-3

CORRESPONDENCE AND CLARIFICATIONS

J

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

QA/QC Initials:

me

Date:

5/9/11



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From: Pichard, Errin [mailto:Errin.Pichard@dep.state.fl.us]
Sent: Tuesday, September 29, 2009 10:58 AM
To: Porter, Timothy; Waters, Jason; Henry, Danielle D.
Cc: Hooper, Bill
Subject: RE: Modified Method 26A Approval

Mr. Porter:

We have reviewed the request to use the modified EPA Method 26 train to sample HCl at McKay Bay and we agree that the proposal is acceptable. As noted in the correspondence below from Mr. Jason Waters of Hillsborough County, please be aware that Rule 62-297, Florida Administrative Code, requires compliance test runs to be no less than one hour and no longer than four hours. According to the chart you presented, it appears that the proposed sampling rate will allow you to meet this requirement.

If you have further questions, please call me at 850-921-9580.

Errin Pichard, Administrator
Emissions Monitoring Section
Florida Department of Environmental Protection

From: Waters, Jason [mailto:watersj@epchc.org]
Sent: Tuesday, September 29, 2009 8:17 AM
To: Pichard, Errin
Cc: Liu, Pwu-Sheng; Henry, Danielle D.; Burkholder, James
Subject: FW: Modified Method 26A Approval

Errin,

Looking at the 2006 test, the facility did use Method 26A with isokinetic sampling for HCl as indicated in the test protocol dated 9/7/2006. They had been using full size impingers with omitting the two sodium hydroxide impingers (not needed to determine Cl₂). The sampling volume was a minimum of 60 dscf and the sampling time was a minimum of 60 minutes. See attached copy of their protocol from 2006. So it appears they tested differently in Tampa in the past.

The proposed modified Method 26A by the facility will have the same impingers set but with a single point sampling for a minimum of 60 minutes and the sampling volume will be a minimum of 30 dscf.

Method 26 is a method using single-point sampling with midjet impingers, and constant flow rate of 2 liters/min (0.07 cu ft/min). According to section 8.1.5. of Method 26, it states that a sampling time of one hour is recommended, and shorter sampling time may introduce a significant negative bias in HCl concentration. The Specific Permit Condition A.40. of Title V permit 0570127-005-AV, specified Method 26 or 26A shall be used for testing HCl. If Method 26 is used the sampling time shall be one hour. The condition is relisted here for reference:

11/5/2009

A.40. The procedures and test methods specified in paragraphs (1) through (8) shall be used for determining compliance with the hydrogen chloride emission limit.

(1) The EPA Reference Method 26 or 26A, as applicable, shall be used to determine the hydrogen chloride emission concentration. The minimum sampling time for Method 26 shall be 1 hour.

State Rule 62-297.310(4)(a)(1), F.A.C., states that unless otherwise specified in the applicable rule, the required sampling time for each test shall be no less than one hour and no longer than four hours.

Based upon the above, I will defer to your recommendation of using the proposed modified Method 26A if the facility maintains the 60-minute minimum sampling time for HCl to avoid negative bias as stated in the EPA document and to comply with the state rule (The protocol stated they would use a minimum of 60 minutes, but it was not indicated in the email below, I just wanted to point it out so everyone in the state will do it consistently if you approve these for other facilities).

Thanks,

Jason Waters, P.E.
Chief, Industrial Air Compliance
Air Management Division
Environmental Protection Commission of Hillsborough County
3629 Queen Palm Drive
Tampa, FL 33619
813-627-2600 x1269
813-627-2660 FAX

The Department of Environmental Protection values your feedback as a customer. DEP Secretary Michael W. Sole is committed to continuously assessing and improving the level and quality of services provided to you. Please take a few minutes to comment on the quality of service you received. Simply click on [this link to the DEP Customer Survey](#). Thank you in advance for completing the survey.

From: Porter, Timothy [mailto:tporter@WM.COM]
Sent: Friday, September 25, 2009 2:23 PM
To: Pichard, Errin
Cc: Hooper, Bill
Subject: Modified Method 26A Approval

Errin,

As requested I am providing details on the use of modified Method 26A for annual performance testing at the McKay Bay Municipal Waste Combustor (MWC) facility in Tampa. Since 1999 we have been using Modified Method 26A for HCl performance at all sixteen of our MWC facilities across the country regulated under the MWC Emission Guidelines in 40 CFR 60 Subparts Cb/Eb. All such testing has been conducted in accordance with approved test protocols specifying the use of modified (non-isokinetic) Method 26A for the determination of gaseous only HCl emissions. As summarized in the table below modified Method 26A is for all practical purposes a Method 26 but with large impingers and constant rate sampling instead of small impingers and constant rate sampling. We could also specify the sampling train as a Modified Method 26 (large impinger constant rate sampling) in the test protocol.

11/5/2009

	Method 26	Method 26A	Modified Method 26 or 26 A
Target Species	Gaseous HCl	Gaseous + particulate HCl	Gaseous HCl
Impingers	Small	Large	Large
Heated probe and filter	yes	yes	yes
Sampling rate	Constant 2 liters/min	Approx 0.5 cfm isokinetic	Approx 0.5 cfm constant rate
Approx sample volume (60 min)	4 cubic ft	30 cubic ft	30 cubic ft
Sample filter	discarded	analyzed	discarded
Analysis	IC	IC	IC

The only instances where HCl would need to be tested isokinetically is after a wet scrubber where the gas stream is saturated and HCl may be present in the water droplets. McKay like most other large MWC plants is equipped with a spray dryer absorber (SDA) to control acid gases including HCl and SO₂. There are no water droplets present in the approximate 300+ deg F / 20% H₂O content gas stream at the SDA outlets (if there were, the fabric filters would be blinded). Certainly there are no water droplet present in the 400+ deg F gas stream at the SDA Inlets. One major practical reason for using a modified M26A/ M26 train when sampling for gaseous HCl is it eliminates the potential for condensation in the M26 3-way stopcock used for sample purge which had always proven very difficult to properly heat. Condensation will quickly introduce a negative bias in the results.

Certainly there is no reason to run an isokinetic train during the collection of gaseous only HCl upstream and downstream of a dry scrubber. Based on the above details the modified Method 26A (non isokinetic) or modified M26 (large impingers) would be considered interchangeable for sampling gaseous HCl emissions. We would respectfully request that the use of modified M26A (non-isokinetic) be considered a minor amendment to Method 26A or conversely a minor amendment to M26 (for use of large impingers) .

I trust the above provides you with enough information to help in your review. If you have any question or need additional information please let me know.

Regards,
Tim

Timothy Porter
Director, Air Quality Management
Wheelabrator Technologies Inc.
A Waste Management Company
4 Liberty Lane West
Hampton, NH 03842

Tel: 603-929-3375
Email: tporter@wm.com

Waste Management recycles enough paper every year to save 41 million trees. By not printing this email, you can help save even more.

11/5/2009

<http://survey.dep.state.fl.us/?refemail=Leigh.Pell@dep.state.fl.us> Thank you in advance for completing the survey.

From: Mcalister.Gary@epamail.epa.gov [mailto:Mcalister.Gary@epamail.epa.gov]
Sent: Tuesday, September 21, 2010 5:57 PM
To: Pell, Leigh
Subject: Re: Analysis for total fluoride

Hi Leigh-Ann,

If the company is going to sample with Method 13B and then analyze the samples with ion chromatography using the requirements in Method 26, I wouldn't have any technical objection to that.

Gary

From: "Pell, Leigh" <Leigh.Pell@dep.state.fl.us>
To: Gary McAlister/RTP/USEPA/US@EPA
Date: 09/13/2010 10:52 AM
Subject: Analysis for total fluoride

Mr. McAlister,

We have a waste to energy facility in FL wishing to use ion chromatography for total fluoride analysis (Method 13B). The company, Wheelabrator used a method 13B sampling train for collection and only wishes to change from the ion electrode analytical method to IC(Method 26A).

I found a previous request in which Errin Pichard was coordinating with you on for a combination of 13B and 26A sampling train. You denied the request from Wheelabrator because of contamination when combining the trains and now the facility only wishes to change the analytical procedure not the sampling train.

Would you see a problem with this approach?

Thank you for your guidance,
Leigh-Ann Pell
850-921-9510